Test Plan

The test plan is in two phases, a test plan covering the UAV and the other for the image-processing server.

Microcontroller Testing:

1. Supply a stable voltage to the microcontroller via USB and check the Arduino using the blink tutorial
2. Confirm the required voltages are at the right pins (0V, 3.3V and 5V) using a digital multi meter thus checking the voltage level converter
3. Confirm the connection between the Arduino Mega and the shield is working correctly and data is being received from the sensors
4. Check that the sensor stick consisting of the accelerometer, magnetometer and gyroscope is measuring values precisely
5. Check that the barometric pressure sensor is accurately measuring altitude

Structural Testing:

Test the ESC's and motors via the following procedure:

1. Connect ESC's to motors via a throttle hub
2. Connect the throttle hub to CH1 of the receiver
3. Pair the transmitter and receiver. When paired, the red light on the receiver should be solid.
4. Attach the LiPo battery to the ESC
5. Test the maximum throttle of the motors from the transmitter controller
6. Calibrate motors and ESC. Mount the ESC, LiPo battery and motors onto the frame and check for vibrations and the sturdiness of the frame
7. Test motor orientation – opposite motors, 2CW and 2CCW. Propellers labelled R should be secured tightly to motors in CW direction

UAV Integration:

1. Mount the assembled microcontroller (Arduino, shield and sensors) onto the semi completed UAV frame (with motor, battery, propellers and ESC) giving us the completed UAV frame
2. Turn the quadcopter on and test for stable flight

Sensor and Transmitter Calibration:

1. Upload the Aeroquad software to Arduino Mega using the configurator
2. Connect the configurator to Aeroquad
3. Initialize EEPROM
4. Calibrate transmitter using with transmitter and receiver connected. The blue dots on the software should move with transmitter sticks
5. Calibrate magnetometer in x, y and z axis
6. Calibrate Accelerometer for proper orientation of the quadcopter
7. Calibrate gyroscope
8. Calibrate ESC. Software sends high and low throttle to run motors

Image Processing Server Test Plan:

1. Allow live feed via RTMP server
2. Detect red ball using image processing
3. Notify user of found object (red ball)
4. Serverside Image processing - Able to receive video from live feed

Searcue System Integration Test Plan:

1. Connect the camera to the completed UAV and test video feed during flight
2. Final test will be to locate a coloured object such as a ball within an unobstructed field