

# Individual Lab Report 5

S. M. Bryan

Team A / The Avengers

Teammates: Tushar Agrawal, Pratik Chatrat, & Adam Yabroudi

ILR04

November 25, 2015

## 1. Individual Progress

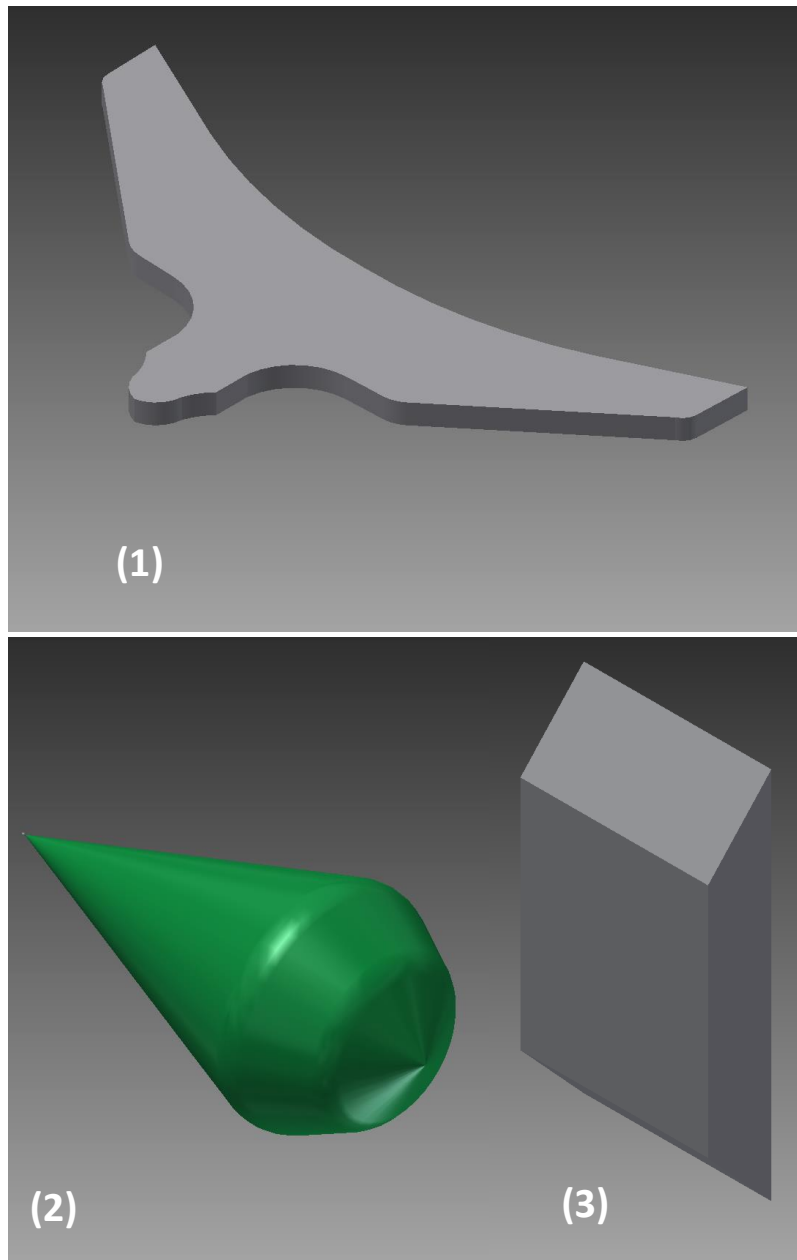
As the semester winds down, Team A is in the homestretch before the FVE. Over the past two weeks, I've assisted in the tedious, final details of the project. Work encompassed delivering a CAD model to Pratik for use finalizing the sensor layout and assisting Adam in the manual labor wiring the drone.

The most visible contribution this week was in building the CAD models for Pratik. Cad models included (1) the wing and fuselage for the plane, (2) the profile of the ultrasound beam, and (3) a mounting bracket. The mounting bracket was a simplification of the forward edge of the wing that allowed Pratik to precisely control the angle of the sensors. The models can be seen in *Figure 1* below.

I worked with Pratik to minimize the number of sensors. Seeing the sensors in virtual space allowed him to finally reach decisions in eliminating unneeded components. Finding the correct total requires balancing the following considerations:

1. Coverage and redundancy in critical areas
2. Minimizing weight from sensors and wiring
3. The total time required to ping each sensor is linearly proportional to the total number of sensors (Team A is investigating possible work arounds to this)
4. Maintaining the structural integrity of the UAV
5. Minimizing drag caused by modifying the wings' profile

With the work completed in testing sensors, including the RVIZ point cloud display that Tushar developed, I should be able to mount the sensors before the FVE.



*Figure 1: CAD Models for Sensor Layout. (1) Wing and fuselage, (2) Ultrasound sensor and beam, (3) sensor "bracket" (simplified version of forward wing edge)*

Additionally, I completed small tasks to assist Adam in completing the drone build. The electronics and proprietary code from BirdsEyeView Aerobotics have posed a continuous challenge. You can see the work completed in Figure 2.

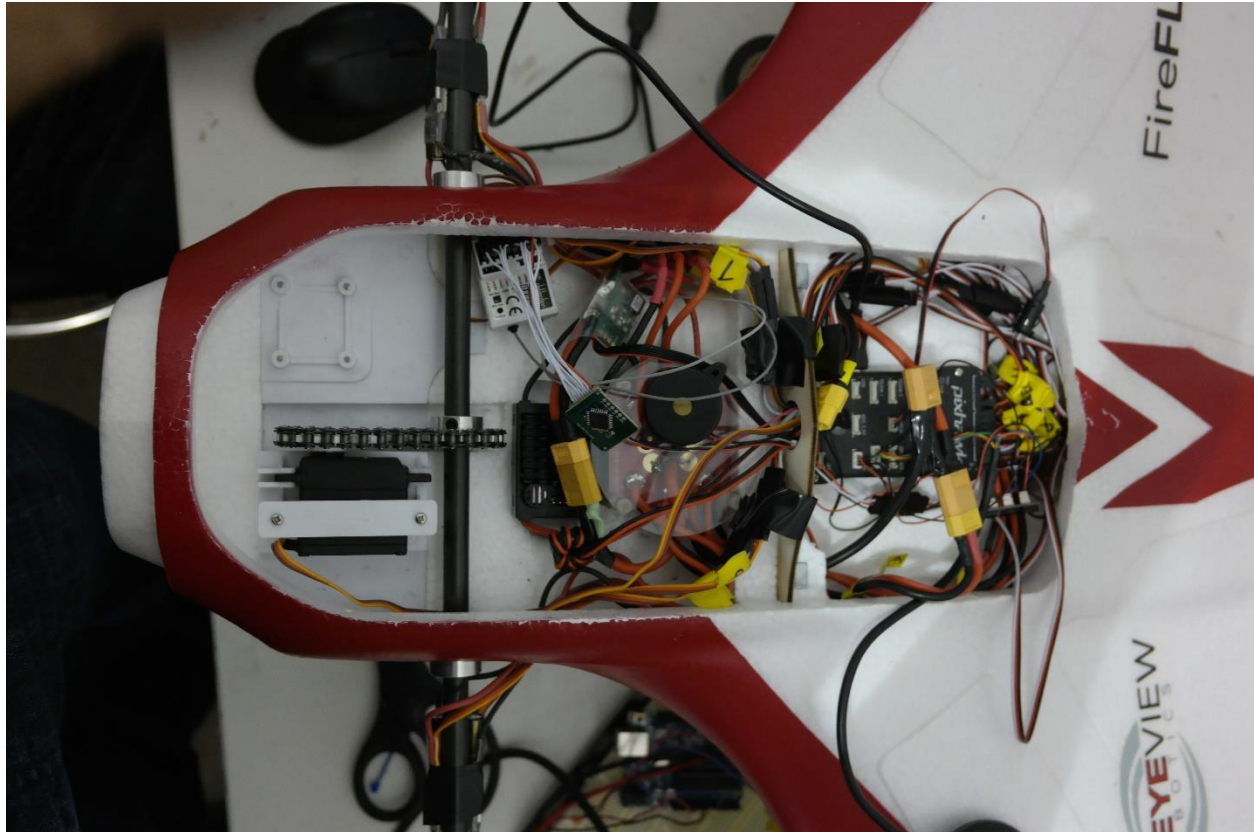


Figure 2: Wiring completed on FireFLY6

## II. Challenges

As stated above, the electronics and code from BirdsEyeView Aerobotics have been an obstacle to overcome.

I assisted Adam in a few of the minor wiring changes; however, they don't compare to his exhaustive work. Most of my work lies in the coming two weeks prior to the FVE. I will cover that below in *Section IV: Future Plans*.

## III. Teamwork

Each team member took on different components of the task. This allowed the team to build their individual skillsets while expediting the work.

*Tushar Argawal*

Tushar continued his work on the vision system, tweaking parameters. However, he was able to identify several issues with the calibrations setup. Due to the distances involved ( $>100$

feet) it's critical that he have an accurate setup to calibrate the system. This will be part of my future plans below.

*Adam Yabroudi*

Adam the exhaustive work on the internals of the UAV. He overcame issues with the power module, PPM, and battery layout. He has been reaching out to BirdsEyeView Aerobotics daily for support.

*Pratik Chatrat*

Pratik finalized the sensor layout. He's worked with the CAD models I built to better optimize the sensors array. I will be implementing his design in the coming week.

#### **IV. Plans**

Before the FVE, Team A will be in a full sprint to finish work. I will be working to implement the sensor array that Pratik designed. Additionally, I will be improving Tushar's calibration setup for the vision system.