# Aerial Alumni
# 2015 VWCC AUTONOMOUS ROBOTICS COMPETITION

Jason Doyle
B.S. Electrical Engineering
VPI & SU

Phillip Benzinger
B.S. Computer Science
Liberty University

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**Abstract**

Abstract goes here.

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# List of Figures

# 1 Technical Report: (Total = 60 pts)

Each team must email ONE pdf document of its Technical Report (with all sections contained again in one document) to George Studtmann (gstudtmann@virginiawestern.edu) by Friday, November 27 th , 2013 by midnight. The Technical Report should include the components listed below. Each of the three topics is worth 20 points.

## 1.1 Executive Summary:

This summary should be no more than two pages using a 12-point font, single spaced, with 1-inch margins. The summary should succinctly describe the problem that was solved, why the robot is an optimal solution to the problem, and results of pre-competition testing.

## 1.2 CAD Images, Circuit Schematics, and Programming Flowcharts (or code):

CAD images should adequately describe the form and function of the robot. Circuit schematics should convey how the circuitry was constructed and how it works. A descriptive flowchart of the programming code (or the code itself, if it is properly commented) should be provided.

## 1.3 Bill of Materials:

The bill of materials should include the following information for each component of the robot: part name, size or part number, vendor name, quantity used, unit price, and total price. You should also sum all the total prices to display the overall cost of the components of your robot. This cost must be less than $150 for components/items used outside of the BOE-bot kit. For components that you did not have to purchase, you must still list a vendor where the item could be purchased along with the unit and total price. These prices must be included in the overall cost of the robot.

# 2 Introduction

The problem is to develop an autonomous robot to complete a set of trials. The first trial is.... The second .... third .... forth.... an autonomous air vehicle (AAV) was chosen to complete the trials.

The size of the robot can only be 8 in. x 12 in. x 10 in. high so a 250 size quad frame was chosen. 250 represents 250 mm diagonal distance between the center of two propellers. The frame was also chosen because it has a frame built under it, to allow all of the electronics to be mounted.

# 3 Conclusion

# 4 Future Work

# 5 Bill of Materials

| **Item** | **Item Num.** | **Store** | **Qty** | **Unit Price** | **Subtotal** |
|---|---|---|---|---|---|
| Frame | 366000015-0 | Hobby King | 1 | $19.99 | $19.99 |
| Motor CCW | 9536000002-0 | Hobby King | 2 | $12.13 | $24.26 |
| Motor CW | 9536000001-0 | Hobby King | 2 | $12.13 | $24.26 |
| Speed Controller | 9192000258-0 | Hobby King | 4 | $12.99 | $51.96 |
| Power Distribution | 9171000530-0 | Hobby King | 1 | $1.89 | $1.89 |
| Flight Controller | 9171000593-0 | Hobby King | 1 | $24.99 | $24.99 |
| Gemfan Multirotor 10 Pair 6x4.5 Black | 329000381-0 | Hobby King | 1 | $10.20 | $10.20 |
| Parallax Propeller Hat | 32230 | Parallax.com | 1 | $24.95 | $24.95 |
| Electronic Mounting Plate | Custom Part | VWCC | 1 | TBD | TBD |
| Standoffs | | | 8 | | |
| Wire | | | | | |
| Connectors | | | | | |
| Black Zip Ties | 0076328 | Lowes | 8 | X | X |
| Thread Locker | 24200 | Lowes | N/A | N/A | N/A |
| | | | | | **$172.30** |

**Spare parts**

| **Item** | **Item Num.** | **Store** | **Qty** | **Price** | **Subtotal** |
|---|---|---|---|---|---|
| Speed Controller | 9192000258-0 | Hobby King | 2 | $12.99 | $25.98 |
| Electronic Mounting Plate | Custom Part | VWCC | 1 | TBD | TBD |
| | | | | | **$25.98** |

**Shipping Costs**

| **Shipper** | **From** | **Cost** |
|---|---|---|
| EMS Express | Hobby King Int. | $38.47 |
| Swiss Post Direct | Hobby King Int. | $2.46 |
| USPS Priority Mail | Parallax Inc. | $7.15 |
| | | **$48.08** |
| | **Grand Total:** | **$246.36** |

# 6 Weight Budget

| **Item** | **Qty.** | **Unit Lift (g)** | **Unit Weight (g)** | **Total Lift (g)** | **Total Weight (g)** |
|---|---|---|---|---|---|

# 7 CAD Drawings

Figure 1: Electronics plate

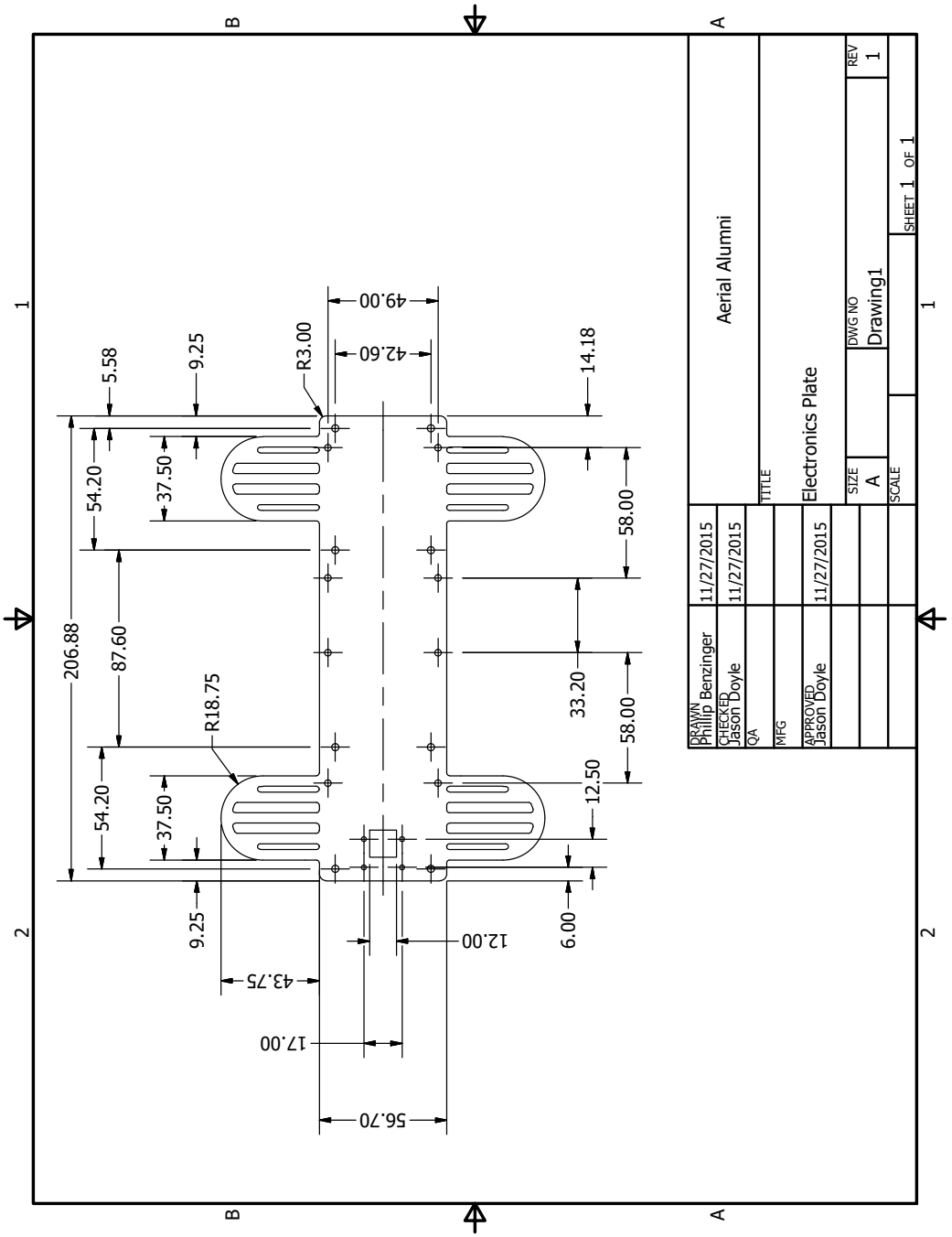

Figure 2: Block Diagram

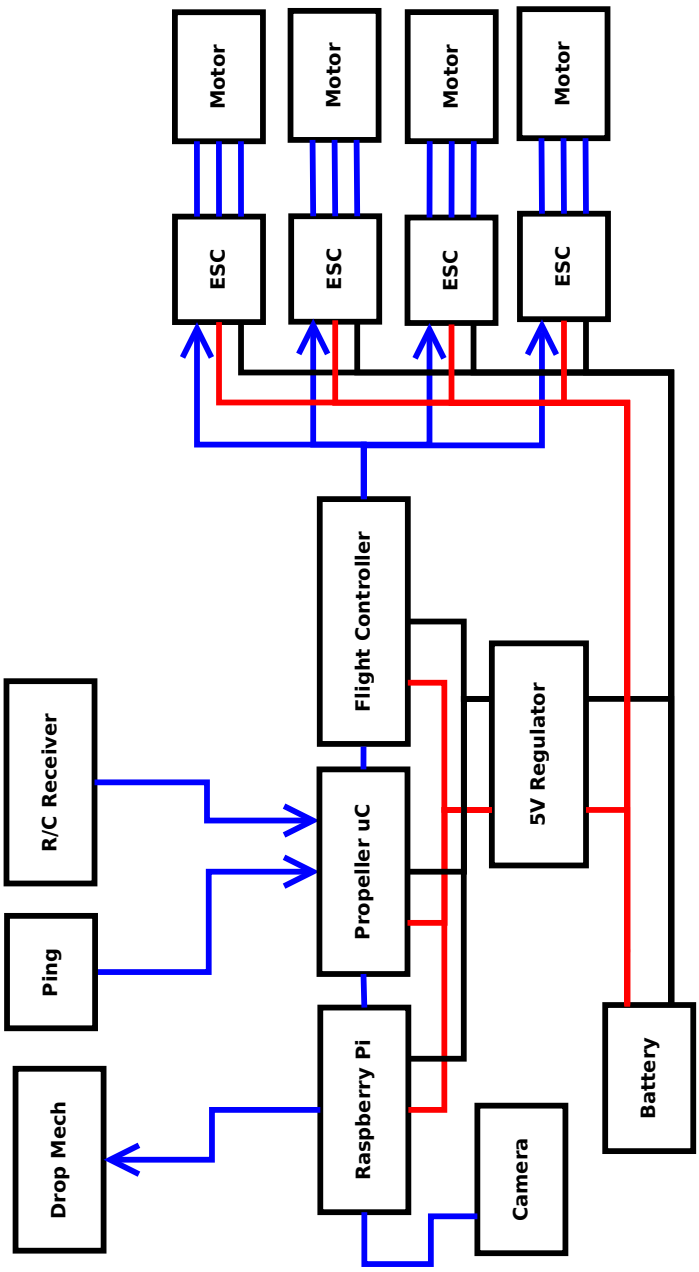

Figure 3: Propeller $\mu$C connections

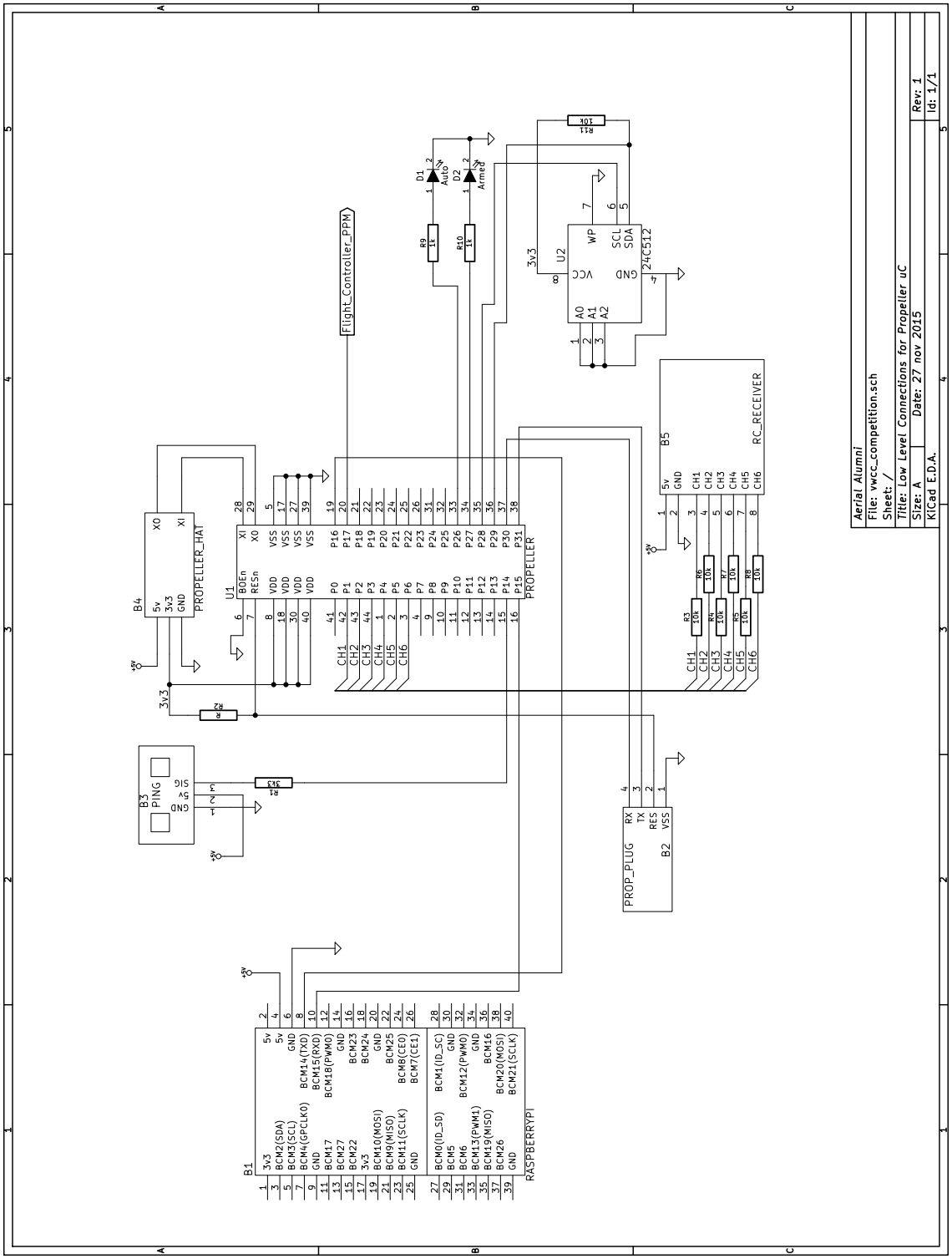

Figure 4: Autonomous and arming flight mode controls from radio controller.

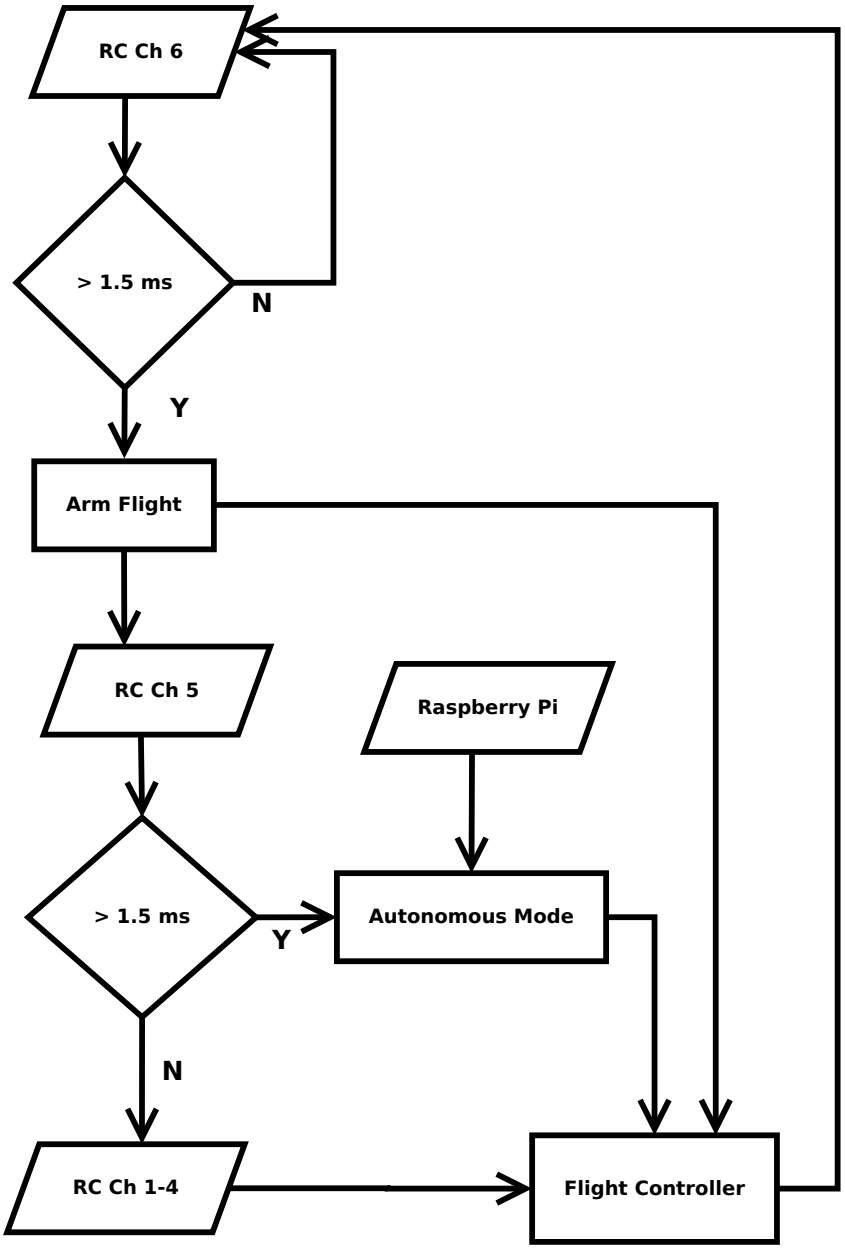

Figure 5: Propeller $\mu$C flow chart.

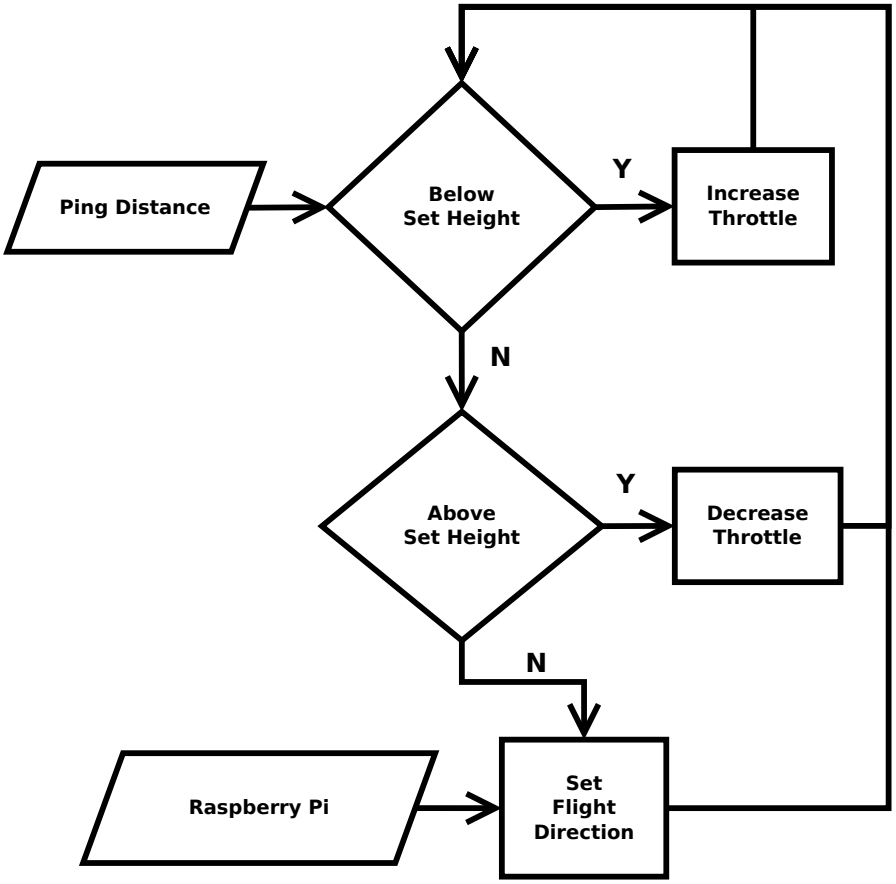

Figure 6: Raspberry Pi flow chart.