Aerial Alumni
2015 VWCC AUTONOMOUS ROBOTICS COMPETITION

Jason Doyle
B.S. Electrical Engineering
VPI & SU

Phillip Benzinger
B.S. Computer Science
Liberty University

November 26, 2015

Abstract

Abstract goes here.

Contents

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 L x W x H in. so a 250 size quad frame was chosen

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
Parallax Propeller Hat	X	Parallax.com	1	$24.95	$24.95
Standoffs					
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
					$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

B3
PING
GND 5v SIG
1 2 3

+5v

B4
5v   X0
3v3
GND   XI
PROPELLER_HAT

R
R2

U1
6 BOEn   XI   28
7 RESn   X0   29
8 VDD   VSS   5
18 VDD   VSS   17
30 VDD   VSS   27
40 VDD   VSS   39

R1
5k3

+5v

B1
1 3v3   5v   2
3 BCM2(SDA)   5v   4
5 BCM3(SCL)   GND   6
7 BCM4(GPCLK0) BCM14(TXD) 8
9 GND   BCM15(RXD) 10
11 BCM17   BCM18(PWM0) 12
13 BCM27   GND   14
15 BCM22   BCM23   16
17 3v3   BCM24   18
19 BCM10(MOSI)   GND   20
21 BCM9(MISO)   BCM25   22
23 BCM11(SCLK)   BCM8(CE0) 24
25 GND   BCM7(CE1) 26

27 BCM0(ID_SD)   BCM1(ID_SC) 28
29 BCM5   GND   30
31 BCM6   BCM12(PWM0) 32
33 BCM13(PWM1)   GND   34
35 BCM19(MISO)   BCM16   36
37 BCM26   BCM20(MOSI) 38
39 GND   BCM21(SCLK) 40
RASPBERRYPI

41 P0   P16 19
42 P1   P17 20
43 P2   P18 21
44 P3   P19 22
1 P4   P20 23
2 P5   P21 24
3 P6   P22 25
4 P7   P23 26
9 P8   P24 31
10 P9   P25 32
11 P10   P26 33
12 P11   P27 34
13 P12   P28 35
14 P13   P29 36
15 P14   P30 37
16 P15   P31 38
PROPELLER

Flight_Controller_PPM

R9
1k
D1
Auto

R10
1k
D2
Armed

U2
1 A0   8
2 A1 VCC WP 7
3 A2   SCL 6
          SDA 5
      GND
      4
24C512

R11
10k

PROP_PLUG
RX 4
TX 3
RES 2
VSS 1
B2

+5v

1 5v
2 GND
3 CH1
4 CH2
5 CH3
6 CH4
7 CH5
8 CH6
B5
RC_RECEIVER

R3 10k
R6 10k
R4 10k
R7 10k
R5 10k
R8 10k

Aerial Alumni
File: vwcc_competition.sch
Sheet: /
Title: Low Level Connections for Propeller uC
Size: A   Date: 27 nov 2015   Rev: 1
KiCad E.D.A.   Id: 1/1