Voice Controlled Quadcopter

FINAL

PRESENTED BY: TEAM PURSUIT E9

Team And Faculty

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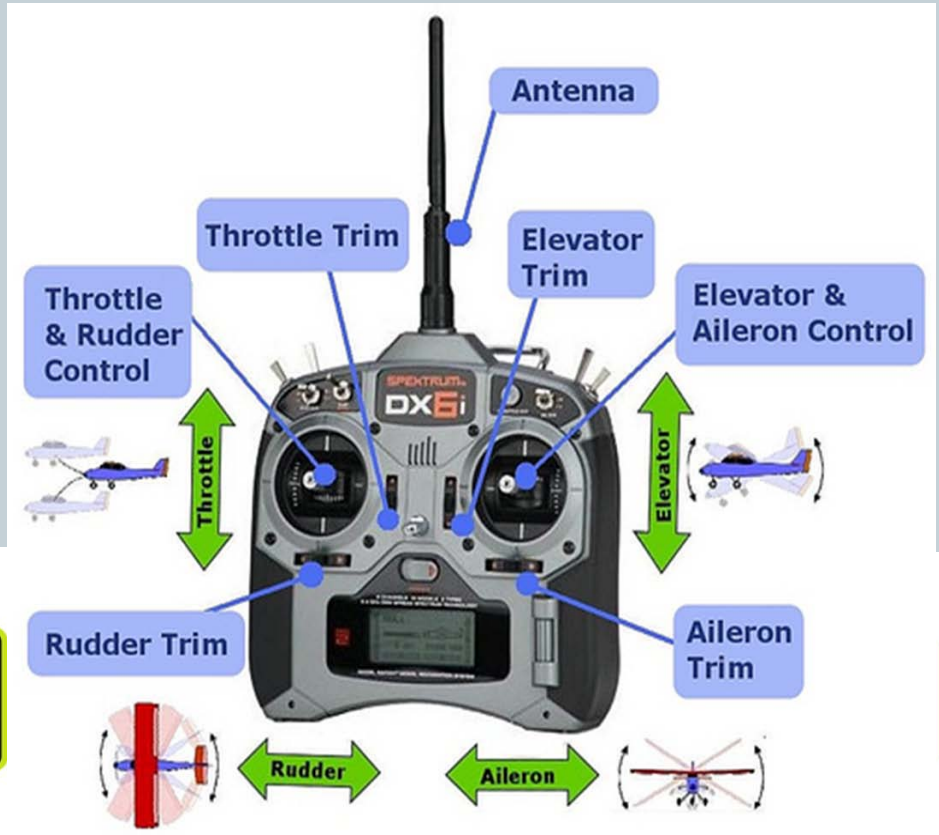
Introduction

- Flight
- Operational Manual
- Safety Concerns
- Budget
- Blade Protection
- Future Work
- Questions

Purpose

Manual Flight

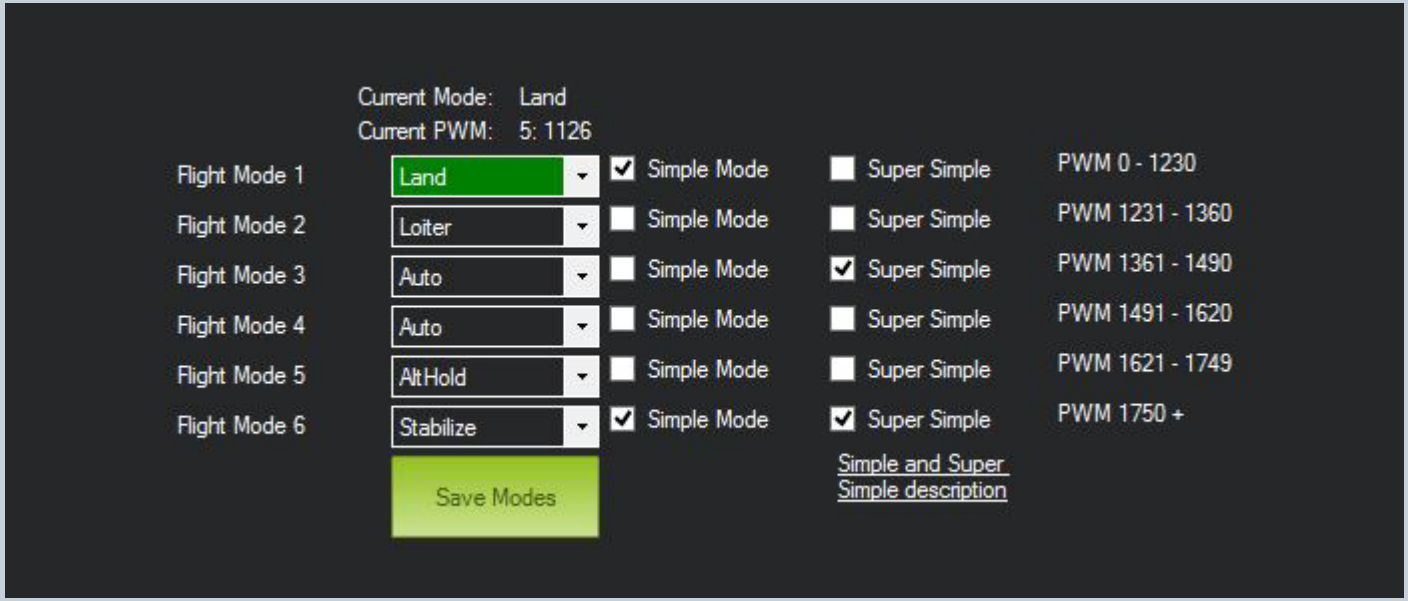


Arming Copter

Disarming Copter

Autonomous Flight

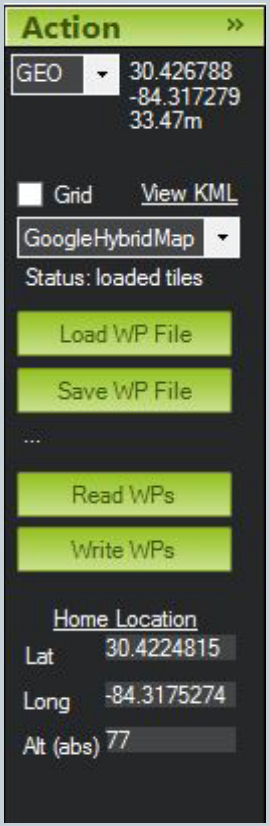
Setting Autonomous Mode



Set Home

Home Location

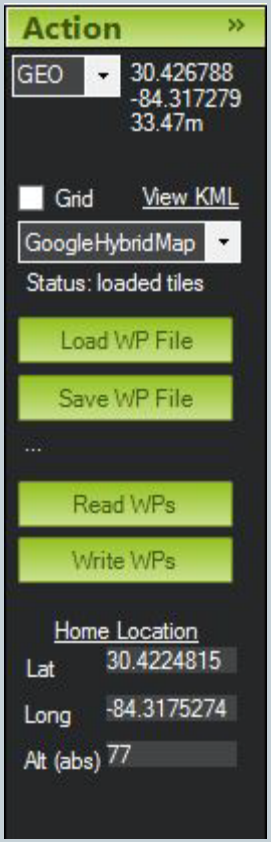
Lat	30.4224815
Long	-84.3175274
Alt (abs)	77

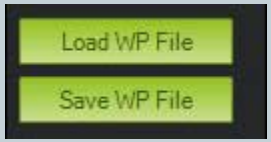


Setting Autonomous Functions

- WAYPOINT
- LOITER_UNLIM
- LOITER_TIME
- LOITER_TURNS
- RETURN_TO_LAUNCH
- LAND
- TAKEOFF
- CONDITION_DELAY
- CONDITION_DISTANCE
- CONDITION_CHANGE_ALT
- CONDITION_YAW
- DO_SET_MODE
- DO_JUMP
- DO_CHANGE_SPEED
- DO_SET_RELAY
- DO_REPEAT_RELAY
- DO_SET_SERVO
- DO_REPEAT_SERVO
- DO_CONTROL_VIDEO
- DO_SET_ROI

Upload to Copter





Operation Manual

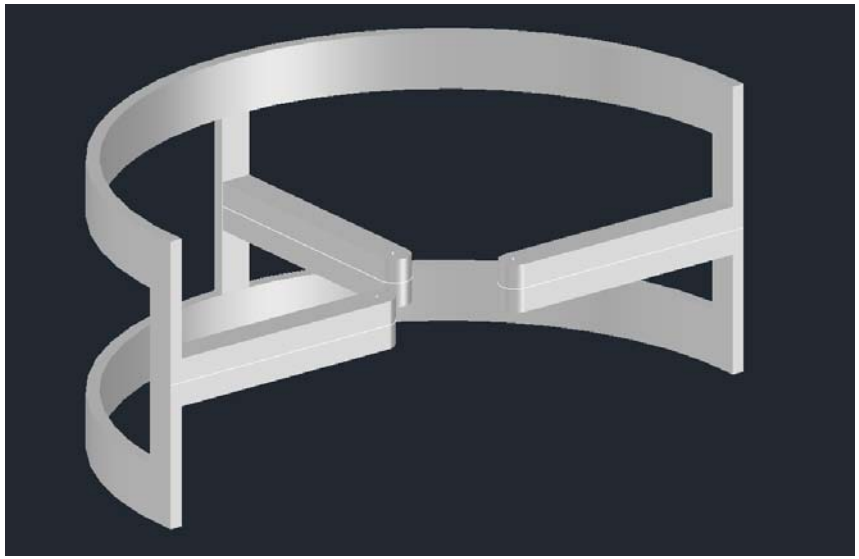
Safety Concerns

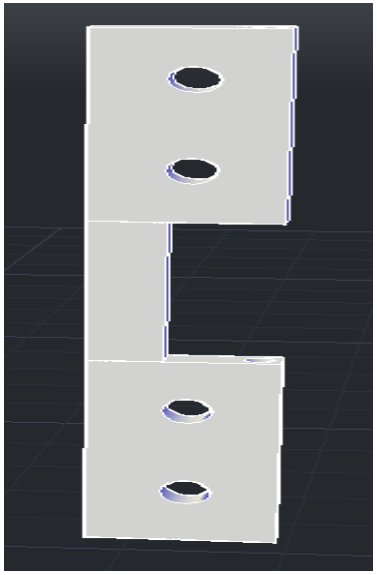
Safety Tips

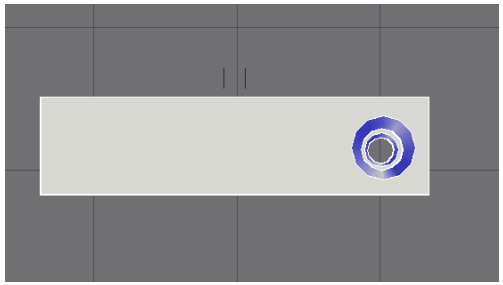
- Be caution of the hardware and your surrounding
- Work at a safe distance around rotating parts
- Never have hands around copter when powered on
- NO TESTING OR PROGRAMMING WITH PROPS ONBOARD COPTER
- Never work on rotating parts alone
- Take a break when fatigued or stressed

- Wear safety attire when necessary : safety googles, long sleeves, pants, closed toe shoes
- Keep safety first and communicate

Blade Protection







Budget Expenses

A. Expense				
Item	Distributor	Quantity	Per Unit Cost	Total Cost
Bluetooth Data Link	Viper Flight Systems	1	$29.99	$29.99
GoPro HERO3 Black Edition w/ SD Card	Viper Flight Systems	1	$368.99	$368.99
Tarot T-2D Brushless Gimbal Kit	Viper Flight Systems	1	$239	$239
Tarot Gimbal GoPro Video Cable	Viper Flight Systems	1	$12	$12
APC Propellers 10X4.7 Push-Pull Set	Viper Flight Systems	4	$8	$32
Easy-to-Machine ABS Shapes, 1/2" Thick, 24" X 24", Black	McMaster-Carr	1	$94.66	$94.66
Easy-to-Machine ABS Shapes, 1/4" Thick, 24" X 24", Black	McMaster-Carr	1	$49.74	$49.74
Easy-to-Machine ABS Shapes, 1/16" Thick, 24"X 24", Black	McMaster-Carr	1	$12.68	$12.68

Subtotal	**$839.06**
Shipping Total	$54.56
Expenses Subtotal	$893.62

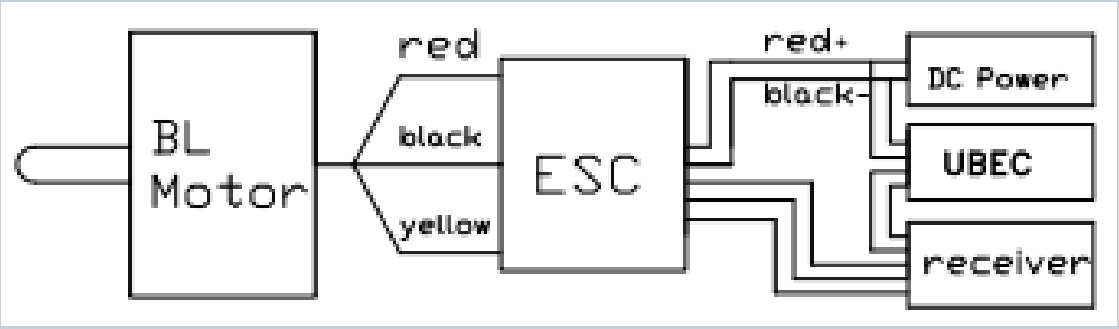
Out-of-Pocket Expenses

Item	Distributor	Quantity	Per Unit Cost	Total Cost
iAnder USB Bluetooth 4.0 Low Energy Adapter	Amazon	2	$7.99	$15.98
LinkS (2 Pack) SuperSpeed USB 3.0 Female Coupler	Amazon	1	$6.99	$6.99
Microsoft Xbox 360 Kinect Sensor USB AC Adapter Power Supply Cable Cord	Amazon	2	$2.99	$5.98
URBEST Plastic Shell Batteries Holder Box for 10 x 1.5 AA Battery	Amazon	1	$7.25	$7.25
HDVD New 10 pack 10 inch 2.1 x 5.5mm DC Power Pigtail Female	Amazon	1	$5.69	$5.69
Gardner Bender 19-AWC Wire Gard Wire Connector Assortments, 9-Pack	Amazon	1	$4.50	$4.50
HDVD New 10 pack 10 inch 2.1 x 5.5mm DC Power Pigtail Male	Amazon	1	$5.69	$5.69
315MHz RF Transmitter and Receiver Link Kit	Amazon	1	$5.00	$5
BitVoicer Software	BitSophia	2	$9	$9
AA Batteries	Dollar General	1	$12.36	$12.36
3 Cell LiPo Battery Charger	HobbyTown	2	$21.49	$42.98
DF13 6 Position to 5 Position Connector	3DR	1	$5	$5

Subtotal	**$126.42**
Shipping Total	$29.27
Expenses Subtotal	$155.69

Data Sheets

- Motors
- 3DR uBlox GPS

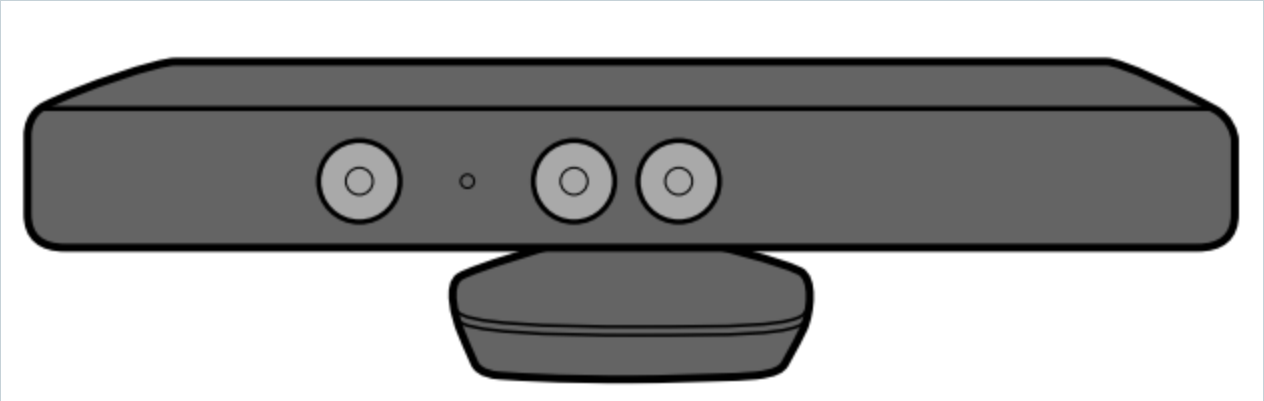


Operation Manual

- 2013 RTF X8
- APM 2.6
- 3DR Radio
- 3DR uBlox GPS
- Tarot Gimal Kit

Operation Manual

- AR8000
- DX8
- Xbox Kinect
- 2013 RTF X8



Software/Communication System Overview

Base Station

OctoCopter

MIC → Bitvoicer → Transmission Module → Receiver Module → ArduPilot

Test Plans

With the exception of the last two, all software & voice control tests were completed successfully.

- Command Recognition Test
- ArduPilot Communication Test (USB)
- ArduPilot Communication Test (RF)

Not Completed

- Flight (Airborne) Test
- Mission Test

Operation Manual

- BitVoicer
- Arduino
- RF Modules
- ArduPilot Pin Mapping

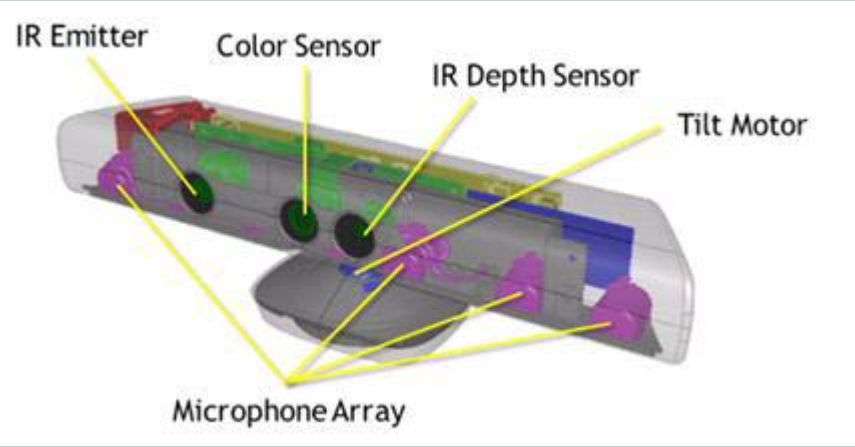
Future Work

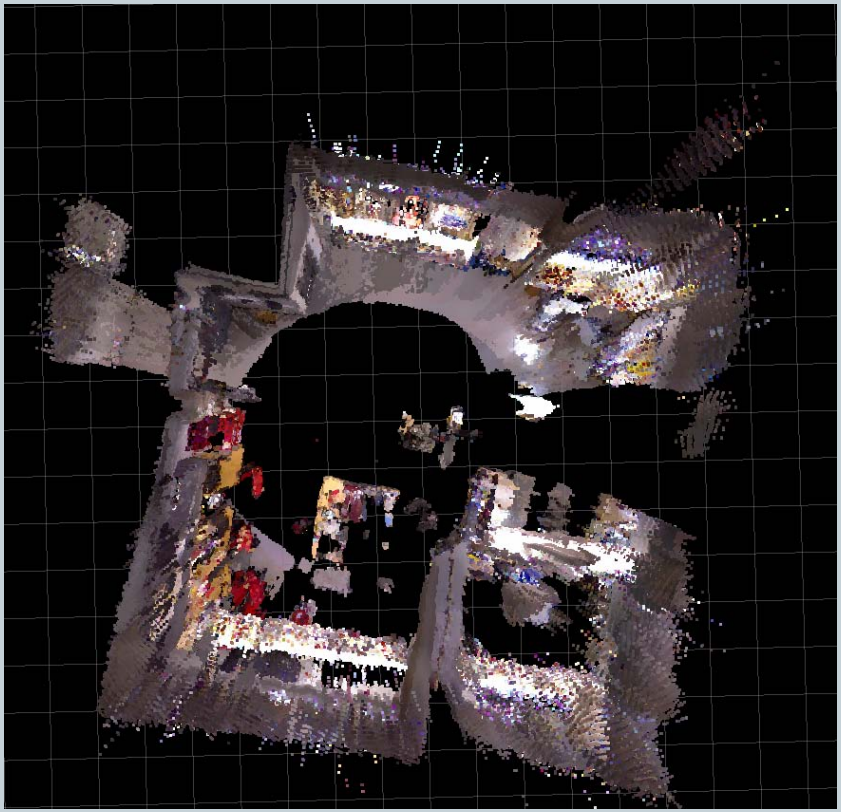
- Arduino code development for flight & mission commands
- Safety protocols implemented in code for unintended commands or faulty actions
- Bluetooth headset included for accuracy and flexibility when voicing command

Image Processing Overview

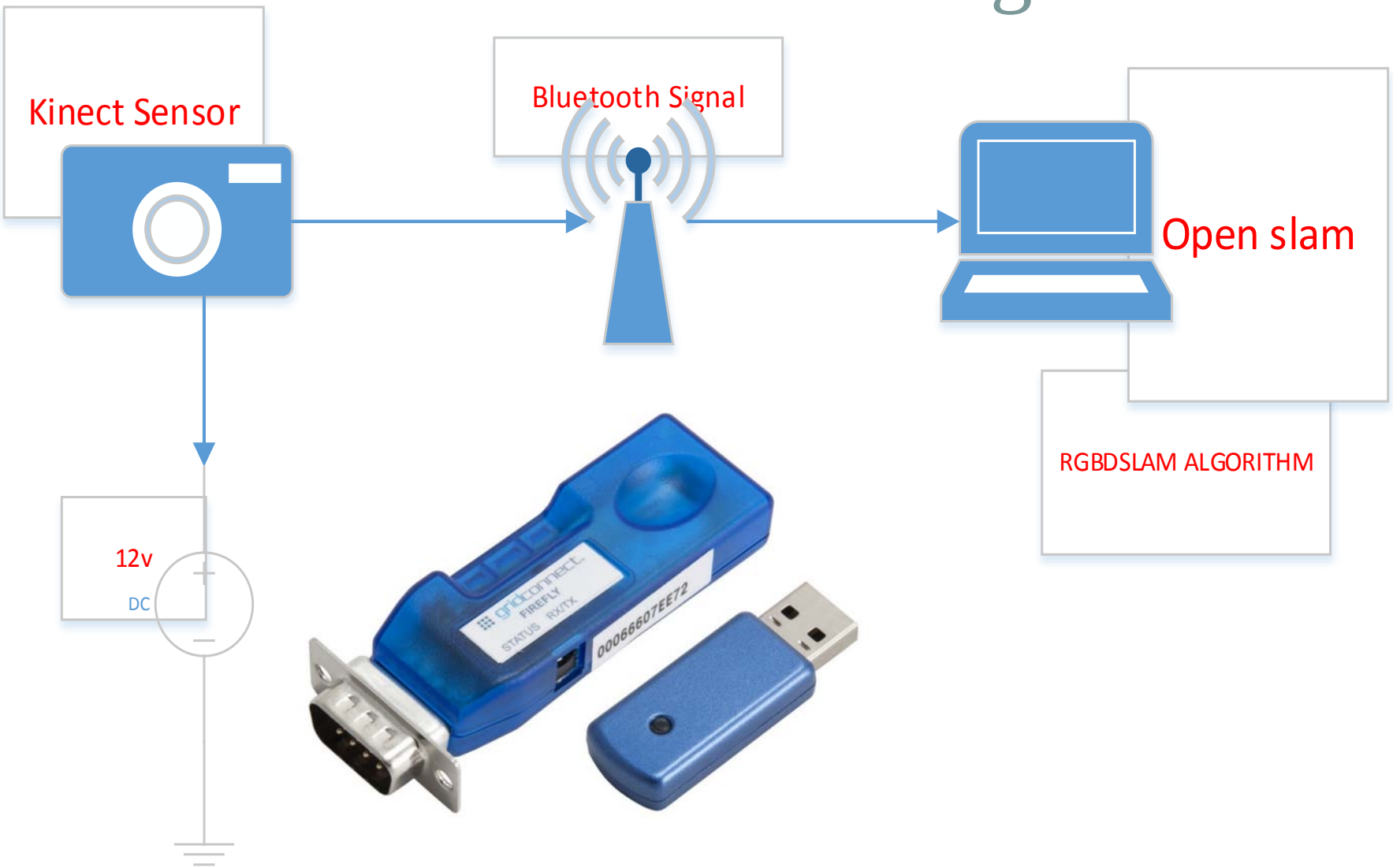
RGB-D SLAM

- UBUNTU
- ROS-HYDRO
- OPEN NI LAUNCH





Flow Chart of Design



Test Plans

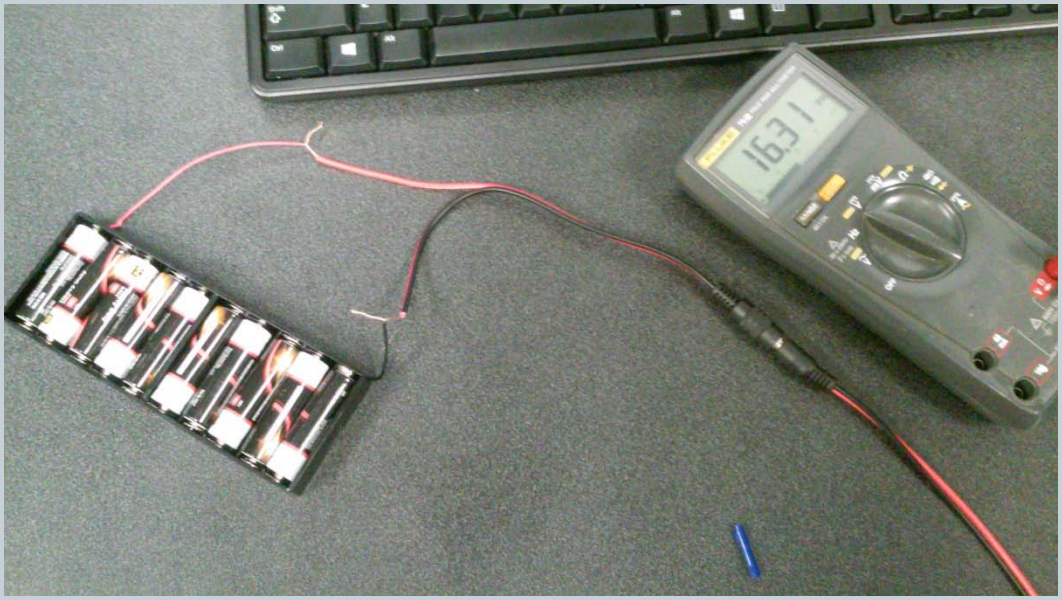
Passed
- Live Feed (USB & Wi-Fi)
- RGBD Slam Demonstration
- Battery Pack Power Supply

Failed
- RGBD SLAM (Windows & Micro SD)
- Bluetooth Module

Not Completed
- Gimbal
- Blade Protection

Operation Manual

- Battery Pack
- RGB-D SLAM
- GoPro Live Feed
- GoPro App



Future Work

- Manipulate the Python code to fit the preference of the user
- Not “reinventing the wheel” but echoing the Kinect sensor with the GoPro Camera
- Blade Protection constructed and displayed

The End

- QUESTIONS
- CONCERNS
- SUGGESTIONS

THANK YOU