Sprint 8 Start

Long Flight Time Buoyant Drone May 17th, 2021 6:00 PM(PST)

horizontal lineATTENDEES

* Excused absences: N/A
* Unexcused absences: N/A
* Late: N/A

## AGENDA

* Administrative Stuff
* Sprint Reports

6:01

* + Leon
    - Working on startup procedures for drone flight
    - Wire terminal will also be needed to solder onto

6:05

* + Jeremy
    - Inputting values from servo and motor test
    - Will be doing a final servo test with a motor attached

6:08

* + Isaac
    - Helping Dylan with inflation test and working on final report

6:09

* + Dylan
    - Needs a pickup truck to carry the helium, will also need to buy a gauge
    - Pockets of the envelope cause more drag than expected

6:12

* + George
    - Using control points to optimize the correction

6:15

* + Ryan
    - Worked on chapter 5 of the final report

6:18

Etc:

* Got accepted for the first round of the pitch competition, need to follow up with them for practice pitch

6:23

* 8:30 thursday will be the pitch practice
* Define Goals (General, see where we need dependencies etc)

6:29

* + Hardware
    - Hook up minimum hardware to get drone to fly
      * 3D parts held taught by balloon
      * uC32, Raspberry Pi, ESC, servos, motors, wire terminals, remote controller receiver
    - TEST FLIGHT W/ Helium
    - Sensor array working with uC32
    - uC32 sensor data sending to Raspberry 3 B+
    - uC32 output 4x PWM signals to ESC (via OC pins)
    - uC32 output 4x PWM signals to servos (via digital I/O
    - Finish Servo Power test
  + Software
    - Finish procedure to control servos/motors directly with remote controller
    - Implement remote and autonomous control in VREP

6:41

* Define End Date
  + May 28th

6:42

* Tasks (Specific) List Requirement ID if available. Time estimate
  + Leon - (**85 hours**)
    - Finish servo testing with motor load with Jeremy **(4 hours)**
    - Finish procedure to control servos/motors directly with remote controller **(15 hours)**
      * Code procedure (10 hours)
      * Test procedure (5 hours)
    - Wire up minimum electronics to get drone flying (uC32, Raspberry Pi, ESC, servos, motors, wire terminals, remote controller receiver) **(10 hours)**
      * Wire electronics (5 hours)
      * Test drone with electronics (5 hours)
    - Implement system state machine for remote control functionality **(15 hours)**
      * Code state machine (5 hours)
      * Test state machine (10 hours)
    - Add sensor checking and sampling to system state machine **(15 hours)**
      * Code state machine (5 hours)
      * Test state machine (10 hours)
    - Wire up sensors to drone (IMU, ultrasonic, altimeter, GPS, and barometric) **(6 hours)**
      * Wire electronics (3 hours)
      * Test drone with electronics (3 hours)
    - Group meetings **(15 hours)**
    - Sub-team meetings **(5 hours)**
  + Jeremy (75 hours) -
    - Finish Testing Servos with motor load(4 hours)
    - Buy Wire terminal for battery distribution(2 hours)
    - Order helium and pick up helium (3 hours)
    - Revise Power Management chapter(10 hours)
    - Research legal/safety requirements(6 hours)
    - Finish draft of ch11 legal/safety(10 hours)
    - Wire prototype(10 hours)
    - Add electronics to gondola (5 hours)
    - Power test with all parts(5 hours)
    - Group Meetings(15 hours)
    - Subteam Meetings(5 hours)
  + Isaac - 82 hours
    - Finish implementing closed loop remote control (25 hours)
      * Import code to client program (10 hours)
      * Test and debug (15 hours)
    - Finish implementing autonomous control (20 hours)
      * Import code to client program (5 hours)
      * Test and debug (15 hours)
    - Help with fabrication testing(7 hours)
    - First draft of simulation chapter(10 hours)
    - Group meetings (15 hours)
    - Sub-team meetings (5 hours)
  + Dylan - **81 hours**
    - Attach 3D printed parts to envelope (6 hours)
      * Gondola (1)
      * Servo brackets(4)
      * Ultrasonic(1)
    - Inflation test with 3D parts (2 hours)
    - Attach servo and motor shafts to brackets (4 hours)
    - Add ultrasonics to bracket (1 hour)
    - Add electronics to gondola (10 hours)
    - Inflation test with all electronics (2 hours)
    - Order helium and pick up helium (3 hours)
    - Do initial RC test at Delaware (10 hours)
    - Start Helium loss test (3 hours)
    - Writing Considerations of a buoyant drone draft(10 hours)
      * General design overview outline (2)
      * Upgrading outline to draft (4)
      * Revisioning (4)
    - Writing Lift Bag and Drone Frame Design outline (10 hours)
      * Lift Bag Design (3)
      * Gondola Design (3)
      * Ultrasonic Mounting (1)
      * Servo Mounting (3)
    - Group meetings (15 hours)
    - Sub-team meetings (5 hours)
  + George (111 hours) - (Can contribute additional time since capstone is his only course)
    - Update Closed Loop Control System with actual measurements (4 hours)
    - Design feedback loop and with integral for autonomous controls (4 hours)
    - Tune Closed Loop Control System to meet design requirements (4 hours)
    - Simulate State Response in Matlab for the Closed Loop system to confirm system response (3 hours)
    - Tune autonomous system to meet design requirements (7 hours)
    - Design control method for feeding control system next positional values (6 hours)
    - Simulate State Response in Matlab for the Closed Loop system to confirm system response (5 hours)
    - Design estimator to determine drone position using accelerometer and GPS data (5 hours)
    - Integrate estimators with the control system (1 hour)
    - Test state response for closed loop RC with estimators integrated (2 hours)
    - Test state response for Autonomous with estimators integrated (2 hours)
    - Export Closed Loop RC to Vrep (3 hours)
    - Adjust Closed Loop RC gains according to Vrep Response (3 hours)
    - Export Autonomous to Vrep (3 hours)
    - Adjust Autonomous Gains according to Vrep Response (3 hours)
    - Complete Chapter 7 Outline (5 hours)
    - Complete Introduction Outline (4 hours)
    - Group Meetings (15 hours)
    - Subteam meetings (15 hours)
    - IdeaHub Pitch (10 hours)
  + Ryan (90 Hours) -
    - Complete wiring diagram for dev boards to sensors, servos, and voltage regulator (5 hours)
    - Complete wiring design for V2.0 PCB (10 hours)
    - Prepare slides on PCB failure in final design defense meeting and show how surface mount parts should be ordered in larger footprint for hand soldering (10 hours)
    - Order 3.3V, and 5V switching regulator for servo, sensors array, microcontroller, and microprocessor (2 hours)
    - Finish Section 1 Sensor array chapter
      * All sensors that require I2C protocol with microcontroller (5 hours)
      * GPS sensor requiring UART protocol with microcontroller (5 hours)
      * Microcontroller SPI communication with microprocessor (5 hours)
      * Data telemetry GPIO pin to microprocessor (5 hours)
      * RC receiver GPIO pin to microprocessor (5 hours)
    - Finish Section 2 State Machine Intro
      * Explain how sensor array data determines state machine (5 hours)
    - Finish Section 3 PCB Interface
      * Explain V1.9 design features and failures (5 hours)
      * Explain V2.0 design improvements on V1.9 with switching regulators, trace width improvements (6 hours)
      * Trace width calculation guideline explanation for V1.9 and V2.0 PCB (2 hour)
    - Group Meeting (15 hours)
    - Sub-team meetings (5 hours)

7:07

* Gantt Chart Updates

Meeting End: 7:19