

CprE / SE / EE – sddec26-11

## CyFlyBot: Collaborative CyBot and UAV System for Faster Missions

### Week 8 Report

*April 8th 2026 – April 14th 2026*

*Client: Dr. Rover and Dr. Jones*

*Faculty Advisor: Dr. Rover and Dr. Jones*

### Team Members:

Daniel Bieber

John Brittain

Jake Nickel

Caleb Sanchez

Tu Reh

Ping Wu

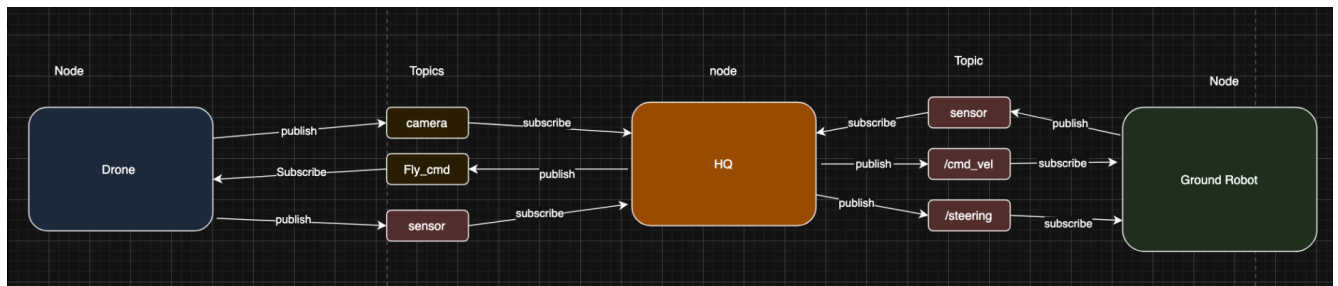
Mitchell Fowler

### Weekly Summary

This was the third week of our course adjustment and will be the last week we view it as such before achieving a new standard. The general meeting was successful with a renewed focus on design documents with a timeline. The advisor meeting was also successful with advice being given on some of our design choices as well as presentation choices. Hardware was able to work on getting the CyBot and CyNot up to ROS standards. Software was able to get a rudimentary simulation of a ground robot while also clarifying ROS standards with appropriate documentation.

## Past Week Accomplishments

- Course Adjustments
  - Successfully completed previously determined hour and effort contribution improvements. Average of double the amount of time spent.
  - Weekly Group and Sub-Group Meetings completed successfully
- Design Documents
  - Completed first draft of section 4 of Master Design Document
  - Completed ROS sub diagram



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- Software
  - Gazebo Simulations
    - Got working code for 2 wheeled ground robot, will adjust to desired robot next week
  - ROS2
    - Researched further as a team
    - Completed more diagrams
- Hardware
  - CyBot/UGV
    - Prepped psuedo code for future use
    - Found microcontroller implementation for a variety of boards
  - Power
    - Calculated Capacitive Charging Requirements
  - CyBot Alternative
    - Completed, need to present
- Administrative
  - Created weekly goal tracking document
  - Meeting rooms reserved for rest of the semester at correct time

## Individual Contributions:

| NAME          | Contributions                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Weekly Hours | Total Hours | Attended General Meeting        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|---------------------------------|
| John Brittain | <ul style="list-style-type: none"> <li>• Work on designing custom UAV expansion deck to operate cameras and stream image data over WIFI (1 hour)</li> <li>• Faculty meeting presentation (1 hour)</li> <li>• Ensured compatibility for current expansion decks on the UAV (30 minutes)</li> <li>• Meetings – Subgroup, and faculty meeting (2 hours)</li> <li>• General documentation work, fixing typos, and better clarification on low-level design document (1 hours)</li> </ul> | 5.5          | 28.5        | Team (N)<br>Sub (Y)<br>Facul(Y) |
| Daniel Bieber | <ul style="list-style-type: none"> <li>• Gained an introduction in ROS2 (2 hours)</li> <li>• Found microcontroller implementation of ROS2 for TIVA, Arduino, and ESP32(2 Hours)</li> <li>• Sub Group Meeting (1 hour)</li> <li>• General Meeting (1 hour)</li> <li>• Advisor and client meeting(1 hour)</li> </ul>                                                                                                                                                                   | 7            | 25.5        | yes                             |
| Jake Nickel   | <ul style="list-style-type: none"> <li>• Worked on low level design for slam_toolbox (1 hour)</li> <li>• Team meeting (1 hour)</li> <li>• Worked on gazebo simulation. Started the process of implementing warehouse environment. (2 hours)</li> <li>• Sub group meeting (1 hour)</li> <li>• Advisor and client meeting (1hour)</li> </ul>                                                                                                                                           | 6            | 24.75       | yes                             |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                            |   |       |     |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------|-----|
| Caleb Sanchez   | <ul style="list-style-type: none"> <li>• Researched best stack for simulating UGV/UAV(1 hour)</li> <li>• Set up stack for software team; Docker containing ROS2 connected to Gazebo (2 hours)</li> <li>• Created prototype UGV model and simulated camera feed(1 hour)</li> <li>• General Meeting (1 hour)</li> <li>• Sub group meeting (1 hour)</li> <li>• Advisor and client meeting (1 hour)</li> </ul> | 7 | 28.5  | yes |
| Tu Reh          | <ul style="list-style-type: none"> <li>• Updates on previous low-level diagram of ROS2 (1 hour)</li> <li>• Reviewed over ROS2 on nodes, topics from previous experience. (1 hour)</li> <li>• Sub Team meeting (1 hour)</li> <li>• General meeting (1 hour)</li> <li>• Advisor and client meeting (1 hour)</li> </ul>                                                                                       | 5 | 25.25 | yes |
| Ping Wu         | <ul style="list-style-type: none"> <li>• Finishing up ROS 2 Design Diagram (1 hour)</li> <li>• Worked on low-level design document (1hour)</li> <li>• Sub Team meeting (1hour)</li> <li>• General Meeting (1 hour)</li> <li>• Advisor and Client Meeting(1 hour)</li> </ul>                                                                                                                                | 5 | 24.5  | yes |
| Mitchell Fowler | <ul style="list-style-type: none"> <li>• Finished Weekly Report Revisions (2 Hours)</li> <li>• Completed CyBot Alternative(30 Minutes)</li> <li>• Week 8 Report Writing(1 Hour)</li> <li>• Capacitive Charging Research and Calculation (90 Minutes)</li> <li>• Sub Team meeting (1 hour)</li> <li>• General Meeting (1 hour)</li> <li>• Advisor and client meeting(1 hour)</li> </ul>                     | 8 | 31.75 | yes |

## General Meeting Review

The general meeting occurred again at SIC 3131 from 4-5pm on Monday, April 13<sup>th</sup>. The meeting was successful with discussion on completing the design documents for the end of the semester. It was resolved that after this week, 2 sections per week would be done to give appropriate time to review. Discussions were also had about future presentations to advisors, with preparations for this week made, along with software presenting the bulk of their work next week.

## Summary of Weekly Advisor Meeting

Week 8's advisor meeting was successful. It was the first meeting with Dr. Rover and Dr. Jones after the course adjustment, so we presented our recent achievements to them. John took the lead on the presentation, and it was very appreciated by the rest of the team. Dr. Rover and Dr. Jones gave advice on a variety of findings, including appropriate reasoning in methodology and increasing slide readability. Along with this, we were given warnings about the limitations of board stacking for the drone, as well as the usability of the flow sensor and ArUco markers.

## Extended Discussion

There were some issues with coordination between sub teams for meetings, so next week we will see a focus on making sure the meetings happen at the scheduled time. Overall, however, things are starting to "gel". We're each getting more comfortable in our roles and are able to help the other team members when we can.

## Pending Issues

- Hardware
  - Sub-team meeting reinforcement. Scheduling has been an issue, so the quicker we get this nailed down, the better.
  - Improve understanding of ROS2. While mostly a software element, the more hardware understands it, the better we'll be able to prepare the components for the software side.
  - Implement ROS2 for different microcontrollers
  - Design detachable camera module for CyBot
- Software
  - Nail down mapping logistics. It is understood that it will be entirely within the HQ, but actually doing this is the next step.

- Finalize low level diagrams
- Testing on simulation and ROS2

## Plans for Coming Week

- Hardware
  - Daniel Bieber
    - Research Differential Drive with ROS2
  - John Brittain
    - Control and navigate CYBOT from 288 using ROS2 as proof of concept
    - Create a state diagram for high-level hardware design
    - Finalize design for custom imaging deck, including PIN outs and hardware
  - Mitch Fowler
    - Prepare presentation for advisor meeting
    - Research camera module/ESP32 for CyBot
- Software
  - Jake Nickel
    - Create simulations for CyBot and CyNot
  - Caleb Sanchez
    - Begin creating computer vision topics
    - Test CV topic in simulation
  - Tu Reh
    - Finalize low level diagrams
    - Work on design document
    - Set up working environment for simulation and ros2
    - Testing on simulation and ros2
    - Team meeting and sub team meetings
  - Ping Wu
    - Finish up ROS 2 diagram
    - Meet with sub team to get a good understanding of simulation on Linux
    - Help with mapping or computer vision components.