CprE / SE / EE – sddec26-11

CyFlyBot: Collaborative CyBot and UAV System for Faster Missions

Week 6 Report

April 1st, 2026 – April 7th, 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 second week of our course adjustment. The general meeting was successful, and discussions were about timelines and realistic deliverables. Discussions were also about low level design and bridging software and hardware through ROS. The weekly advisor meeting was cancelled due to schedule conflicts for Dr. Rover and Dr. Jones. The hardware sub-team had success with the drone demo and gained ideas about additional board usage. The software sub-team made progress in mapping, localization, computer vision/ ArUco tags. Both sub teams made progress with documentation for the preceding concepts.

Past Week Accomplishments

- Course Adjustment
    - Continued course adjustment from last week
        - Productive General and Sub Team meetings
        - Material prepared for next advisor meeting
- Design Documents
    - Made progress on low level design documents
        - Crazyflie 2.1 brushless
        - Computer Vision models
        - VSLAM
        - ROS2
- Software/ Coding
    - ArUco(OpenCV tagging software) experience
    - VSLAM (mapping and localization algorithm for computer vision) experience
    - ROS
        - Gained teamwide experience on Open Source operating system used in robotics
- Hardware
    - Experienced Demo of CrazyFlie 2.1 Brushless Drone
        - Proper handling of drones and supplies
        - UI navigation
        - Board troubleshooting
        - Lighthouse demo
    - Organized Cybot Code
    - Cybot Alternative construction progress made
- Administrative
    - Gained approval for access to Coover 3050
    - Weekly Reports 1 and 2 redone per Dr. Rover's Request

Individual Contributions:

NAME	Contributions	Weekly Hours	Total Hours	Attended General Meetings
John Brittain	Worked on technical design document. Worked on presentation to Advisors	5	18	yes

Daniel Bieber	Researched wireless charging for the drone and found a method to use the charger with additional downward facing decks. Acquired models for a landing pad with charging functionality. Added CyBot movement functions in relation to aisle and shelf numbers. Worked on sections 3.2 and 3.7 of the design document.	5	18.25	yes
Jake Nickel	Researched vSLAM for mapping and localization. Started to learn and research about ROS2. Worked on low level designs and write ups for software	5	18.75	yes
Caleb Sanchez	Researched ArUco Tags. Created working prototype for ArUco tag application. Created low level frontend diagram	5	21.5	yes
Tu Reh	Worked on section 3.5 of design document. Low level diagram of ROS2 architecture. Research into computer vision open-source code for object detection	5	20.25	yes
Ping Wu	This week involved strengthening understanding of ROS 2 after some time away from it, with a focus on reviewing core concepts such as nodes, topics, and communication. Work then shifted to mapping out how ROS 2 would be implemented within the CyFlyBot system, particularly the communication between the drone and ground robot. Worked on the ROS 2 diagram to visualize the system architecture and support the project design. In addition, research was conducted on potential simulation tools for the final demo to help test and validate the system prior to deployment.	5	19.5	yes

Mitchell Fowler	Worked on constructing CyBot Alternative. Redid both Reports 1 and 2 per Dr. Rovers Request	5	23.75	yes

General Meeting Review

The meeting was held in SIC 3131 from 4pm-5pm. All members were in attendance and arrived on time. The first topic was discussing correct report formatting and submission. Next topic was recapping the last week and its successes. First was the hardware sub-team and then the software sub-team followed. Discussions were had on ROS and how it could bridge software and hardware. There were also discussions on the next steps, which included more effort on the low-level design documents as well as possible demo scenarios. Specifics on expansion boards were discussed between hardware and software and its implications. Ideal and realistic timelines and tasks were also discussed between the teams.

Summary of Weekly Advisor Meeting

Per the monthly meeting for faculty, the meeting was canceled by Dr. Rover and Dr. Jones. The material prepared for the meeting will be used for next week.

Extended Discussion

As the second week of our course adjustment, the fire of correction was still in us. Our meetings were filled with passion for trying to solve the problems at hand, while our individual research showed our focus. While this level of effort should have been occurring since week 1, it is nice to be able to be in the right direction again. We're all gaining experience in the things we put off due to supply issues or lack of direction. The design documentation is going great, with progress being made for the sub-team specific documents as well. Discussions have been fruitful, with communication seeing a vast improvement

Pending Issues

- Hardware
    - Continue gaining experience with CrazyFlie 2.1 Brushless
    - Work on getting a functional CyBot
- Software
    - Improve Familiarization
        - ROS

        - ArUco
        - vSLAM

Plans for Coming Week

- Hardware
    - John Brittain
        - Continue finishing designs for UAV and ROS2
        - Research simulation possibilities
    - Daniel Bieber
        - Research ROS for use of a UGV and plan out receiving ROS signals
    - Mitch Fowler
        - Finish Report Revision for weeks 3, 4, and 5
        - Present CyBot Alternative to team
        - Research capacitive charging at request of John
- Software
    - Caleb Sanchez
        - Gain familiarization with ROS and how to use it
        - Create more Low level diagrams
        - Research potential simulation solutions
        - Start working on communication module (after design diagram)
    - Tu Reh
        - Review ROS2
        - More low-level diagram(updates and other components like database schema)
    - Ping Wu
        - Finish ROS 2 design diagram
        - Work on low-level design diagram
        - Research more about mapping
        - Potentially work on simulation
    - Jake Nickel
        - Lear the basics on ROS2
        - Create a low level diagram for mapping
        - Research more about SLAM algorithms