

CprE / SE / EE – sddec26-11

CyFlyBot: Collaborative CyBot and UAV System for Faster Missions

Week 5-6 Report

September 23rd 2026 – October 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

Week 5: This week saw progress on all fronts. There were setbacks, including the system failure of the UGV, but they were fully diagnosed and the problematic components are in the process of being replaced. ROS2 Hardware/Software node integration progress was made, with movement nodes being tested. Software made progress with the crazyflie simulation, as well as specific issues like the start and stop trigger on the issue board.

Week 6: There was good progress all around this week. While trying to fix the UGV team members decided that it might be a good idea to spend our budget on a new UGV. Members added a start mapping button to the frontend of the UI that will instruct the UGV to begin mapping. ROS2 Hardware/Software node integration had progressed in the movement and got a good start on the LiDAR. Hardware made progress with putting the drone together, as well as software moving forward with testing the drone on simulation.

Past Week Accomplishments

Week 5:

- Hardware
 - UGV
 - ♣ Diagnosed failure of entire system
 - ♣ Ordered replacement parts
 - ROS2 Nodes
 - ♣ Node developed for movement
 - ♣ Ran simulated tests
- Software
 - Simulation
 - ♣ Fully upgraded to incorporate crazyflie sim software
 - Frontend and Backend
 - ♣ Advised revisions made
 - Issue Board
 - ♣ Fixed Trigger Issue

Week 6:

- Hardware
 - UGV
 - ♣ Further reconstructed UGV
 - ♣ Backup UGV purchased
 - ♣ Lidar Node further developed
 - ♣ Raspberry Pi board fully functional
 - UAV
 - ♣ Sourced sensing boards for imaging deck
 - ♣ Prototype board further developed
 - ♣ Custom frame for prototype board and UAV designed
- Software
 - UGV
 - ♣ Continued testing the start trigger issue
 - ♣ Started looking into software and hardware merge for cybot
 - UAV
 - ♣ Made progress on Drone localization based on ArUco markers
 - Frontend

- ♣ Worked on fetching UAV camera feed and mapping from simulation
- ♣ Implemented full screen feature for camera feed and manual control feature of UAV
- ♣ Implemented start trigger for mapping and attempted/design flight commands
- ♣ Received camera feeds in the frontend from the UAV

Individual Contributions:

NAME	Contributions	Weekly Hours	Total Hours	Attended General Meeting (Both)
John Brittain	Work on UAV ROS Integration + Imaging Deck prototype built on bread board Sourced / Ordered two XIAO ESP32-S3 sensing boards for UAV imaging deck + Dualband Travel Router to host local network. CrazyFlie Prototype board connects both XIAO's to the UAV for power. Designed a 3D printable frame to mount the two cameras onto the UAV.	9.5	25.5	yes
Daniel Bieber	Developed UGV Ros2 node for movement and ran simulated tests Developed implementation for the Lidar Node for Ros2. Set up Raspberry Pi board	9.5	29.5	yes
Jake Nickel	Worked on mapping mission start and stop issue Continued testing the start trigger issue	10	30	yes

	Started looking into software and hardware merge for cybot			
Caleb Sanchez	Worked on crazyflie sim and automated drone flight Worked on Drone Localization based on aruco markers in warehouse	11	36	yes
Tu Reh	Worked on Backend and Frontend Worked on fetching UAV camera feed and mapping from simulation. Implemented full screen feature for camera feed and manual control feature of UAV.	9	27	yes
Ping Wu	Worked on Backend and Frontend Assisted with Diagram building Implemented start trigger for mapping and attempted/design flight commands from the UI. Received camera feeds in the frontend from the UAV	9	24	yes
Mitchell Fowler	Diagnosed UGV Error UGV Repair Diagram Building UGV Reconstruction and sourcing Document Creation (Robot Handling and Role Change)	10.5	33	yes

General Meeting Review

Week 5:

The general meeting was held on Tuesday, September 29th at 2:00 p.m. The team reviewed progress across the hardware, software, and simulation components of the project and discussed priorities for the upcoming week. On the hardware side, the team discussed rebuilding the UGV by replacing the slave board, integrating the motors and UPS board, integrating the Raspberry Pi, and setting up ROS2 nodes. For software, the team reviewed continued development of the web application, including frontend optimization and backend integration with robot data. The simulation team will continue working with the

Crazyflie in Gazebo while beginning to explore automation capabilities. Team members also checked in with one another regarding any current issues or areas where additional support may be needed. Due to upcoming exams and a hackathon, progress on some software tasks may be slower until Thursday evening, after which development is expected to continue.

Week 6:

The general meeting was used for the teams to understand where each member was and where we needed to go forward. Initially, Hardware discussed the issues with UGV as well as the node integration, while software proceeded to talk about the issues affecting Frontend Simulation. Solutions were discussed with the results to be discussed next week. Deliverables for the week were also discussed, including updated website and diagrams.

Summary of Weekly Advisor Meeting

Week 5:

During this week's advisor meeting, the team received several recommendations for improving the current system design. One suggestion was to reuse and update the existing system diagram from last semester. We were also advised to improve the naming of components in the diagrams by using more specific and descriptive labels. Another recommendation was to consider using faster Wi-Fi to better support video streaming tasks. The advisors also suggested creating a network diagram to clearly show how the different system components communicate with one another. In addition, the organization of component names and colors should be improved so that each robot and subsystem can be easily identified. Lastly, the hardware and software diagrams should better align with one another to clearly demonstrate how both sides of the system work together.

Week 6:

During this week's advisor meeting, the team discussed the current issues with the UGV and how we planned to resolve them. We were suggested to reevaluate our plan to ensure all our hardware was similar for the motors that were likely to be replaced. The suggestions were replacing all 6pin motors with 4pin motors or determining if it was possible to leave off the encoder pins from the 6pin motors to handle the new board. The advisors gave more suggestions for improving our system diagram, including creating a simulation diagram.

We were also requested to make a document about how our project management has evolved and how our roles on the team have changed.

Extended Discussion

Week 5:

This week saw the aftermath of the UGV setback. There was going to be a presentation on said UGV next week, but this has taught us a lesson on preparing for the worst. A lot of the team also had other obligations, so the theme of the week was balance. Could we balance immediate priorities in our lives with our work in this project? For most of us, we believe this is the case.

Week 6:

This week was another "brick in the wall" type of week. There was nothing outstanding, but there is steady progress being made on all fronts. The UGV has been worrying, as time is of the essence, but an entire replacement has been ordered and is being tested. By the end of next week, we would like to be testing the actual nodes on it, along with the UAV. Frontend simulation is also being worked on.

Pending Issues

Week 5:

- Hardware
 - Defunct UGV
 - ♣ UPS board and slave board need replacement
- Software
 - No current pending issues at the moment

Week 6:

- Hardware
 - UGV reconstruction
 - The ROS2 LiDAR node and CyBot nodes need further implementation and testing
- Software

- o UAV will disconnect as soon as we try to input a flight command from the UI

Plans for Coming Week

Week 5:

- Hardware
 - o Rebuild UGV
 - ♣ Replace slave board
 - ♣ Integrate motors and UPS board
 - o Integrate Raspberry Pi
 - o Setup Ros2 nodes
 - o Continue integrating the UAV
- Software
 - o Continue optimize and polish the front end from any feedback and testing issue for smoother user experience.
 - o Work on crazyflie in gazebo and beginning automation exploration
 - o Continue to develop the backend by getting more data from the robots

Week 6:

- Hardware
 - o UGV raspberry pi integration
 - o Continue developing and testing the ROS2 LiDAR node on the Raspberry Pi
 - o set up the travel router for local network communication.
- Software
 - o localization with the drone using ArUco markers
 - o Fix UAV disconnecting from frontend after control input
 - o refine the frontend's visual design and overall user experience

Resources and Documentation

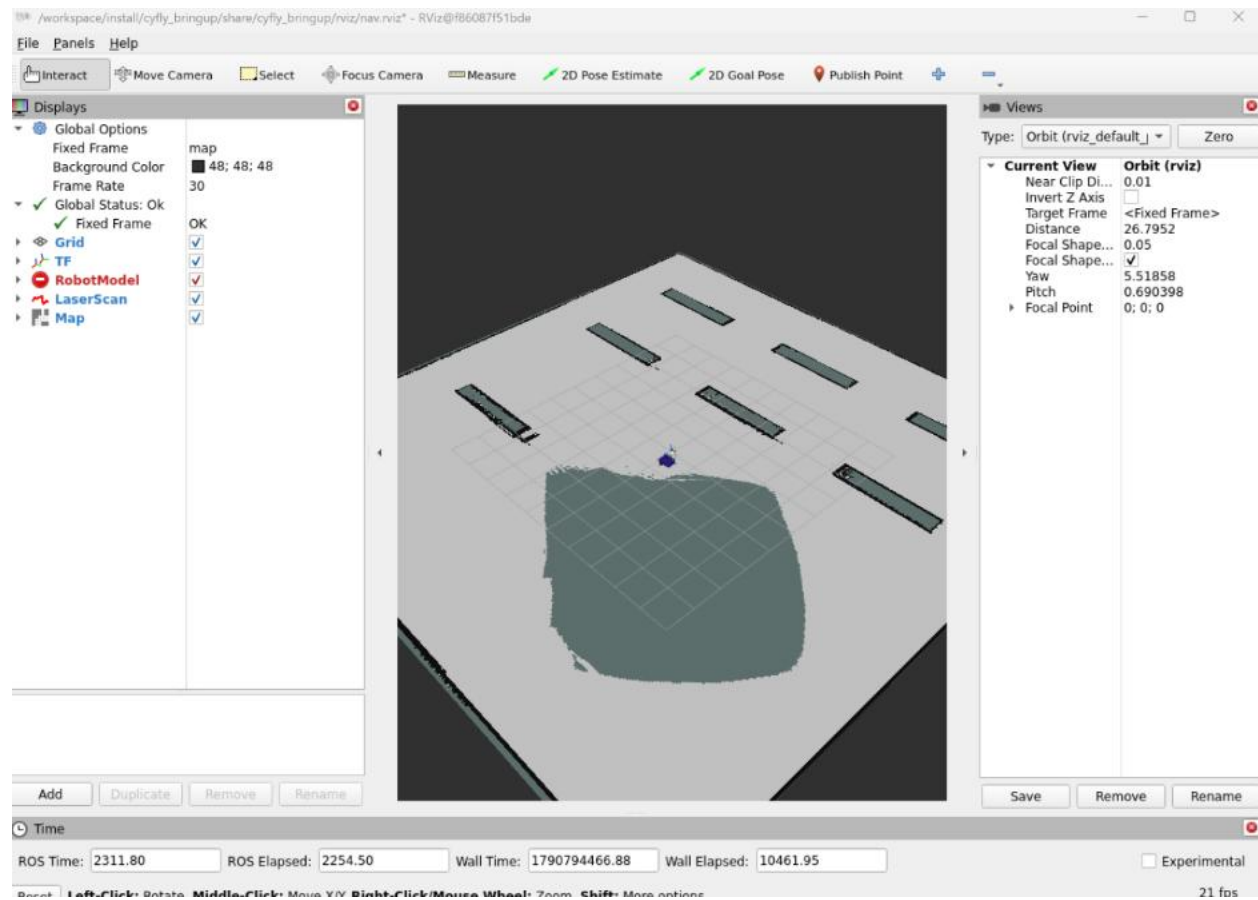


Figure 1: Successful Start and Stop Trigger Test