

CprE / SE / EE – sddec26-11

CyFlyBot: Collaborative CyBot and UAV System for Faster Missions

Week 4 Report

March 10 2026 – Dec 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

Gained Clarification from Dr. Rover and Dr. Jones about Scenarios. We will be focusing on a warehouse/factory setting going forward. We also conducted more research as well as brainstormed different ideas. Good Progress was made on Senior Design Website

Past Week Accomplishments

- Team
 - Finished Part 2 of Design Document
 - Researched Generalized Topics
 - Researched BitCraze Crazyflie 2.1 brushless drone and weight capacity
- Daniel Bieber
 - Collected Datasheets for CyBot and CyBot components (10 minutes)

- Brainstorm Landing Pad Concept Idea (20 minutes)
 - See sharepoint for landing pad sketch
- John Brittain
 - Researched existing robotic systems utilized in industrial/warehouse settings today. (1.5 hours)
 - [Article 1](#) UGV/UAV in Warehouse situations (like ours)
 - UGV/UAV in Warehouse situations (like ours)
 - UGV acts as a mobile taxi for the UAV, the drone rides on the UGV between aisles, then takes off briefly to scan high shelves, and lands back on the UGV.
 - UGV is localized using EKF fusing wheel odometry, IMU, and 2D LiDAR scan-to-map.
 - UAV uses a downward facing camera to scan a QR code marker stamped onto the UGV.
 - [Article 2](#) Less relevant but useful for coordination strategies.
 - Leader-follower, UAV is the leader and the UGV follows.
 - Uses APF for UAV path planning, attraction towards goals and repulsion from obstacles.
 - Drone can land on the UGV for battery recharging.
 - UGV handles low ground obstacles independently (drone can't see them).
- Jake Nickel
 - Researched how QR codes may help with navigation for the drone (20 minutes)
 - Brainstormed new navigation idea Pre-Computation/Scout. (30 minutes)
 - See sharepoint for documentation
 - Worked on parts of part 2 for design document (20 minutes)
- Caleb Sanchez
 - Website Development Collaboration (1 Hour)
- Tu Reh
 - Website Development Collaboration (1 Hour)
- Ping Wu
 - Website Development Collaboration (1 Hour)
- Mitchell Fowler
 - Researched CrazyFlie 2.1 and Boards (30 minutes)
 - Lighthouse Positioning System Workshop (30 minutes)

- Brainstorm (10 Minutes)
 - See sharepoint for mind map/brainstorm
- Report Writing (20 Minutes)
- Project Planning (20 Minutes)

Pending Issues

- Verify Suppliers with Clients
- Resource Acquisition Request with ETG
- Timeline Verification
- Deliverable Verification
- Precise operating tasks (what will the UAV/UGV be responsible for specifically)
- Design considerations
 - UGV Navigation, how will the UGV navigate the environment (which sensors, etc.)
 - Data acquisition, inventory tracking. What data will our UAV/UGV collect and use for our goal?

Plans for Coming Week

- Continue Brainstorming (3 new articles of Brainstorming)
- Continue Project Management Documentation (Gantt Chart, Design Document)
- Discuss with Clients the necessary verification
- Work on Part 3 of Design document
- Find potential solutions for our functional/user requirements and constraints.
 - Research common ways warehouses keep track of inventory/arrange items, and how CyFlyBot can utilize these (Smooth integration and installation)
 - Look into ArUco markers (UAV localization / landing)
 - Geo-References (data-collection and tracking)
 - EFK, and other methods (UGV navigation)
 - UAV-UGV taxi relationship (battery constraint)