EE / CprE / SE 4910 - sdmay26-07
Salt Spreading Autonomous Mobile Robot
Week 8 Report

11/12/2025 - 11/18/2025
Client: student-led
Faculty Advisor: Alexander Stoytchev

Team Members:

Isaac Blandin - Project Manager & Software Team Lead
Dylan Bunting - QA Lead & Electrical Team
Hoyt Dzwoniarski - Electrical Team
Thomas Huedepohl - CAD Lead and Electrical Team Lead
Mikhail McDade - Software Team
Shobhit Singh - Scribe & Software Team

Weekly Summary

This week's theme was set by the arrival of the components from our first component order. The software team has begun initial exploration and testing with our sensors and controllers. Bumper system, GPS, and ESPCam testing are all in progress.

On the drivetrain and power side of the project, we took a step back and a few steps forward. Our original drivetrain ideas had to be scrapped due to the realization of how much weight our battery selection adds. Our power system has undergone a redesign due to a higher-than-expected power draw from our ESPCam, new information on the internal voltage regulator of our main controller, and the introduction of a new design constraint for improved handling of current spikes during periods of high computational demand.

Past Week Accomplishments

- Isaac:
    - Completed in-person 3D printing training.
    - Ran initial GPS module accuracy tests
        - Tested static, clear-sky performance using single-point RTK.
    - Completed pinout-level control system diagram.
- Thomas:
    - Reworked drivetrain design
        - Implementing higher power drive motors and wheel selection change
        - Redesigning the drivetrain to handle a higher weight than before due to the weight of the motor
        - Switch from four-wheel drive to two-wheel with casters (inspired by line-following robots).

Past Week Accomplishments (Cont.)

- Dylan:
    - Selected newer, higher torque drive motors
    - Switched wheel selection to rubber, airless tires
    - Aided in drivetrain design
- Mikhail:
    - Conducted initial tests integrating bump switches with Arduino to detect collisions and trigger an intercept.
- Shobhit:
    - Continued work with object detection on ESPCam.
    - Experimented with processing and transmitting object data.
- Hoyt:
    - Began redesign of the power distribution system
        - Determined the current needs for 12V, 6V, and 5V rails.
        - Researched the concepts of current spike handling (how to spec out capacitors and such)

Time Tracking

Name	Hours This Week (Period)	Cumulative Hours
Isaac Blandin	7	51
Dylan Bunting	5	45
Hoyt Dzwoniarski	6	45
Thomas Huedepohl	6	46
Mikhail McDade	5	47
Shobhit Singh	6	50

Plans for the Upcoming Week

- Complete CAD drawing of drivetrain
- Begin first drivetrain prototype build
- Complete in-person 3D printing training
- Tear down and reverse engineer purchased salt spreaders
    - Attach relay for control
- Continue testing with ESPCam to assess the capabilities of ESP-powered CV options.
- Complete GPS Accuracy baseline tests
    - Open-Sky/Overcast
    - Multi-pathing
    - Static/Dynamic
- Complete power system redesign & order components.

Summary of weekly advisor meeting

This week, our advisor meeting included a brief review of progress, during which we discussed the work we have done so far with the new components. However, the majority of our meeting was discussing the upcoming faculty panel presentations. Dr. Stoytchev gave us advice on what to include and how to prepare for the presentation. We were given a timeline to follow for this preparation.