EE / CprE / SE 4910 - sdmay26-07
Salt Spreading Autonomous Mobile Robot
Week 6 Report

10/29/2025 - 11/04/2025
Client: student-led
Faculty Advisor: Alexander Stoytchev

Team Members:

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

Weekly Summary

In week 6, our team tackled two primary challenges. First, our team handled final component selections and creation of a BOM for our first prototype. We employed decision-making methodologies to identify the optimal solutions in terms of performance, ease of implementation, and cost, as well as other relevant factors. Following an approval by our faculty advisor, we created the BOM and placed a procurement order with the ETG. Second, our group began the process of even further detailed design such that our group can hit the ground running on first proofs of concepts once we receive our orders.

Past Week Accomplishments

- Team:
  - Created BOM and ordered components for proof of concepts and first prototype
  - 10/30/2025 - Advisor Meeting
    - Presented final BOM to professor and went through design decisions
    - Got initial approval for ordering components.
- Isaac:
  - Selected final GPS solution for purchase
  - Created a mid-level control system design diagram
    - Interconnections, but not pinout level
  - Created a high-level full-system concept drawing
- Thomas:
  - Continued research on battery options, researching alternatives.
- Thomas and Hoyt:

        - Made final battery system decisions
        - Analyzed power system needs, such as voltage converters and current needs
- Dylan:
    - Continued research on motor controllers and motors
    - Did initial force analysis of the motors
    - Selected final motors and motor controllers
- Mikhail:
    - Started research on communication protocols on Arduino R4 and power needs/supply specifications.
- Dylan & Mikhail:
    - Researched lower-budget tread alternatives
- Shobhit:
    - Selected final limit switches and computer vision camera options
    - Did initial testing with a personal ESPCam.
    - Started research on communication protocols for the CV camera and GPS unit.

Time Tracking

Name	Individual Contributions	Hours This Week (Period)	Cumulative Hours
Isaac Blandin	Design Diagrams, GPS Solution Selection	6	41
Dylan Bunting	Motors Research, Load Analysis, Motor Selection	6	36
Hoyt Dzwoniarski	Battery Research, Power System Needs Analysis	6	36
Thomas Huedepohl	Battery Research, Battery Selection, Power System Needs.	7	37
Mikhail McDade	Drivetrain Research, Arduino Uno R4 Deep Dive.	7	38
Shobhit Singh	ESPCam Testing, Sensor Research, Sensor Selection.	8	41

Plans for the Upcoming Week

- Create more thorough, detailed design diagrams and drawings
    - Power system diagram with each voltage being split by buck converters and the power draw on each rail.
    - Control system diagram with each controller, sensor, and other board. Pinout level detail for all interconnections.
    - Detailed drivetrain drawings - detailed enough for CAD to be the next step.
- Experiment with physical salt-spreading solution options
- Continue testing with ESPCam to assess the capabilities of ESP-powered CV options.
- Get 3D printing certifications done.
- Complete BOM for supporting components
    - Any specialty wiring, buck converters, non-3D-printable brackets, etc.

Summary of weekly advisor meeting

In our weekly advisor meeting with Dr. Stoytchev, we presented our final findings from the component selection research to him. We were able to present our choices and justify our selections for each component that we are currently confident in. We were given suggestions on some of our selections due to costs (we are likely going to have to choose a different option for treads or manufacture our own). We also discussed some of our detailed design decisions.