EE / CprE / SE 4920 - sdmay26-07
Salt Spreading Autonomous Mobile Robot
Status Report 1

01/19/2026 - 02/05/2026
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

Work Period Summary

To begin this semester, the whole team has been working to reorganize and hit the ground running to make up for falling behind in the past semester. We have met multiple times to plan the next month of work on both the hardware and software sides of the project, and we have begun work on both short- and long-term components.

This work period has seen developments in GPS, navigation, mobile companion app, computer vision, salt spreading, electrical system, and the next iteration of our drivetrain.

Past Work Period Accomplishments

- Isaac:
  - Team scope/work planning for the semester
  - GPS subsystem work
    - Tested differential GNSS (DGNSS) using GPS correction data from the Iowa Real-Time Network via USB and a computer functioning as the NTRIP client.
    - Began work on implementing our main controller (Arduino UNO) as the NTRIP client and sending correction data to the GPS receiver via I2C
      - Hours spent debugging I2C communication issues.
- Thomas:
  - Took apart the salt spreader and documented
  - Came up with plan on how to control and power salt spreader
  - Researched and found parts

Past Work Period Accomplishments (cont.)

- Dylan:
    - Sourced electrical components for the circuit and began designing a more accurate and finished circuit diagram. Also began designing/prototyping the waterproof system for our electronic systems.
- Mikhail:
    - Worked on understanding the basics of grid-based navigation, as well as brushing up on C++ skills for more complicated tasks, and or management of data involving the Arduino. Making a very simple C++ program to make the grid and set up the location of the goal and the robot. And troubleshooting the server that's supposed to run on the Ardiono for testing.
- Hoyt:
    - Worked on planning PCB design for future prototype.
    - Collaborated on electrical system organization for upcoming sensor integrations.
- Shobhit:
    - Worked on the ESP32 camera perception and user interface subsystem.
    - Debugged and stabilized communication between the app and ESP32 module, resolving crashes caused by UART library limitations with enterprise Wi-Fi, small antenna, and module movement.
    - Used camera module to refine object detection testing, collecting accuracy data (ongoing).
    - Researched and documented user input methods for defining salt-spreading areas, including map-based polygon drawing and relevant open-source implementation resources.

Time Tracking

Name	Hours This Period	Cumulative Hours
Isaac Blandin	12	12
Dylan Bunting	6	6
Hoyt Dzwoniarski	6	6
Thomas Huedepohl	6	6
Mikhail McDade	6	6
Shobhit Singh	7	7

Plans for the Upcoming Week

- Full power distribution system implemented
- Parts ordered for the next iteration of drivetrain
- First iteration of the map-based user interface for choosing the salting area
- Differential GPS implementation completed + testing started
- Continued development of the pathfinding system
- Electronics enclosure completed
- Cardboard-aided design of next drivetrain & enclosures
- Improved battery mounting & connections
- Relay/Transistor integrated for salt spreader control

Summary of weekly advisor meeting

- 01/29/2026 Team-Advisor Meeting
    - Gave updates on work that was completed over winter break
    - Discussed budgeting for additional hardware for parallel development amongst the software team
    - The software team presented their plans for the month of February
    - Discussed plans for what needs to be ordered in the coming weeks for our next steps
    - Discussed electrical plans (electronics enclosure/waterproofing, battery connectors, battery housing, power switches, etc.)
    - Discussed plans for our next iteration of the drivetrain (materials, cost, ground clearance)
- 02/05/2026 Team-Advisor Meeting
    - Discussed an ongoing issue with our I2C network for the sensors
    - Continued discussions on electrical system revamp
    - Presented plans for motor relocation to address drivetrain needs discussed in the previous week's meeting.
    - Went through our 4910 reflection in preparation for our first faculty review.