Lab 12: Hylio AG-210 Sprayer Drone Diagnostics

1. Introduction

Modern sprayer drones like the Hylio AG-210 play a significant role in precision agriculture by automating the application of pesticides, herbicides, and fertilizers. These drones rely on various integrated electrical and mechanical systems such as GPS, ESCs, motors, batteries, pumps, and controllers. In this lab, you will learn the procedures for inspecting, diagnosing, and troubleshooting common issues in the Hylio AG-210 sprayer drone to ensure safe and reliable operation.

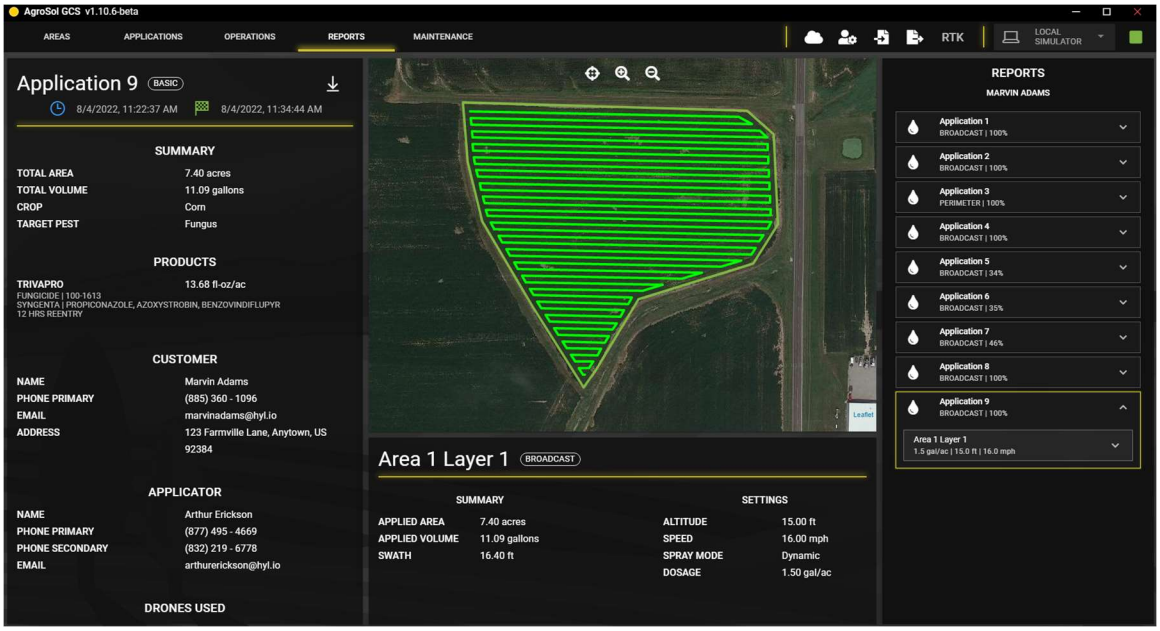
2. Materials and Methods

2.1 Materials Required

• Hylio AG-210 Sprayer Drone

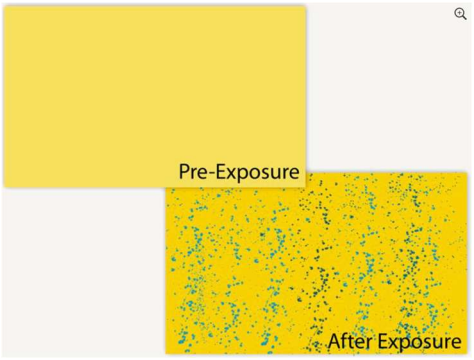
• Intelligent LiPo Battery (12S 16 Ah) and Charger

- Multimeter
- Field Tool Bag (screwdrivers, pliers, etc.)
- Laptop with AgroSol GCS software



• Hylio GroundLink Flight Controller

• Safety gear (gloves, safety glasses, PPE)
• Water sensitive papers (for spray tests)



• First Aid Kit, Spill Kit, Fire Extinguisher
• Drone Landing Pad and Generator

2.2 Methodology

2.2.1 Experiment 1 – Component Familiarization and Preflight Checklist

i. Identify and visually inspect all key components of the AG-210 sprayer drone: arms, frame, motors, propellers, battery compartment, GPS module, diaphragm pump, nozzle array, and electronics bay.

ii. Follow the official field checklist before operation:

- Verify that drone batteries are fully charged.
- Ensure the controller, drone, laptop, and mission software are communicating.
- Confirm all safety equipment and water-sensitive paper are packed.
- Perform site survey for safe flight and weather check.

2.2.2 Experiment 2 – Functional Testing and Diagnostics

i. Power on the AG-210 drone and establish connection with AgroSol GCS software via GroundLink controller.

ii. Perform the following functional checks:

- Arm the motors and perform motor spin test (without lift).
- Activate spray pump and observe nozzle flow rate using water-sensitive paper.
- Check GPS lock status and log satellite count.
- Monitor battery status under light load.

iii. Simulate minor faults:

- Disconnect ESC signal wire and observe behavior.
- Disable GPS temporarily to check failsafe triggers.
- Block nozzle to observe system warnings.

2.2.3 Experiment 3 – Emergency Procedures and Report

i. Review the emergency scenarios:

- Flyaway/loss of control
- Battery failure
- Environmental hazard (wind, bird strike, etc.)

ii. Follow procedures from SDSU Emergency Response Plan:

- Engage RTH if available; otherwise, safely land.
- Notify authorities and record GPS.
- Log incident and file report to SDSU safety office.

iii. Submit a written summary describing your observations, faults simulated, and responses.

3. Discussion

In the lab report, discuss your understanding of sprayer drone subsystems and diagnostics. Attach screenshots of telemetry data, spray test results, and GPS status. Highlight how failures were simulated and resolved. Discuss how emergency scenarios could be prevented or handled efficiently in real-world agricultural operations.