3.3 Results of Testing

Each test at each level was repeated 10 times.

Unit-level Testing:

3 unit-level tests were conducted. checkMoveSize, checkMoveAngle, and checkNoFly.

checkMoveSize generated a path as a list of points and got the size for each move and asserted that the distance between each point was 0.00015 The test passed for all randomly generated paths.

checkMoveAngle worked similarly, it asserted all angles formed between each movement step laid within the predefined 16 angles. Angles were calculated for each step in a generated path, and the test passed for all randomly generated paths.

checkNoFly verified that generated paths did not intersect with no-fly zones, which were retrieved from the ILP REST service. Each path segment was checked for intersection with restricted areas, and assertions confirmed that no intersections occurred. This test passed for all generated path.

Integration-level Testing:

2 Integration level tests were conducted. validDeliveryPath and validDataRetreival.

validDeliveryPath combined the movement constraints validated in the unit level and asserted that a complete delivery path could be generated that satisfied all constraints, including valid step size, valid angles, and avoidance of no-fly zones. All generated paths passed this test.

validDataRetreival validated integration with the external ILP REST service. Data for drones, restricted areas, service points, and drones for service points was retrieved and stored in arrays. Assertions verified that the size of each dataset matched manually verified counts from the source service. The test passed consistently.

System-level Testing:

2 system-level tests were conducted. under30SecondsTest and viewOutput.

under30SecondsTest asserted that execution of the calcDeliveryPath endpoint completed within 30 seconds. System time was measured before and after execution, and the test passed for all randomly generated delivery sets.

viewOutput asserted that the output of the calcDeliveryPath endpoint was valid JSON by attempting to parse the output string. All outputs were successfully parsed, and the test passed for all generated inputs.