

Team Number: Group 32

Project Title: Multiple Drones Coordination System

Report Date: 03/24/2025

Part one:

All team members have detailed tasks listed on Team's Planner: YES or NO; if NO, explain.

Yes.

Please answer the following questions:

1. Have you met as a team this past week? If yes, give date/time, and the members attended the meeting. If no, explain.

Yes, we met multiple times. 3/29/25 1PM EST. and 3/30/25 1AM EST

2. Have you met with the sponsor as a team? If yes, give date/time, and the member attended the meeting. If no, explain.

No, we did not meet with the sponsor this week. We have not received a request for it from our sponsors; and we did not contact our sponsor as we were focused on the last stages of our project.

3. Describe verbally the tasks completed the past week and the challenges faced.

Tutku Gizem Guder (Target Detection Subsystem)

- Tested the target detection system with one drone in different environments using airsim and the game engine.
- Tested the communication between multiple drones in different environments.
- Optimization of target detection implementation
- Optimization of the communication between drones and the environment.

Matthew P.(User Interface)

- **Integration:** Debugging UI and integration of live metrics with arisim.
- **Testing and Feedback:** Conducted user testing and gathered feedback for improvements.

Brenden Martins (3D Simulated Environment Subsystem)

- Optimized Environment for more seamless integration with other subsystems.
- Integrated the UI for the live metrics tracking alongside Matthew Paternoster.

4. Describe the tasks to be completed the coming week.

Tutku Gizem G. (Target Detection Subsystem)

- Testing after the integration.

Brenden Martins (3D Simulated Environment Subsystem)

- Working together with the other subsystems to have the integration fully done.

Matthew Wyatt (Data Management and Communications Subsystems)

- Continue to sync data with AirSim, the user interface, and our MySQL database as well as work to bring communications between other AirSim-specific subsystems.
- Test and debug integrations between the other subsystems and AirSim.

Student Name	# Tasks completed past week	# Tasks not completed	# Tasks for next week
Brenden Martins	1	1	1
Matthew Paternoster	1	1	1
Matthew Wyatt	2	0	2
Tarek Kayali	2	1	N/A
Tutku Gizem	2	1	1

Name of the Member: **Tutku Gizem Guder**

Report Date: **3/24/2025**

Completed Tasks & Challenges

- Successfully implemented the algorithms using Unreal Engine and AirSim.
- Challenged by various development hurdles to ensure the algorithms function effectively within the simulation framework is
- Adapted to use Unreal Engine after spending some time with Unity
- Addressed initial compatibility issues between the implemented algorithms and the simulation environment.
- Currently tackling the challenge of integrating the subsystem seamlessly with the environment and other subsystems, ensuring smooth interoperability.

Remaining Tasks

- Finalizing the integration process, refining connections between components for optimal performance.
- Conducting thorough performance testing to evaluate system stability, efficiency, and responsiveness.
- Fine-tuning and optimizing the overall system for reliability and scalability.

Name of the Member: Matthew Wyatt

Report Date: 3/24/2025

List the following:

1. All tasks completed the week before the past week (completion date in parenthesis). This is copied from the last report, and if this report is the first one, skip.

a. (3/22/2025) AirSim Integration Setup

Description: Set up the AirSim simulation environment and prepare it for integration with the project subsystems. This includes installing dependencies, configuring the environment, and ensuring compatibility with project requirements.

Outcome: A fully configured AirSim simulation environment that is ready for

integration with the Drone Control, Target Detection, and Simulation Management subsystems.

2. All tasks completed the past week (completion date in parenthesis)

a. (4/6/2025) AirSim Integration (Drone Control, Target Detection, Simulation Environment)

Description: Began integrating the AirSim simulation environment with the project subsystems, including Drone Control, Target Detection, and Simulation Management. Initial integration steps were completed, but bugs were discovered during integration testing, which delayed full completion.

Outcome: Integration is partially complete. Bugs identified during testing are being addressed to ensure seamless functionality between the AirSim environment and the project subsystems.

b. (4/6/2025) Integration Testing

Description: Perform integration testing for the AirSim environment, Drone Control, and Target Detection subsystems. Ensure all components work seamlessly together and meet project requirements.

Outcome: Identified issues for resolution to be fixed next week to fully integrate the various subsystems into one singular working prototype.

3. All tasks you are currently working on or planned for this coming week (completion date in parenthesis)

c. (4/6/2025) Subsystem Data Integration (User Interface Subsystem with Database Subsystem)

Description: Integrate the User Interface Subsystem with the database and other project subsystems (already integrated with simulation environment). Ensure that the UI can display real-time data from the Drone Control and Target Detection subsystems during simulation.

Desired outcome: Display a fully integrated User Interface Subsystem that provides accurate and real-time data visualization for the simulation environment.

d. (4/6/2025) **Project Testing and Debugging**

Description: Conduct comprehensive testing and debugging of the integrated system, including all subsystems and the AirSim environment. Identify and resolve any remaining issues to ensure the system meets project requirements.

Desired outcome: A stable and fully functional system that is ready for further development and deployment.

Name of the Member: Matthew Paternoster

Report Date: 03/24/2025

Implementation (2/26):

- **Testing and Feedback:** Continue to debug and refine the UI and live metrics integrated with airsim. Python server connects successfully with AirSim, however the drone feed does not work still.
- **Testing Integrated System:** Drone feed still not displaying correctly, still trying to debug.

Next Steps:

Continue to test the communication between the UI and AirSim, and figure out why the live drone feed still does not work. I believe it might be because of having to use older out dated versions of airsim and unreal engine.

Name of the Member: Brenden Martins

Report Date: 3/24/2025

List the following:

1. All tasks completed the past week (in this example template, tasks between 1/20 and 1/26) (completion date in parenthesis) **Highlight these tasks headers in green.**

Simulation Environment Optimization (03/24/25)

Description: Focused on optimizing the 3D simulation environment within Unreal Engine to support more seamless and stable integration of other subsystems (e.g., UI, Target Detection, Drone Control, and Data Management). This involved:

- Cleaning up unnecessary runtime actors
- Reducing render complexity for better performance
- Preparing scene architecture to accommodate additional drones and live sensor input
- Ensuring consistent behavior of the simulation across runs for reliable subsystem testing

Outcome: The simulation now seems to be able to open when unzipped and downloaded from a compressed file. Allowed for the integration of the UI for the drone metrics.

2. Tasks you attempted but did not get to complete due to time constraints or other factors in the week (in this example template, tasks between 1/20 and 1/26).

None (03/24/25)

Name of the Member: Tarek Kayali

Report Date: 3/23/2025

Tasks Completed the Past Week (completion date in parenthesis)

(03/17/2025) Initial Integration of Drone Control Subsystem

Description: Integrated the Drone Control Subsystem with MySQL for data retrieval and logging. Established foundational communication between the control module and AirSim to initiate autonomous flight paths using predefined coordinates.

Outcome: Enabled basic autonomous flight execution and ensured real-time synchronization of drone telemetry with the central database.

(03/17/2025) Flight Logic and Pathing Test Runs

Description: Developed and tested basic flight control algorithms within AirSim, including waypoint navigation and response to environmental boundaries.

Outcome: Drones successfully navigated through simulated environments using scripted paths; this validated the early logic for pathing and command response.