Team Number: Group 32

Project Title: Multiple Drones Coordination System

Report Date: 1/27/2025

Part one:

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

No, we currently have tasks for short-term, mid-term, and long-term, we are just waiting to confirm deadlines that are reasonable and sufficient for each member.

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.

No, one of our team members is overseas and can't meet through conventional means and other members have conflicting work schedules, so we try to meet various times with whoever is available.

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

Not yet, we haven't had a meeting scheduled from the sponsor this semester yet.

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

In the past week, we have created reasonable, efficient tasks to be used as an outline for the remainder of our project.

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

Brenden M. (Simulation Management Subsystem)

- Set up tasks deadlines to efficiently track progress.

Matthew P.(User Interface)

- Start planning for the implementation for real-time data updates from AirSim.
- Optimize UI performance to handle large-scale simulation data smoothly.
- Conduct further testing to ensure synchronization between UI components and real-time drone operations.

Tutku Gizem G. (Target Detection Subsystem)

- Refining the Target Detection Subsystem

  Improving the accuracy and speed of the machine learning model for real-time data processing.

Matthew Wyatt (Data Management and Communications Subsystems)

- Sync data with AirSim and work to bring communications between other subsystems.

Student Name	# Tasks completed past week	# Tasks not completed	# Tasks for next week
Brenden Martins	1	1	2
Matthew Paternoster	1	0	3
Matthew Wyatt	2	0	2
Tarek Kayali	N/A	N/A	N/A
Tutku Gizem	1	1	1

Name of the Member: Brenden Martins
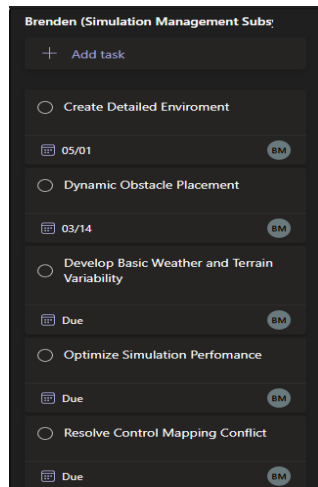
Report Date: 1/20/2025

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) <mark style="background-color:#00ff00">Highlight these tasks headers in green.</mark>

<mark style="background-color:#00ff00">**Finalized Task Scheduling and Deadlines (2/2/2025)**</mark>

- Description:

  - Established a timeline for all tasks under each subsystem/role, ensuring that all milestones will align with the overall project schedule.

  - Tasks were assigned priority levels (short-term, mid-term, long-term) based on dependencies and required resources.

- Outcome:

  - Created a detailed roadmap that allows for better task tracking and coordination across subsystems.

  - Enabled efficient workload distribution and reduced the risk of bottlenecks in project execution.

Brenden (Simulation Management Subs)

+ Add task

○ Create Detailed Enviroment
📅 05/01   BM

○ Dynamic Obstacle Placement
📅 03/14   BM

○ Develop Basic Weather and Terrain Variability
📅 Due   BM

○ Optimize Simulation Perfomance
📅 Due   BM

○ Resolve Control Mapping Conflict
📅 Due   BM

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).

Integration of Dynamic Weather System (1/27/25)

- Description:

  - Attempted to implement AirSim's built-in weather system to introduce rain, wind, and fog variations dynamically.

  - Encountered issues with AirSim's weather API conflicting with environment lighting, causing unexpected graphical glitches.

  - Did not complete due to to time spent troubleshooting and debugging unexpected behavior in weather transitions.

- Outcome:

  - Identified the core issue related to UE4's volumetric fog rendering affecting visibility calculations in AirSim.

  - Next steps involve adjusting lighting settings and testing weather interpolation effects for smooth transitions.

Name of the Member: **Matthew Paternoster**

Report Date: **1/20/2025**

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) <mark style="background-color:#00ff00">Highlight these tasks headers in green.</mark>

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). <mark style="background-color:red">Highlight these tasks in red.</mark> (attempt date in parenthesis)

<mark style="background-color:#00ff00">For **each** task you have completed **during the past week**:</mark> **Avoid leaving filler or template text in your reports**

1.   <mark style="background-color:#00ff00">Task #1/Completion of MDCS Press Release Document</mark>

2.   Short description – these descriptions form the basis of the final project report

   a.   Implementation:

- Made UI enhancements to improve the usability of the platform for first responders.
- Finalizing improvements to AI coordination.
- Additional debugging was required to ensure seamless communication between multiple drones.
- Integrate UI with AirSim for Real-time data updates.

    b.   Results:

Initial testing provided valuable feedback on coordination challenges, particularly in obstacle avoidance and multi-drone synchronization.

3.   Outcome of the task activity

Identifying Optimization Needs: Testing revealed areas requiring further refinement, particularly in large-scale disaster simulations.

Improving User Experience: UI enhancements made the system more intuitive for disaster management teams.

Providing a Roadmap for Next Steps: This week's work set the foundation for scaling up test scenarios and refining.

<u>Next Steps:</u>

- Continue refining target detection and obstacle avoidance.
- Integrate UI with AirSim and real-time data updates.

Name of the Member: Tutku Gizem Guder

Report Date: 1/20/2025

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

Refining and calibrating the Target Detection Subsystem (1/26/2025); however, this is still an ongoing task that needs to be continued (what I proximate) close to the demo time.

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).

Implementation:

Although I managed to improve the accuracy and speed of the machine learning model for real-time data processing. I still need to conduct additional testing to validate these improvements.

Results:

By improving the accuracy and speed of the machine learning model, I could increase efficiency in detecting and tracking targets in simulation; but this is not validated and is not coherent.

Next Steps:

Continue improving real-time processing accuracy.

Implement additional validation measures for the model.

Keep working on the trials to yield fruitful results.

Name of the Member: Matthew Wyatt

Report Date: 1/27/2025

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. (1/26/2025) Requirement Analysis

Description: Analyzed the project requirements based on the proposal. This involved understanding the scope, objectives, and deliverables of the project. Outcome: Established a clear understanding of the project requirements, which will guide the subsequent phases of the project.

b. (1/26/2025) Database Review Part I

Description: Reviewed the MySQL database that was already created to ensure it meets the project requirements. This involved checking the schema, data integrity, and relevance of the data.
Outcome: Confirmed that the MySQL database itself is suitable for the project, ensuring that we have access to the necessary data. However, we may need to migrate the location of the server.

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

a. (2/2/2025) Database Review Part II

Description: Continued evaluation and optimization of the MySQL database to ensure data quality and performance.
Outcome: Optimized the MySQL database for better performance and confirmed its readiness for integration with AirSim.

b. (2/2/2025) API Review

Description: Reviewed the existing API created to sync data between the UI and MySQL.
Outcome: Confirmed that the API is suitable for syncing data between the UI and MySQL, ensuring seamless data flow and integration.

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

a. (2/9/2025) Data Integration

Description: Integrate the MySQL database with AirSim using identified APIs.
Desired outcome: Enable the simulation to use real-world data.

b. (2/9/2025) Data Syncing

Description: Ensure that the data between the MySQL database and AirSim remains synchronized.

Desired outcome: Maintain data consistency between the database and the simulation environment.