Team Number: Group 32

Project Title: Multiple Drones Coordination System

Report Date: 03/10/2025

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 as a group on Thursday (1PM) and Saturday (1PM). Although not everyone could make it to both, we managed to meet with everyone in this way..

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. We were settling back into our routines after the spring break.

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

Tutku Gizem Guder (Target Detection Subsystem)

- Conducted target detection testing for changing the targets and maintaining a focus on the targeted object. Prior issues persisted in the first few runs, but seemed to get fixed upon the later runs.
- Implemented the drone system in Unity through AirSim, where the drone can detect a target and approach its location.

Matthew P.(User Interface)

- **Integration**: Continue to improve the drone feed, implement seamless integration, and add more features.
- **Testing and Feedback**: Conducted user testing and gathered feedback for improvements.

Brenden Martins (3D Simulated Environment Subsystem)

- Overhauled the 3D environment for a more accessible, more fleshed out environment which includes easier access for integration with other subsystems.
- One of the challenges we faced was integrating parts into the 3D environment, converting from Unity to UE 4.27

Matthew Wyatt (Data Management and Communications Subsystems)

- Continue to sync data with AirSim and our MySQL database as well as work to bring communications between other subsystems.
- Integrate the other subsystems with each other, primarily focusing on integration between subsystems that use AirSim first (Control, Target Detection, Simulation Environment).

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

Tutku Gizem G. (Target Detection Subsystem)

- Retrying Unreal Engine

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

Name of the Member: Tutku Gizem Guder

Report Date: 3/10/2025

Testing and Implementation

- I tested the algorithm again, and it got better at identifying man-made objects (vehicles, sidewalks, etc.), and moving biological targets (animals and humans)
- Focused on improving the speed of target tracking and re-tracking, I am satisfied with it. Majority of the lags seem to be gone.

Coming Up Tasks

- I'm looking for integration methods to combine the algorithm I developed with the 3d environment the team has created. I am especially looking to integrate the algorithm without doing much reprogramming

Name of the Member: Brenden Martins

Report Date: 3/10/2025

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.==

==Finished Implementing a New 3D Environment (2/24/25)==

We had an issue with converting one of our subsystems' parts into UE 4.27. To try and help mitigate this issue and have a more intuitive integration process, I overhauled the 3D environment and was able to incorporate a 3D simulated environment with a much more fleshed out cityscape.

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 (03/10/25)==

Name of the Member: Matthew Wyatt

Report Date: 3/10/2025

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.   (3/10/2025) <mark>Performance Optimization</mark>

   Description: Optimize the performance of the integrated system. Identify and address any bottlenecks in data retrieval, processing, and syncing between MySQL and AirSim.
   Outcome: Ensure that the subsystems are able to perform tasks smoothly, securely, and quickly.

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

   a.   (3/15/2025) <mark>Subsystem Data Integration (Communications)</mark>

   Description: Enhanced the communication subsystem by streamlining data exchange processes between MySQL and AirSim. Focused on improving system responsiveness and reliability by addressing latency issues and optimizing data synchronization pipelines.
   Outcome: Achieved a robust and efficient communication framework capable of handling high-throughput data exchange securely and without interruptions.

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

a. (3/22/2025) <mark>Subsystem Data Integration (Drone Control Subsystem)</mark>

Description: Integrate the MySQL database with the Drone Control Subsystem using identified APIs. Coordinate with other subsystem components to ensure seamless integration.

Desired outcome: Enable the Drone Control Subsystem to utilize real-world data effectively and ensure smooth alignment with other subsystems.

b. (3/22/2025) <mark>Subsystem Data Integration (Target Detection Subsystem)</mark>

Description: Integrate the MySQL database with the Target Detection Subsystem using identified APIs. Meet up with other subsystem components to coordinate and advance integration efforts.

Desired outcome: Enable the Target Detection Subsystem to process real-world data accurately and ensure smooth integration with other subsystems.

Name of the Member: Matthew Paternoster

Report Date: 3/10/2025

Implementation:

- **Integration**: Continue to test the integration of the live metrics and drone feed.
- **Testing and Feedback**: Conducted user testing and gathered feedback for improvements.
- **Testing Integrated System**: Implement switching betwee the feed of the multiple drones.

Next Steps:

Continue to test the Python server with the UI with AirSim and implement the ability to switch between the feeds of the different drones. Also, continue to improve and update the features as we go.

Name of the Member: Tarek Kayali

Report Date: 3/16/2025

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

(Skipped since this is the first report.)

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

1. (3/15/2025) Initial System Setup & Configuration

Description: Set up the development environment for the Drone Control Subsystem, including configuring AirSim, MySQL, and necessary APIs for communication. Ensured all dependencies and libraries were installed and operational.

Outcome: Established a functional environment for subsystem development and integration, allowing for smooth workflow in upcoming tasks.

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

1. (3/22/2025) Flight Control Algorithm Development

Description: Develop and refine the control algorithms for autonomous drone movement, including waypoint navigation, altitude control, and obstacle avoidance using sensor data. Test in AirSim for initial validation.

Desired Outcome: A stable and efficient control algorithm that allows the drone to move autonomously while avoiding obstacles.

2.   (3/22/2025) Subsystem Data Integration (Drone Control Subsystem)

Description: Integrate MySQL database with the Drone Control Subsystem to store and retrieve mission parameters, flight logs, and telemetry data. Ensure seamless communication between the database and drone operations.

Desired Outcome: Enable the Drone Control Subsystem to utilize real-world data effectively and maintain accurate records for further analysis.