DRONE SPOOF DETECTOR

- Team -

- Leah Casey
- Samuel Gross
- Logan Parker
- Ashley Vanaman
- Michaela Walker
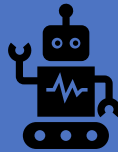
Client Information

Pierce
Aerospace

Aaron (CEO)

Gary (CTO)

Chris (Direct
contact)

Overall benefit of the project to the client

ABILITY TO VIEW DRONE INFORMATION IN A 3D TOPOGRAPHIC SPACE, RATHER THAN JUST A TOP-DOWN MAP VIEW

ABILITY TO FILTER OUT "SPOOFED" DRONE INFORMATION AND SEE ONLY REAL DRONE INFORMATION ON THE SCREEN INSTEAD

ABILITY TO SEE THE FLIGHT PATH OF A DRONE OVER TIME

ABILITY TO SEE WHERE THE OPERATOR LOCATION IS AT

FEATURES

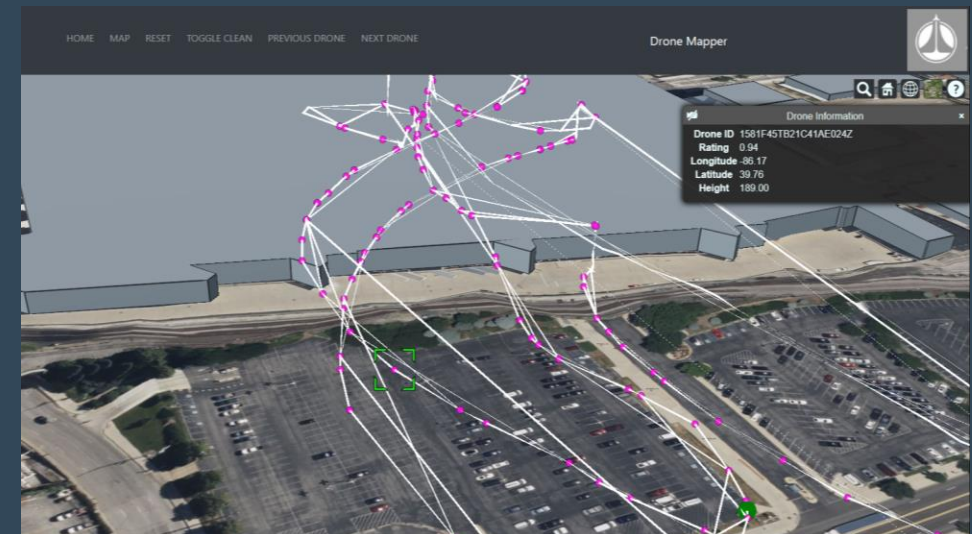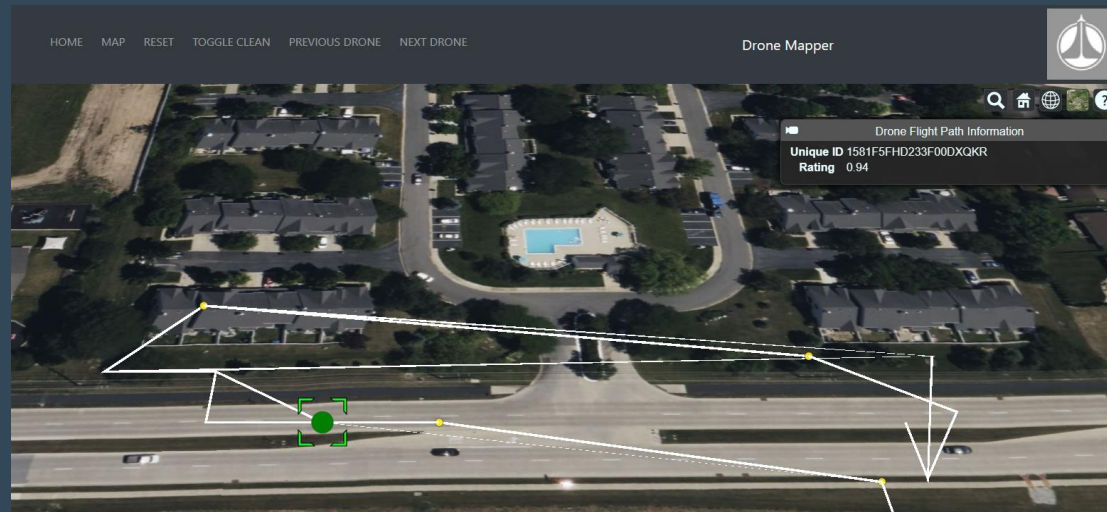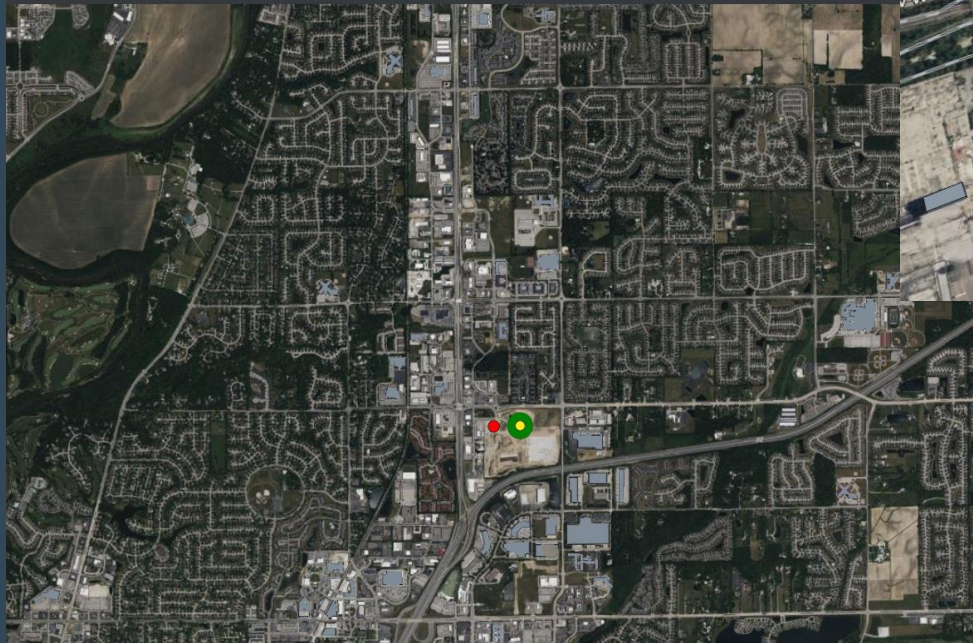# Feature 1 : Buttons to cycle between individual drones

Feature 2: Map overlays (Streets, building names, etc.) & scaling data points
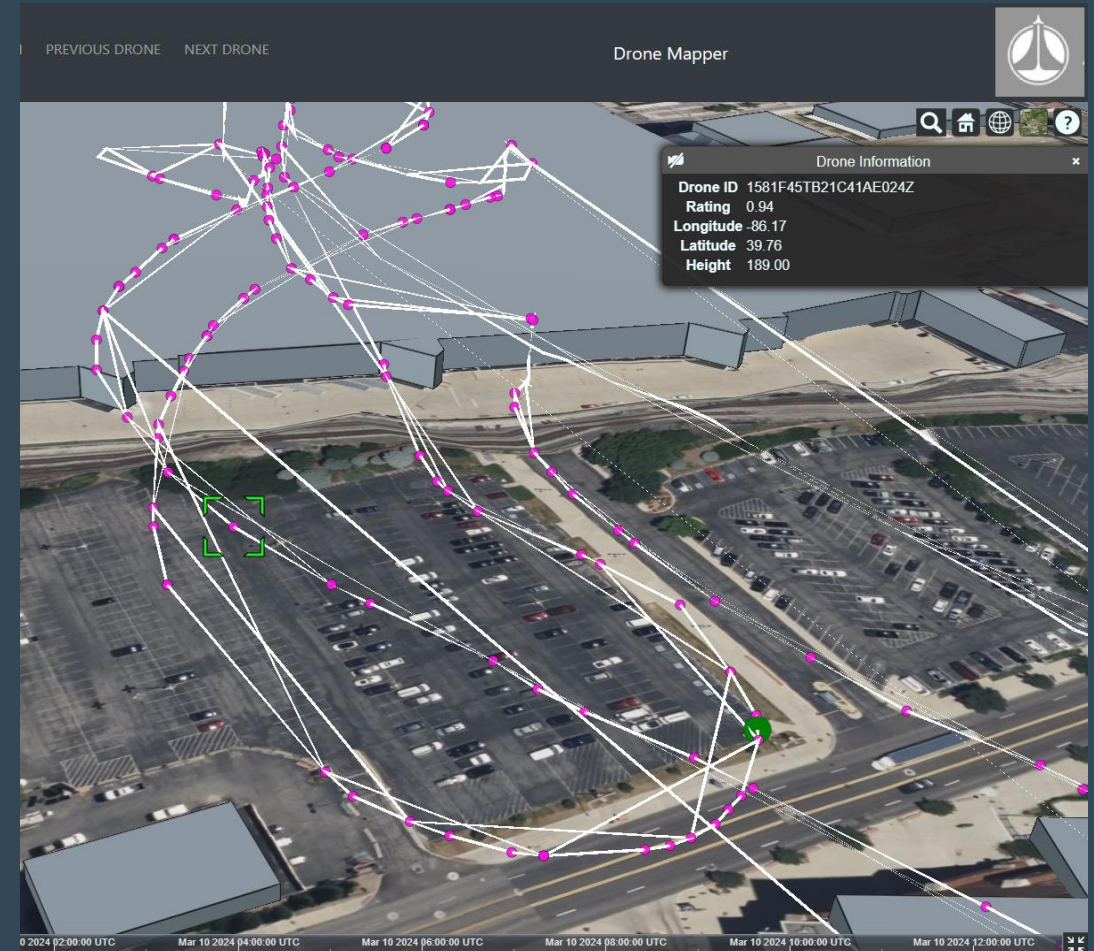
Feature 3: Improved flight paths (Data points, time functionality, flight path information)

Business Requirements Connections

- **BR1**
  - **Develop a data curation framework for forensic users that can identify potential spoofing attacks within certain cyber-physical systems.**

- **BR2**
  - **Display visual and text information to end-users.**

- Feature 1 connects to BR2
  - Adding buttons to cycle the camera to different drones gives the user more ease-of-use in finding drone data on the map itself.

- Feature 2 connects to BR2
  - The Map overlay gives the user access to street information, as well as scaling the drone data points when the camera zooms out so the user can easily see drone information from a zoomed-out perspective.

- Feature 3 connects to BR2
  - Flight paths now show the data points that have formed the flight path, each with individual information.
  - A drone now follows the flight path using the cesium time functionality and the data point timestamps
  - Flight paths now have information about the drone and its overall rating when clicked

FEEDBACK

Mentor

Mid-Iteration

- Concerned with our lack of progress towards Unreal Engine
- Liked that we wouldn't have to remake python code in Unreal
- Suggested shifting to add more functionality to web page
- Offered to help with converting C++ classes to Blueprints

End of Iteration

- Discussed the shift from Unreal Engine back to the web page
- Clarified the new features the group added to the web page instead of getting UE up to par
- Very happy we were able to add new functionality to the project this late into the iteration
- Said he was glad we were able to come together in the end and make some coordinated progress

Client

End of Iteration
- Believes our product looks good compared to a professional product they currently use.
- Believes this project was a good real-world experience.
- Liked our last iteration features - "Icing on the cake".
- Was disappointed it was still a webpage, but they are still happy with it
- Was glad we did a landing page – they wanted a page with instructions but forgot to mention it.

Client using software
- Client used software well.
- Client tested the features by interacting with the webpage, the drone flight path, and the new button features.
- Client used the software for 5 minutes.
- Client was excited about the software. They had no complaints of the landing page nor the UI.
- There was nothing unusual and no issues noted.

Team Contributions

- Leah: Updated backend testing to raise coverage. Added the ability to see many map overlays on Cesium. Added styles and some general instructions to the user landing page. Spent a lot of time learning about Unreal, which we ultimately had to abandon.

- Samuel: I added time functionality to the cesium JavaScript that reordered the drone points according to time stamp and plotted them in such a way that we could have multiple in the air at once. This required me to restructure a lot of the JavaScript, store information in arrays and dictionaries, and add code to do things like clearing the display and resetting certain lists. The client gave us a new dataset he wanted analyzed, so I revamped our test mode to display it, created a new configurations file, and created a rating system for each drone, as well as changing the structure of the output JSON to be better for the frontend. Then I added back in our lost functionality of being able to switch between real and fake data and our operator data.

- Logan: In Unreal, added more configuration variables to FLocationData structure, as well as adding config variables to drone, drone controller, and drone receiver. Changed drone controller ConnectToServer() to poll server, print information, then wait 10 seconds before looping. On the webpage, added buttons to webpage to cycle between drones. Added buttons to webpage to cycle through drones and implemented barebones landing page. Worked with Leah to add a reset button and more information to the flight path. Configured CI workflow to run JS unit tests and print coverage report.

- Ashley: Learned more about Unreal, Python, and JavaScript. Worked on the time functions in JavaScript and the tests for it.

- Michaela: When working on Unreal, was trying to figure out how to test in unreal and produce tests for the UEUI project Chris had provided for unreal. After the transition to webpage, I worked on figuring out Javascript testing and implementing that for our Webpage.

Time To Drink