Elijah Keck

Engineering Notebook

**09/13/21**

* Began researching AirSim and how to install it to use for development

**09/16/21**

* Installed AirSim
* Installed Visual Studios 2019
* Installed Unreal Engine 4

**09/19/21**

* Installed Blocks Environment and generated car and multi rotor
* Was able to manually control car -- Unable to manually control multi rotor
* Worked on Product Backlog

**09/23/21**

* Examined AirSim documentation for multi rotor movement and generation

**09/27/21**

* Drew up use case and DFD for UAS
* Worked on SDD and SRS 1st draft
* Began Sprint Demo Presentation

**09/28/21**

* Finalized SDD and SRS first drafts
* Worked on sprint demo presentation
* Worked on spawning drones in AirSim

**09/29/21**

* Edited AirSim settings.json to allow for drone spawning in any location/number
* Created videos for sprint demo
* Uploaded videos and information onto sprint demo presentation slides

**09/30/21**

* Completed sprint demo

**10/07/21**

* Researched AirSim APIs to develop movement

**10/11/21**

* Met in person to speak about current implementation of the project, AirSim installation, AirSim APIs

**10/13/21**

* Researched AirSim APIs to develop movement
* Researched AirSim contributed tutorials

**10/18/21**

* Researched how to execute python scripts in Unreal Engine 4
* Executed tutorial python scripts in Unreal Engine 4
* Worked on Test plan v1
* Tested takeoff and landing functions in simulation
* Tested moving along a path function in simulation

**10/19/21**

* Finalized test plan v1 changes

**10/25/21**

* Worked on changes to SDD and SRS to make SDD and SRS v2 based on feedback
* Made class model and updated previous diagrams for SDD
* Had PO meeting

**10/26/21**

* Finalized SDD and SRS changes to v2

**10/27/21**

* Created python scripts for single and multiple uav movement
* Created python script for uav communication (ping pong information)
* Recorded demo videos
* Uploaded videos and new diagrams for sprint demo presentation
* Tested uav single drone movement
* Tested multiple uav movement and communication

**10/29/21**

* Completed sprint demo presentation

**11/2/21**

* Got feedback on presentation

**11/9/21**

* Began research about multi agent AirSim simulations

**11/16/21**

* Began work on agents stationkeeping around a lead drone (the sink)
* Began research on geometries provided by Dr. Akbas

**11/19/21**

* Finished agents stationkeeping around a lead drone with constant communication of position updates to the two agents from the lead drone
* Researched lead-follow drone dynamics in AirSim

**11/21/21**

* Implemented the first case for drone swarm formations
* Implemented a way to keep track of how many drone actors are active in the simulation
* Began implementation of case structure for number of drones correlating to formation used based on provided algorithms

**11/22/21**

* Tested implementation of 2 drone actor geometry
* Researched drone port overloading to avoid the issue seen in many GitHub issue reports on AirSim
* Researched waypoint generation for drone swarm given start and end point

**11/29/21**

* Worked on SDD feedback changes and additions for final version
* Added to case structure for AirSim drone swarm geometries

**11/30/21**

* Worked with IT to finalize setup of the lab computers to develop with AirSim and unreal
* Finalized changes to SDD and pushed final version to GitHub

**12/02/21**

* Added more cases to case structure of AirSim drone geometries
* Met about measurement implementation
* Reviewed code about the object slice method

**12/03/21**

* Finished all drone geometry cases
* Discussed implementation of measurement of volume using trapezoid integration with scipy
* Researched NED to unreal coordinate system translations

**-- SEMESTER 2 --**

**01/17/22**

* Discussed project goals
* Discussed major modules to implement
* Set up zen hub for semester 2

**01/18/22**

* Discussed individual tasks to fit within the major modules
* Discussed implementation of modules and tasks
* Created Epics in zen hub for the modules
* Created individual tasks on zen hub

**01/19/22**

* Continued creating individual tasks on zen hub
* Continued discussing and coming up with tasks for implementation of solutions

**01/25/22**

* Created individual settings .json files for each amount of drones (2-8 drones)
* Fixed formations to add the proper offset from the spawn point described in the settings .json
* Finalized product backlog

**01/26/22**

* Changed method of getting drone position from the multi rotor state function to use ground truth data

**02/01/22**

* Made all formations use ground truth data
* Pruned SDD outdated information

**02/02/22**

* Added new state charts into SDD for new modules

**02/03/22**

* Added fixes for old information and added new sections for current work in SDD

**02/04/22**

* Finalized SDD V1 for semester 2 with filling out new sections

**02/08/22**

* Worked on swarm pathing class in conjunction with Dillon's linked list class
* Added method to put drones on waypoint path
* Added method to detect waypoint arrival
* Changed swarming script to a class file
* Added a testing script to centralize testing and execution of new classes and modules