



Aerial Swarm Simulators

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Introduction

The aerial swarm will be autonomous with a unified, cohesive behavior that will be able to collect data from a three dimensional environment.

Benefits:

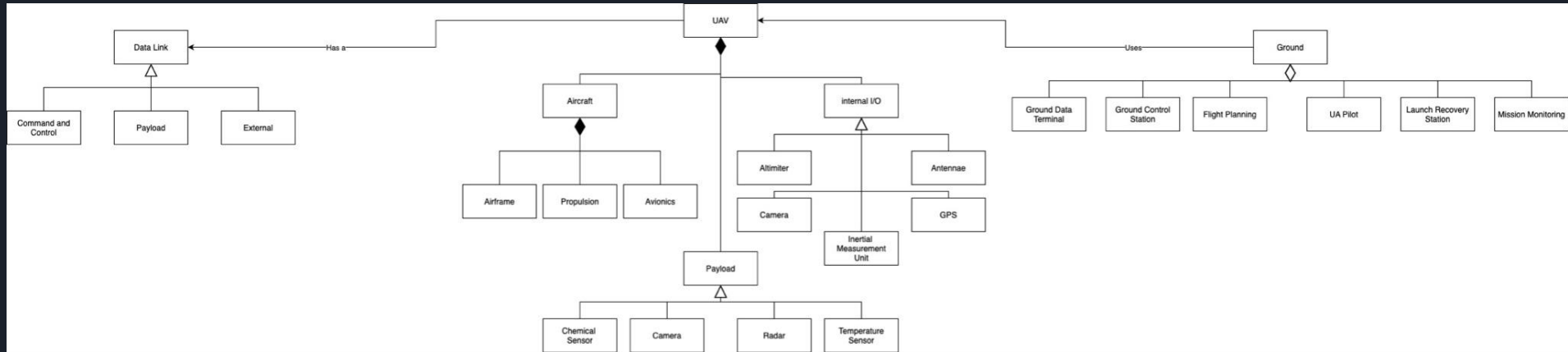
- Safer for dangerous areas
- Easier for time constraint mission



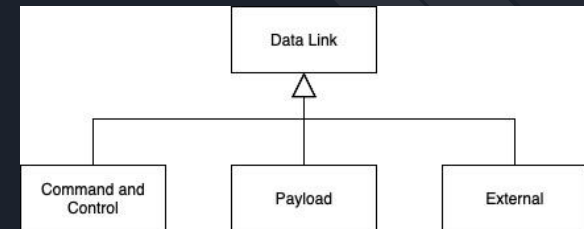
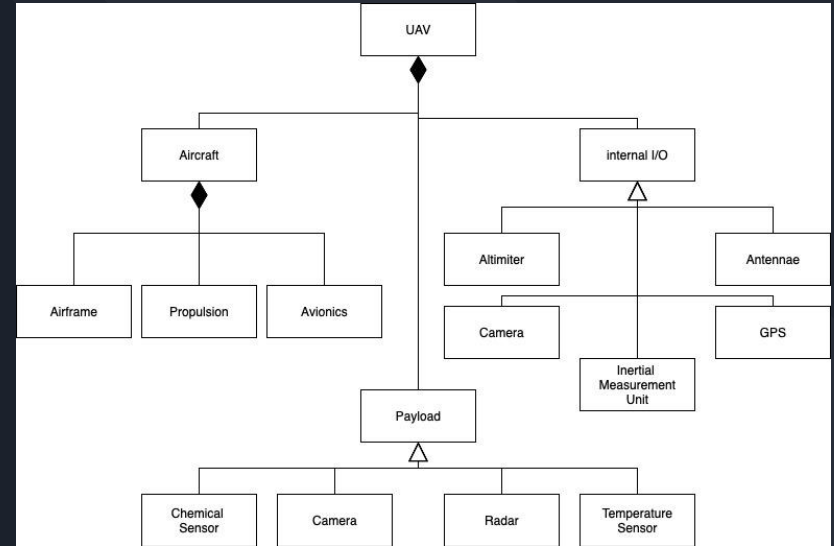
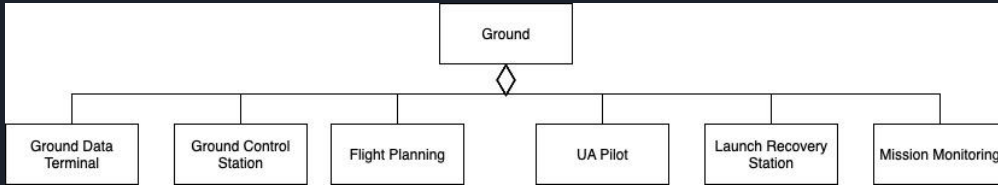
Design Considerations

- Assumptions
 - Intercommunication is not realistic
 - UE4 and AirSim are without error
- Dependencies
 - Only usable within Microsoft's AirSim
 - UE4 and VS 2019
- Design Constraints
 - Limited to UE4 environment
 - Collisions/ objects constrained
- No safety or cyber security considerations

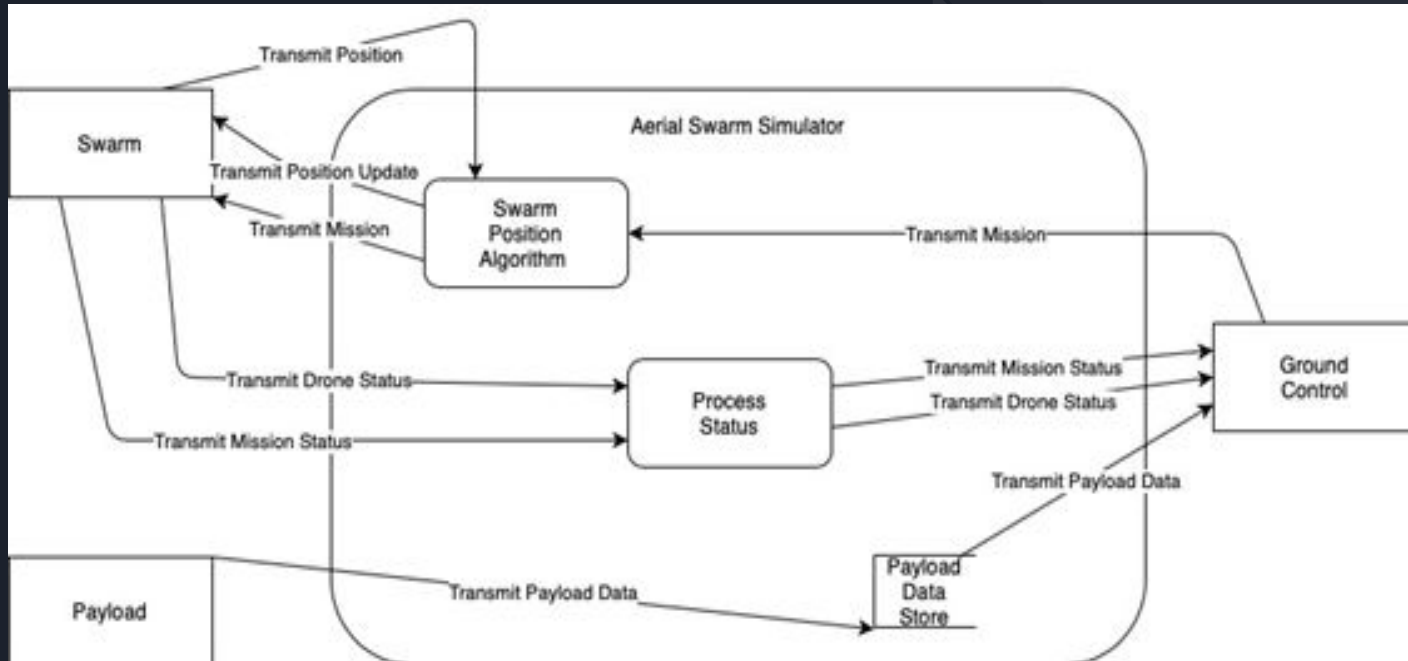
System Architecture (high to Low)



Sub-System Design 1



Sub-System Design 2





Single Autonomous UAV Demo

- Single UAV is able to take off
- Take measurements
- Move in a pattern
- Land



Ping Pong Communication Demo

- Multiple UAVs simulate communication
- One UAV moves to a location
- Takes status
- Passes estimated position coordinates
- Second UAV moves to a relative distance of the first UAV



Lessons Learned

Sprint 1

- Increase collaboration
- More In-person meetings

Sprint 2

- Steep “economy of scale”
- Design & Implementation Differences
- Don’t reinvent wheel



Project Timeline

Sprint 1 Promised

- Model multiple UAV
- Motion behavior
- “Pong” game
- SRS V1.0
- SDD V1.0

Sprint 1 Completed

- Model multiple UAV
- Motion behavior
- SRS V1.0
- SDD V1.0



Project Timeline

Sprint 2 Promised

- “Pong” game
- Ground station
- Mission analysis
- Test Plan V1.0
- SRS V2.0
- SDS V2.0

Sprint 2 Completed

- “Pong” game
- Test Plan V1.0
- SRS V2.0
- SDS V2.0
- Partial ground station



Project Timeline

Sprint 3

- Model 3D geometric object
- Measure geometric object
- Model 3D non-standard object
- Measure non-standard object
- Final demonstration



Questions ?