Hello and welcome to our project: Modelling Unmanned Aerial Swarms Using Unreal Game Engine and AirSim Simulator.

Our product is a unified swarm of Unmanned Aerial Vehicles.

Our system is a simulation built on Unreal Engine 4 and Microsoft’s AirSim Simulator.

The purpose of our product is to minimize danger to human operators while gathering data near environments such as volcanoes and wildfires.

The benefits of our product can be summarized as:

* Safer for the operators collecting data
* Fast Deployment for the aerial swarm
* Easier to reach difficult terrain
* Easy to manage the aerial swarm

Our team’s goal for the product is to have autonomous behavior that allows the aerial swarm to complete missions independently and react to the environment dynamically.

The aerial swarm must have object detection to both identify objects and for collision avoidance.

Finally, the swarm will collect data from the environment by

1. Measuring the volumes of objects
2. Measuring the surrounding air temperature
3. Measuring the air’s chemistry

The first demonstration we will view is of the measurement of an object’s volume.

The swarm consists of 3 drones. One drone is the lead and the other two work as a pair when measuring the object.

The drones take multiple measurements through each horizontal pass.

They will make a short move upwards and proceed with the next horizontal pass.

This method is visually similar to 3D printing.

In this example we have a simple shape – a cube.

The measurement algorithm will work for any shape even if it is irregular.

However, the object must have a solid, uniform interior for an accurate assessment of volume.

The drones are finished measuring the object when they make a final horizontal pass above the object.

Next we will view the aerial swarm in flight.

The drone at the center of the formation is always the lead drone.

You will see one of the drones fall out. This indicates the drone has become inactive.

When a drone is abruptly removed from the aerial swarm, the swarm reforms.

No matter which formation is used the drones are positioned at a distance radial to the lead drone.

We hope these short videos have demonstrated to you the general functionality of our product.

Thank you for watching.