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

In this video, we will demonstrate one of the features of our product: Collision Avoidance of an autonomous UAV.

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

The purpose of our product is to offer a verification and validation simulation that minimizes cost and improves dependability of autonomous systems.

The benefits of our product may be summarized as:

* Safer for operators collecting data
* Easier testing platform to manage and maintain
* Reduces cost of autonomous system testing

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

The aerial swarm will have object detection to identify collision avoidance situations and follows the Federal Aviation Administration’s Right-of-Way Rules.

Our autonomous system behavior makes right hand turns during these situations:

1. Head-On approach with another aircraft
2. Converging path with another aircraft on the right
3. Overtaking a slower aircraft on the same heading and path

The first demonstration you see is of the Head-On approach.

Two UAV are moving along the same path with opposite headings.

We are controlling the demonstration, so only one UAV has active Collision Avoidance.

Once the UAV reaches the pre-determined threshold, it will identify the collision avoidance situation.

The UAV will then choose a new path to its right side and begin maneuvering.

After successful avoidance, the UAV continues towards its original goal.

The Next demonstration is along a convergent path with another aircraft to the right.

It is important to note that our UAV only avoids other aircraft on the right because this is specified in the FAA regulation.

As the two aircraft approach the intercept point, the UAV will identify the collision avoidance situation.

The UAV on the left will choose a new path that moves behind the other aircraft.

Finally, the third demonstration shows how overtaking works.

When two aircraft are headed in the same direction along the same path, with the lead moving at a slower speed, the rear aircraft overtakes the lead.

Once the rear UAV has approached past the pre-determined threshold, it will identify the collision avoidance situation.

Just as the other scenarios, the rear UAV will select a path around the lead aircraft to the right side.

After successful avoidance, the UAV continues towards its original goal.

We hope these short videos have demonstrated to you the overall functionality of our product in collision avoidance.

Thank you for watching!