

Name of project	Drone3D: Aerial Drones Platform in a 3D Environment
Mentor & collaborators	Susana Sargento ( <a href="mailto:susana@ua.pt">susana@ua.pt</a> ), André Reis ( <a href="mailto:abreis@ua.pt">abreis@ua.pt</a> ), Bruno Areias ()
Team	Team 9
	Afonso Guimarães ( <a href="mailto:afonso.guima@ua.pt">afonso.guima@ua.pt</a> ), Marlene Bastos ( <a href="mailto:marlenebastos@ua.pt">marlenebastos@ua.pt</a> ), Duarte Dias ( <a href="mailto:duarterochadias@ua.pt">duarterochadias@ua.pt</a> ), Tiago Feitor ( <a href="mailto:tiagofeitor@ua.pt">tiagofeitor@ua.pt</a> ), Rui Silva ( <a href="mailto:rs.silva@ua.pt">rs.silva@ua.pt</a> ), Vasco Cardoso ( <a href="mailto:vasco.cardoso16@ua.pt">vasco.cardoso16@ua.pt</a> )
Percentage of final system	85%

## The project

Our project consists on a mission system platform developed for drones. On this platform you will be able to send missions to multiple drones (through a 3D engine), missions which will make the drone run a certain area, gather information on sensors mounted in itself and also from sensors placed on the ground and send it to a ground station that will later process that information to make a heatmap. After the mission is completed the drone will autonomously land itself on specific markers for that purpose.

## Minimum Viable product

### Description

In brief, our main objective for the MVP is to make the platform able to:

1. Send missions to one drone.
2. Gather the information predefined for the mission.
3. Self landing of the drone.
4. Process the information gathered to generate a heatmap.

### Features

Features that need to be developed in order for the MVP to be achieved:

1. Ability to send missions to a drone (only one drone is used in the MVP).
  - 1.1. Drone has to run the specific commands that will be sent to it before starting the mission (The mission may include a list of coordinates to where the drone should go to collect data and other commands to communicate with the sensors).
2. Ability for the drone to collect and send all the data that was predefined for the mission.
  - 2.1. Has to collect both information from the sensors on the ground and from the sensors that will be mounted on itself and send it to a ground station.
3. Ability to land by itself.
  - 3.1. The drone, through a camera, has to detect a marker assigned to him and adjust its position to land there.

4. Ability to process the information and generate a 3D Heatmap (this is done manually by the team using the data obtained from the mission, it's not an automatic process!).

## **Scenario(s)**

### **Local and specifications:**

1. The mission for the MVP will be done on a restrict area of the university, an area that is well known by the team testing it (probably somewhere near the IT and the Biology Department)
2. We will assume there is full connectivity between the Drone flying and the ground station.
3. We will also assume the drone has enough battery for the mission and all the weather conditions are good for the flight and success of the mission.
4. We must have in mind that there are factors we cannot control, e.g. a battery or motor malfunction during the flight, and in these cases the only thing that is possible is to try to land the drone making the less possible damage to it, but unfortunately, in most of cases, even that is not possible, so we can only hope for the best.

### **Scenario:**

The team will deploy a mission through the ground station (a computer of their own) to the drone. The drone will then take off and fly over the area that was assigned and gather information from the sensors on board and from the ground sending it to the ground station. After the mission is completed the drone should look for a ground marker to land so he can proceed to land by itself. In the end graphic engine will process all the information and build the 3D heatmap.

## **Rationale**

By sending the mission to the drone and collecting the data from the sensors we will clearly show both points one and two of the features we enumerated above. Also the ability to land by itself, detecting the ground marker and adjusting its position according to it will demonstrate the feature we presented on point three. The last feature we have to demonstrate will get displayed easily by the ability of the ground station to process the data gathered for the construction of the heatmap.