

# DRONE ZONE

## Drone Obstacle Course Competition Rules 2023

Sponsored by the Federal Aviation Administration &  
Oklahoma State University

**PLEASE GIVE THESE RULES TO THE STUDENTS**

### Foreword

This contest is limited to **five entries per school**. Entries may be comprised of teams or individuals and all entries will compete against one another.

Each school **MUST** complete a Fair Registration/Competition Entry Form and return it to the Oklahoma Engineering Foundation Office (OEF) office **by February 13, 2023**. Prizes will be awarded to winning entries from **registered** schools (*entries from unregistered schools will **NOT** be eligible for prizes*).

### Objective

The goal of this competition is to fly and maneuver an Unmanned Aerial Vehicle (UAV) or drone through an obstacle course as fast and as safely as possible. The drone you use can be one that you have purchased or it can be one that you have designed and created on your own.

### Design Statement

Each entrant / team will navigate an obstacle course at the Oklahoma Engineering Fair event, flying their drone over a structure(s), through a structure(s), and under a structure(s) and then complete the course in reverse. The drone will start and end the course by hovering their drone in a stationary manner for 15 second at the course drone launch pad. Participants can purchase a drone or build one from scratch. The competition will be judged by:

- Ability to employ (3) safety mechanisms
- Ability to hover drone, as well as ability to maneuver over, through, and under obstacles
- Complete course within a 5-minute time limit
- Extra points given to those participants who design/create their own drone

**For those participants that opt to create their own drone, a Parts List must be provided. This list should indicate the source, cost, and fabrication operations for the drone.**

### Materials & Restrictions

Costs in materials in constructing a drone is restricted to a \$250.00 or less per drone (this does not include an FPV (first person video)).

Common vendors for purchasing drone kits include – Amazon, Hobby King, Get FPV, and Ready Made RC.

### Rules

The drone must be able to lift vertically from launch pad, hover for 15 seconds, navigate safely through timed obstacle course, run the course in reverse, hover above landing pad for 15 seconds and then land safely at the point of origin within a 5-minute time limit.

Each participant will have the option to practice the course one time before competing. If the drone does not function properly after the first attempt, participants will receive an additional (2) minutes to resolve the issue. After such time, if the drone is still not operational the entry will be disqualified.

Before starting, participant/team must demonstrate safety features and practices by taking the blades off of their drone and then powering-up the unit. Then the competitor will put the blades back on the drone. This is known as a failsafe check.

Each participant must demonstrate successful lift, hover, obstacle negotiation, and return to the landing site or (point of origin).

The test will discontinue immediately if a drone appears to be out-of-control. If the participant cannot correct this condition within (2) minutes, they will be disqualified.

Each participant has a maximum of 12 minutes for the competition.

The objective is to achieve the greatest accuracy in navigation demonstrating balance with stability, obstacle negotiation and speed of mission (max of 5 minutes). A minimum of (3) safety mechanisms must be place and participants must be able to explain orally why such mechanisms are important.

No hand intervention with the drone's operation is permitted during the competition other than controls from the radio.

**NOTE:** If the drone is created, a Parts List must be submitted at the time of check-in and inspection. The judges will observe and inspect each drone prior to competition.

The competition area is off-limits to everyone except the competitors and judges. Observers may watch from outside the competition area.

## Judging & Scoring

1. Students will receive an entry form the Oklahoma Engineering Foundation. Judges will virtually inspect the obstacle course and the drone and assign an entry number, indicating student's turn in sequence of competing.
2. An Award will be given to First, Second and Third Place and an Honorable Mention may also be awarded.
3. The obstacle course competition will continue until all registered entries who are present have competed.
4. Every drone will be inspected and registered at the contest area just prior to competition. Each drone shall be registered and operated by one and only one team. No re-registration is permitted. A team may register only one drone. After course / drone inspection by the judges, the drone will be placed in the contest queue.
5. A score will be awarded to those demonstrating the largest ratio pertaining to accuracy in relationship to the speed of execution. A penalty equal to 50% will be applied for any entry not providing a complete and accurate parts list.

Difficulty of Obstacle Course = 30 points

Drone pilots should be able to safely maneuver and control their drones by hovering, flying over, under, and through obstacle structures without touching any elements in the obstacle course. There will be a 10 point deduction for each and any obstacle contact.

Employment of (3) safety mechanisms = 20 points

The Federal Aviation Administration has created rules and safety tips to help you fly safely. Be prepared to verbally provide at least (3) safety mechanisms that you have put into place prior to flying this obstacle course. [https://www.faa.gov/UAS/getting\\_started/](https://www.faa.gov/UAS/getting_started/)

Ability to safely and with stability hover drone for :15 seconds at start and end of course = 10 points

Ability to create your own drone = 20 points

As a reminder, a Parts List must be provided. This list should indicate the source, cost, and fabrication operations for the drone.

Ability to maneuver drone within obstacle course in 5 minutes or less:

- Over 5 minutes = 0 points
- 4 to 5 minutes = 5 points
- 3 to 4 minutes = 10 points
- 2 to 3 minutes = 15 points
- 1 to 2 minutes = 20 points

**Maximum potential score: 100 points**

6. Prior to competition, each course and drone is to be virtually inspected and initialed by the judges to indicate compliance with contest construction specifications.
7. Each team is responsible for the security of its entry. No time will be spent looking for or waiting for teams not present when it is their turn. Teams not present will go to the end of the queue, only if time permits.
8. Decision of judges, during all phases of the competition, is FINAL. In the event of a tie, the drone determined to have the steadiest and most accurate control will be declared the winner.

### **Prizes and Distribution**

Contest winners will be announced on the Engineering Fair web page at <https://www.oef.org/>

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