

## 2023 Drone Competition



### Description

The current space program is requesting a Mars rover exploration mission for 2020. A new rover (payload) needs to be delivered on time and with the help of your Space Launch Vehicle (Drone). Who can deliver this rover the fastest? Your task is the following: Fly drone through the different space obstacles to deliver and release the rover (3D Printed Rover Provided) on the landing zone and then returning to the starting position in the fastest amount of time.

### Rules

- Each team will build their drone either from individual parts or a kit. **Ready to fly drones purchased will not be accepted.**
- Teams must consist of a minimum of two (2) student members with a maximum of three (3) student members.
- Time begins when the drone leaves the starting position. Time ends after the pilot has successfully picked up the rover, maneuvered through the obstacles, released the rover, and returned to the same starting position.
- The rover may not be modified in any way.
- The rover must be picked up and released during flight.
- One team member other than the pilot will be designated to enter the enclosure to return a downed drone to the take-off position. The judge will give permission when it is safe to enter the enclosure. The drone is not allowed to restart props until the team member is completely out of the closure and judge has given the all clear to resume.
- The judges may disqualify any team for any safety infraction.
- All radios/controllers must be impounded, except when contestants are flying, until all flights are over. Failure to return your radio/controller to the impound area will mean disqualification from the contest.
- Any team flying their drone outside of the drone enclosure will be immediately disqualified. This includes in any location inside or outside of the Fort Worth Convention Center during the dates of the Texas TSA State Competition.

### Safety Requirements

- All drones must have propeller guards/shrouds that at a minimum enclose all propeller arcs on the outside of the drone.
- The Drone Contest Director may call for an Emergency Stop at any time if they determine that a drone is unsafe due to unsafe equipment or unsafe piloting.
- All team members must wear OSHA approved (Z87.1) clear safety glasses at all times.
- All team members must wear OSHA approved hard hats at all times inside the drone marked safety zone around the perimeter of the drone enclosure. Texas TSA will not supply hard hats. Teams without hard hats will not be allowed to fly.
- All team members must have a signed Texas TSA Liability Release form physically with them at the Drone Contest. Not having the Texas TSA Liability Release form disqualifies that member from competing as part of the Team during the Drone Contest.
- Each team and their drone will be inspected prior to flight to ensure compliance with all safety rules.
- All drone controllers must be powered off and turned in to the Drone Contest Director at the beginning of the contest. No other drones will be allowed to be turned on during the Contest to ensure that there is no interference between the current pilot and the current drone.

## Drone Competition

- There will not be any opportunity for practice flights prior to the beginning of the Drone Contest. Drones are not allowed to be powered on in any area of the Fort Worth Convention Center during the Texas TSA State Conference.
- All team members must remain in the designated areas at all times during the flight. The Pilot must be in the Pilot Box at all times during that team's flight. Additional team members must remain in Team Box areas at the back corners of the Designated Contest Area.
- Teams waiting to compete will be instructed where to wait by the Drone Contest Director at the beginning of the contest.
- All control of the UAV must be through direct inputs to the controller by the pilot, without any autopilot, flight, or navigational aids, with the exception of auto takeoff and landing functions.
- Teams using a UAV that does not conform to these rules will not be permitted to use it at the competition.
- Each team must use their own drone for the competition.

## Specifications

- Dimensions: Maximum rotor size 5"
- Unmanned aircraft must weigh less than 5 pounds, including payload, at takeoff
- Battery power no greater than 6S, 1600mAh
- Must not receive or use GPS
- Must not have any object avoidance systems.
- Must be a quad (4 rotor) drone
- Drone must be controlled via handheld remote (no cell phones) and pilot may use FPV goggles but not required.

## Documentation

- Student will provide an Engineering Portfolio that will be submitted in a three brad folder (no binders allowed). Place the State Contest sticker received at registration on the outside of the folder at the top right corner of the front cover. The Engineering Portfolio must include:
  - Cover page with Student ID#, Category #, and Category Name.
  - Table of Contents
  - Signed Liability Release Forms
  - Detailed list of all parts and components purchased. Also list any parts made using 3D printer, CNC machining and other equipment to make your own parts.
  - Part cutsheets that provide the manufacturer's data about the specifications for each part or component not made by the student. Do not remove product stickers from parts. This helps the judges identify that the correct parts listed and cut sheets were used. Removing stickers could result in disqualification of the vehicle.
  - Student explanation of their build process
  - Pictures documenting the build process
  - Flight log (include date, location, amount of time flying, and student initials)
  - MLA Cited Sources for Research

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## Judging

- 25% Appearance: Quality of craftsmanship and appearance. Awarded 1st through number of valid entries.
- 25% Engineering Portfolio: Completeness and detail level of the Engineering Portfolio. Awarded 1st through number of valid entries.
- 50% Race Results: Points will be awarded based upon flight times.

Each team will be awarded 1st through the number of valid entries for appearance, engineering portfolio and flight results. The lowest combined score wins 1st Place, the second lowest combined score wins 2nd Place, and so on. In case of a tie, the vehicle with the better appearance and engineering portfolio will place higher.

## Gate Information:

