



**Drone Technology**

**Virtual Team Guide**

**April 2023**

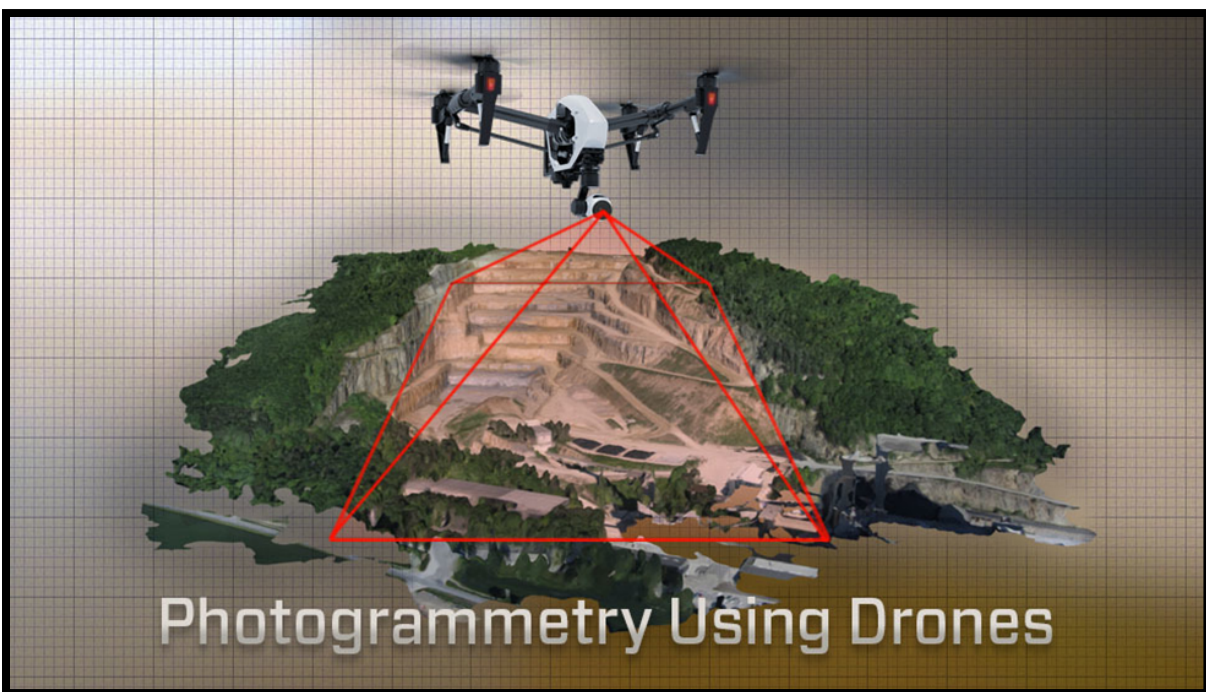
**Note:** Event rules/regulations are subject to revision prior to competition

The **2023 Drone Technology Event** prepares students to enter a wide range of industries using this emerging field of technology. Drones are cost effective, safer, faster and more accurate than traditional methods of aerial data acquisition. Additionally, with the integration of drones into the national airspace, this platform helps multiple industries leverage autonomous drone operations and redefines their business models.

This platform allows drone operators equipped with special imaging sensors to fly optimized autonomous mapping flight plans over farmland to generate insightful and useful maps. In construction and surveying, drones are increasingly being utilized to scan job sites and create photo-realistic 3D maps of terrain and structures with centimeter-grade accuracy providing construction professionals with timely information used for asset tracking, surveying, 3D modeling, site planning and much more. The energy industry is perpetually gathering information for risk management from pipeline monitoring to encroaching trees and foliage on transmission lines.

Drones give users the ability to gather aerial imagery in a timely, safe and cost-effective manner, thus helping to identify potential crisis like spills and outages. The usage of drones in the mining industry is increasingly becoming an invaluable resource. Drone operators and end-users have the ability to monitor stockpiles, map potential exploration targets and track equipment at a fraction of the cost of traditional forms of aerial imagery, but in a much safer manner.

Photogrammetry, the science of making measurements from photographs, pertains to mapping the earth and with the recent explosion of consumer drone technology; photogrammetry by GPS-enabled drones is increasingly becoming the norm.



**Purpose:**

To evaluate team members' skill and preparation for employment in fields related to and including drones, engineering, automation, manufacturing, electronics, computers and emergency services.

To recognize outstanding performance by participants in scenarios that require problem solving and teamwork in a real-world situation.

**Clothing Requirement:**

Official SkillsUSA attire is required. For complete details, visit [www.skillsusastore.org](http://www.skillsusastore.org). If you have questions about clothing or logo attire, call 800-401-1560 or 703-956-3723

**Eligibility:** The Drone challenge is open to active SkillsUSA members.

**Supplied by the Competing Team:**

- Safety equipment – **Eye Protection is required at all times!!!**
- Laptop computer (optional)
- Drone with charged batteries (we recommend 3 batteries)
- Drone controller with charged batteries
- Blade guards on drone when flying
- Tools required for working on drone
- Battery charger (optional but recommended)

A pit area will be provided for teams to assemble and work on equipment. Each team will have a conference table, two chairs and access to a 120-volt electrical outlet. A practice area will also be provided.

At this time the use of FPV is not permitted.

## **Advanced Challenge Overview**

A two-member team will remotely operate the drone, which should be capable of launching and flying three fields as directed by contest officials. Teams will be allowed to change batteries between fields.

**Field A1:** Each team must demonstrate positive control by completing a series of maneuvers, as directed by contest official. Time limited to 10 minutes.

**Each team must complete Field A1 before proceeding to Field A2.**

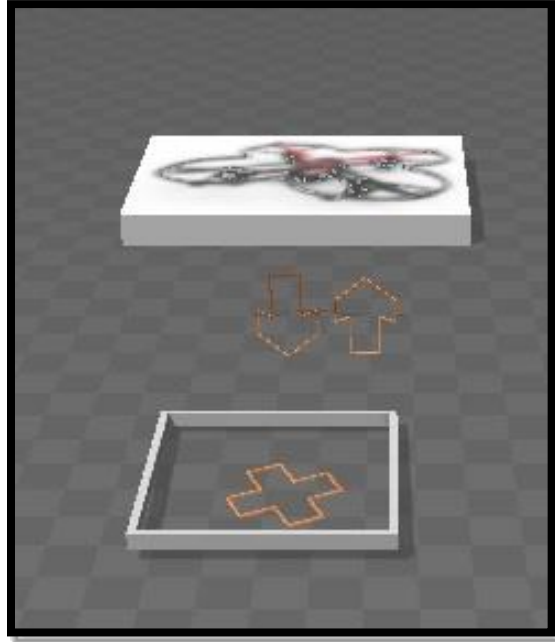
**Field A2:** Each team must launch from a designated mark and land on each of (4) landing zones, ultimately launching and landing on/from each landing zone. Time will be limited to 10 minutes.

**Each team must complete Field A2 before proceeding to Field A3.**

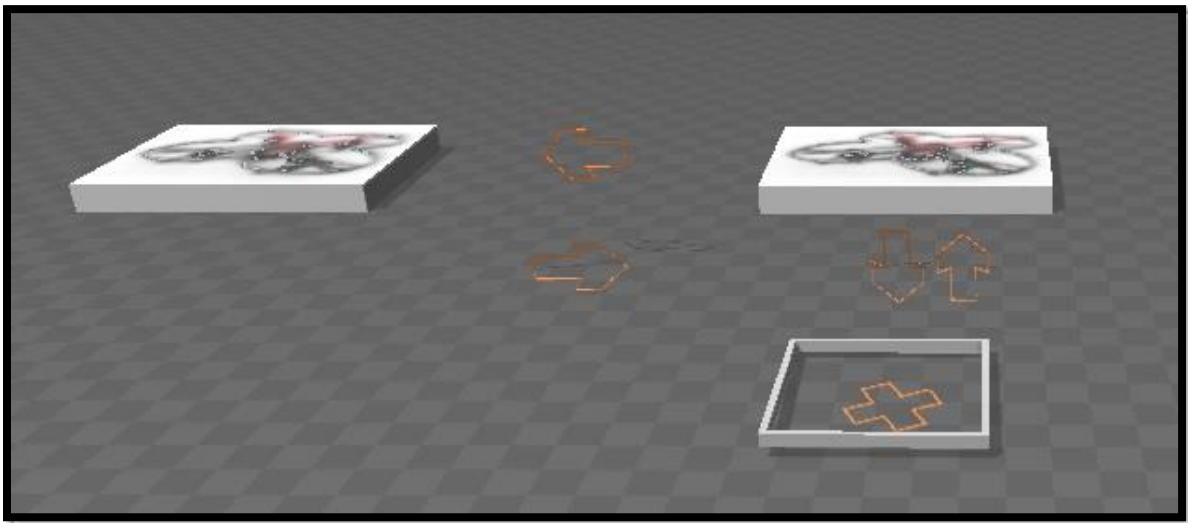
**Field A3:** Each team must launch from a designated mark and navigate through gates while capturing a photo of the image inside each of 4 containers. Time will be limited to 10 minutes.

### Field A1

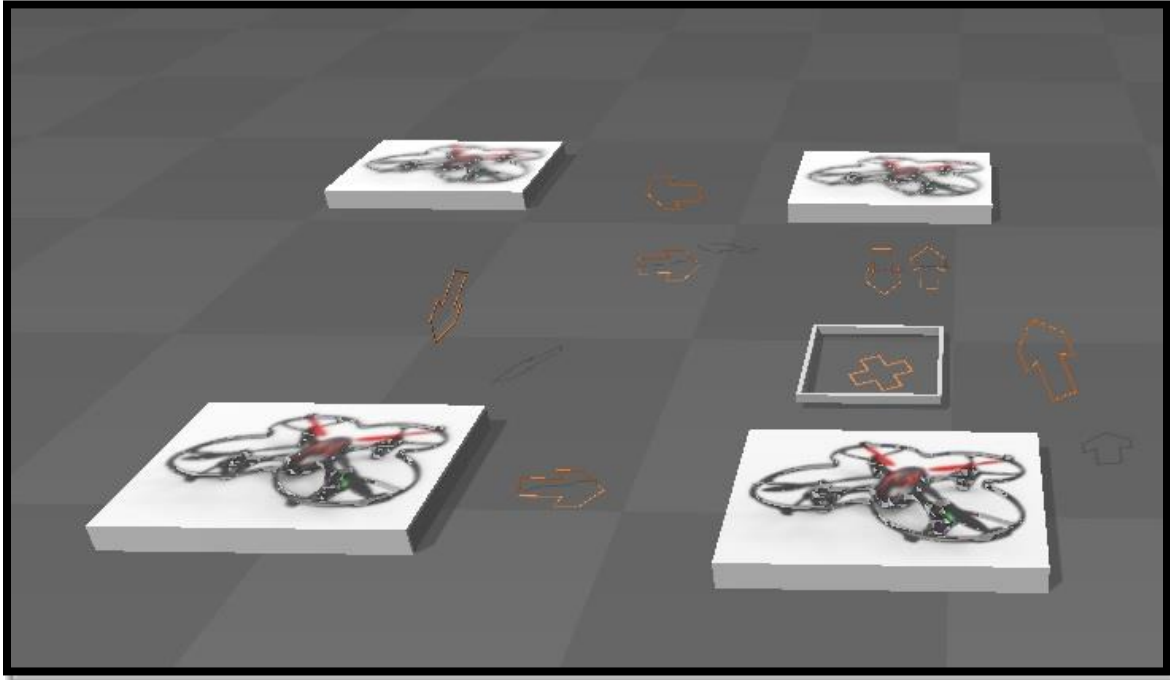
Launch from a starting position to a hover between 3 to 5 feet above start position for 5 seconds then land at starting position.



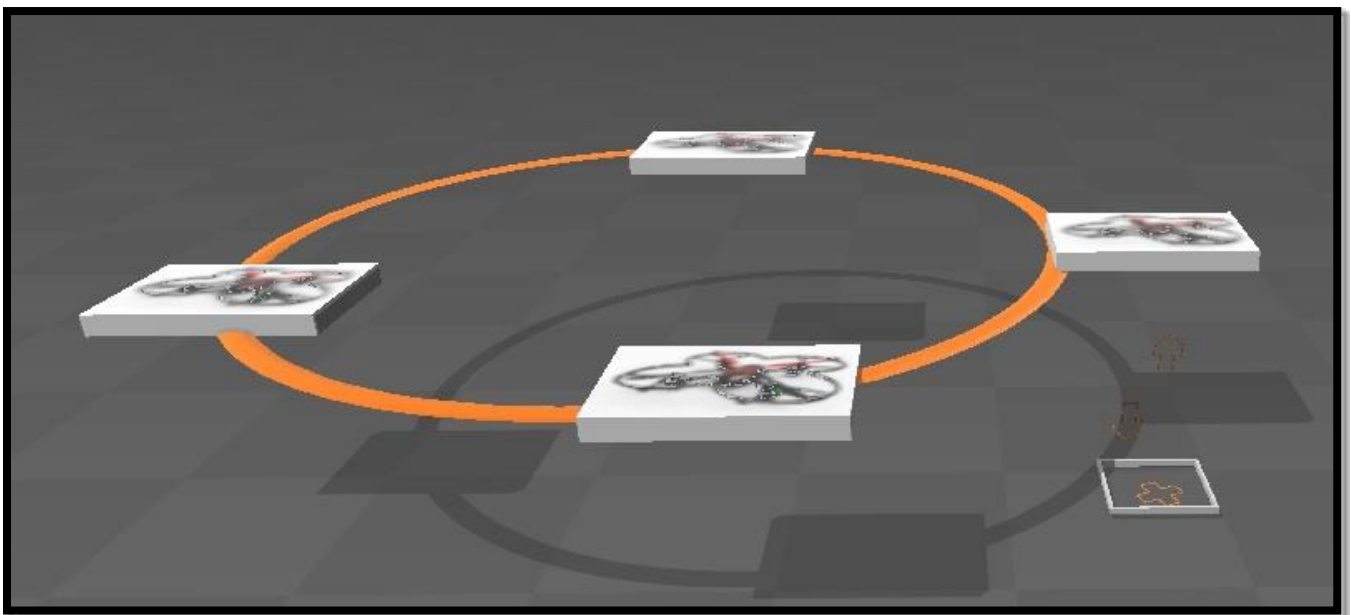
2. Launch from starting position to hover position then move in a straight line forward 5 feet-stop-back 5 feet to hover position and land at start position.



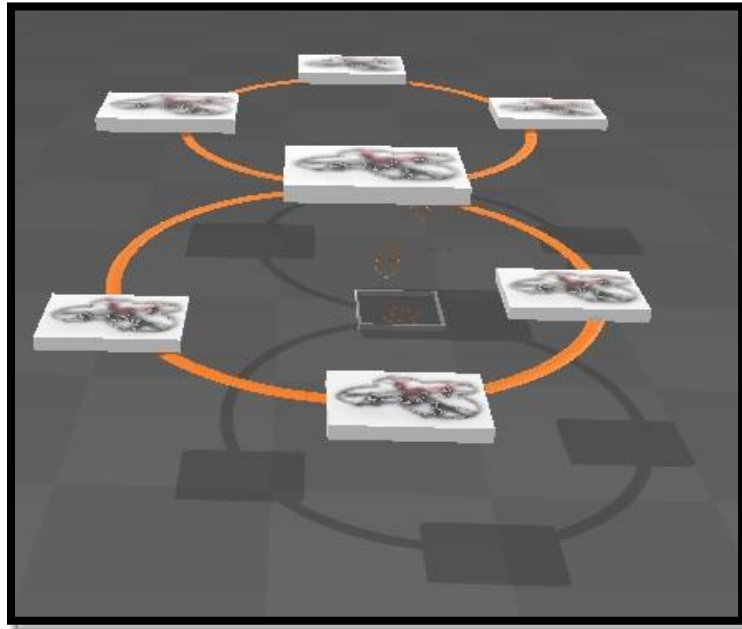
3. Square: Launch from start position to hover position – fly forward 5 feet-hover then turn 90 degrees (either right or left) fly 5 feet forward and hover turn 90 degrees and fly forward 5 feet hover turn 90 degrees and fly forward 5 feet hover over starting position for landing then land.



4. Circle: Launch from start position to hover position –turn 90 degrees fly in a circle of at least 3 foot diameter ending circle over starting position for landing then land.

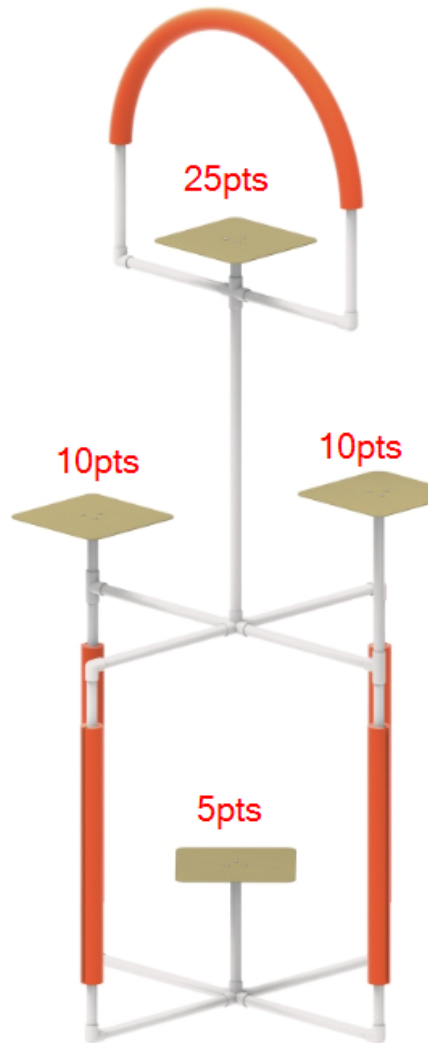


5. Figure Eight: Launch from start position to hover position- (this is the center of the figure eight)  
start you figure eight from this position making one loop ending over the center and continue second  
loop to complete figure eight. Fly back to hover over starting launch position and land.



## Field A2

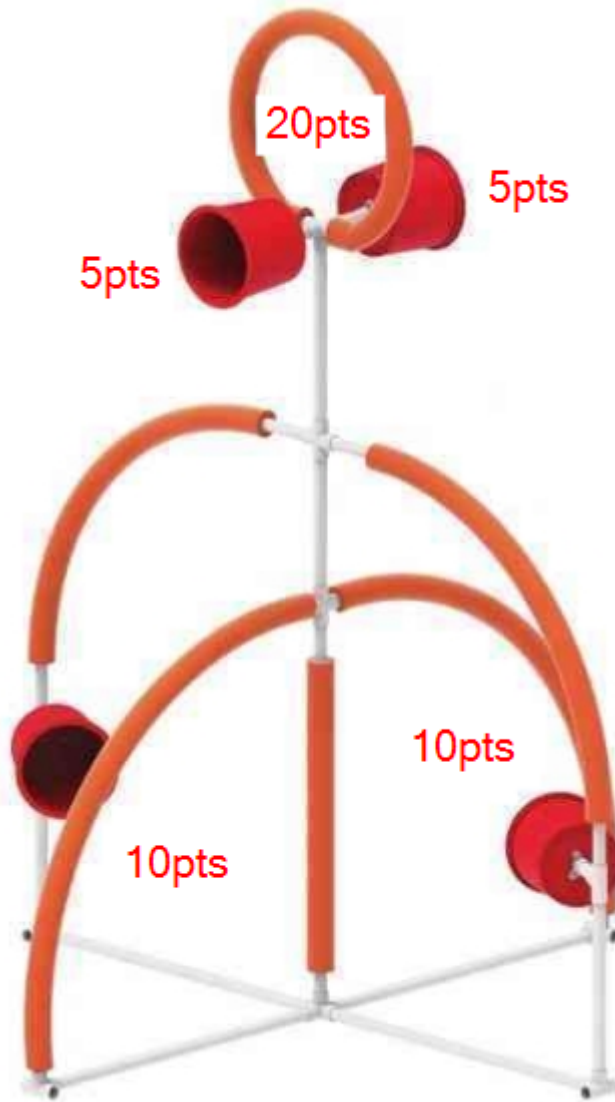
Launch from a designated mark and land on one of the (4) landing zones. When directed by contest official, launch and land on a different landing zone. Continue until all (4) landing zones have been completed. Team must return to the primary/first launch mark to receive full point value. Time will be limited to 10 minutes.





### Field A3

Launch from the designated mark and navigate through each gate while capturing a photo of the image inside the container. Continue until each gate has been successfully navigated and each container has been photographed. Each team must pass through the top gate then return to the primary/first launch mark to receive full point value. Once the flight is complete show the photographs to the contest official and describe what is in each image. Time will be limited to 10 minutes.



## **Engineering Notebook**

The Engineering Notebook will be submitted for judging at check-in. Required elements:

- Overall neat and professional appearance
- Complete list of materials for the drone with cost.
- Description of drone and materials with supporting materials
- Illustrations, sketches, photos, and written log entries accurately documenting the design and skill development with evolution of skills.
- Rules for drones with the FAA registering information and fees.

## **Written Test**

The written test will be given as a team test. Both members of the team are to work together only. No outside help or communication of any kind.

The test will cover terminology, mechanisms, rules, guidelines and laws.

### **Final Scoring (maximum of 350 total points):**

1. Written test (max 100 points)
2. Engineering Notebook (max 100 points)
3. Field One (max 50 points)
4. Field Two (max 50 points)
5. Field Three (max 50 points)