Drone Technology-BASIC

Virtual Team Guide

April 2024

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

The **2024 Drone Technology Event** is designed to equip students with the skills and knowledge necessary to excel in various industries utilizing this rapidly evolving technology. Drones offer a multitude of advantages over traditional methods of aerial data acquisition, including cost-effectiveness, enhanced safety measures, increased efficiency, and superior accuracy.

Moreover, as drones become integrated into the national airspace, they present opportunities for industries to optimize operations through autonomous drone systems, fundamentally reshaping business paradigms. By leveraging drones, businesses can efficiently acquire aerial imagery, facilitating timely and cost-effective data collection processes. This capability empowers drone operators and end-users alike to monitor stockpiles, delineate exploration targets, and track equipment at significantly reduced costs compared to conventional aerial imaging methods, all while prioritizing safety.

In addition to their applications in traditional industries, drones are increasingly utilized in emergency response and disaster management scenarios. Equipped with thermal imaging cameras and other specialized sensors, drones can swiftly assess disaster-stricken areas, identify survivors, and map out access routes for rescue teams. Furthermore, drones aid in assessing structural damage to infrastructure, facilitating rapid response and recovery efforts. Their ability to provide real-time situational awareness in challenging environments makes drones indispensable tools for emergency responders and humanitarian organizations worldwide.

As drone technology continues to advance and become more accessible, its potential applications across various sectors are boundless. From enhancing agricultural productivity to revolutionizing environmental monitoring and disaster response, drones are reshaping industries and driving innovation at an unprecedented pace. As students engage with drone technology through organizations like SkillsUSA, they gain valuable insights into the limitless possibilities of this transformative technology, empowering them to become leaders and innovators in the future workforce.

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. 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.

Basic Challenge Overview

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

Flight Test #B1: 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 Flight Test #B1 before proceeding to Flight Test #B2.

Flight Test #B2: Each team must navigate a series of gates and land on a designated mark, as directed by contest official. Each gate will have an opening of at least 24" or 24" diameter. Height from the floor will be from 12" to 48". Time limited to 10 minutes.
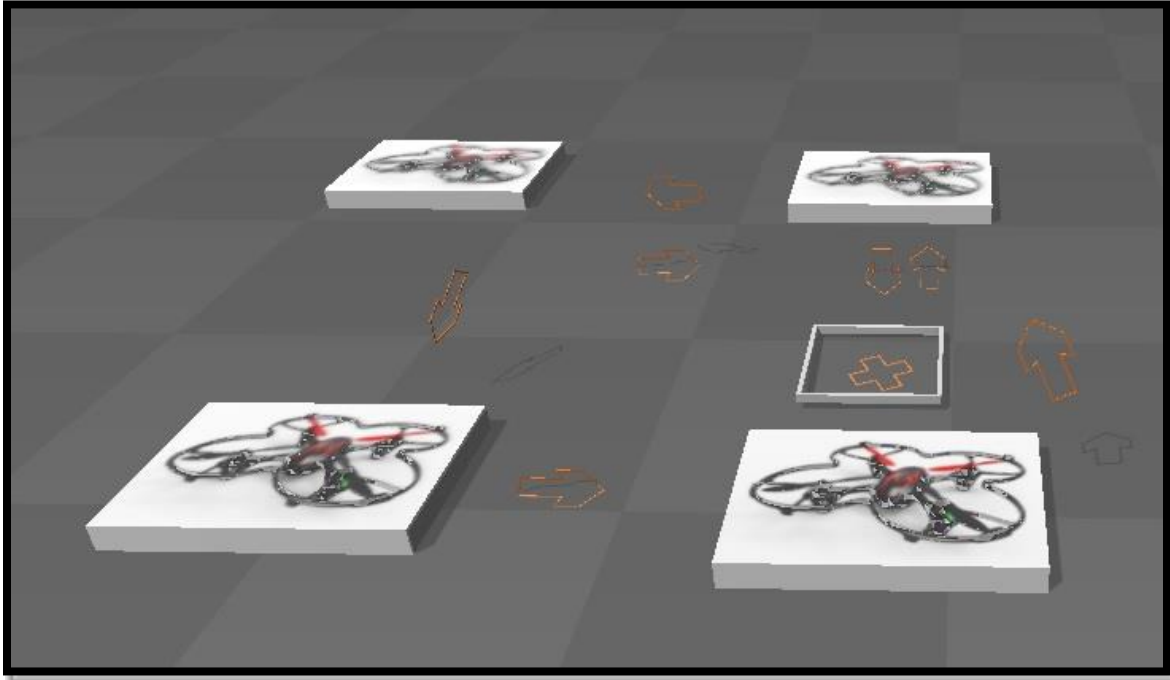
Flight Test #B1

Launch from a starting position to a hover between 3 to5 feet above start position for 5 seconds then land at starting position.
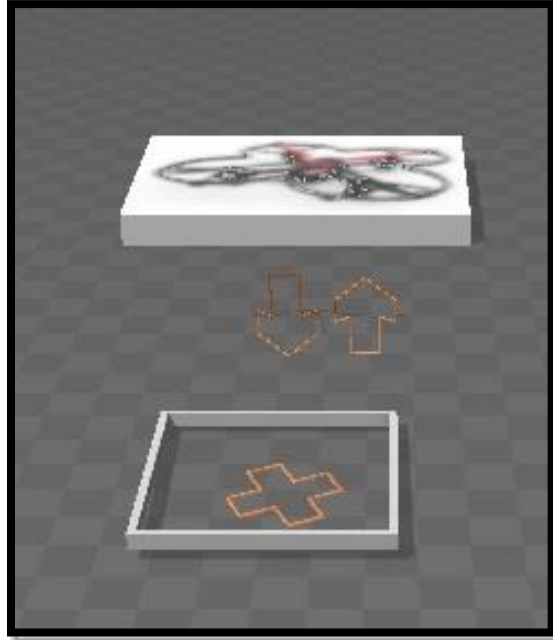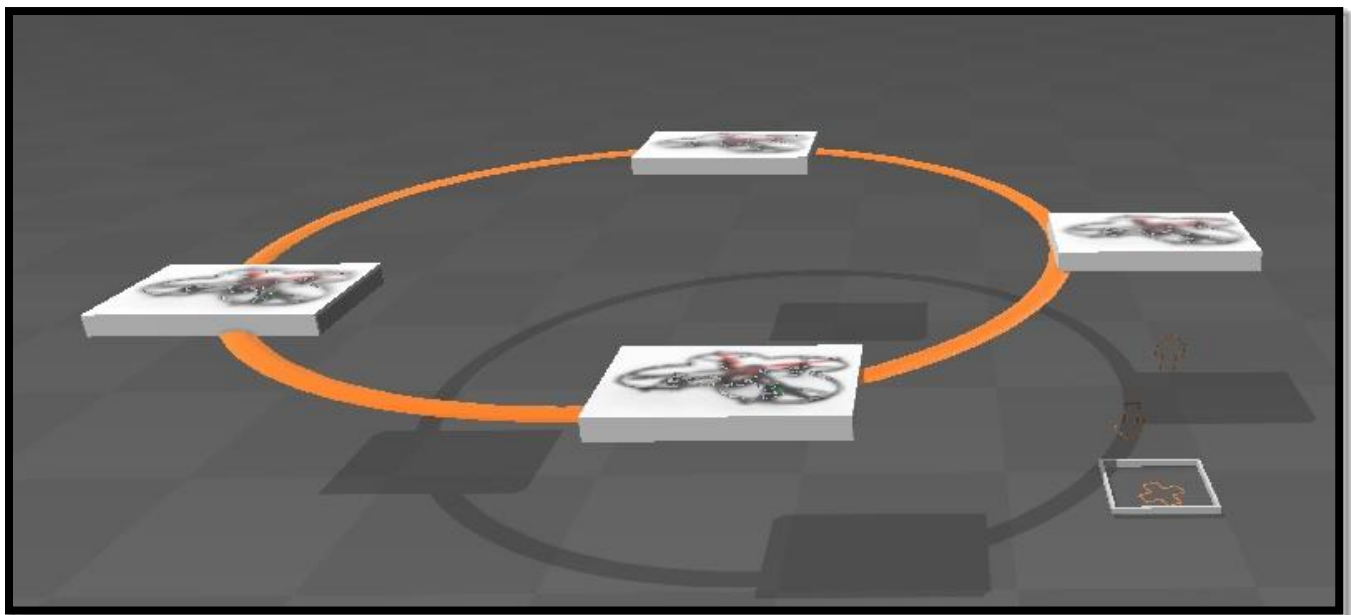

2. Launch from starting position to hover position then move in a straight line forward 5 feet-stop-back 5 feet to hover position and land at start position.
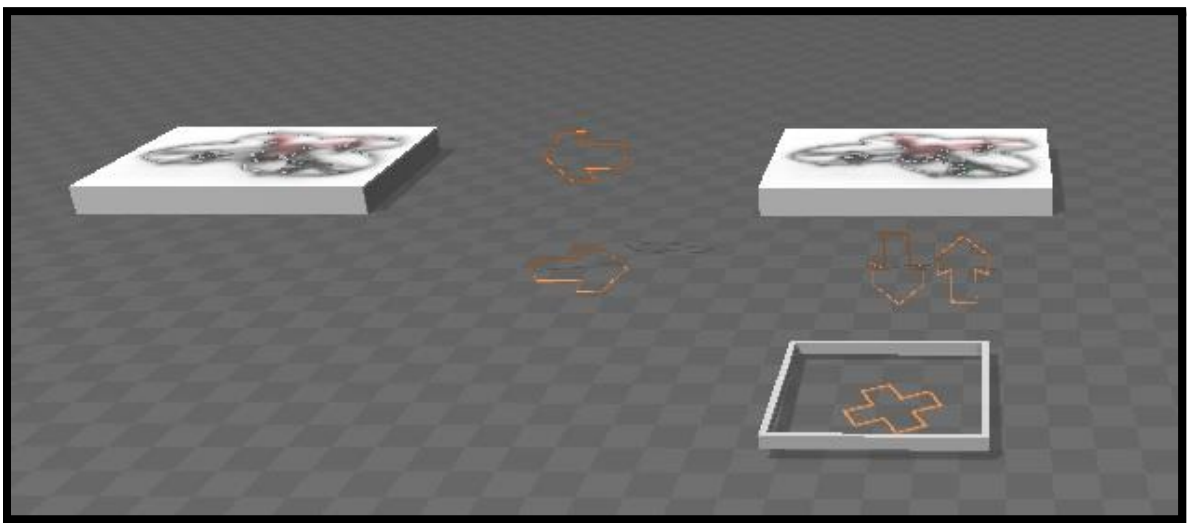
3. Square: Launch from start position to hover position – fly forward 5 feet-hover then turn 90 degrees (either right or left) fly 5 feet forward and hover turn 90 degrees and fly forward 5 feet hover turn 90 degrees and fly forward 5 feet hover over starting position for landing then land.

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.
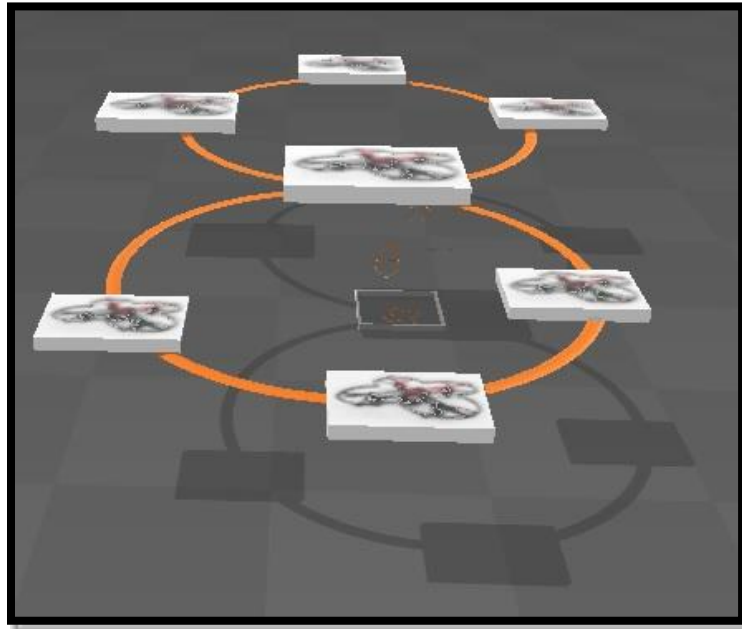
Flight Test #B2

Launch from a starting position to a hover between 3 to5 feet above starting position. When directed by contest official proceed to navigate through the gates in pre-determined route.

 Your time in completing the field will be recorded. Once you start a flight you may NOT touch your drone nor change batteries. If you crash or the drone can no longer fly the run time will be recorded for that flight.
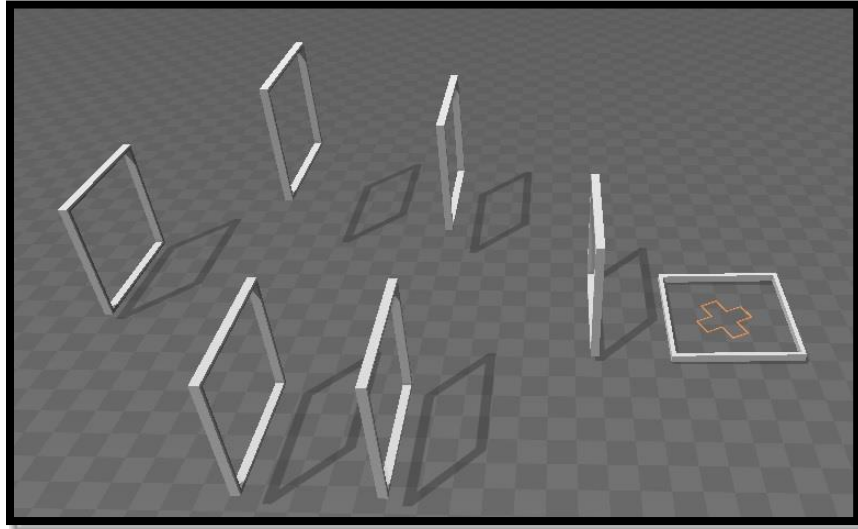
One team member (flying the drone) will stand at the designated location near the starting mark. The second team member may be on the other side of the gate to visually observe the drone in flight and may communicate flight directions or adjustments to the remote-pilot-in-command.

If your drone flies outside of the field parameters, that flight will not count and you may be disqualified by the judges. Each team must maintain control of the drone at all times.

Your drone may not enter the challenge field while another team is flying.

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 300 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)