

Drone Technology

CONTEST DATE & LOCATION: Refer to the Kansas State Championship Conference Packet

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 the real-world situation.

ELIGIBILITY: Open to active SkillsUSA members.

CLOTHING REQUIREMENT: Official SkillsUSA light blue work shirt, navy pants, black, brown or tan leather work safety shoes (with protective toe cap). Safety glasses with side shields or goggles (prescription glasses may be used only if they are equipped with side shields. If not, they must be covered with goggles).

The official Kansas State t-shirt attire may be worn with black battle dress uniform trousers. These items are not supplied by the SkillsUSA Store.

Official SkillsUSA Contest Attire



NOTE: The Official Kansas State T-shirt will be mailed to schools prior to the competition.

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CONTEST PREPARATION: All students will complete a written test and practical exercises.

TEAMS: Teams will be setup as a two-man operation. The Pilot and Visual Observers can switch between rounds but substitutions of team members will not be allowed.

DRONE REQUIREMENTS:

- All teams must follow and adhere to the drone size, weight, type, and style requirements set for by the Skills USA competition information provided with the signup/registration paperwork.
- Drones must be equipped with a forward-facing camera
- Drones must be able to operate for no less than two minutes without requiring a battery change.
- Drone equipment must include enough batteries and/or chargers to complete no less than three flights within one hour.
- Eye Protection
- Blade Guards
- Any tools needed to perform drone service work
- Laptop Computer (optional)

DRONE CAUTIONS:

- For several sections of this course, any/all positioning sensors will need to be disabled. If a drone has *Return To Home* functionality, this will need to be set to hover in place, follow/return along the original flight path, or disabled.
- Lost Link or Fly Away – Each team will be required to present list link and fly away procedures prior to their being allowed to compete. If the judge(s) deem the team's procedures inadequate, the team will be instructed on competition required lost link or fly away procedures.

EXAMPLE: Pilot must have the ability to instantly terminate power to the motors at any time during flight operations.

TEAM INFORMATION: The 2020 Drone Program Skills will test the following:

The Remote Pilot In Command – The ability to preplan missions, the operational command setup between Pilot and Visual Observers.

Depth Perception – A Drone Pilot must have excellent depth perception and constantly be gauging distances between their drone and obstacles in the area.

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Piloting Skills – A Drone Pilot must operate in many types of environments. This course will test the Pilot’s ability to operate their drone in both open and congested areas with several obstacles. This course requires a pilot to fine-tune their fine motor skills to operate within the course and stay out of regulated airspaces noted as No Fly Zones.

Visual Observation Skills – A visual observer is a key part of a successful drone team. This course will require communications between the Pilot and Visual Observer to navigate the course successfully.

Visual Acuity – Locate and properly identify and object

Team Communications – Information must be relayed in real-time between the Pilot and Visual Observers. Teams may bring their own two-way communication devices. The course size is such that the Pilot and Visual Observer can speak together, but two-way communication devices such as headsets are suggested.

Visual Observer - The designated visual observer will be able to move around throughout the course to relay information and maintain a visual line of sight of the drone. The Pilot will be required to stay within a predetermined area.

COURSE: The course will consist of several types of obstacles. The exact number of each type of obstacles will not be disclosed until the contest date. The types of obstacles include but are not limited to elevated landing platforms, skills ring(s), skills tunnel(s), object identification, image identification, color identification, damage assessment, etc.

The Pilot will be required to fly over, under, through, and around obstacles. The scored flight maneuvers will include, but may not be limited to Object Orientated Flying, Direction Orientated Flying, Point of Interest Orbiting, etc.

COURSE FAMILIARIZATION: Each team will be given fifteen minutes to study the course on site and develop their flight and communication plans. The team will be allowed five minutes to walk through the course one time, followed by ten minutes to stand at the piloting box and discuss the course for an additional ten minutes. At the fifteen-minute mark, the team will be required to leave the flight area and return to their designated staging areas.

KNOWLEDGE TEST: Each team will be required to complete a knowledge test. This is a written test based on Federal Aviation Hobby and Commercial Drone Operations Rules. It is highly suggested that teams study the FAA Drone Operational Requirements.

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AMPLE QUESTION: Under normal operating permissions you may not operate a drone above _____ ft in uncontrolled (Class G) airspace.

- a) 200
- b) 300
- c) 400
- d) 550

COMPETITION FLIGHT PREP: When a team is called to the course for their competition flight, they will be given five minutes to prepare for the launch of their drone. If the team fails to launch within the given five minute window, points will be deducted from their score.

SCORING:

- **Launch Time:** Failure to launch within the five-minute preparation window will result in a deduction of points.
- **Crash:** Any crash of the drone, whether it be intentional or accidental, will cause a deduction of points.
- **Obstacles:** Failure to properly navigate an obstacle will cause a deduction of points.
- **No Fly Zones:** Each entry into a No Fly Zone will cause a deduction of points.
- **Course Time:** Failure to complete the course within three minutes will cause a deduction of points.
- **Landings:** Hard landings which result in bouncing of the drone on the landing pad will cause a deduction on points.
- **Lost Link or Fly Away:** If a team encounters a lost link or fly away, they must immediately and audibly announce the issue to a judge. The team must then act upon their predetermined procedures while announcing their actions to a judge. Failure to immediately act upon a lost link or fly away will result in a deduction of points.
- **Failure to Complete Course:** If a team is unable to complete the course, they will be scored upon the amount of the course they have completed less any deductions they received. Any obstacle or course section that has not been completed will result in the maximum deduction for that course section.
- **Unsafe Operations:** Unsafe operations will not be tolerated. Unsafe operations include, but are not limited to:
 - Flying Dangerously fast or in an uncontrolled manner.
 - Flying near or over people who are not directly involved in the flight operations.

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- Flying outside of the flight operations areas. Flying above the designated altitude for this competition.
- Operation of damaged or unsafe drones
- Any team found to be operating in an unsafe manner will be immediately and permanently removed from the competition.

Scoring Tie Breaker: If there is a tie, the ruling will go to the team with the lowest total number of points deductions. If the teams tie on scoring and deductions, the ruling will go to the team that completed the course the fastest.

COURSE DESIGN: This course is designed to test the communication skills of a team while being exposed to Hobby, Commercial, and Public Safety drone operations. The movements and skills required to complete this course range from very basic to more advanced. This course will test the team, not just the individual.

SCHEDULE OF EVENTS:

<u>Activity</u>	<u>Start Time</u>	<u>End Time</u>
Check-In & Orientation	8:00	8:30
Written Examination	8:30	9:30
Team #1 Course Walkthrough & Orientation	9:45	10:00
Team #2 Course Walkthrough & Orientation	10:05	10:20
Team #3 Course Walkthrough & Orientation	10:25	10:40
Judge Orientation and Course Setup	10:40	11:00
Team #1 Flight #1 (Practice Flight)	11:00	11:10
Team #2 Flight #1 (Practice Flight)	11:15	11:25
Team #3 Flight #1 (Practice Flight)	11:30	11:40
LUNCH	12:00	1:00
Team #1 Flight #1 (SCORED FLIGHT)	1:10	1:20
Team #2 Flight #1 (SCORED FLIGHT)	1:30	1:40
Team #3 Flight #1 (SCORED FLIGHT)	1:50	2:00
JUDGE SCORING	2:00	2:10
Debriefing	2:20	2:30
CONTEST END	2:30	

Timeframe is dependent upon number of participants.