

Playbook Module

A-7: Beginners' Competition

Level: Beginner

Objective: Setup and run a beginner level drone competition

Pre-requisites: A-1 Build Your 1st Drone, A-2 Essential Drone Knowledge, A-3 Introduction to the BSA Raptor Academy App, A-4 Introduction to the Drone Flight Controller, A-5 Basic Drone flight control

Learning Objectives: not applicable - skills and proficiency demonstration

Materials Needed: course materials, rules/guidelines, scoring templates, drones, prizes/trophies

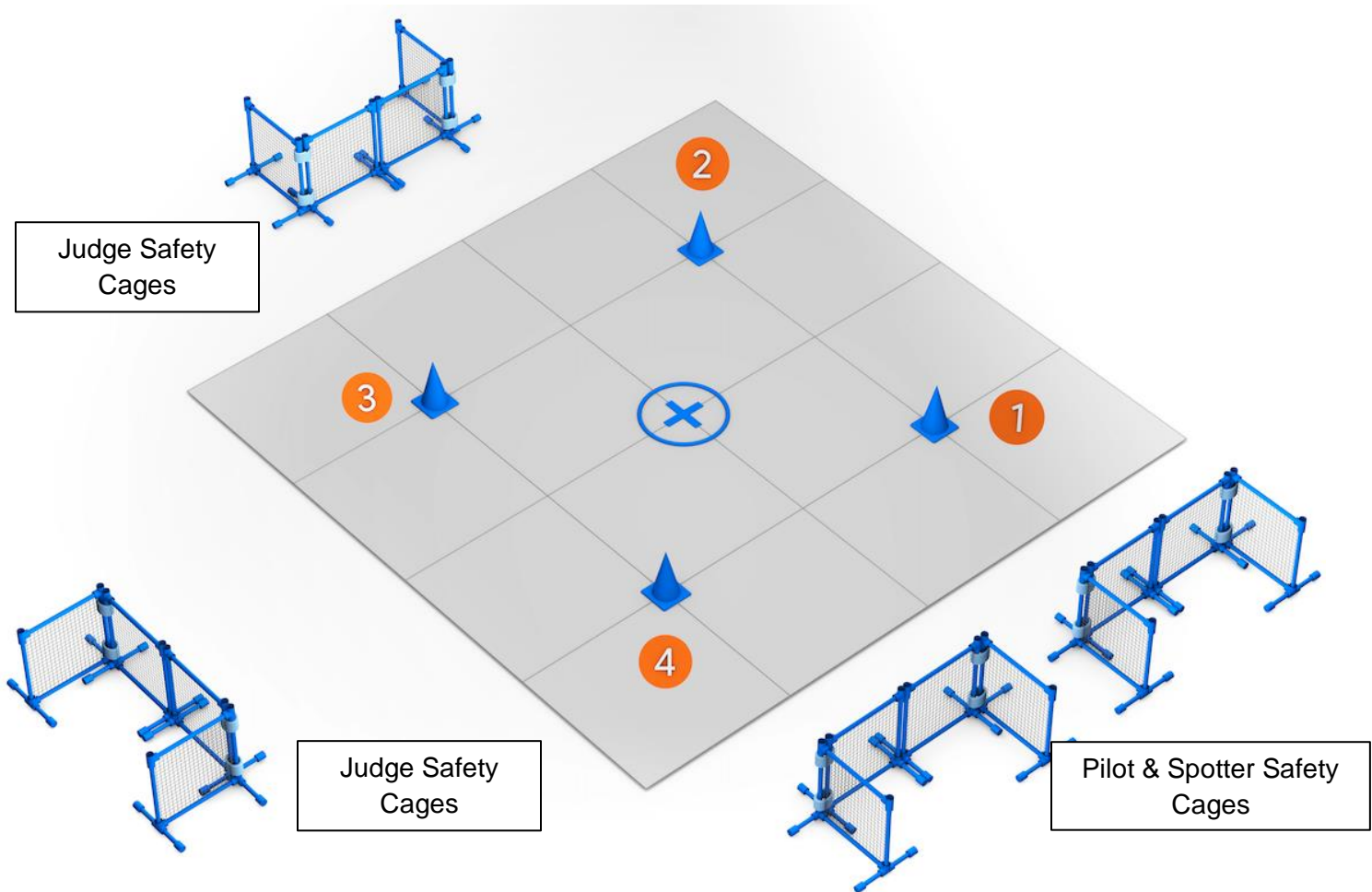
Space Needed: 40 x 40 foot space at least 12 feet high

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Module Content/Outline:

- Prepare the Course:
 - Check out the Events & Competitions Handbook for course information
 - Refer to the figure below as you layout your course.



- Mark a 5-foot diameter circle with a 2-foot by 2-foot "X" in the middle.
- Place the four pylons to make a 20 x 20 foot box centered on the circle.
- Mark the pilot's position 30 feet from the circle (10 feet from the edge of the box) and set up a safety cage.
- Set up a spotter's cage next to the pilot's cage (optional).
- Mark judge positions and set up safety cages

Competition rules and guidelines, including check-in requirements

- Competition Objectives:
 - The main objective is to demonstrate a pilot's basic flight skills with their drones. At this level, pilots may be struggling to control the flight of their drones. This competition is designed to help build their confidence and let them show off what they can do. Do NOT make it too difficult or too competitive.
 - This is to be flown with the basic drone kit, without any additional drone performance modifications - those appear in the Intermediate and beyond level competitions.
 - Have FUN!
- Review the Site Selection, and Course Safety Guidelines in the Events & Competitions Handbook.
- Check-in and Rules - Be sure there is a check-in/inspection table
 - All drones in this competition must be the standard BSA Drone Kit, using propellers and motors supplied in that kit. Pilots may customize the color, decorations, etc., but they cannot modify the performance of their drone for this level of competition. There are optional variations described below for non-standard drones.
 - The check-in is pass/fail. A fail disqualifies that drone from the official competition.
 - Review the general purpose Pre-Flight Check-in/Rules from the Events & Competitions Handbook.
 - This competition is strictly line of sight. The camera display on the phone should be disabled. No FPV goggles are allowed.
 - For beginners, line of sight is the best way to start learning how to control a drone. Once pilots get good at line of sight control, transitioning to FPV is easier and they will have better control over their drone. Pilots should fly while watching their drone. For this competition, the flight map is enabled and there if the pilot runs into trouble (such as the drone taking off and needing to figure out where it is to bring it back).
 - Note: To support line of sight flying, putting some sort of bright colored tape on the nose and a different color on the tail of the drone makes it easier to tell the front from back.
 - Drones that do not pass inspection are not allowed to compete.

Competition Awards

- Review the competition Scoring General instructions on the Events & Competitions Handbook.
- Patrol/Troop Awards: patrol and/or troop awards are optional. If the event organizer decides to add awards for patrols and troops, we recommend they be done as follows:
 - Calculate the median proficiency points for the Scouts who participated in the competition and add them up. Divide by the number of Scouts to get the average. This is the racing points calculation for the patrol and/or troop.
 - The patrol with the highest point count is the 1st place patrol and the same works for Troops.
- Other awards: The competition organizer can create other awards at their discretion.
- Proficiency points
 - Proficiency points are DIFFERENT from competition Scoring Points, so don't get them confused!
 - Pilots will receive 10 points for completing the competition, unless they win 1st, 2nd, or 3rd place.
 - 1st place winner: 100 points
 - 2nd place winner: 50 points
 - 3rd place winner: 25 points
 - Pilots can receive up to 25 points for extra credit (outlined below).
 - There is a maximum of 125 proficiency points possible.
 - Patrol/Troop Proficiency Level: patrols and troops do not get proficiency points. They get rated as Beginner, Intermediate, Advanced, or Expert based on the median of the proficiency ratings of the pilots in the patrol and/or troop.

Official Competition Steps

1. A Competition Official reviews safety precautions with all pilots, participants and spectators.
2. The Competition Official calls the first heat and calls the first pilot.
 - The Pilot preflights their drone using the Drone Preflight Checklist
 - The Pilot goes to the pilot station/cage and turns on their controller.
 - A Competition Official places the drone in the center of the hover circle, facing away from the pilot. When the pilot indicates that they are ready, the Competition Official turns on the drone and then moves to a safety cage or safe distance away (at least 25 feet from the flight line).
 - A Competition Official issues the command, "Arm Your Drone" and the pilot arms their drone.
 - The command, "Start" is given (can be a starting horn or other such signaling mechanism).
- Pilot Flight steps
 - Note - the nose of the drone must always face away from the pilot.
 - Take off and do a controlled ascent to about 6 feet off the ground.
 - Hover for a minimum of 10 seconds.
 - Square Dance:
 - Fly sideways and forward till your drone is roughly over Pylon #1.
 - Fly left to Pylon #2 and briefly hover over it.
 - Fly backwards to Pylon #3 and briefly hover over it.
 - Fly to the right to Pylon #4 and briefly hover over it..
 - Fly forwards to Pylon #1 and briefly hover over it.
 - Repeat this 3 times (3 laps), working to keep your drone inside the box marked by the pylons.
 - Now, turn 90 degrees to either the right or left and repeat the 3 laps around the box while facing to the right or left.
 - Next, turn to face away from the competition course and, while looking over your shoulder, repeat the 3 laps around the box.
 - Last, turn around to face the competition course and fly diagonally from Pylon #1 to Pylon #3.
 - Fly to the right to Pylon #4, then diagonally to pylon #2.
 - Return the drone to the hover circle and perform a tight spin (yaw), spinning 360 degrees around at least 5 times. End with the nose of the drone facing away from you.
 - Land.
 - Pull up your postflight checklist and go through it.

Options for competition

- The group organizing the competition may add any optional competitions that they like. These should not replace the official competition, which is set to focus on the Scout's basic flying skills.
- If the number of competitors is not too large, the competition organizer may also implement multiple heats - up to 3 rounds per drone - to allow for the best time of the three trials to be used. This can help Scouts who are new to the drone program, get over competition day jitters.
- Scoutmaster challenge: the Scoutmaster and Assistant Scoutmasters are invited to compete on the competition course and see how they rate against the Scouts. They can either use their own drone or borrow one from one of the competitors.
- This competition is designed to have one drone at a time on the course. At this level, Scouts may not have good control of their drones, and having multiple drones on the course may lead to collisions.

Event Scoring Rubric:

- 1) Checkin & Prepare your drone (Preflight Checklist) (pass/fail)
 - a) Verify Battery charge/safety:
 - b) Install Battery:
 - c) Check Drone connection status & Sensors:
 - d) Verify Drone Registration:
- 2) Competition: 1st place: 100 points, 2nd place: 50 points, 3rd Place: 25 points
- 3) Extra credit points: (up to 25 points)
 - a) Take off & Landing: (5 points)
 - i) ___ Smoothness of takeoff - did not shoot up high in the air, gentle takeoff
 - ii) ___ How closely did they land near the takeoff point?
 - iii) ___ Smoothness of landing - no bouncing, land upright, did not flip over
 - b) Keeping on the course: (5 points)
 - i) ___ Drone stays within the flight line
 - c) Precision of flight: (5 points)
 - i) ___ Drone stops and changes course closely over each pylon
 - d) Altitude control: (5 points)
 - i) ___ Altitude stays within roughly 10 feet of original take off altitude while traversing the course.
 - e) 360 degree Yaw: (5 points)
 - i) ___ Drone stays inside the hover circle.
 - ii) ___ How tight of a circle did them achieve (spin around axis, vs meandering around)
- 4) Disqualifications and crashes
 - a) If a drone flies outside of the flight line area 3 times, that pilot is disqualified from that heat.
 - b) If a drone crashes during a heat, the pilot gets a second heat. This should be at the end of the first heat for all pilots to allow time for the Scout with a crashed drone to make repairs. If the competition has multiple heats planned, no pilot may fly more than the defined number of heats, including any heats where they crashed.
 - c) Any deliberate breach to safety guidelines that endangers the safety of participants, non-participants, or could result in damage to property is merit for disqualification and subject for review.
 - d) Any device malfunction that results in the loss of vehicle control is subject to temporary grounding until a cause determination and remedy has been made and tested off-course in a designated area for rectification. Should the failure not be resolved, the participant is subject to temporary disqualification on the grounds of vehicle readiness.