DJI EDUCATION

AIZONE

1st ROBOMASTER

AUSTRALIA 2021

DRONE COMPETITION

MANUAL

RoboMaster 2021 Youth Technical Challenge

Content

1. Introduction

1.1 Background

The artificial intelligence competition encourages young people and technology enthusiasts to learn and use STEM knowledge, experience artificial intelligence, explore the principles of future technology operation, cultivate engineering practice and independent thinking ability, and finally apply knowledge in competition and experience fun in learning.

1.2 Flight Mission

This contest requires all contestants to apply mathematics and programming knowledge while independently completing flight missions according to the racing track information provided by the organizing committee.

During the flight missions, the drones may need to pass through different kinds of obstacles, or complete designated paths such as tunnels.

The contestant is expected to write code, enable the drone to complete missions, and reach the endpoint as soon as possible.

1.3 Group Division

No more than five teams from the same school are allowed to participate. Each team should be composed of 3–4 members. The organizing committee may increase the number of teams from the same school if necessary.

Participant shall team according to year

Participants are divided into primary (6 to 11 years old) and secondary (12 to 18 years old) school groups according to their ages and compete separately.

2. Contest Descriptions

2.1 Equipment

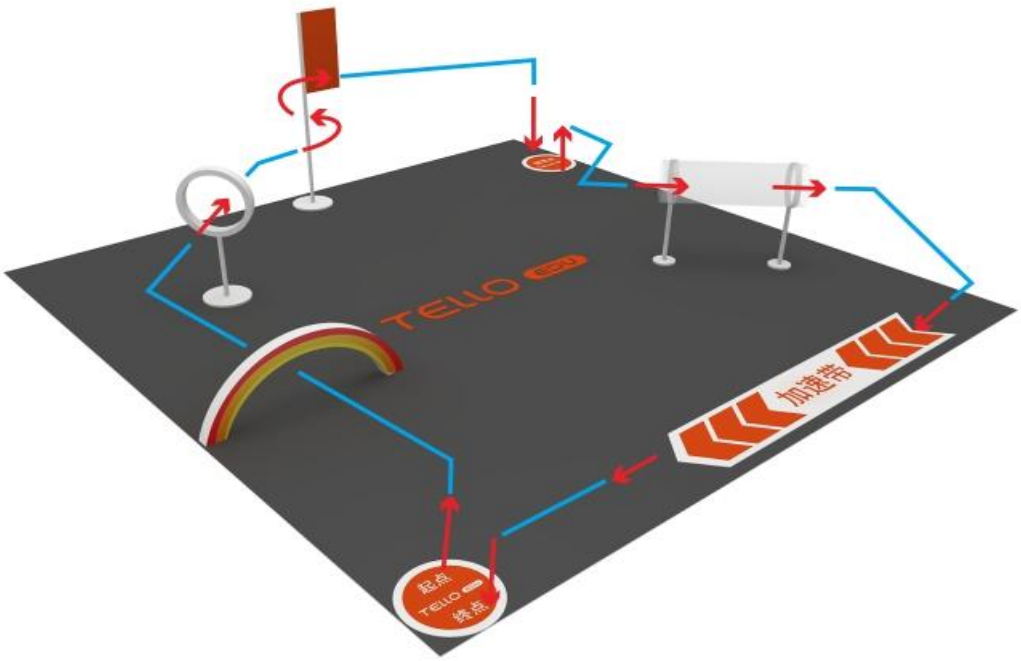
The equipment that you can use during the contest includes Tello EDU, a computer or mobile device, and several Mission Pads. The rank is evaluated according to the scores that you receive. In the event of identical scores, the contestant with the shorter time will earn a higher ranking.

2.2 Programming Languages

During the contest, contestants is recommended to use Scratch, via the Tello EDU app or Scratch 2.0 (PC) for primary school students and Scratch or Python for secondary school students.

2.3 Venue

The contest shall be held in an indoor environment. The recommended venue size is 6×6×6 m (length × width × height). The venue should have strong lighting and a non-slippery and non-glare floor.



Illustration

2.4 Result

The organizing committee will build an obstacle area consisting of different props, including arches, circular rings, tunnels, banners, landing pads, and more.

The contestant will earn 10 points when the drone successfully passes through the arches and circular rings, 15 points when the drone successfully bypasses the banners and passes through the tunnels, 20 points when the drone lands accurately, and 10 points when the drone lands around the designated area.

2.5 Chances to Fly

Each team only has three chances to fly during the contest and the team with a better overall performance will be regarded as the final contest result.

2.6 Mission Over Conditions

A flight mission is over when one of the following happens:

1. The drone completes the flight mission and reaches the endpoint;

2. The drone stops moving for more than 10 seconds (including crashes or hovering after collisions).

3. Contest Flow

3.1 Receive materials

When you arrive at the venue, you will get the venue map and scoring standards. You can walk around to get familiar with the venue.

The venue map should provide all necessary information required for programming such as the height and distance of the obstacles.

3.2 Random Draw

Each team draws to decide the competition order.

3.3 Program Design

Each team starts programming (it is recommended to use Scratch 2.0 for PC) according to the venue map and missions. It is recommended to limit the programming time to 40 minutes, but if a shorter time is implemented, the mission will be much more difficult. It will make it hard for most competitors to finish programming within the allotted time. While programming, contestants are allowed to enter the obstacle area to measure distance, height, and other necessary information.

3.4 Measurements

After the contest begins, each team can bring measurement tools to measure the venue while designing a program. Several teams can enter the venue and measure simultaneously. There will be staff on-site to maintain order and protect the venue from damage.

3.5 Test Flights

Within the 40 minutes of programming, each team has two chances to fly, with a limit of three minutes for each attempt.

3.6 End Programming

Staff will collect all computers and mobile devices for programming.

3.7 Flight Competition

According to the order decided randomly, each team will claim and set up their programming equipment. There will be a 2-minute preparation time for placing mission pads and three chances to fly.

When the preparation time is up, the referee announces the start of the game and starts the timer. When the drone reaches the target point, the timer is stopped.

4. Details

1. During the competition, no one is allowed to operate the drone or program except the player. Drones are not allowed to fly out of the field.
2. Organizers can set up two obstacle areas to speed up the pace and save time for players.
3. Players can control Tello EDU via their keyboard or mobile device.
4. The drones and equipment used during the competition are all prepared by the participating teams, and participating teams are not allowed to use drones of other teams for the competition.

5. Scoring

5.1 Points

Teams are scored based on time and the number and type of obstacles traversed.

10 Points: Passing through an arch, time gate, or feather banner

15 Points: Passing through a tunnel

20 Points: Landing completely within the designated area

10 Points: Landing slightly outside the designated area.

Teams with the same score will be ranked by time. The team that finishes the competition in less time wins.

5.2 Reference Point Table

Team Name	Student Name	Arch	Ring	Banner	Tunnel	Landing Area	Time	Total Points	Student Signature

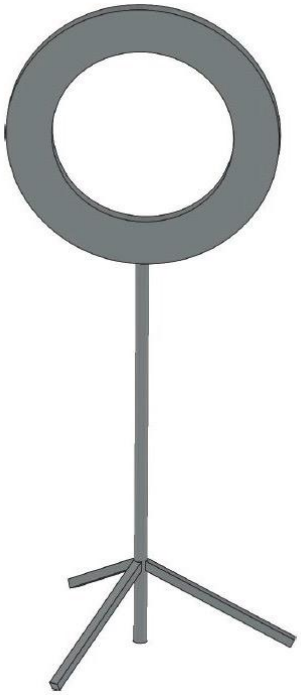
* For detailed field settings, please refer to **Venue** document.

Appendix: Obstacles

An obstacle area consisting of different props, including arches, circular rings, tunnels, banners, landing pads, and more.

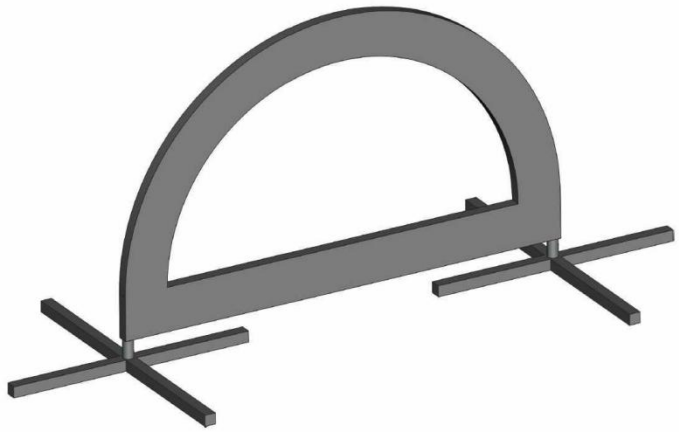
Circular Ring

The diameter of the ring is 60cm. The distance between the center of the circular ring and the ground is 80cm.



Arch

The arch is a semicircle with a diameter of 100cm.

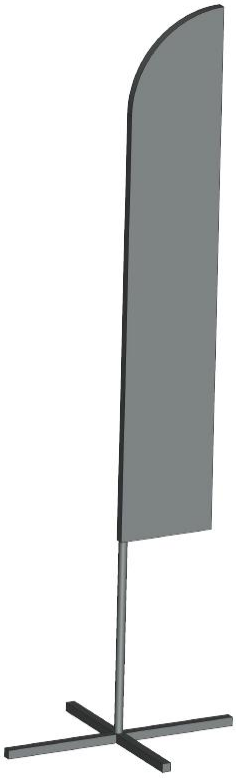


Tunnel

The tunnel is a horizontally placed tubular object with a diameter of 60cm, a length of 100cm, and the height of its central axis from the ground is 50cm.

Banner

The flag consists of a fixed pole and a flag.



Landing Pad

The diameter of the landing pad is 100cm.