



DRONE ODYSSEY CHALLENGE 2024

Drone Soccer

Main Organiser:



Co-Organiser:



Partner:



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1. Challenge Booklet Change Log

Version	Release Date	Description
1.0	12 April 2024	- Official Challenge Booklet release

2. Introduction

Drone Odyssey Challenge is an exciting game-based competition that promises plenty of fun while inculcating technical skill sets, critical thinking, and an appreciation of new and disruptive technologies relevant to the modern world. Open to students from the Primary and Secondary levels, this competition will see participants working together in teams to code their programmable drones to transform them into Unmanned Aerial Vehicles (UAVs) capable of performing tasks under given scenarios.

A series of workshops and live demonstrations have been specially developed for both students and mentors to complement their learning journeys leading up to the competition proper. Drone Odyssey Challenge is organised by Science Centre Singapore and EP Tec Solutions PTE LTD with support from the Ministry of Education (MOE) and various partners.

DOC 2024 will be held on-site and will consist of the following tournaments:

1. Obstacle Challenge (Team)
2. Drone Swarming Challenge (Team)
3. AI Visual Sensing Challenge (Team)
4. Drone Soccer (Team)

Registration for these category challenges will be via <https://www.gevme.com/>

Competition registration opens from 12 April to 26 June 2024.

For international participants (not from Singapore), please contact the following for registrations and more information.

China: Celine SHEN at Celine_SHEN@science.edu.sg

Rest of Asia: Fenda NGO at NGO_Kai_Ser@science.edu.sg

3. Drone Soccer Competition

Drone soccer combines the technical skills required for drone piloting with the tactical aspects of team sports like soccer. It offers a unique and exciting way to experience both drone technology and competitive sports.

4. Team Rules

4.1 Team Definition

Each team will have a maximum of 5 members.

This category is open to the following age groups: 7 to 20 years old

Students need not be from the same school. However, all the members of a team must be within the age group (7 to 20 years old) to qualify.

4.2. Expectations on Teams

Teams should behave fairly and be respectful towards other teams, coaches, judges, and competition organizers. Teams are to adhere to the competition rules to ensure fair competition.

Flying of the drone may be done only by the team. The task of the coach is to accompany them, help them with organizational and logistical matters and support the team in the case of questions or

problems. The coach cannot be involved in the programming of the drones. However, the coaches are allowed to help with the maintenance and repair of the drones.

On the competition day, during Match runs, only 1 coach/mentor is allowed to stand behind the players.

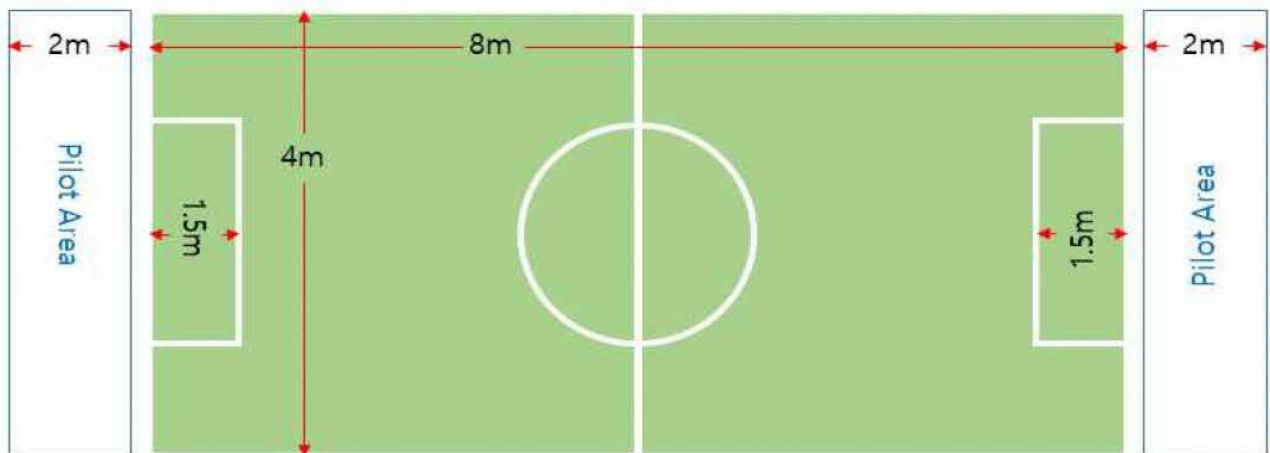
If any of the rules mentioned in this document are broken or violated, the judges or chief referees can decide on one or more of the following consequences. Before a decision is reached, a team or individual team members may be interviewed to find out more about the possible violation of the rules. The interview can include questions about the drone or the program.

- A team may be disqualified completely from the competition immediately.

5. Competition Format and Procedure

5.1 Competition Playing Field

The competition playing field is 8 meters in length, 4 meters wide and 4 meters high. There will be a pilot area of around 1.5 meters to 2 meters wide for players to each on each side of the playing field. The area will be caged, and the drones will only be flying within the caged area.



Dimensions in Graphic

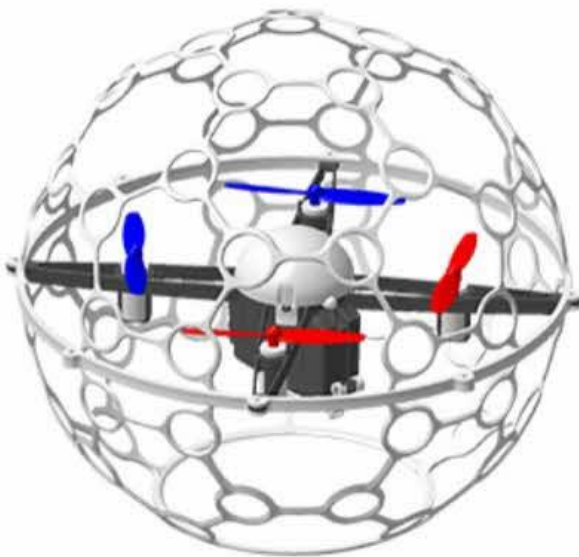


Actual Playing Field

5.2 Game Rules

Drone Ball

The drone ball used will be provided by the Association. The type of balls used will be the competition standard type class 20 drone balls as shown below. Each team will be provided by 5 balls each on the competition.



Class 20 Skykick Official Ball

Size: 200*200*180mm

Weight: 110g

Teams are allowed to use their own Drone Soccer balls during the competition.

Drone Soccer Ball requirements:

Size: $\leq 200*200*180\text{mm}$

Weight: $\leq 160\text{gm}$

Teams

Each playing team will have 2 strikers and 3 defenders. Each team is to select the players position and confirm their positions before the competition starts.

Line Up

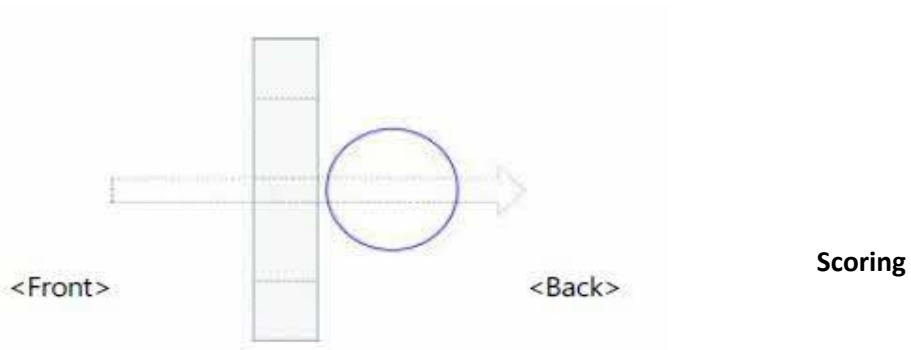
- 1) When teams are called to play, they are to prepare their drones and insert the batteries only within the cage. No insertion of batteries or arming of drones anywhere outside the cage area.
- 2) Teams are to line up their drones in front of the goal post in one straight line in any position they wish from left to right. Teams are to ensure that their team LED lights are of the same colours.

Pre-Start

- 1) The umpire will check with the lines man to ensure that all safety aspects are taken care of and that both teams are ready.
- 2) The umpire will announce the command of "Arm Your Drones", at which during this time, teams are to arm their drones to prepare to fly. No take offs are allowed at this point.
- 3) The umpire will then blow a whistle to signal the start of the games. Once the whistle is heard, teams are to commence playing.

Game Play

- 1) The game will last for 3 minutes at which the umpire will signal the times every minute and the last 5 seconds of the game.
- 2) The objective is for the strikers to score as many points as possible against the opposing team. Two strikers are in play from each team and any of the strikers are able to score. Defenders are not allowed to score but they are allowed to help in the front of the field.
- 3) Once any of the striker scores, the entire team will go back pass their own field center line before they are able to score again. If any of the team members do not pass the center line, any scoring done by the strikers will not be counted. This is known as the offside rule.
- 4) When the strikers score, the goal post will be lighted up to signal a goal and will stay lighted until all team members have gone back pass their own centre line. If a score is made while the light is on, the score will not be counted.
- 5) The ball MUST pass fully through the loop to be counted as pictured below.











Post Game

- 1) The umpire will use the whistle again when the three minutes is up.
- 2) All teams are to disarm their drones immediately.
- 3) Teams are to wait for umpire instructions before moving into the cage to retrieve their drones.
- 4) Teams are to exit the cage once they are done retrieving their drones and prepare for the next game.

Frequent Incidents and Response

- 1) There might be times when the goal post lights might stop working or do not light up. In such instances, the umpire will instruct the lines man to conduct manual counts for score and use the hand flag for signals.

Category	Score approved	Score disapproved	Return declared	Return completed
Flag				
GOAL LED Color	 change to RED	 stay WHITE	 stay RED	 change to WHITE

- 2) There are times where the drone balls stop working or crash during the game. The game will carry on regardless until there are either no strikers or defenders left on either side of the team. When a drone is no longer functional, the player is to inform the lines man that he/she is giving up and place the controller on the floor. If the controller is not placed on the floor, the lines man will assume the player is still in play. Offside rules still apply in this situation.
- 3) In the unlikely event when the drone balls somehow leave the playing field, it will be considered out of bounds and will no longer be able to carry on. Player is to disarm and give up by putting the controller on the ground.

5. Competition Matches

1. A total of 10 groups of 3 teams will be allocated.
2. Each game is made from best of 3 matches.
3. The winner of each group will continue to the quarter finals. (10 teams)
4. 5 teams will eventually move to the semifinals.
5. Round Robin between the 5 teams will occur and the winner will be determined by point system.
6. If the case if there is a draw after 3 rounds
 - a. A new match will be played.
 - b. In event that the new match is a draw, winner is determined by total score points across the 4 matches.

6. Flying Safety and Flying Safely

All participating teams should adhere to the following during the flying of the challenges.

1. Flying Regulations in Singapore
All flying must be conducted
 - a. In accordance with Civil Aviation Authority of Singapore's (CAAS) UA Safety Guidance (<https://www.caas.gov.sg/public-passengers/unmanned-aircraft/ua-safety-guidelines>). Participants who do not meet safety & regulatory requirements would be immediately disqualified from the competition.
 - b. Only in permitted flying areas as advised in CAAS's site on "permitted fly and no-fly zones". (<https://www.caas.gov.sg/public-passengers/unmanned-aircraft/permitted-flying-areas-and-no-fly-zones>).
2. Guardian as Safety Supervisor
 - a. Every individual/team should have a guardian during his/her attempt at flying. Guardian should be age 21 or above. Safety supervisor's duty is to ensure that Flying is conducted in a controlled environment and proper safety measures are in place to minimize injury or damage to property; and verify the participants' attempts to make sure flying regulations are complied with.
3. Checklist for Safety Supervisor
 - a. Pre-Flight Preparation of Space
Participants selected and prepared flying area, such that it complies with CAAS flying regulations and fly zones. (Refer to websites listed above) (Examples would be closing windows in an enclosed room, restricting entry during flight.)

- b. Pre-Flight Planning & Communication
Participants do pre-flight planning and explain to the Safety Supervisor their Flight Plan, contingency Plans. (e.g., Fly away Drones, or crash) and procedure to Turn off drone, in event of emergency landing.
- c. In-Flight Safety
 - i. Safety Officer & Participants to ensure no one is within 1m of the drone prior to drone take off.
 - ii. Participants must announce “arming drone” to indicate flight test to surrounding.
 - iii. Participants made appropriate measures to restrict entry into the flight zone during flight.
 - iv. Participants should be ready to always conduct drone emergency landing.
- d. Post-Flight Safety
Participants announce “disarming drone” to indicate end of flight and take actions to turn off drone.

7. Awards & Prizes

7.1 The Championship Award

This is the most prestigious award that a team can win.

Championship Award recipients are entitled to the following cash prize:

Award	Prizes
Champion	\$500 Cash and Championship Trophy, Winner Medals
1 st Runner-up	\$300 Cash and Winner Medals
2 nd Runner-up	\$150 Cash and Winner Medals

Note:

1. Awards will only be given if the team meets the minimum standard set by the Drone Odyssey Challenge organizing committee.
2. All Participants will receive e-Certificate(s) of Participation upon submission of the challenge(s) if they are not recipients of any awards.
3. International participants are not eligible for cash prizes.