DRONE ODYSSEY CHALLENGE 2024

Category A1 to D1
General Rules

Main Organiser:

Co-Organiser:

Table of Contents

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. Cat A and B - Obstacle Challenge (Team)
2. Cat C - Drone Swarming Challenge (Team)
3. Cat D - AI Visual Sensing Challenge (Team)
4. Cat E - Drone Soccer (Team)

Registration for these category challenges will be via https://www.gevme.com/DOC2024

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. Theme for DOC 2024

The theme of this year's Drone Odyssey is "Drones for Good" with a focus on utilizing drones to address future challenges and promote technology for positive impact. Participants can gain insights into the significant role of drones in addressing challenges through this year's DOC.

4. Team Rules

4.1 Team Definition
Each team will have a minimum of 2 members and up to 4 members.

This category is open to the following age groups:

- Primary: students 7-12 years old
- Secondary: students 13-16 years old
- Tertiary: students 16-20 years old

Students need not be from the same school. However, all the members of a team must be in the same age group 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.

Coding of the drone must 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.

On the competition day, during mission runs, coaches/mentors are not allowed to communicate with their teams.

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 get up to a 50% reduced score for one or more judging rounds.
- A team may be disqualified completely from the competition immediately.

5. Competition Format and Procedure

5.1 Competition Format

Practice Runs → Presentation → Mission Runs → Award Ceremony

1. Teams will be briefed on the proceedings on the day and issued specific instructions pertaining to the challenges during the Mission Briefing. Following which, teams will be given time to practice for their mission runs during the trial session.
2. The Trial/Practice session will be conducted as a free practice session when teams are allowed access to the playfields on a first come first serve basis. However, teams will not be able to spend more than 5 minutes on a playfield at any one time. Officials will ensure that no team is allowed to hog any playfield.
3. Teams will commence with the Final Mission after their lunch break. Each team will be allowed reasonable preparation time before their ONE (1) drone run. The scores obtained for that ONE (1) drone run will be used to determine the final rankings for the finals. In the case of a tie in scores, the faster timing for that ONE (1) drone run will be used as a tiebreaker.
4. The winners of the Challenge and Merit Awards will be notified by the end of the competition.

5.2 Presentation Format & Judging Criteria

The details of the Presentation are as follows:

1. Teams will present to a panel of Judges.
2. Teams will have to prepare a **5-minute presentation** followed by a **5-minute Q&A by the Judges**.
3. The goal of the presentation is to help the judges understand the team's project and hence prepare questions for the team. This will enable judges to have a better understanding of the team's learning processes.

4. Visual materials are allowed in the presentation (e.g. PowerPoint slides, boards, charts etc.).
5. Teams are to provide for their own equipment needed for their presentations. For example, laptops (charged and ready to present) or boards and charts.
6. There is no limit on the number of slides used if presentations remain within the 5-minute timeframe.
7. All the members in the team are required to attend the presentation, unless under exceptional circumstances.
8. The official language for all presentations is English. Interpreters are not allowed.

Presentation Topic:

Category A to C1

Teams may choose the following topics for their presentations.
Teams are not limited to 1 topic.

Topic	Content Suggestions
Livestock Monitoring	How are the drones used for the specific topic?
Land Survey	Why are they important?
Security	What kinds of drones are currently being used?
Search and Rescue	

Category D1

Topic	Content Suggestions
AI Intelligent Drones	What kinds of drones are currently being used? How do they operate?

Judging Criteria for Drone Odyssey Presentation:

Criteria	Points
Presentation Effectiveness Message delivery and organization of the presentation	4
Creativity Imagination used to develop and deliver the presentation.	4
Problems / Applications identification Clear definition of the problem being studied.	4
Problem and Applications Analysis Depth to which the application was studied and analysed by the team, including extent of analysis of existing solutions.	4
Sources of information Quality and variety of data/evidence and sources cited.	4
Subject Knowledge Ability to respond critically and analytically.	10
Total	30

5.3 Mission Run Format

1. Teams will be quarantined in designated team areas and are only allowed to modify the construction or code of the drones during Practice Times. If teams want to make test runs, they need to queue with drones (controller included). Shoes are to be taken off before entering the competition playing field.
2. If there are any Surprise Rules during the competition round, this will be conveyed to the teams by a briefing that will be conducted by the Chief Judge before the start of the Practice Time. If the surprise rule brings additional game elements, teams are not allowed to remove these elements from the playing field if they do not want to solve the surprise rule.
3. If there is randomization of any gameplay elements, this will be done before the start of each Challenge Attempt, with all teams having the same layout in the same Challenge Attempt round.
4. Flying will only be done within the designated flying space. Teams violating this may be barred from competition at the discretion of the Drone Odyssey Challenge 2024 organising committee.
5. All participants will be held responsible for the safe flying of their drone(s) throughout the entire competition. The organisers reserve the right to ground the flying machine(s) of any team.
6. Teams should prepare all required equipment, including routers, laptops, chargers, drones, spare batteries, and accessories for the competition.
7. Charging of batteries is permitted within the competition hall, but only official battery packs should be used and charged in accordance with the manufacturer's guidelines. Teams must ensure they have an adequate supply of batteries for all missions and be capable of troubleshooting their own equipment in the event of technical issues.
8. No transfer of materials (physical, digital, or otherwise) between the designated team areas and outside the quarantined area. Any team found in violation will be subjected to the penalties listed in 2.2.
9. The organisers of Drone Odyssey Challenge 2024 will not be held responsible for any damage to, or the loss of, any drone(s) and associated equipment throughout the entire competition.

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. <u>Pre-Flight Preparation of Space</u>
      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. <u>Pre-Flight Planning & Communication</u>
      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. <u>In-Flight Safety</u>
      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. <u>Post-Flight Safety</u>
      Participants announce "disarming drone" to indicate end of flight and take actions to turn off drone.

7. Awards & Prizes

For each category – Obstacle Challenge, Swarm and AI Powered Visual Sensing respectively:

Award	Rank	Remarks	Prize
Best Presentation Award	1st		
	2nd		
	3rd		
Best Knowledge	1st	Participated in Presentation	Medal and E Certificate for each team member
	2nd		
	3rd		
Best Strategy	1st		
	2nd		
	3rd		

	Competed in Presentation and Mission Run	Cash Prize, Trophy [1 per team], Medal & E Certificate for each team member
Championship Award [Refer to 7.1]		

Across all categories:

Award	Remarks	Prize
Judges Award	Apart from all the awards listed, judges may present up to 5 other awards to teams and/or individuals that have displayed outstanding attributes (during the competition) that set them apart in a unique way.	Medal and Certificate for each team member

The Organiser reserves the right to amend the prizes without prior notice.

7.1 The Championship Award

This is the most prestigious award that a team can win. Teams are considered for the Championship Award based on their overall excellence and total learning experience during the competition.

The Championship Award assessment is based on the scores of the top finalists according to the following weightage:
- **70% Drone Performance**
- **30% Presentation Score**

Championship Award recipients are entitled to the following cash prize:

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

Note:

1. Teams can win multiple awards, with no set limit, but it is possible that not every award will have a recipient. 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.