



DRONE ODYSSEY CHALLENGE 2018

COMPETITION MANUAL

Main Organiser:



Co-Organiser:



With Support by:



Partners:



Drone Odyssey Challenge 2018 Manual - Change Log

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DRONE ODYSSEY CHALLENGE 2018

1. INTRODUCTION

Drone Odyssey Challenge is a new and exciting game-based competition that promises plenty of fun while inculcating technical skillsets, 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 inaugural competition will see participants working together in teams to code their programmable drones so as to transform them into Unmanned Aerial Vehicles (UAVs) capable of performing tasks under given scenarios. Being the inaugural year, 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 with support from the Ministry of Education (MOE) and various partners.

2. THEME

SURVEILLANCE MANAGEMENT

Due to the global backdrop of terrorism, Singapore's national security remains at high risk for 2018. It is thus vital for us to find means to secure and protect the safety of this nation's people within our own borders. Drones (Unmanned Aerial Systems) can function as effective surveillance management systems that can monitor, identify and even neutralise potential threats.

3. CATEGORIES

Category A – Primary Schools: Coding with Drones

Code a programmable drone and turn it into an unmanned aerial vehicle (UAV) that can navigate itself through an obstacle course.

Each team should consist of **TWO (2) to THREE (3)** members.

Category B – Secondary Schools: Research & Design with Drones

Design a suitable mounting (i.e. using 3D printing, Lego bricks or various construction materials) to attach a data logger (i.e. Micro:bits) on a programmable drone and code for it to perform a series of tasks along an obstacle course.

Each team should consist of **TWO (2) to THREE (3)** members.

4. GENERAL RULES

- The deadline for registration is **27 April 2018**. Teams can register online at the following URL: <http://goo.gl/YxDNmY>. A registration fee of \$25 applies per team.
- Participants must be full time registered students of a school of the correct level for the category they are registering for. They are not allowed to take part in categories higher or lower than their educational standard, i.e. Primary school students are not allowed to take part in Category B. Secondary school students are not allowed to take part in Category A.
- Participants will be notified upon successful registration within one week of the registration deadline. The decision made by the Drone Odyssey Challenge organizing committee is FINAL, and is subject to the competition schedule and logistics support availability.
- Each member can only participate in one team within their eligible category.
- Members and family members of the organising committee are not allowed to participate in Drone Odyssey Challenge.
- The organisers reserve the right to amend the rules and regulations. In the event of any change, all teams will be informed at least **TWO (2)** weeks prior to the start of the competition.
- Prizes will be awarded to the designated recipient(s), as stated in the registration form.
- A safety netting will be set up around the perimeter of the flying arena for purpose of safety.
- The organisers of Drone Odyssey Challenge 2018 will not be held responsible for any damage to, or the loss of, any drone(s) and associated equipment throughout the entire competition.
- 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.
- Information pertaining to the competition may be found at the event website: www.science.edu.sg/events/Pages/dronechallenge.aspx. For any specific queries regarding the competition, please send an email with the title addressed to the relevant category (e.g. <CAT A> Clarification about General Rules & Regulations) to the following email address: drone_odyssey@science.edu.sg

5. FORMAT OF COMPETITION

Interested participants and mentors are invited for the formal announcement of the competition to be held at Science Centre Singapore on 16 Mar 2018 at 2:30pm. Participants and mentors will be briefed on the rules and regulations as well as the mission tasks for the two competition categories. They are also welcomed to clarify any queries they may have about the competition during the Questions & Answers session.

Registered teams will then work on their respective mission tasks based on the game-play announced by the Drone Odyssey Challenge organizing committee in preparation for the preliminary rounds to be held at ITE College Central on 22 and 23 May 2018 for CAT A and CAT B respectively.

Top 20 teams of each category from the preliminary rounds will be invited back for the finals to be held on 5 and 6 July for categories A and B respectively at the Suntec City Convention Centre. These finalist teams will be required to prepare for and perform additional mission tasks that will be announced only after the completion of the preliminary rounds. These finalist teams will also have to prepare and present before a panel of judges on their learning journey for the competition thus far.

Date	Event	Venue
2 March 2018	Registration Opens	--
16 March 2018	Competition Announcement	Science Centre Singapore
27 April 2018	Registration Closes	--
22 May 2018	Cat A Preliminary Rounds	ITE College Central
23 May 2018	Cat B Preliminary Rounds	ITE College Central
5 July 2018	Cat A Finals & Awards Presentation Ceremony	Suntec City Convention Centre
6 July 2018	Cat B Finals & Awards Presentation Ceremony	Suntec City Convention Centre
7 July 2018	Drone Odyssey Challenge Public Activities & Showcases ¹	Suntec City Convention Centre

Any changes to the above schedule for the various categories will be informed latest by 9 May 2018.

¹ Drone Odyssey Challenge will be open to the public for various drone related activities and showcases on 7th July 2018. While the competition proper only takes place for the two days prior, participants, mentors and their families and friends are cordially invited to visit the same activity space on Saturday for more fun and excitement.

5.1 PRELIMINARIES

The preliminary rounds will take place on 22 and 23 May 2018 at ITE College Central. All participating teams should expect the following during the course of the preliminaries on that day:

- The competition hall will open at 8:30 am. Only registered team members of the participating teams can enter the competition zone from 8:30 am to 5:30 pm.
- All participating teams will report to the venue by 8:30am for registration. Teams reporting for registration later than this stipulated timing without extenuating reasons may be barred from competition at the discretion of the Drone Odyssey Challenge 2018 organising committee.
- As for spectators, there is a separate entrance to the spectator hall and they are not permitted within the competition zone (playing field and student work areas).
- 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 2018 organising committee.
- Teams are allowed to charge their batteries within the competition hall. Only official battery packs are allowed and charged according to the manufacturer's recommendations. Teams are required to bring sufficient batteries for all the missions.
- All participating teams will be expected to complete **THREE (3)** mission runs lasting throughout the day. Teams will be allowed time in between each mission runs to practise as well as prepare. The total score out for the **THREE (3)** mission runs will be used to determine the final rankings for the preliminaries. In the case of a tie in scores, the total time for the **THREE (3)** mission runs will be used as a tie-breaker.
- The top **TWENTY (20)** performing teams from each category will be invited for the finals. Details for the final missions will then be made known to all finalist teams so that they may start preparations in anticipation of the finals to be held later.

5.2 FINALS

The finals will take place on 5 and 6 July 2018 for Category A and B respectively at Suntec City Convention Hall. All finalist teams should expect the following during the course of the finals on that day:

- The competition hall will open at 8:30 am. Only registered team members of the finalist teams can enter the competition zone from 8:30 am to 5:30 pm.
- All finalist teams will report to the venue by 8:00 am for registration. Teams reporting for registration later than this stipulated timing without extenuating reasons may be barred from competition at the discretion of the Drone Odyssey Challenge 2018 organising committee.
- As for spectators, there is a separate entrance to the spectator hall and they are not permitted within the competition zone (playing field and student work areas).

- 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 2018 organising committee.
- Teams are allowed to charge their batteries within the competition hall. Only official battery packs are allowed and charged according to the manufacturer's recommendations. Teams are required to bring sufficient batteries for all the missions.
- All finalist teams will be expected to complete **THREE (3)** mission runs lasting throughout the day. Teams will be allowed time in between each mission runs to practise as well as prepare. The total score out for the **THREE (3)** mission runs will be used to determine the final overall ranking of all finalist teams. In the case of a tie in scores, the total time for the **THREE (3)** mission runs will be used as a tie-breaker.
- All finalist teams will be expected to make a **TEN (10)** minute presentation before a panel of judges using suitable presentation aids such as but not restricted to; powerpoint slides, A2 posters, journals, demonstrations, printed A4 handouts, various AV media and etc. The team's performance, as assessed by the judging panel, will be used as consideration of the various Merit Awards to be presented. Teams may strategically scope their presentations to vie for specific Merit Awards.

6. AWARDS

Drone Odyssey Challenge judges and officials make all scoring decisions and their decision is FINAL. For arbitrary cases, the Drone Odyssey Challenge organising committee will have the FINAL say.

There is no limit to the number of awards that a team can win, but there may not be a winner for every award. Awards may not be given out if the team do not meet the minimum standard determined by the Drone Odyssey Challenge organising committee.

6.1 CHALLENGE AWARDS

Challenge Awards are presented to the best performing teams in their respective categories based on their mission runs. Prizes associated with these awards are summarised below:

Award	Prizes
Champion	\$500 Cash, Championship Trophy, Winner Medals & Sponsored Products
1 st Runner-Up	\$400 Cash, Winner Medals & Sponsored Products

2 nd Runner-Up	\$300 Cash, Winner Medals & Sponsored Products
3 rd Runner-Up	\$200 Cash, Winner Medals & Sponsored Products
4 th Runner-Up	\$100 Cash, Winner Medals & Sponsored Products

6.2 MERIT AWARDS

Merit Awards are presented to finalist teams in each category by a panel of judges in recognition of outstanding attributes displayed. They may include the following awards and more:

Award	Awarded To
Best Presentation	Team that best exhibits creativity, fluency, confidence and flair in its presentation, and that demonstrates that “WOW” factor to the panel of judges during the interview session.
Best Knowledge	Team that best exhibits in-depth knowledge on subjects relevant to the theme, programming, mechanical design and unmanned aerial systems in general.
Best Strategy	Team that takes the initiative to achieve its mission objectives through intelligent and well calculated risk management skills and strategies, as well as a willingness to plan and execute risky maneuvers.
Best Learning Journey	Team that best demonstrate the highest levels of learning, application, analysis, synthesis, critical evaluation, self-awareness and the ability to maintain a reflective log of their learning journey.
Best Sportsmanship	Team that best demonstrates great sportsmanship during the competition - cheering, encouraging other teams, celebrating other’s success as much as their own.

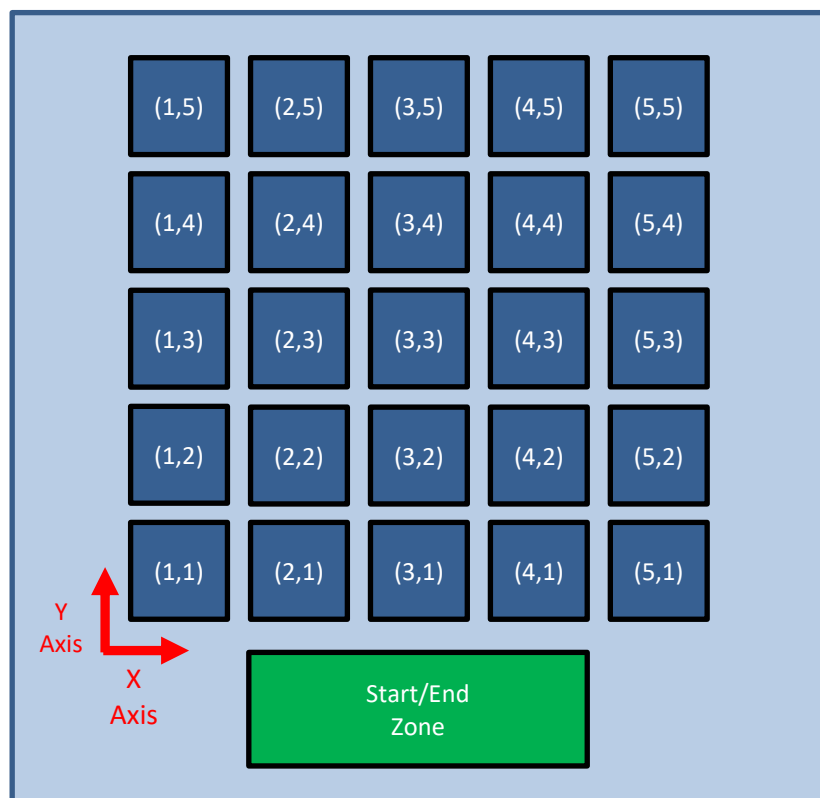
All teams presented with a Merit Award shall receive the following prizes:

Merit Award Prizes
\$300 Cash, Merit Award Medals & Sponsored Products

Any of the above awards may not be given out if no team is deemed to have meet the minimum standard as determined by the Drone Odyssey Challenge organising committee's panel of judges. Merit awards beyond what has been specified above may also be awarded to teams at the discretion of the Drone Odyssey Challenge organising committee's panel of judges.

7. MISSION TASKS

The basic premise of the challenge for the preliminary rounds is for teams to code a drone to autonomously navigate their drones within a 5 X 5 grid as shown below:



For illustrative purposes only.

Actual playfield layout may differ in actual look.

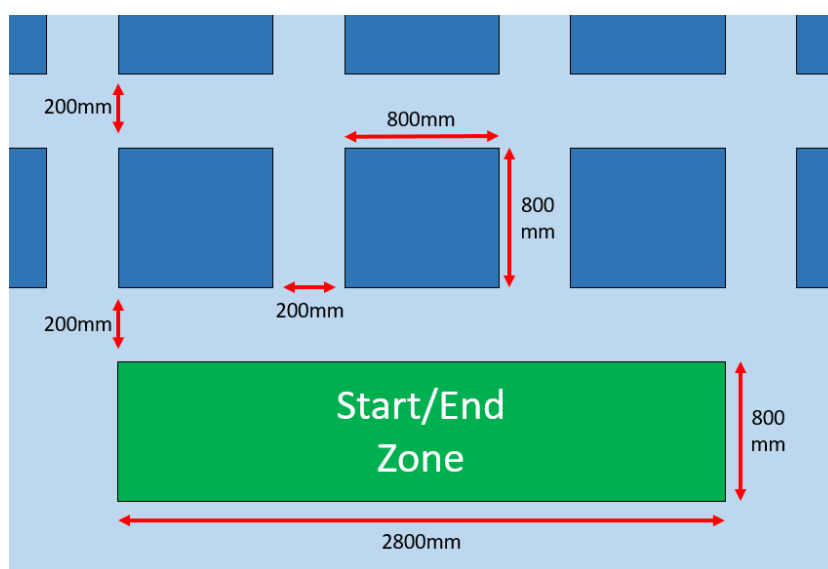
Teams will be asked to navigate their drones to specific “coordinates” within this 5 X 5 grid starting from the Start/End Zone. At each of the “coordinates”, teams will have to take a picture to denote that they have been to teach of the “coordinates”. These “coordinates” will be randomly drawn before the start of each mission round. Obstacles

may be situated along the flight path. Teams will be judged based on the number of photos taken correctly and the timing taken to complete the missions.

For the finals, teams will program their drones for autonomous navigation within a 5 X 5 grid. A unique situation will be introduced and teams will need to formulate a solution to circumnavigate and strategise against it. For CAT B teams, they will be asked to design suitable mountings to attach sensors and data loggers to their drones to perform other mission tasks. Specifics for the final missions will only be released to the finalist teams following the conclusion of the preliminary rounds.

8. PLAYFIELD SPECIFICATIONS

The playfield sits within an approximate 6m X 6m space. The playfield consists of 25 tiles, each of dimensions 800mm X 800mm with a spacing of 200mm between edges. The Start/End Zone is a 2.8m x 0.8m space. See illustration:



Not to scale.

For illustrative purposes only.

All obstacles will fit within an 800mm X 800mm space. These obstacles can have varying heights.

9. TECHNICAL RULES & REGULATIONS

Only Parrot Mambo programmable minidrones (www.parrot.com) and its associated Parrot-branded accessories are allowed. Teams may use any programming language to code their drones. No modifications to the stock Parrot Mambo are allowed for the competition (with the exception as stated below).

For the finals, CAT B finalist teams are allowed to attached non-Parrot accessories due to the requirements of the mission tasks. These attachments can be third party sensors, parts or even 3D-printed pieces, subject to the discretion of the organisers of Drone Odyssey Challenge 2018.



Parrot Mambo.

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