

19. GRC Drone Mission	Team/Individual	Building
Level : Junior / Senior	1-2 PERSON	Assembled

Game Description

This is a drone piloting competition for completing a mission by flying along a designated path to evade obstacles and destroy targets. Each team is permitted to have 1 to 2 contestants, who serve as the pilot (drone controller) and assistant pilot. The assistant pilot is responsible for technical duties, such as changing batteries and retrieving crashed drones. Team members can divide or switch roles among themselves to decide who will pilot the drone during the mission. Each team has 2 minutes per round to fly and complete the mission, with a total of 2 rounds. The scores from both rounds will be combined to rank the teams and determine the winner.

I. Drone Specifications

Equipment	Description
Aircraft Types	Quadcopter
Wheelbase (Motor Distance)	Not less than 75mm and not exceeding 135mm (Update 14 Feb. 2026)
Motor Types	Unlimited
Battery	Not exceeding 4.5 volts (1S battery)
Weight	Not exceeding 140 grams
Safety Equipment	Must have a propeller guard around the drone (Prop Guard)
Flight Controller	Remote control, smartphone, tablet
Flight Performance	The drone must be capable of crashing to destroy targets

II. Competition

- Teams consisting of contestants A and B are permitted to have either contestant pilot the drone during the mission—for example, contestant A can pilot both rounds, or A and B can take turns piloting. If a team has only a single contestant (Individual), that contestant can pilot the drone themselves for both rounds. The chosen contestant must fly using the naked eye only, following the designated flight path on the field, navigating through various obstacles, and finally successfully attacking the targets. Each team has 2 minutes of competition time to complete the mission. The flight path is shown in Figure 2, and the targets that must be destroyed are shown in Figure 3.
- Drones used in the competition must be provided by the contestants themselves. Each team can have an unlimited number of drones, but can only use one drone at a time during the competition. Spare drones are allowed, but they must be reported to the referees and inspected before the competition starts, and

Unauthorized copying or use of these rules may result in legal liability for copyright infringement.

Copyright © All rights reserved by iROCTH / TREC / TRTC

kept at the side of the field during the match. A maximum of 2 spare batteries are allowed; they must be reported and prepared before entering the competition field.

3. When the competition starts, contestants enter the field in the Take-Off area and are given 30 seconds of equipment testing time to prepare before the actual Take-Off. After preparation is complete, the contestant gives a signal to the referee for testing. The referee will call out "Ready!" and count down "3, 2, 1, Take Off!". The pilot must wait for this command before flying to perform the mission. If a pilot takes off before the command, it will be penalized as a False Start, and they will have the right to take off again after receiving another signal. Contestants may walk following the drone as long as they stay within the designated zones and do not cross into the flight area during the competition. If the drone malfunctions during the competition, the contestant can resolve the issue, but time will not be stopped during this troubleshooting process.
4. While flying to complete the mission, the contestant must control the flight by line of sight only to navigate through the obstacles along the designated route during the first phase (flight path shown in Figure 1). If the drone encounters an accident, crashes, or falls, or requires repairs and adjustments, this is permitted, and it can take off from the spot where the accident or crash occurred, or after repairs, to continue the mission while the competition time continues to run. If the drone is damaged beyond repair and cannot continue flying, the contestant can switch to a spare drone prepared before the start of the competition (if not reported to the referees beforehand, switching is not allowed), and the contestant can replace the battery during the competition (batteries must be shown to the referees and brought along during the match).
5. After flying along the designated route through all obstacles in the competition field, the contestant must destroy the targets, which consist of 2 balloon targets, by crashing the drone into the surroundings of the target so that the pins on the target pierce and pop the balloons.
6. The referees will start timing the competition from the end of the "Take Off" command until the aircraft lands, which marks the end of the match. When 20 seconds and 10 seconds remain in each test round, the referees will call out "Remaining time: xx seconds" (time will not be called out at other times), and players can choose whether to land or continue destroying targets based on their own situation. When 5 seconds remain, the referees will announce a countdown: "5, 4, 3, 2, 1, Time's up!", concluding that round of the competition.

Scoring and Judging

1. Total competition score = 120 - Competition time used + Target attack score + Landing score - Other penalty points, with a minimum score of 0.
 - o **Example:** The competition time is 120 seconds, and the time is converted into seconds. If the landing time is 1 minute, 20 seconds, and 30 milliseconds (1'20"30), the time used is 80.30 seconds.
2. Target attacks: Each target successfully attacked awards 100 points.
3. Technical scores for target attacks: Contestants can earn bonus points from attacking targets as follows:
 - a. **Boomerang Move:** Controlling the drone to crash into and pop a balloon from behind awards an additional 100 points.
 - b. **Big Bang Move:** Controlling the drone to crash into and pop both balloons simultaneously in a single collision awards an additional 300 points.
4. Tie-breaking criteria for equal scores:
 - a. The contestant with the faster flight time receives a higher rank.
 - b. If the times are equal, the contestant who successfully attacked more targets receives a higher rank.
 - c. The contestant with fewer penalty points accumulated during obstacle navigation receives a higher rank.
5. Penalties:
 - a. Taking off before receiving the signal from the referee results in a 3-point deduction.
 - b. Each time the aircraft touches the ground during flight results in a 2-point deduction (no deduction applies if touching the ground during target attacks).
 - c. Each time the aircraft touches an obstacle during flight results in a 2-point deduction (excluding structural contact during target attacks).
 - d. Touching the drone after Take-Off during the mission results in a 2-point deduction (excluding accidents requiring repairs, or picking up and placing a crashed drone to restart flying).
 - e. During obstacle course navigation, the pilot must navigate through the obstacles one by one and must not skip any checkpoint. If a pilot skips an obstacle checkpoint, the referee will issue a warning to return and complete the mission at that point. Skipping an obstacle once results in a 4-point deduction and requires flying back to successfully complete that checkpoint. A second skip results in a 6-point deduction, and a third skip results in a 20-point deduction for each skipped checkpoint.

f. Flying out of the competition area (crashing into safety netting or crossing designated boundaries on the floor) results in a 5-point deduction.

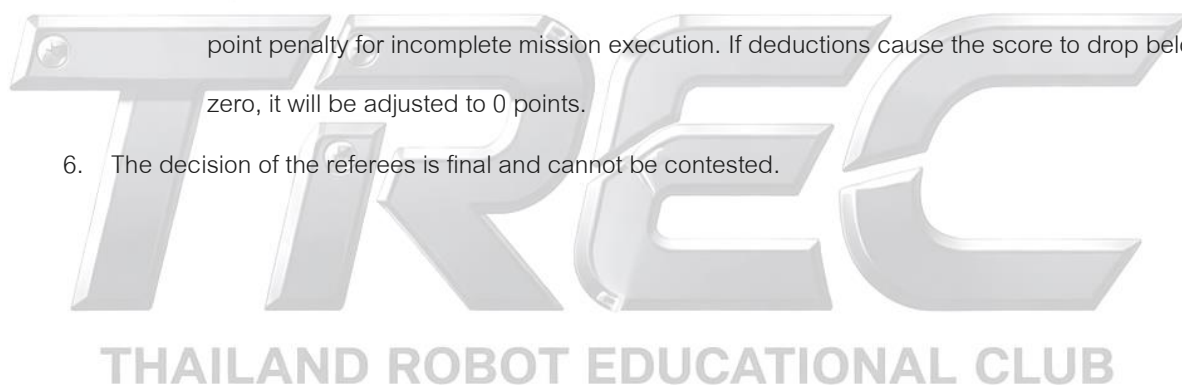
g. Landing Point (10 points total): If any part of the drone (including prop guards and landing gear) extends outside the designated landing area (inside the white circle), a 2-point deduction applies. If any part of the drone goes outside the Landing Pad entirely upon landing, a 5-point deduction applies. Landing abnormally, such as crashing or falling due to an accident, results in a 5-point deduction.

h. Contestants may follow the drone during obstacle navigation but must remain outside the flight area and stay strictly within the designated zones during target attacks. A 30-point deduction applies every time a contestant steps outside the designated area or encroaches onto the competition field.

i. If the drone crashes to the ground or cannot continue flying due to other reasons (excluding hitting obstacles or other accidents), the contestant may quickly reset the machine themselves and place it back in its original position, receiving credit for one touchdown with no point deductions.

j. While navigating obstacles or attacking targets, if the contestant determines that the drone cannot continue flying, they may request to stop the competition with the referee. The referee will stop the timer, the game will end, the competition time will be recorded as 120 seconds, and the score will be calculated based on targets hit, minus any errors, plus an additional 5-point penalty for incomplete mission execution. If deductions cause the score to drop below zero, it will be adjusted to 0 points.

6. The decision of the referees is final and cannot be contested.



III. Competition Field

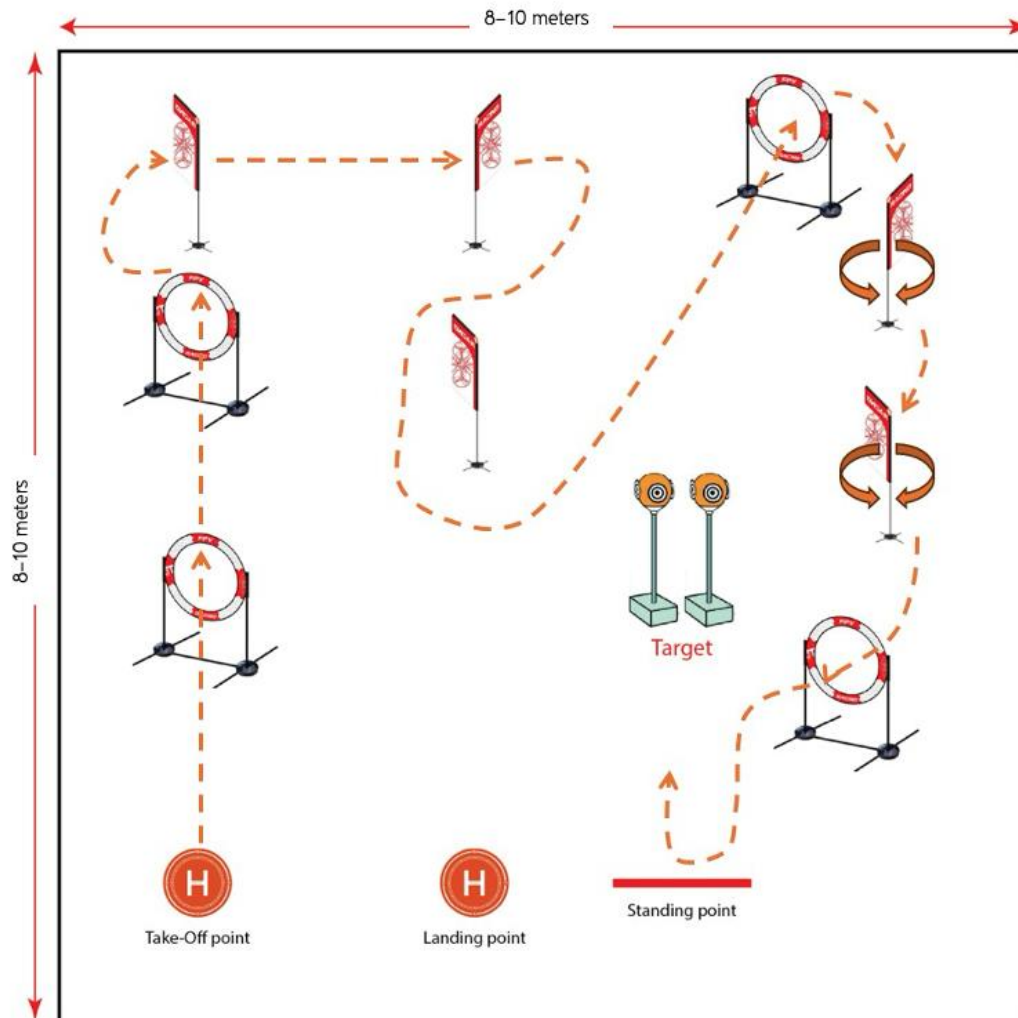


Figure 2: Flight Path

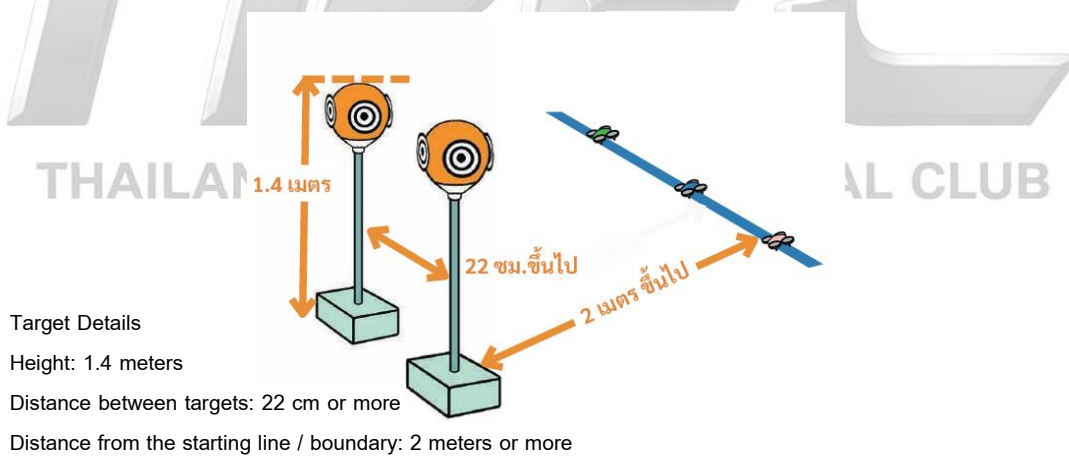


Figure 3: Target

Unauthorized copying or use of these rules may result in legal liability for copyright infringement.

Copyright © All rights reserved by iROCTH / TREC / TRTC

IV. Field Equipment

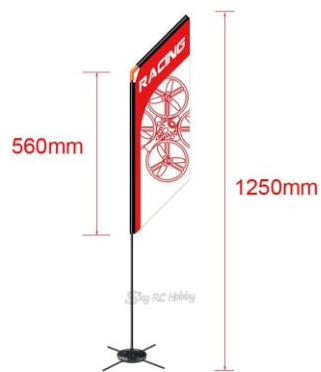


Figure 4: Racing Flag



Figure 5: Racing Gate

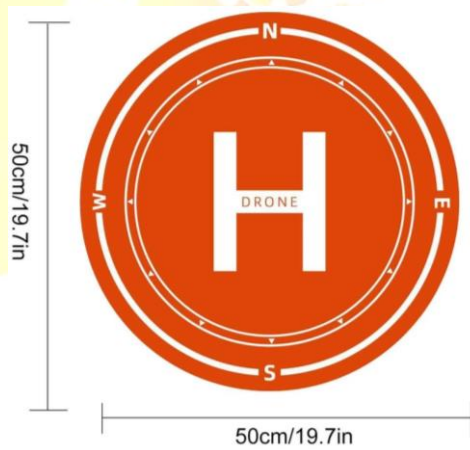


Figure 6: Take-Off and Landing Pad

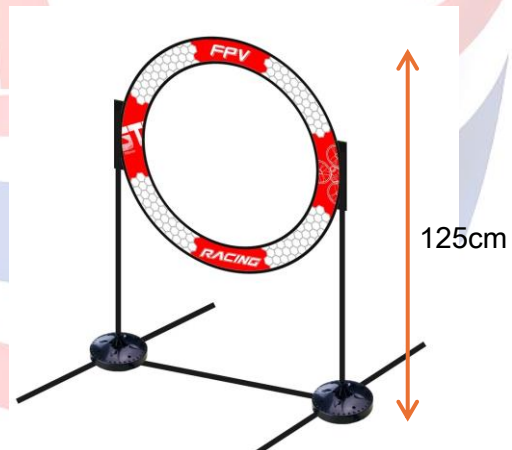


Figure 7: Racing Gate

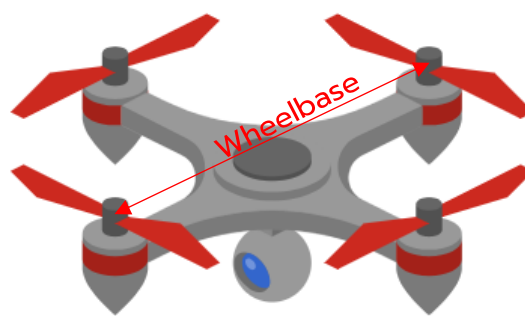


Figure 8: Wheelbase Measurement

V. Special Attack Moves

- a. Boomerang Move:** Controlling the drone to crash into and pop a balloon from behind receives an additional 100 points.



- b. Big Bang Move:** Controlling the drone to crash into and pop two balloons simultaneously in a single collision receives an additional 300 points.



TREC

THAILAND ROBOT EDUCATIONAL CLUB