



2025

Australia Youth Drone Tournament

World Robot Contest

FTF Obstacle Challenge Manual

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1. Competition Overview

Name: 2025 WRC Drone Speed Challenge Manual

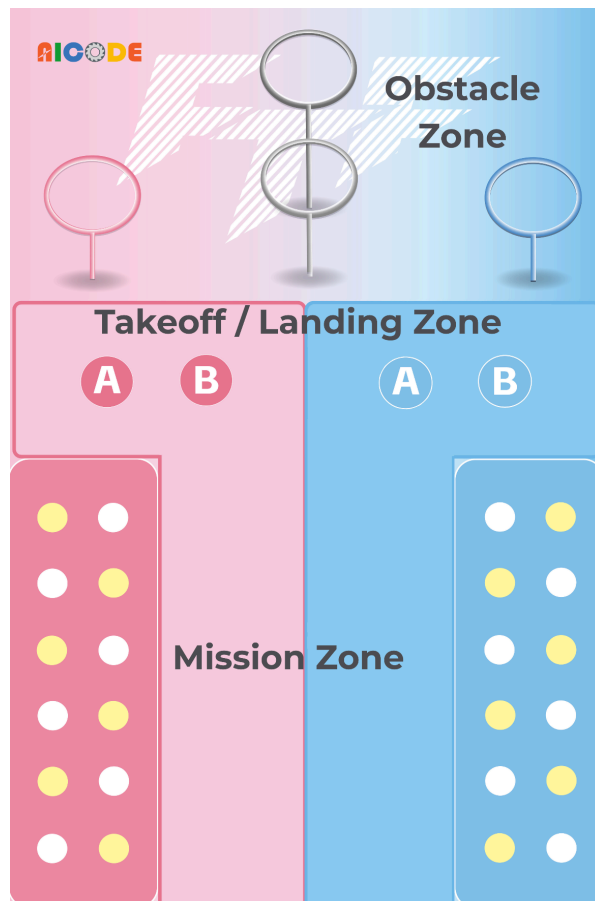
Format: 2v2 Team-Based Match

Participants: Primary School / Secondary Students

Venue: A **6m x 4m arena** featuring multiple zones: Mission Zone, Player Movement Zone, Obstacle Zone and Takeoff/Landing Zone. Safety barriers will be installed around the arena to ensure a secure environment.

Equipment: Teams need to bring their own drones, which must meet safety standards and be capable of stable and responsive control. All equipment will be inspected by the organisers before the competition. A participating drone must meet the following specifications:

- Aircraft model: Quadcopter (four rotors)
- Aircraft wheelbase: Maximum 180mm
- Flight time: At least 5 minutes
- Takeoff weight: Less than 250g (including protective guard and battery)
- Protection design: Fully enclosed protective guard to ensure flight safety
- Control Method: Must be capable of being controlled via a physical remote controller



2. Competition Format

2.1. Grouping and Scheduling

Teams are randomly divided into groups of four and play round-robin matches within their group.

2.2. Competition Stages:

2.2.1 Group Round-Robin Stage

A. Grouping Rules

- a. The standard group size is 4 teams per group.
- b. If the total number of participating teams is not a multiple of 4, the remaining teams will form a group of 3 teams. No group may have fewer than 3 teams.

B. Match Pairings - Each team plays once against every other team in its group:

- a. **4-team group:** a vs b, a vs c, a vs d, b vs c, b vs d, c vs d (6 matches total)
- b. **3-team group:** a vs b, a vs c, b vs c (3 matches total)

C. Advancement Criteria

- a. Only 1 team per group will advance to the next stage.
- b. Rankings are determined based on three criteria:
 - i. Honor Points
 - ii. Points (based on pin knockdowns and penalties)
 - iii. Mission Zone Completion Time (see "Scoring System").

2.2.2 Tie-Breaking Stage (Position Matches)

A. Trigger Condition

If the total number of group winners **is not a power of 2** (e.g., 5, 6, 10, 14), additional matches are required to reduce the number to the nearest lower power of 2 (e.g., from 10 to 8 teams).

B. Purpose

The goal is to finalize the number of teams entering the knockout round as a power of 2 (e.g., 4, 8, 16, 32).

C. Eligible Teams

The lowest-ranked group winners (based on group performance) participate in the tie-breaking stage.

D. Match Format

Tie-breakers are conducted in **single-elimination format** among the lowest-ranked teams:

- i. The two lowest-ranked teams play first.



- ii. The winner challenges the next higher-ranked team.
 - iii. This continues until the required number of teams remains.
- b. **Example**

If 10 teams qualify from the group stage, but only 8 are needed:

 - i. Team #10 vs Team #9 → Winner A
 - ii. Winner A vs Team #8 → Final spot for Top 8
 - iii. The remaining top 7 teams plus the winner proceed to the elimination round.
- c. **Additional Notes**
 - i. Pairings are assigned based on ranking, without new draws.
 - ii. Tie-breaker match duration and rules are the same as regular matches.
 - iii. If a tie occurs, a 1-minute overtime match will decide the winner.

2.2.3 Elimination Stage

- A. Format:** The elimination stage uses a **single-elimination system**: the winning team advances to the next round, and the losing team is eliminated.
- B. Draw and Pairings:** Teams draw lots to determine match numbers. Matches are arranged in numerical order: e.g., Draw #1 vs Draw #2, Draw #3 vs Draw #4, etc.
- C. Match Rules:** Each match lasts 3 minutes and follows the same gameplay rules as previous stages. If a match ends in a tie, a **1-minute overtime** will be held; the first drone to complete Obstacle D wins.

2.3. Match Duration

Each match (group or elimination) lasts **3 minutes**.

3. Competition Rules

The competition consists of **two stages**:

Stage 1 - Mission Zone Challenge: Teams operate their drones within their designated mission zones to complete a set task (knocking down all designated bowling pins).

Stage 2 - Obstacle Course Battle: Once the mission is completed (first to finish moves on), players maneuver their drones through the **Obstacle Zone** while competing strategically.

3.1. Mission Zone Rule

3.1.1 Mission Tasks (Example: Red Zone, Blue Zone is a mirrored layout)

A. Knocking Down Bowling Pins

- a. The Red Zone contains 12 bowling pins: **6 white** and **6 yellow**.

- b. Knocking down all **6 white bowling pins** is mandatory.

B. Penalty Balls:

- a. **6 Yellow Penalty Balls** (yellow bowling pins) are placed in the mission zone.
- b. Avoid hitting 6 yellow pins. Each yellow pin knocked down results in a **5-second penalty**.

C. Post-Mission Procedure

- a. After completing the mission, teams must **return their drone to the take-off zone**.
- b. The **referee must be notified** for the **penalty countdown** to begin.
- c. Penalty time will be served **after** the drone returns to the take-off zone.

3.1.2 Player Movement and Special Rules

- A. Players **must stay** within the designated movement area and **cannot enter** the competition zone to interfere with drones.

B. Special Touch Opportunity

- a. Each participant is allowed only one opportunity per match to intentionally enter the competition zone and touch the drone by raising their hand to signal.
- b. After touching the drone, the participant must immediately return to the operator area before they can continue controlling the drone.
- c. This opportunity can be used to adjust the drone's position, remove obstacles, etc., but must not be used to deliberately move objects, interfere with the mission, or disrupt the opponent.

C. Obstacle Knockdown Handling

- a. If a participant accidentally knocks over an obstacle in the mission zone (e.g., unintentionally hitting it while operating the drone normally), such as a protective ball or barrier pole, a **yellow card warning** will be issued.
- b. The participant must, without affecting the normal progress of the match, **return the knocked-over obstacle to its original position** before continuing the mission.
- c. Each team is allowed up to **two yellow card warnings**. A third yellow card will result in a **red card penalty**.
- d. If a red card is issued while a participant is operating the drone, that participant **must immediately stop controlling the drone**. Unless the drone is in a dangerous or obstructive position (to be determined by the referee), the team may only **appoint one other team member** to take over for the remainder of the match.

3.2 Obstacle Zone Rules

3.2.1 Obstacle Layout and Pathway

Drones take off from the takeoff zone and navigate a sequence of **4 obstacles** (marked A–D).

- A. **Red Team Path:** $B \rightarrow A \rightarrow C \rightarrow D$
- B. **Blue Team Path:** $A \rightarrow B \rightarrow C \rightarrow D$
- C. The **D-point** is the finish line.

3.2.2 Strategy and Rule

Teams may strategically disrupt the opponent's flight path using drone maneuvers, but physical interference (such as blocking with hands or objects) is strictly prohibited and results in a **red card** (disqualification).

No Special Touch Opportunity is allowed in the obstacle zone.

3.3 Penalty Ball Rules

- A. **Penalty Balls (Yellow Pins):**
There are 6 penalty balls placed around the competition field. Their locations are clearly marked on the field map provided before the event. Each penalty ball has a distinct color or label to distinguish it from other obstacles.
- B. **Penalty for Contact:**
When a drone knocks over a penalty ball, a time penalty will be issued. For each penalty ball knocked over, the team must land the drone and keep it within the designated take-off/landing zone for **5 seconds** before continuing the mission. This will be monitored by the referee. The penalty time starts when the referee announces "Penalty Start" and ends when the referee announces "Penalty Over."
- C. **Referee Monitoring:**
Referees are responsible for observing and recording any penalty ball contacts. If a participant physically touches a penalty ball during the match, they will be disqualified from flying for the remainder of that round.

3.4 Match End

The match will automatically conclude once the 3-minute duration has elapsed, regardless of the drone's current status or position on the field.

4. Scoring System

Scoring is divided into three categories: **Honor Points**, **Points**, and **Mission Zone Time**.

Final rankings are determined in the following order: **Honor Points > Points > Mission Zone Time**.

A. Honor Points (Obstacle Zone Completion)

After entering the Obstacle Zone, each drone must complete the designated obstacle path as quickly as possible.



Rankings are based on the order in which drones pass through the final obstacle (Obstacle D) within the match time.

In the group round-robin matches, the team with the highest cumulative Honor Points advances to the next stage.

Honor Points are awarded according to the ranking combinations as follows:

Rank Combination	Honor Points
1st place (solo)	1 point
1st & 2nd place (team)	3 points
1st & 3rd place (team)	2 points
1st & 4th place (team)	1 point
2nd & 3rd place (team)	0 points
2nd & 4th place (team)	0 points
3rd & 4th place (team)	0 points

B. Points

If Honor Points are tied, teams are ranked based on the following point system:

1. For each white pin knocked down: +2 points
2. For each yellow card received: -3 points
3. For each red card received: -10 points
4. For each penalty (yellow) ball hit: -3 points

C. Mission Zone Time

If both Honor Points and Points are tied, rankings are determined by Mission Zone Completion Time, which is calculated from the start of the match until the team completes all designated tasks. Any penalty time must be added to the final total to determine the result.

If still tied: a **1-minute overtime match** where the first to complete Obstacle D wins.

5. Violations and Penalties

Yellow Card

5.1 Deliberate Obstruction or Interference

If a participant deliberately crosses into restricted zones or uses their body or other objects to touch or block the opposing team's drone or flight path, they will receive a **yellow card**.

5.2 Behavior

If a participant crosses into a restricted area and deliberately interferes with an opposing team member or uses their drone to make contact with them, it will result in a **yellow card**.

5.3 Ignoring Referee Warnings

If a participant continues to violate the rules or behave inappropriately after receiving a warning, the referee will issue a **yellow card**.

5.4 Disputing Match Results

If a participant, team leader, or coach disagrees with the competition result, they must submit a **written appeal form** in paper format and clearly state the reason for the dispute to the referee as soon as possible. If the referee verifies that the original result is correct, the team will receive a **yellow card**.

Red Card

5.5 Intentional Collision or Disruption

During the competition, if a participant deliberately controls their drone to crash into field structures, spectators, or unrelated individuals (i.e., not caused by normal operational error), a **red card** will be issued and the incident will be officially recorded.

5.6 Unauthorized Modifications or Equipment Use

Participants may only use devices approved by the competition committee. Unauthorized modifications to the drone, or the use of external signal devices or other non-approved tools to interfere with the match, are strictly prohibited. A red card will be issued and the violation recorded. Depending on the severity, the team may be disqualified, and the responsible person may be subject to other penalties (e.g., removal from rankings or eligibility reviews)

6. Referees and Officials

6.1 Referee Team Structure

The competition will assign **one head referee**, who is responsible for overseeing the entire competition and making final decisions on major disputes and rule violations.

The second referee will assist the head referee by observing match details, recording rule violations, scoring outcomes, penalty ball contacts, and other competition-related information.

One staff member will be assigned to record results at each competition site.

6.2 Referee Responsibilities

- A. Inspect the participating teams' drones to ensure they meet safety and competition standards, and ensure the fairness and integrity of the match.
- B. Monitor the competition closely and enforce the rules. Penalise any confirmed violations based on the rules.
- C. Accurately record match scores, penalties and relevant data to ensure the scoring process is accurate and complete.
- D. In the case of disputes, the referee will explain and resolve the issue based on the rules and on-site situation. If a participating team still disagrees with the ruling, they may file an appeal to the head referee after the match. However, the final decision of the head referee shall be considered final and binding.

7. Important Notes

7.1 Safety Guidelines

- A. All participants must carefully read and strictly follow the drone user manual and safety operation procedures before operating any drone to ensure their own safety and the safety of others.
- B. Safety barriers will be set up at the venue. Spectators and non-participating individuals must remain behind the barriers and are not allowed to enter the competition area.
- C. If a drone malfunctions or poses any safety risk during the competition, the participant must **immediately stop operation** and follow safety instructions. On-site safety personnel will respond quickly to ensure everyone's safety.
- D. It is strictly forbidden to operate drones or related equipment in or near the venue without permission.

7.2 Equipment Management

- A. Participants must ensure their drones and equipment are in **good working condition**, including battery levels, propellers, and control systems before the competition.
- B. If a drone is found to be malfunctioning during the competition, the participant may request assistance from event staff. Staff may inspect and handle the issue if it does not affect competition fairness. Replacements and repairs must be approved and supervised by the referee.
- C. After the match, participants must clean their area. Any equipment left behind will be treated as abandoned.

7.3 Competition Fairness

- A. All participants must follow competition rules and may not gain an unfair advantage through any means. If a team is found to have cheated or disrupted the competition, they will be disqualified.
- B. Participants must treat referees and staff with respect. Any disrespectful behavior will result in disciplinary action, including disqualification.
- C. If a participant disagrees with a ruling, they must submit a written appeal. The final result determined by the head referee will be considered official.