

# RobotChallenge - Remote AirRace Rules

*Note: All rules are subject to change without notice.*

**Name of Event:** Remote AirRace

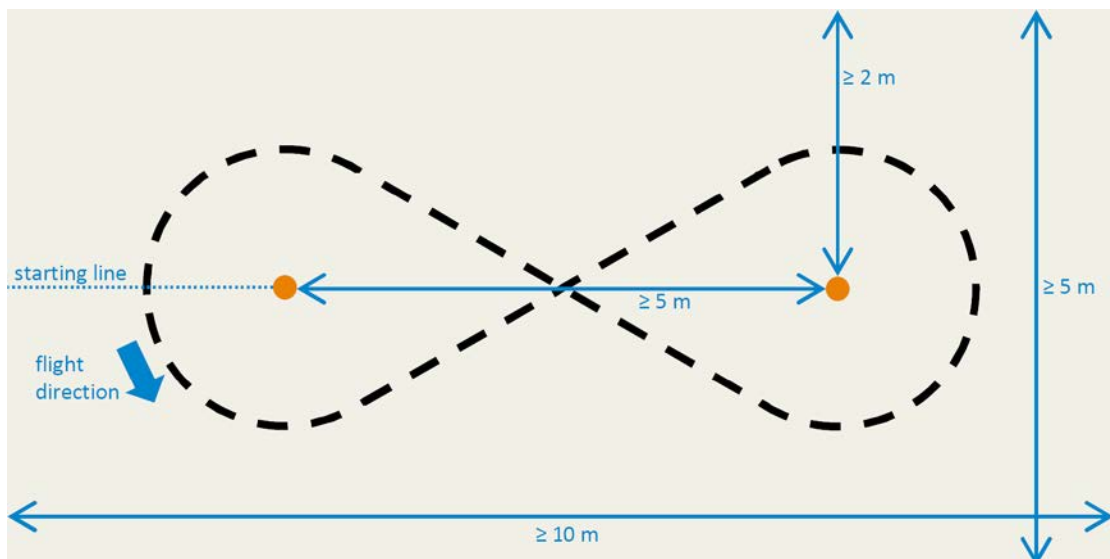
**Short Description:** The robot is in the remote control state, flying robots have to complete figure 8's around two poles that are several meters apart, two fixed circles will be installed between the two poles. The robots have to demonstrate their ability to maneuver quickly and accurately in three dimensions, the robot successfully completed the 10 circle flight, and the shortest time team won.

## 1. General Requirements

### 1.1. Field Dimensions

A. The field is at least 10 m long, 5 m wide and 3 m high. It is covered by a safety net. Two orange poles are placed in the field at least 5 m apart. The poles are 3 m high and have a diameter of 11 cm. There is guaranteed free space of 2 m around the poles.

B. The center of the two poles, like the intersection of the dotted line, will place two circles with a diameter of 1-1.2 meters, the bottom of the circle is 0.5 meters - 1 meters.



## 2. Requirements for Robots

### 2.1. General Robot Specifications

A. The robot must be an aerial vehicle, which is able to fly in a height of 1 - 2 m.

B. Aerial vehicles include fixed-wing aircraft, rotary-wing aircraft (helicopter, multicopter), flapping-wing, or airship designs.

C. All aircrafts shall not exceed a total weight of 2 kg

D. A maximum speed of 10 m/s must not be exceeded.

E. All other robot designs must fit within a cube of 1 m side length.

## **2.2. Class Specifications**

- A. Robots must be remote-controlled, and any remote controller can be used.
- B. Navigational aids shall be removed residue-freely within two minutes after the flight time.

## **2.3. Security and Safety**

- A. Failure to comply with the security and safety rules, will lead to disqualification of the team and grounding of all the team's robots for the remainder of the event.
- B. Equipment and operations must comply with the Austrian law.
- C. Only electric propulsion robots are allowed to participate in the competitions.
- D. The robot must be clearly identified with the starting number as obtained during the registration.
- E. Robots may not have sharp or potentially dangerous parts, excluding normal propellers and helicopter-blades.
- F. Only non-flammable gases may be used for the buoyancy body.
- G. A human safety pilot must be able to take over control of the robot at any time in case of an emergency.
- H. Entrance to the flight area is only permitted for one team member of the scheduled team after clearance by the judge.
- I. Teams must always follow the instructions of the judge.
- J. The judge can abort every flight.

## **2.4. Homologation**

- A. All participating robots are allowed to compete only after passing the homologation. This check will be performed before the first flight and covers all points listed below.
- B. The robot must show its ability to remain at a flying height of 1 - 2 m without human intervention regarding the height (lateral control is allowed).
- C. The ability to safely control the robot has to be shown by the team member who will operate the robot during the competition (robot operator).
- D. The robots must comply with all security and safety requirements.

# **3. Game**

## **3.1. Aim of the Game**

- A. The robot starts off remotely, and the robot continues to fly around eight characters and 10 circles, the circle is 1-1.2 meters in diameter. It needs to go through 2 circles per cycle, and the shortest time team wins.
- B. During the flight the robot has to remain mainly within the flying height of 1 - 2 m above the ground.

## **3.2. Start of the Game**

- C. Each team is allocated a preparation time slot of 5 minutes. During the preparation time one team member (robot operator) is allowed to enter the race area in order to prepare for the start.
- D. When preparation is finished or the 5 minutes preparation time is over the

judge starts the 10 minutes flight time and the robot operator can start the robot.

E. The start has to be performed at the starting line.

F. During the flight the robot operator has to leave the race area for safety reasons.

### **3.3. Restart**

A. A flight ends when the robot touches the ground or the safety net or the robot operator decides to abort the flight.

B. Multiple starts are allowed during the flying time. The robot operator may reenter the race area after the judge's clearance and restart the robot.

C. During the flight the robot operator has to leave the race area for safety reasons.

### **3.4. End of the Game**

A. When the robot completes 10 circles of effective flight, or when the referee stops the game, the game ends.

B. The game time is limited to 10 minutes, if it fails to complete 10 consecutive circles in 10 minutes, the time will be awarded 10 minutes.

## **4. Scoring**

A. The robot has to fly figure 8's around the two poles in the correct way as shown in Fig.1 , and pass through 2 circles in sequence. To complete 10 cycles of effective flight (to reach the altitude of the flight, complete the trajectory of the designated route, do not appear on the ground and other conditions), landing at the starting point, the end of the time.

B. According to the time of completing the 10 circle flight, the ranking of competition results is determined by the time of completion.