GUIDE BOOK

WRC

ROBOT CAN COLLECTOR

1. OBJECTIVE

To design and build a robot that is able to start from a “Start-Box” to collect a “can” weighing 200g one at a time and then return to the starting point. During the collection trip, the robot will navigate a black path automonously and at the end of the path of Module 1, it is to be navigated manually via remote-control mode to collect a piece of can placed on a rocker. During the return trip, the robot is to be navigated wirelessly and manually until the end of the path of Module 2 and then it will subsequently return to the starting box for unloading through path-tracing means automonously.

2. JUDGING CRITERIA

The robot which has the **highest points (**collected “cans” – total penalty points) within the stipulated time of **FOUR minutes** is the winner.

3. ENTRY REQUIREMENTS

- The **Robo Can–Collector** is opened for all full-time students from formal MOE primary or secondary schools.
- Entry closes two weeks before the competition. The robot must pass inspection at the beginning of the competition.
- All robots and the transmitting controller shall be caged at the beginning of the competition and will be returned only at end of the entire competition.

4. RULES AND REQUIREMENTS

- The robot is to be controlled by an on-board programmable microcontroller and powered by 12volt (LiPo 3s or 6-8x AA batteries). The robot should not exceed 20 cm in length and width.
- Playing field design:

- The total field size is 240 cm x 160 cm (the standard size of a single sheet of plywood).
- The field is divided into two zones: the Automatic Zone (Left) and the Manual Zone (Right).
- Autonomous Zone: Has a lined path on a white background. The path design is secret (the path is unknown) and has intersections. There is a 25 cm x 25 cm Start Box.

- Manual Zone: This is the remote control area. It consists of a physical obstacle course and a target capture area.
  - Obstacle Course: There will be several obstacles for participants to overcome, which will be identified throughout the competition. These obstacles consist of marbles placed in boxes 1.3 cm high.
  - Can Tower: There are four towers approximately 10 cm high. The towers are pushed to knock over the cans.

5. Controller & Communication:

• Each team provides one robot and one wireless controller (transmitting controller).
• Wireless connections are permitted using Bluetooth, WiFi, or 2.4GHz Radio Frequency (e.g., PS2 Wireless Stick, RC Remote, or Android App).
• The robot and controller must be caged before the start of the competition.

6. Starting Procedure:

• The robot is manually placed in the Start Box in the Autonomous Zone.
• A can weighing approximately -+200g will be placed by the judge in the Tower.
• Competitors are prohibited from touching the remote control button before the robot completes the line and touches the Manual Zone boundary line.
• Penalty: 10 points deducted if a participant touches the remote control too early.

7. Can Collection:

• Upon entering the Manual Zone, participants control the robot over obstacles to the tower.
• The robot must collect the can from the top of the tower. The can must be lifted off the surface (not pushed or dragged along the floor).
• The can is considered successfully retrieved if the robot successfully brings it down the tower without falling.

8. Return Trip:

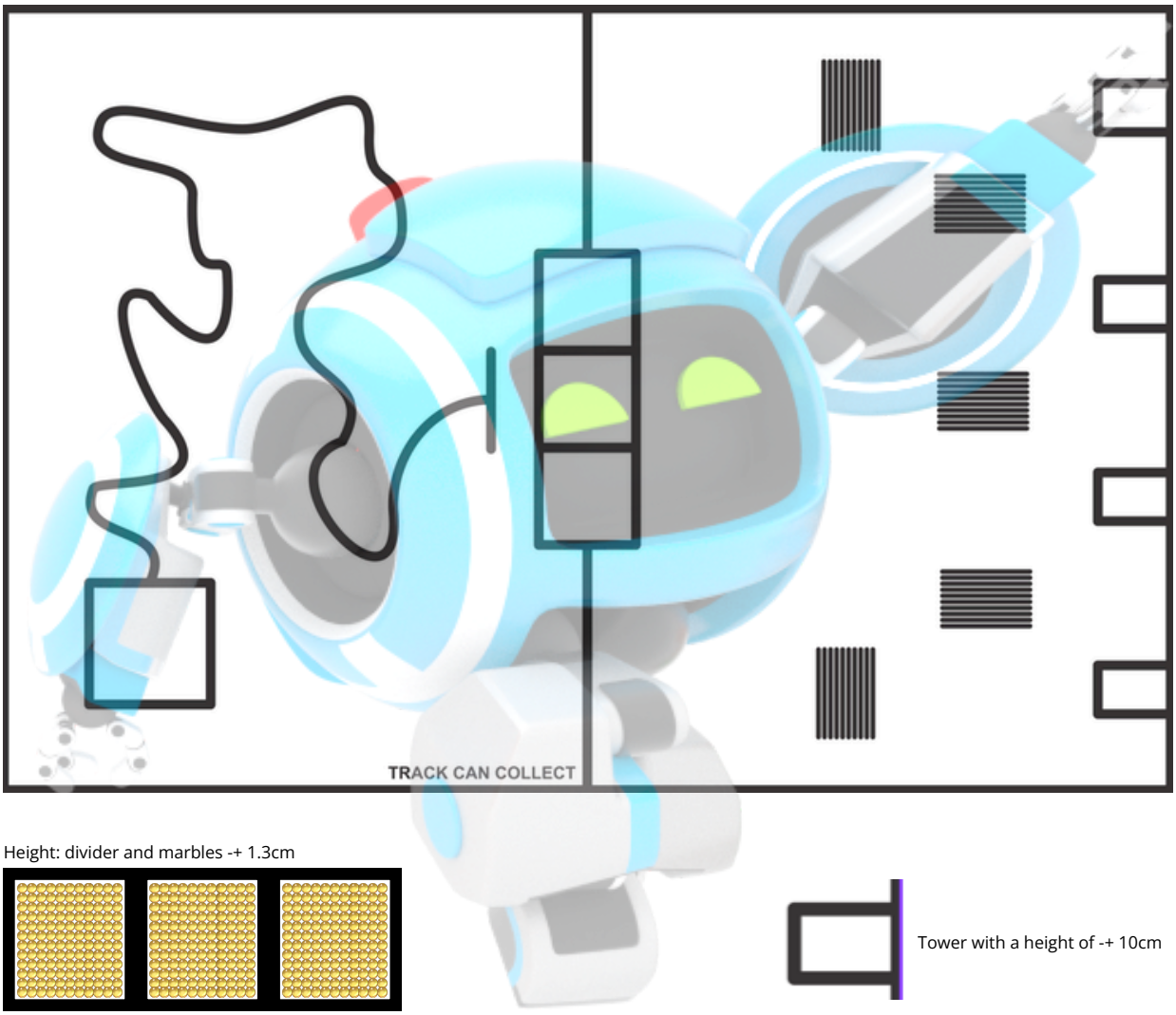
• The robot carries the can back over obstacles to the Start/Finish Square.
• The can is considered "Successfully Delivered" if the robot and the can touch the Start/Finish Square line.
• After finishing, the handler (participant on the field) retrieves the can, and the robot can be repositioned for the next run.

9. Failure (Aborted Run):

- If the can falls from the robot mid-run, it is considered an Aborted Run.
- The robot must be retrieved and returned to the Start Square to start over (the score for the can is forfeited).
- Repairs are not permitted on the field. Repairs may only be made in the pit stop area with the judge's permission (the race time continues).

10. Time & Winners:

- The competition time is 4 minutes.
- The robot must collect as many cans as possible.
- In the event of a tie, the winner is determined by:
  - Fastest time for the first successful can.
  - Fewest number of Aborted Runs (failures).



Height: divider and marbles -+ 1.3cm

Tower with a height of -+ 10cm

Obstacles in the form of speedbumps the size of noodle chopsticks