# WALL TRACKING RESCUE ROBOT

*Competition Rules – English Version*

| Item | Details |
|---|---|
| Robot Type | Autonomous Robot |
| Competition Category | Senior (U19) |
| Number of Participants | 1–2 participants per team |
| Robot Construction | Pre build |

Wall Tracking Rescue is an autonomous robot competition designed around a disaster-relief mission. The robot must transport and deliver relief supplies to designated locations while navigating through a route enclosed by walls. After completing its mission, the robot must return to and stop at the FINISH area.

## Robot Specifications

1. The robot's maximum fully extended dimensions must not exceed 200 mm × 200 mm. There is no restriction on the robot's weight or height.
2. The robot must operate entirely autonomously. Remote-control operation is not permitted.
3. There is no restriction on the number or type of motors and sensors used.
4. The power supply must not exceed 12 volts, or 13.5 volts when fully charged. Alternatively, a maximum of eight AA batteries rated at 1.5 volts each may be used.
5. There is no restriction on the type of materials used to construct the robot. Materials may include plastic, wood, PVC foam board, metal, 3D-printed parts, perforated plastic sheets, or other suitable materials. The robot must be assembled only at the competition venue.
6. The robot must operate autonomously and complete the mission by itself. No other method of robot control is permitted, including radio communication, remote-control devices, wired data connections, or any other external control method. A team that violates this rule will be disqualified and immediately removed from the competition.
7. Programming must be performed entirely offline. Internet access or connection to any online system is strictly prohibited during the competition.
8. The robot may become damaged during the competition. Participants are responsible for inspecting and protecting their own robot.

## Competition Field Specifications

9. The competition field is made of Plaswood or PVC foam board. Its standard dimensions are 120 cm wide and 240 cm long, although the field may be larger. The field surface is white and is enclosed by white walls 10 cm high and 10 mm thick. Internal route walls are also made of Plaswood or PVC foam board, 10 mm thick and 10 cm high.
10. There are three Check Points. Each Check Point is a circular yellow sticker with a diameter of 5 cm. Their positions will be announced by the judges before field-testing begins on the competition day.
11. Relief-supply delivery areas are marked with green rectangular stickers. Each area measures 15 cm × 30 cm. Four delivery areas will be installed on the field, and their positions will be announced before field-testing begins on the competition day.
12. Relief supplies are represented by cube-shaped objects. Width, length, and height must be equal. Each side measures 2 cm with a tolerance of ±3%. Each cube must weigh at least 10 grams and no more than 100 grams.
13. The field contains the following obstacles:

- Speed Bumps: made from seven chopsticks or cylindrical rods, each 3–5 mm in diameter, placed across the field route.

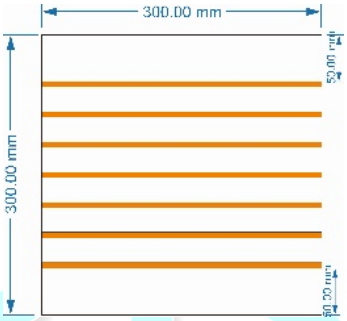


Fig. 1 Speed Bumps

- Ramp and Elevated Section: 5 cm high, with a permitted tolerance of ±3%.

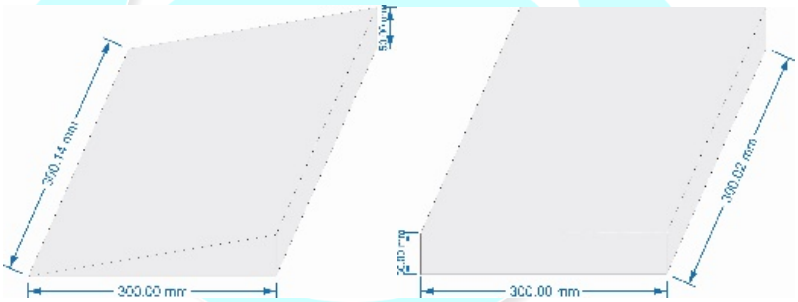


Fig. 2 Ramp

- Black Pit: a black sticker measuring 20 cm × 30 cm installed on the field surface. It is a hazardous and prohibited area. Its position will be announced before field-testing begins on the competition day.

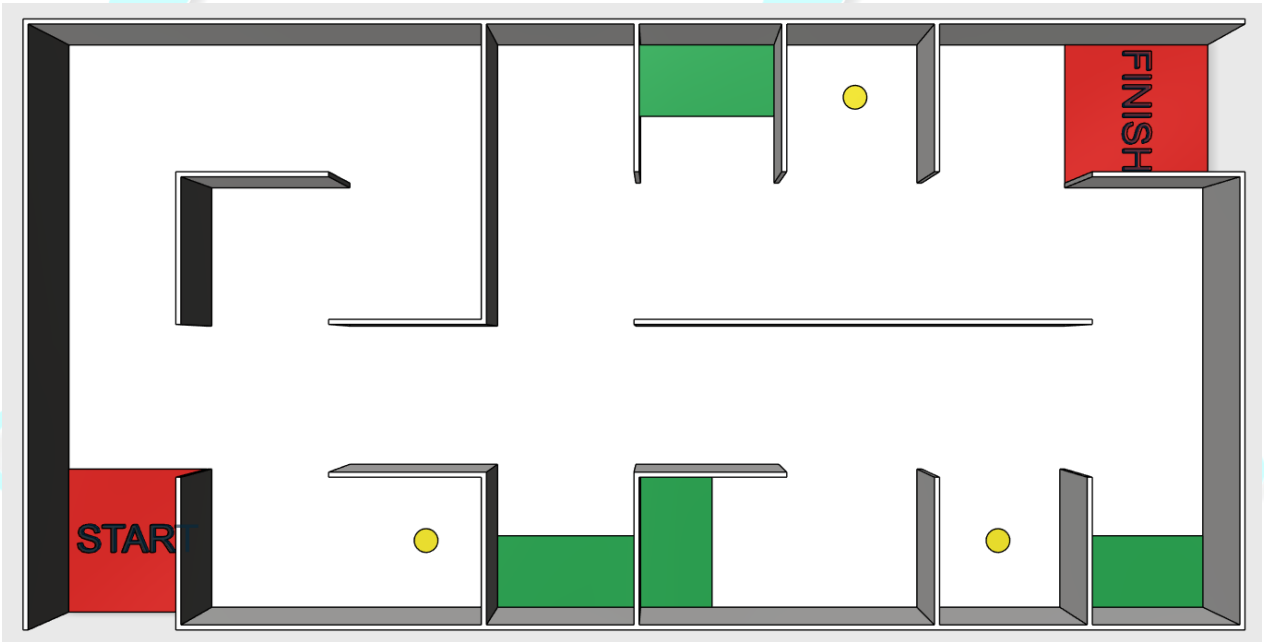


Fig 3. Example Competition Field

# Competition Rules and Procedures

## 1. Mission

14. The robot must be loaded with relief-supply cubes before leaving the START area.
15. The robot may carry a maximum of 8 cubes.
16. The robot must transport the cubes along the designated route and deliver the relief supplies to the specified delivery areas.
17. After completing the mission, the robot must proceed to the FINISH area.
18. The robot must remain completely stationary in the FINISH area for at least 3 seconds.

## 2. Practice Time

19. Before the competition begins, the judges will call all participants together and announce the field layout at the same time.
20. The judges may also announce additional requirements or agreements that all teams must follow during the competition.
21. Participants will be given at least 2 hours to assemble their robots and test them on the competition field.
22. Important information announced by the judges will include the positions of the three yellow circular Check Points.
23. Check Point positions may be determined separately for each competition round.
24. The Black Pit is a prohibited hazardous area. The robot must not travel through or enter it.
25. If the robot enters the Black Pit area, the run will be stopped immediately. The robot will be considered damaged and unable to continue the mission. Only points already earned will be recorded, no completion time will be recorded, and the team will be ranked lower than a team that voluntarily requested to stop its run.
26. Relief-supply delivery areas marked with green stickers will be randomly repositioned every 30 minutes after practice begins.
27. The delivery areas will be randomized again after the robots have been submitted and before the start of each competition round.

## 3. Pre-Run Setup

28. When the robot-testing period ends, every team must submit its robot for technical inspection.
29. After inspection, the robot must be placed in the location specified by the judges.

## 4. Setup Time

30. When a team is called to the competition field, the participants will be given 30 seconds to prepare the robot.
31. The relief-supply cubes must be loaded into the robot during this setup period.
32. A maximum of 8 cubes may be loaded.
33. The cubes may be loaded only once during each competition round.

## 5. Starting the Run

34. At the beginning of the run, the participant must place the robot at the START position.
35. After receiving the start signal, the participant must press the robot's start button.
36. The start button may be pressed only once.
37. If the robot does not begin operating within 5 seconds, as counted by the judge, it will be considered a False Start.
38. After a False Start, the participant will be given up to two additional attempts to start the robot.
39. If the robot still cannot begin operating after these attempts, the team will be disqualified from that competition round.
40. If the participant presses the robot's start button twice after the official start signal, the team will be disqualified from that competition round.

41. During the run, participants are not permitted to hold or touch the robot unless a restart has been requested or permission has been granted by the judge.
42. Any participant who touches the robot without permission will be immediately disqualified from that competition round.

## 6. Check Point Scoring

43. There are three Check Points on the field.
44. The robot must move over or pass through a Check Point to receive its points.
45. Once a Check Point has been scored, passing through the same Check Point again will not provide additional points.

## 7. Relief-Supply Delivery Scoring

46. The robot must travel to a designated relief-supply delivery area and release a cube inside that area.
47. The entire cube must remain within the green delivery area.
48. Each correctly delivered relief-supply cube is worth 15 points.
49. Once the points have been awarded, they will not be deducted if the team later requests a restart.
50. After a restart has been requested, a relief-supply cube that was already delivered may not be retrieved and used again.

## 8. Restart Requests

51. When a participant requests a restart, the robot must be returned to the START area.
52. No additional cubes may be loaded into the robot after a restart.

## 9. Repeated Delivery to the Same Area

53. After restarting, if the robot delivers another relief-supply cube to a delivery area that has already been scored, no additional points will be awarded.

## 10. Requesting to Stop the Run

54. A participant may request to stop the run at any time.
55. If a participant requests to stop the run, no mission-completion time will be recorded.
56. A team that requests to stop will be ranked lower than a team whose robot remains in operation for the full 3-minute time limit.

## 11. Time During a Restart

57. The competition timer will not be paused when a restart is requested.

## 12. Scoring Components

The score is calculated from the following mission components:

58. Correctly delivering relief supplies to the four designated delivery areas
59. Moving over or passing through the three Check Points
60. Reaching the FINISH area
61. Remaining stationary in the FINISH area for at least 3 seconds

## 13. Conditions During the Mission

62. If the robot becomes stuck against a wall for more than 3 seconds, the judges will terminate the run.
63. In this case, the robot will be considered damaged and unable to continue the mission. Only points already earned will be recorded, no completion time will be recorded, and the team will be ranked lower than a team whose robot operates for the full 3-minute time limit.
64. If the robot collides with a wall and causes the wall to move or shift in a way that benefits the mission, the first occurrence will result in a forced restart and a 10-point deduction. A second occurrence will result in an additional 10-point deduction and immediate termination of the run.

65. If the robot releases a relief-supply cube outside the designated delivery area, the cube will be treated as an additional obstacle. The judges will not remove it, and it will remain on the field until the end of that competition run.

## 14. Mission Time and Score Calculation

### 14.1 Mission Time

Each competition round has a maximum mission time of 3 minutes or 180 seconds.

### 14.2 Scoring Details

Updated: 1 July 2026

| Scoring Item | Calculation / Requirement | Maximum / Award |
|---|---|---|
| Check Points | 3 Check Points × 10 points | 30 points |
| Relief-Supply Delivery | 4 delivery areas × 15 points | 60 points |
| Incomplete Mission with FINISH | Reach FINISH and stop for at least 3 seconds | 5 points |
| Completed Mission with FINISH | Complete all mission tasks, reach FINISH, and stop for at least 3 seconds | 10 points |

Remaining-Time Score Formula:

**Remaining-Time Score = (180 − Time Used) × (Number of Relief Supplies Delivered ÷ 4)**

Example: The robot completes the mission and reaches the FINISH area in 65 seconds and successfully delivers relief supplies to all four delivery areas.

**(180 − 65) × 4 ÷ 4 = 115 points**

Restart Penalty: 10 points are deducted for each restart request.

### 14.3 Total Score Formula

**Total Score = (Check Point Score + Relief-Supply Score + FINISH Score + Remaining-Time Score) − Restart Penalties**

### 14.4 Score Calculation Example

- Three Check Points completed: 30 points
- Four relief-supply deliveries completed: 60 points
- Robot reaches FINISH and stops for 3 seconds: 10 points
- Mission completed in 65 seconds: 115 remaining-time points
- No restart: 0-point deduction
- Total Score = (30 + 60 + 10 + 115) − 0 = 215 points

## 15. Repairs and Restarts

66. If the robot is damaged during a competition run, the participant may request a restart in order to repair it.
67. The competition timer will continue running during the repair.
68. Participants are not permitted to upload or replace the robot's program during the repair.
69. Only hardware repairs are permitted.
70. After completing the repair, the participant must return the robot to the START area.
71. The participant must inform the judge before restarting the robot.

## 16. After Completion of Competition Round 1

72. After the first competition round has been completed, the judges will change the field configuration and the Check Point positions for Round 2.

73. Participants will be given at least 45 minutes to test their robots on the new field configuration before Round 2 begins.

## 17. Robot Submission for Competition Round 2

74. When the Round 2 testing period ends, the judges will call all participants to submit their robots.
75. Round 2 will then be conducted using the same competition procedures as Round 1.

## 18. Winner Determination and Ranking

76. The scores from both competition rounds will be added together to determine the final ranking.
77. The team with the highest combined score will be declared the winner.
78. If two or more teams have the same combined score, the team with the higher score in Round 1 will be ranked higher.
79. If the teams are still tied, the team with fewer restart requests will be ranked higher.
80. A team that voluntarily requests to stop its run will be ranked lower than a team whose robot remains in operation for the full 3-minute time limit.
81. A team whose run is forcibly terminated by the judges will be ranked lower than a team that voluntarily requests to stop its run.

## 19. Final Decision

82. All decisions made by the competition committee and judges are final and cannot be contested.