

# OBSTACLE AVOIDANCE ROBOT COMPETITION

## 1. INTRODUCTION

The object of the contest is to build a small microprocessor-controlled robot vehicle that is able to navigate its way, through an unknown terrain, to the target in the shortest possible time. The target is a yellow coloured square at the centre of the quadrant furthest away from the starting point.

The challenge is to design and build a small vehicle capable of fast controlled motion, and provide it with sufficient intelligence to explore and negotiate around obstacles in the shortest possible time.

The purpose of this competition is to provide a technically demanding yet enjoyable problem for the participant.

## 2. TERRAIN SPECIFICATION

- 2.1 The domain for the obstacle avoidance vehicle competition is a flat area criss-crossed by reflective tape forming a 16 x 16 array of 180mm x 180mm (between centres) squares. The domain will be bounded by an unobstructed border of at least one square width. A wall of height 50mm will be constructed around the periphery to contain errant vehicles.
- 2.2 The domain floor and its border will be made of wood painted with non-gloss black paint. The squares marking the domain will be constructed with reflective tape (3M Scotchlite reflective tape) of 10mm width.

## 3. OBSTACLES

- 3.1 The obstacles will consist of rectangular wooden blocks painted with non-gloss white paint. The block can be of any height subject to a minimum of 50 mm. The length and width of the block shall be of a uniform cross-section, either 150 mm x 150 mm or 75 mm x 75 mm. The height is at least 50 mm. If a block is higher than 50 mm, then the horizontal cross-section of the block that is above 50mm can be of any shape provided no part of it extend beyond the base cross-section of 150 mm x 150 mm.
- 3.2 The obstacles will be placed, centrally, within squares and firmly affixed to the floor. A minimum passage width of at least one square is guaranteed.
- 3.3 The first move from the start position must be towards the North. This is to facilitate electronic clocking. Obstacles may be placed to ensure this.

## 4. GENERAL TOLERANCES

The tolerance of the obstacles and domain platform will be within specifications specified in the attached drawings.

## **5. ROBOT SPECIFICATIONS**

- 5.1 There will be no restriction to the length, width or height of the robot vehicle. The vehicle must be fully self contained and not receive assistance from external sources and all parts of the vehicle must travel to the target. The judge may, however, allow participants to retrieve and restart their vehicles in the event of a collision or other situations when a restart is required.
- 5.2 The vehicle must not attempt to change or damage its environment.

## **6. RULES FOR THE CONTEST**

- 6.1 The objective of the competition would be for the robot to reach the target in the shortest time. In the spirit of the games, it was decided to keep rules to a minimum.
- 6.2 Each robot will perform at least two runs within 10 minutes. The timing for a run will start at the instant the judges instruct the participants to start their robots, and end at the instant any part of the robot makes contact with the target square.
- 6.3 All robots must travel on the surface of the domain. Robot vehicles are required to travel within the specified domain and no part of the vehicle must come in direct contact with regions outside the domain. Overhanging within the boundary is allowed.
- 6.4 The use of long probes reaching across obstacles does not constitute "navigate its way through an unknown terrain", and is contrary to the spirit and implied rules of this competition.
- 6.5 The participants will be graded on the fastest 1st run, and on the fastest run. If a vehicle requires a restart, during the first run, it will be disqualified from consideration for the fastest first run prize.
- 6.6 There should be at least 1 clear path (contiguous sequence of full squares) from the starting to the ending position.

## **7. CLONING**

- 7.1 In accordance with the spirit of the competition, clones among the winning entries will only be awarded one prize. Clones will be identified during the "caging" procedure.
- 7.2 Clones are robots with substantially identical physical appearance and working principles.
- 7.3 When in doubt, the decision of the Judges will be final.

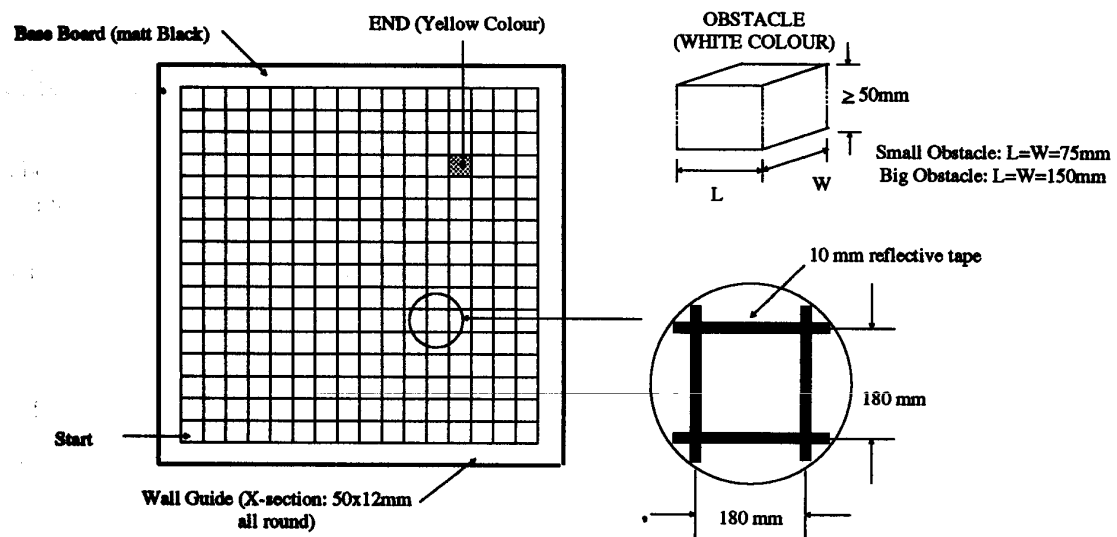


Figure 1: Obstacle Avoidance Robot Terrain