

# Perception 2015

## Problem statement for Rescue Rangers

### Objective:

Each team has to build a manually controlled robot, wired or radio controlled which can traverse the complete arena while passing through each check point within fixed time limit. The robot should be able to withstand fire from all sides and should have adequate means pass the barriers provided.

### Scoring:

1. Passing through every checkpoint will earn you +50 points
2. Taking a restart will cost you -20 points
3. Skipping a checkpoint will cost you -30 points
4. Taking a perfect jump at end will earn you BONUS +50
5. Taking any sort of break for repair will cost you -100 points
6. The final score FS is calculated by formula

$$FS = (\text{no of CP cleared} \times 50) - (\text{no of CP failed} \times 30) - (\text{no of restart} \times 20) - (\text{no of breaks taken} \times 100) + \text{bonus} +$$
$$([ \text{no\_of\_participants} \times 50 ] - [ \text{time-wise position} - 1 ] \times 50 )$$

### Rules:

- The maximum size of bot allowed is 25×20×10 (l.b.h)
- The driving voltage must no be greater than 24v for any component on the bot.
- Participants will be allowed a trial run before commencement of the event subjected to availability of time.
- Every team will be allowed ten minutes of total break which they can utilise as per requirement during the event. After that period the team will be disqualified.
- Teams will be allowed to skip a check point only after three unsuccessful restart attempts.

- During a restart, the bot will have to be restarted by putting it back on the previous checkpoint.
- The timer will be on Pause during the break but will keep running while restart.
- External AC power supply (230V, 50Hz) will be provided by the organisers however teams should bring their own eliminator or battery.

## Arena:

The arena will be completely automated in itself. Entire arena is divided into several zones each having a different challenge to overcome.

### 1. Start Point :

Each bot shall start at this point. **The timer will start once any part of bot touches the start line.**

### 2. Zone A :

Inclined plane with small barriers along the way.

### 3. Zone B :

A bridge made up of pipes with gaps.

### 4. Zone C <CP> :

Down incline immediately followed by a small gap on the platform. It is followed by a levelled plane which again followed by a gap and Up incline.

### 5. Zone D :

Inverted V shaped obstacle.

### 6. Zone E <CP> :

A semi circular arc with inclination towards the centre.

### 7. Zone F :

A bridge made up of pipes with gaps.

### 8. Zone G :

Down incline with bumpers on the way.

9. Zone H <CP> :

A square platform with entry on one corner and exit at another. The bot has cross the platform while passing through the centre of the square. During this period the white barrier sticks will be rotating by 90 degree every 5 seconds. The controller has to dynamically change his direction to swiftly move across the barriers.

10. Zone I <CP> :

See-saw shaped structure; the bot has to climb up the see-saw and get on the next platform while see-saw is coming down. If it fails to do so it has to start again by going through the loop. Once the forward tip of see-saw touches the ground the bot can't go back however it may move back and forth to balance itself while the forward tip of see-saw is in air.

11. Zone J <CP> :

Barriers coming out from the platform; two rod like structures fixed just below the surface will be rotating at fixed speed such that only one structure will come out a one time to block the way of the bot. Controller has to move forward with right plan such he so she escapes the platform without touching the rods. **If a bot is caught by the moving rod, it has to take a restart.** Any damage done to the arena by the bot will lead to immediate disqualification.

12. Zone K :

The bot has to cross V shaped groove in the platform.

13. Zone L <CP> :

The bot has to cross inverted V shaped structure which will be supported by a flexible rotating hinge from both sides of rest of arena. Therefore if a bot will try to move at only one plane, the structure will tilt at one side and the bot will fall.

14. Zone M <CP> :

Fire zone; the bot has to face heavy flames from many sides depending on its position and time spent on the segment. The bot will be sprayed with fire extinguisher if it is still in flame **after** clearing the check point. Any damage done by fire to the bot will be responsibility of participants of that team and no refurbishment will provided for that.

15. Zone N <CP> :

Rotating disc with fixed barrier from one side.

16. Zone O :

The final inclination to take a jump for bonus points.

17. Zone P:

Landing pad ; The bot has to take a perfect jump to earn a bonus point.

The jump will called perfect if more than 50% of the bot is still on the platform after it lands and stops moving. An upside down land will considered imperfect landing. **The timer stops after the bot has come to a halt.**

Prizes worth Rs 4000 will given to winner and 1000 will be given to Runner up. Participation certificates will be given to all participants at end of event.

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