

FIROCEOUS

Introduction

An accident on the International Space Settlement that is in orbit around earth has rendered several areas uninhabitable, and you don't know which areas are safe for human presence. You must check each zone remotely for any harmful substance, render the area fit for human habitation, all from a distance. Presenting the event Firoceous, where you must engineer an autonomous robot to render the Space Settlement fit for operation!

Problem Statement

Build a fully autonomous robot to traverse white line and capable to stop near the rooms; open the doors; detects whether a lit candle placed inside the room and extinguish that candle, if found.

General Rules

1. Total time allotted for the event will be **20 minutes**.
2. Maximum of 2 timeouts are permitted, with each not exceeding 2 minutes. Each timeout will attract penalty.
3. 2 minutes penalty would be imposed on restart.
4. Maximum number of participants allowed is 4 per team. The members from different colleges can form a team.
5. The team cannot touch the bot during the course of run.
6. Bot has to remain within the arena throughout the run.
7. The participants will be provided with 220V, 50 Hz AC power supply, and any other power supply they require has to be arranged by themselves by the participants.
8. Microprocessors used should not be more than 16-bit microprocessors.
9. Rules are subjected to change.
10. Decision of Team NSSC will be final and binding under all circumstances.

During Run:

The bot has to traverse the arena starting from a START point, following the white line. During run it has to detect small rooms aligned parallel to the path and has to push open the door and detect if there is lit candle inside the room which it has to extinguish.

The door will be double doors which will be hinged to the side faces of the room. Bot has to push the door to more than 30 mm inside the room, the door will open fully with a help magnetic mechanism inside the rooms.

Judging Parameters:

Scoring Points:

1. Each team will be awarded 100 bonus points at the start of the run.
2. 5 points will be awarded for clearing each level (T junction).
3. 15 points will be awarded for stopping in front of the room.
4. 20 points will be awarded for push opening the door after stopping at the room.
5. 20 points will be awarded for successfully extinguishing the flame after stopping at the room and opening the door.
6. 30 points will be awarded on reaching the end point.

Penalties:

1. 5 points will be deducted each time the bot deviates from its path.
2. 5 points will be deducted if the bot uses extinguishing measures even if the flame is not present.
3. 5 points will be deducted if the bot stops anywhere else other than in front of the room.
4. 30 points will be deducted for each timeout.
5. 50 points will be deducted for each restart.

Arena Specifications

1. The Arena will be square of 4 meters side.
2. Width of the white line will be 30 mm.
3. The dimensions of the compartment/room will be 200mm*120mm*200mm (l*b*h).
4. The rooms **will be only on the left side** of the line referred from start point.
5. Door dimensions will be 60mm*150mm(b*h), Double Door. 5mm thickness(l)
6. Base of the Candle Will be placed 75 mm away from the inner side of the door, the Candle's wick will be 100 mm above its base and flame will not exceed the length of 50 mm.
7. The distance between the centre of the width of white line and the front of the room (door face of the compartment) will be 150 mm.
8. Path of white line will be on the base of the arena painted black.

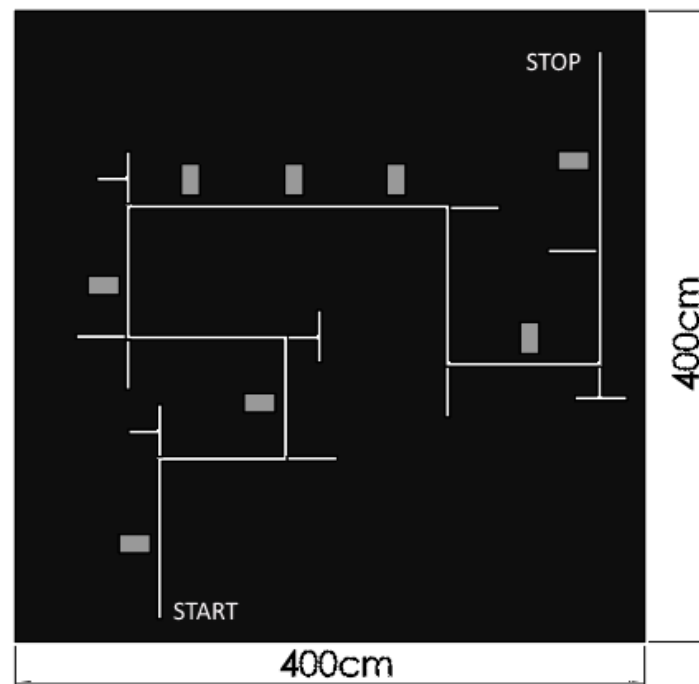


Fig: F01: Top view: Sample Arena

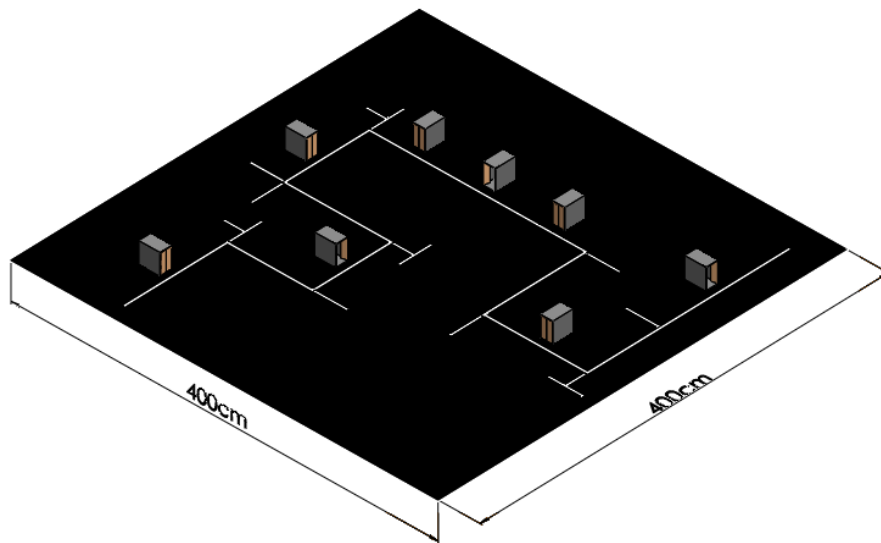


Fig: F02: Isometric View: Sample Arena

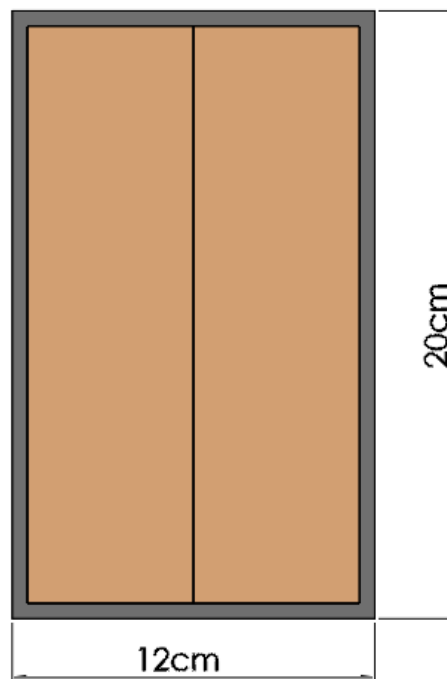


Fig: F03: Front View: Rooms with door closed

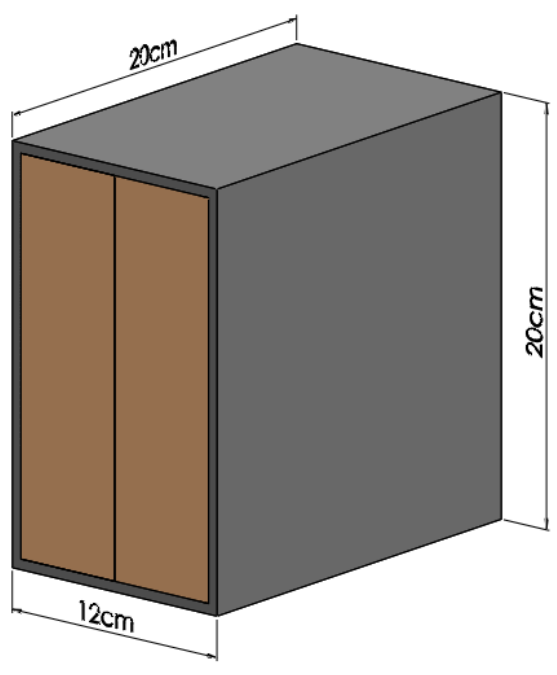


Fig: F04: Isometric View: Compartment/room

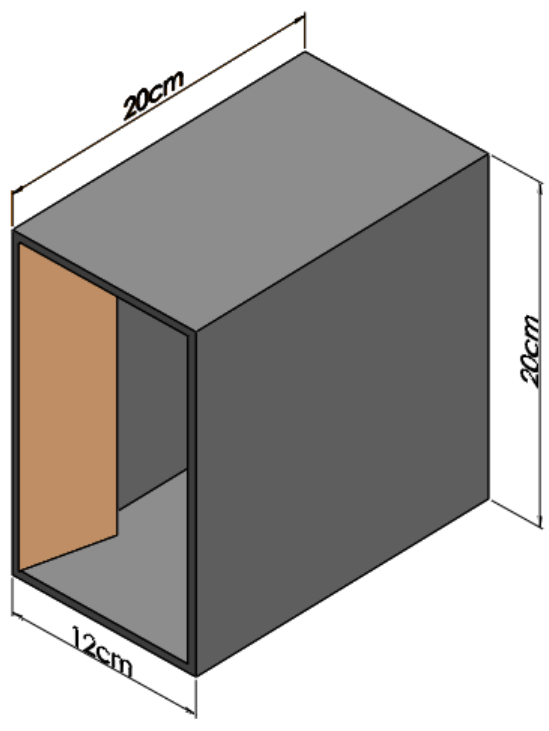


Fig: F05: Isometric View: Room with door opened

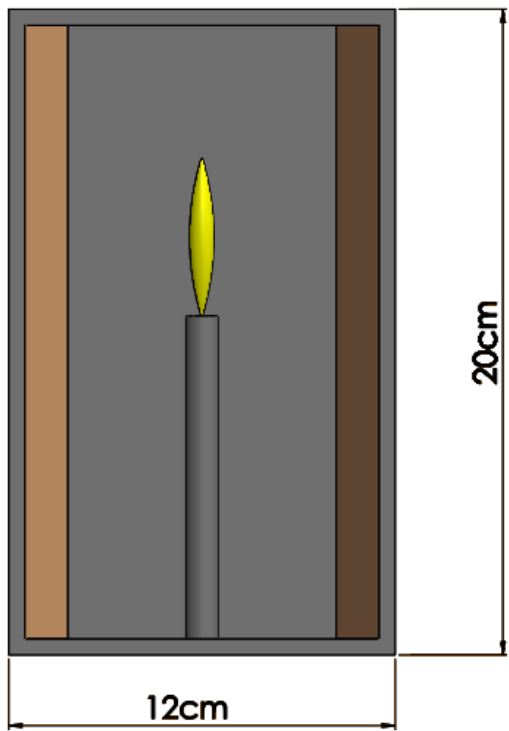


Fig: F06: Front View: Room with Door Opened and Candle inside.

BOT Specifications

1. Maximum dimension allowed for the bot is 25cm*25cm*25cm (l*b*h) and extended length (stretched in single direction) with all arms or rack stretched should not exceed 50cm.
2. In case the team is using a non-electric power supply, the team must get it approved from the organizers beforehand via email. Organizers will not be responsible for inconvenience if approval is not sought.
3. The diameter of the propeller (if used) should be less than 80 mm.
4. Thrust produced by the motor-propeller system (if used) should not exceed 100 grams.
5. During run the bot should not break into two or more than two parts.
6. The wires for the power supply should be at least 15 metres long.
7. In all cases, any on-board power supply devices like batteries are to be included in the maximum dimension limit.
8. Potential difference between any two points on the bot should not exceed 24 volts.
9. The bot dimensions would be subject to tolerance of 5%.
10. The rules are subject to change.
11. In case of disputes, the decision of team NSSC is final and binding.

CERTIFICATION POLICY

1. Top 3 teams will be awarded by Certificate of Excellence for the event.
2. Prize money worth 30,000 INR will be distributed to the winner teams.
3. The winner team has to complete the task, if they fail to complete the task then they will be not eligible for Certificate of Excellence.
4. Participation Certificate will be awarded to the teams who are registered at the event arena with bot approved by the event manager.