TECHNOVANZA

Taking Technology To Society

VIRTUAL VJTI ROBOTICS CHALLENGE (VRC)

INTRODUCTION

Over the past few years, Technovanza has conducted many robotics events and VJTI Robotics Challenge (or VRC) is one of them. However, due to these uncertain times, this event can't be conducted this year. So, for the first time ever, Technovanza will be using the power of simulation to conduct the event online. So welcome to **Virtual VRC!** In this ROS-based online event, we will be using Gazebo to simulate all the thrills of the real deal. Everything from designing and creating the URDF model to writing the algorithms will be done by the participants. So buckle up and enjoy the ride!

URI- THE SURGICAL STRIKE

Today, we are able to live a happy and safe life because of our brave soldiers. They are the ones who keep us safe from all threats and make our life simple and easy. They sacrifice and risk their own lives to protect us from danger. The surgical strike was one of the plans our army and the government made, wherein our army men crossed the Indian border to destroy the **Terrorist Launch Pads** and kill the terrorists. It was a well-planned strike that was executed to finish off the terrorists without causing any harm to innocent people and property. It was carried out on the 28th and 29th of September, 2016 against Pakistan.

Since the year 1947, India and Pakistan have been having a cold war and Pakistan has always been devising new strategies to attack our nation unnecessarily. On 18th September, 2016, four Pakistanis attacked the Indian army in Jammu & Kashmir and the Jaish-e-Mohammad Fidayeen group that belonged to Pakistan took responsibility for the same. India protested and told the Pakistani commissioner regarding the same and in return, Pakistan attacked Indian forces again. This event and many other events that severely caused great damage to the life and property of India led to a surgical strike that was performed as an answer to all the unjust acts carried out by Pakistan.

The surgical strike was executed at 12:30 am when the Indian commandos entered the LOC in Pakistan via helicopter. The operation was performed in various sectors namely Bhimber, Hot-spring, Kel and Lipa. According to the reports, nearly 7 military launch pads, two soldiers and 38 terrorists were killed during the operation. The operation was held with great coordination and attention to detail. The Indian commandos and soldiers successfully completed the strike without any glitches.

Hence, it was all done to showcase that India tolerates no terrorism; and to show that this is a NEW India, it will keep doing such strikes so as to make India and the other nations free from terrorism.

Jai Hind!

TEAM SPECIFICATION:

A team can consist of maximum 4 participants.
Students from different educational institutes can form a team.

CERTIFICATION:

1. Certificate of Participation will be awarded to all the teams.
2. Certificate of Excellence will be given to the top three teams.
3. Disqualified teams will not be considered for any certification.

 Cash prize of INR 29,000 to be won.

 **FREE Registration for all the events and non-commercial exhibition.**

CHARACTERISTICS:

- Army Major (Manual Robot)
- Army Vehicle (Auto Robot)

ARENA:

- The field consists of an area having dimension 7.2 m × 6 m.
- The game field consists of -
    1. LOC Gate
    2. Head Quarters
    3. Base Camp
    4. Army Garrison
    5. 1st and 2nd Terrorist Launch Pads
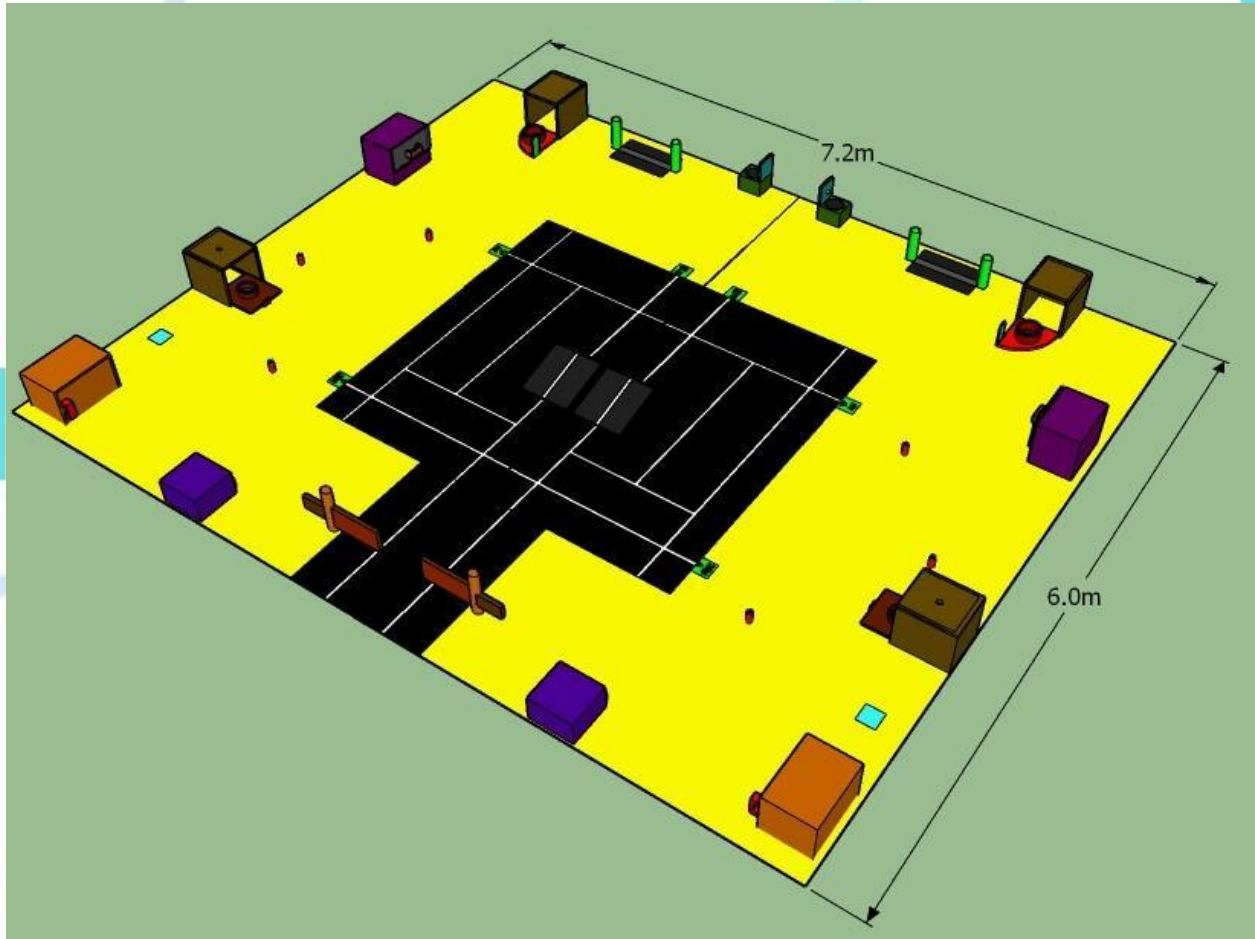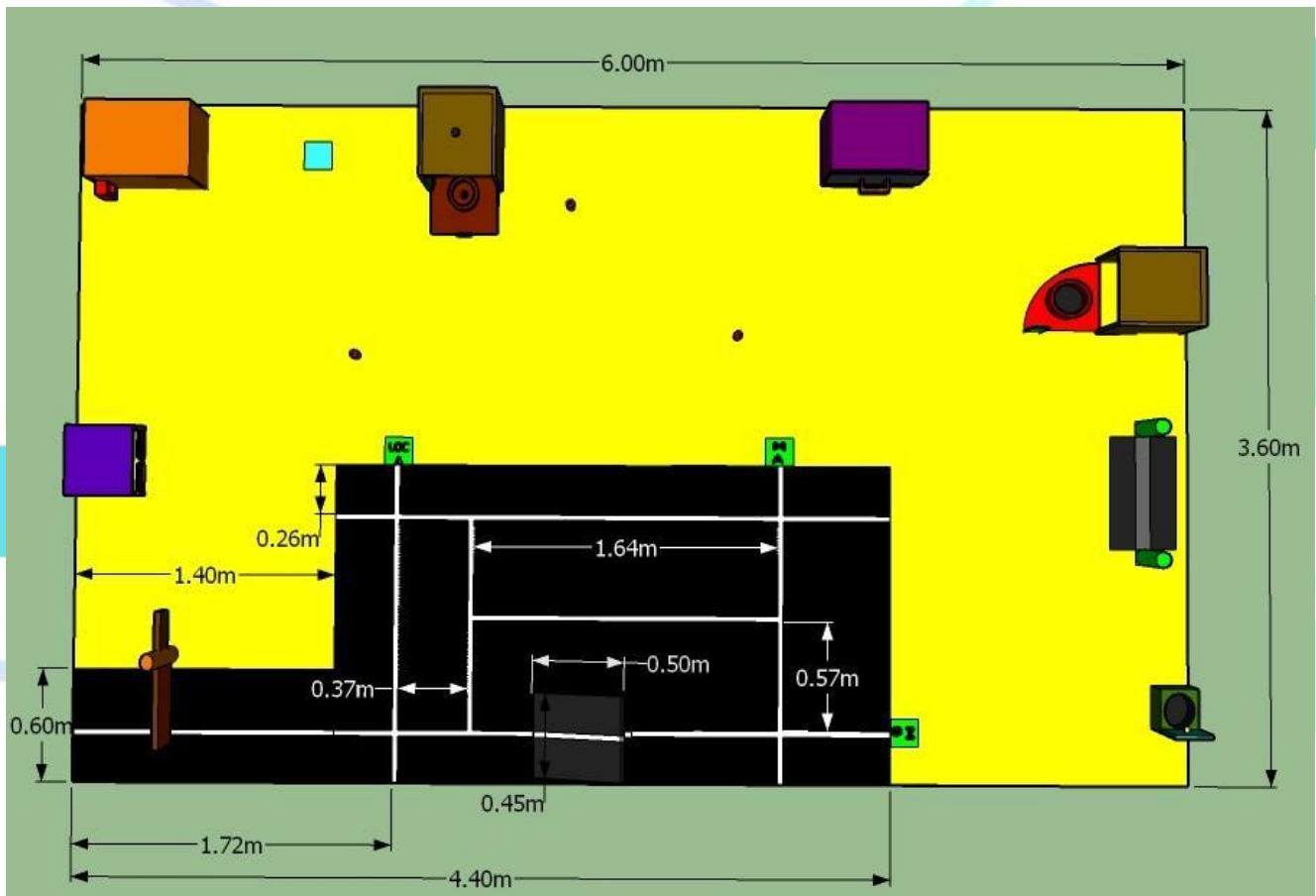   6. Muzaffarabad Terrorist Launch Pad

VJTI Presents
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2020-21

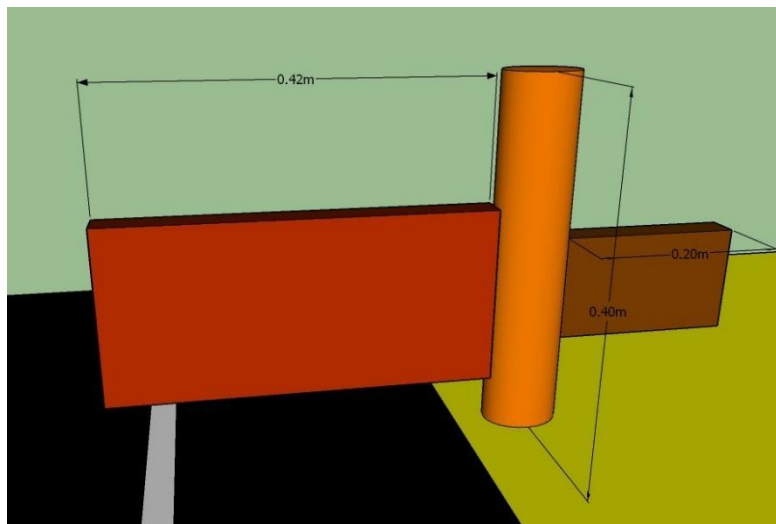**FULL ARENA TOP VIEW:**
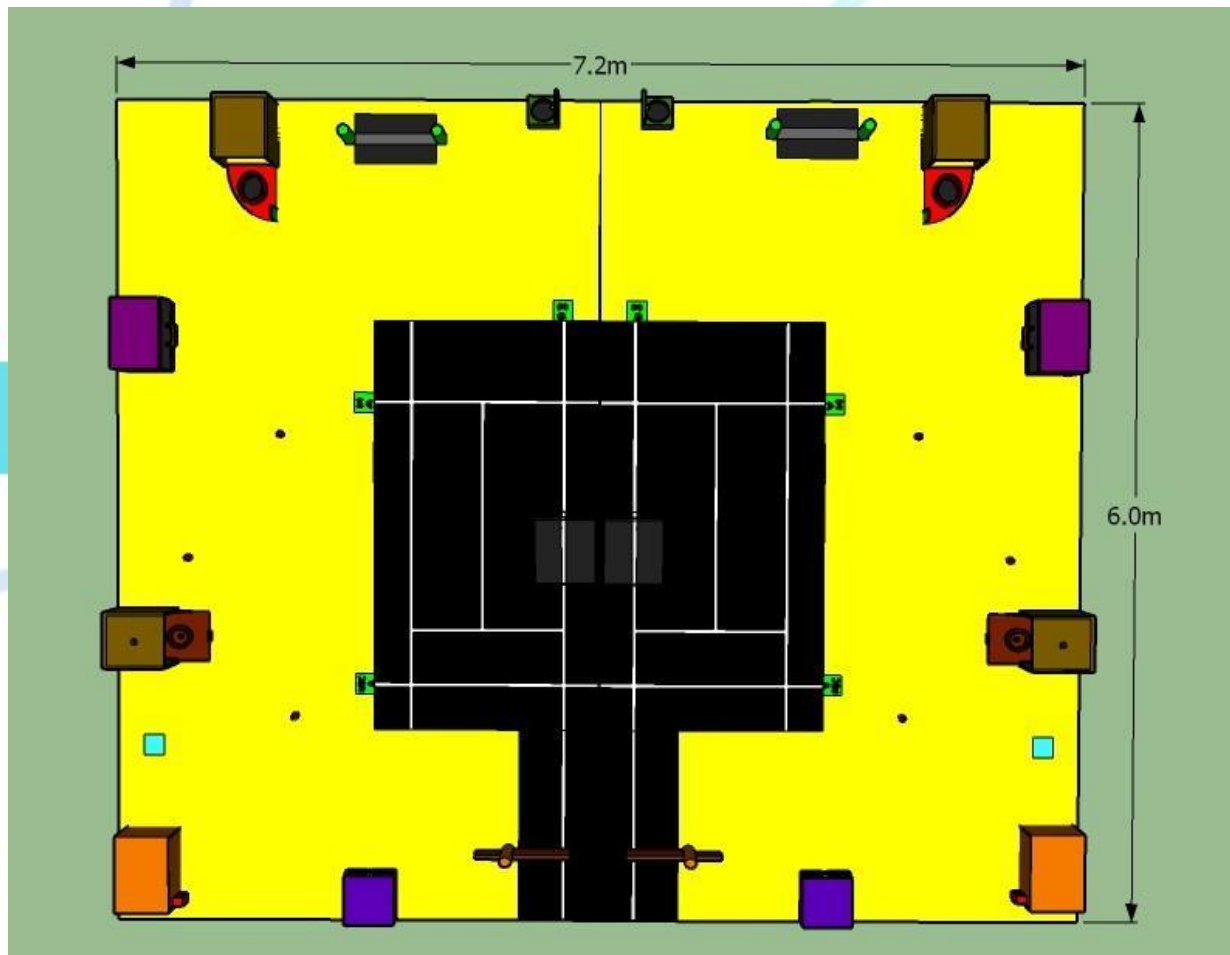
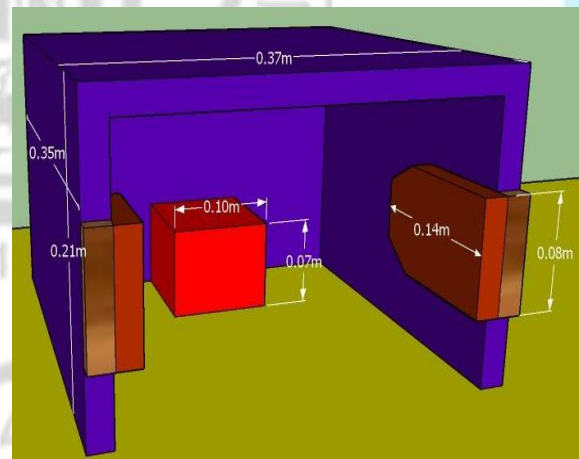**FULL ARENA ISO VIEW:**
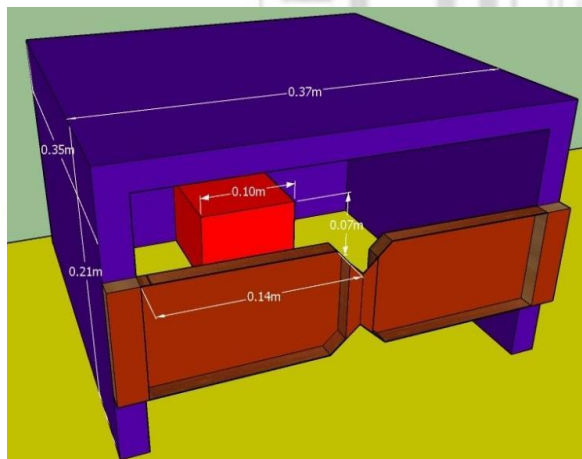
AUTO ROBOT ARENA:

LINE OF CONTROL (LOC):

The Manual Robot will rotate the Line Of Control Gate (extended in Manual Robot's Arena) such that the part of the gate in Auto Robot's arena rotates to clear the path of Auto Robot.
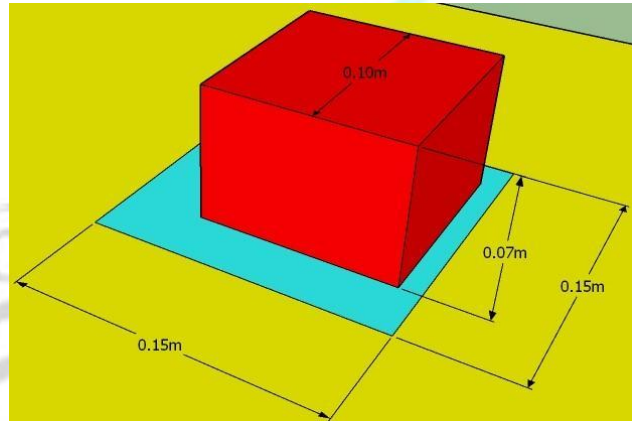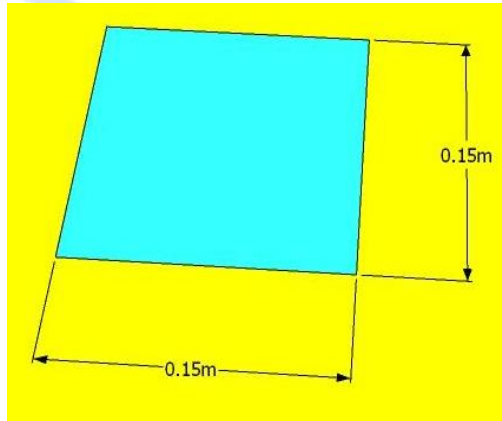
HEADQUARTERS:

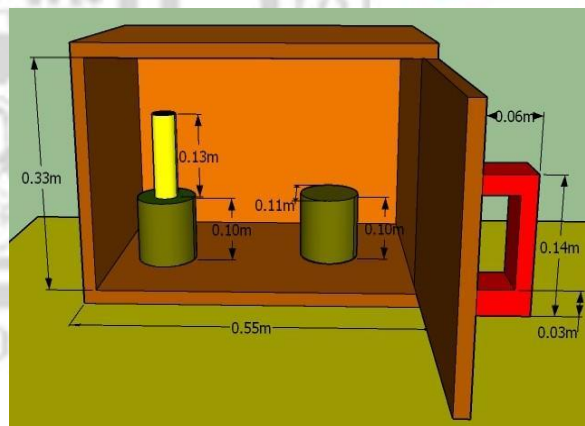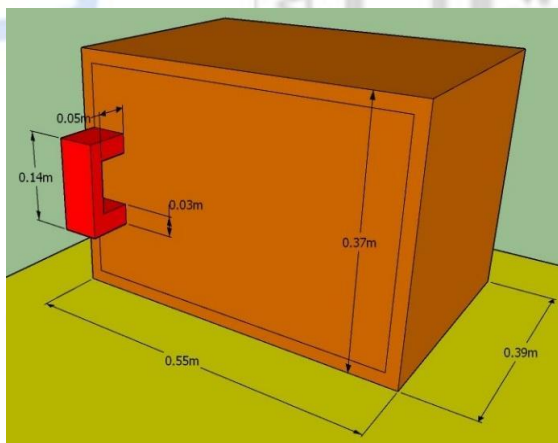The Manual Robot will push the Gate inside and pick up the Permission Letter.

BASE CAMP AND PERMISSION LETTER:

The Manual Robot will place the Permission Letter on the Base Camp.

ARMY GARRISON:

The Manual Robot will take the two bombs (Wired and Non-Wired) by opening the door using the handle.

LANDMINES:
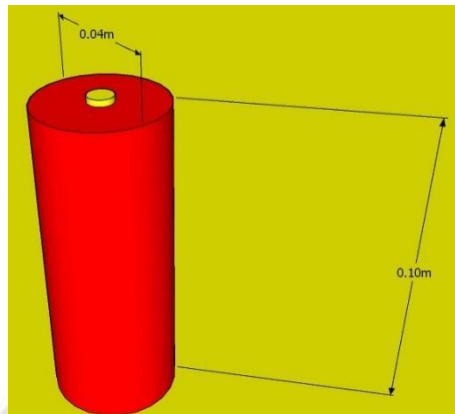
The Manual Robot will have to avoid these Landmines while performing the tasks in the Manual Arena.

Passing over Landmines:
For each Landmine touched, 5 points will be deducted.

TERRORIST LAUNCH PAD -1:

The Manual Robot will place the Wired Bomb in the cavity and push the red handle so that it slides the plank inside.

TERRORIST LAUNCH PAD -2:

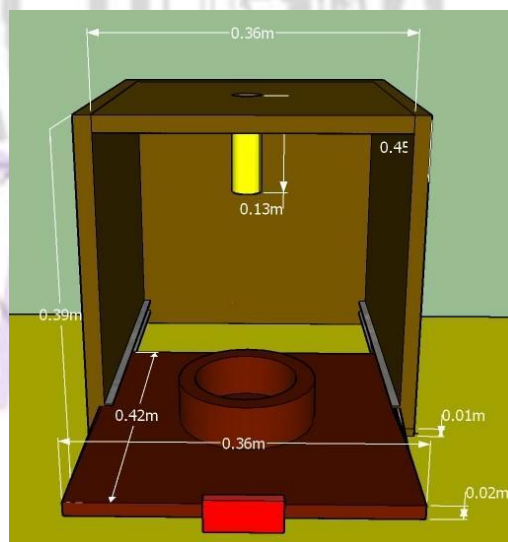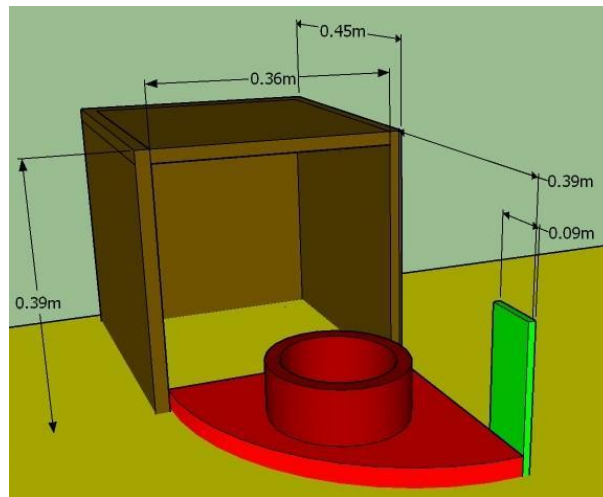The Manual Robot will place the Non-Wired Bomb inside the cavity and rotate the door inwards by using the handle.

WIRE:
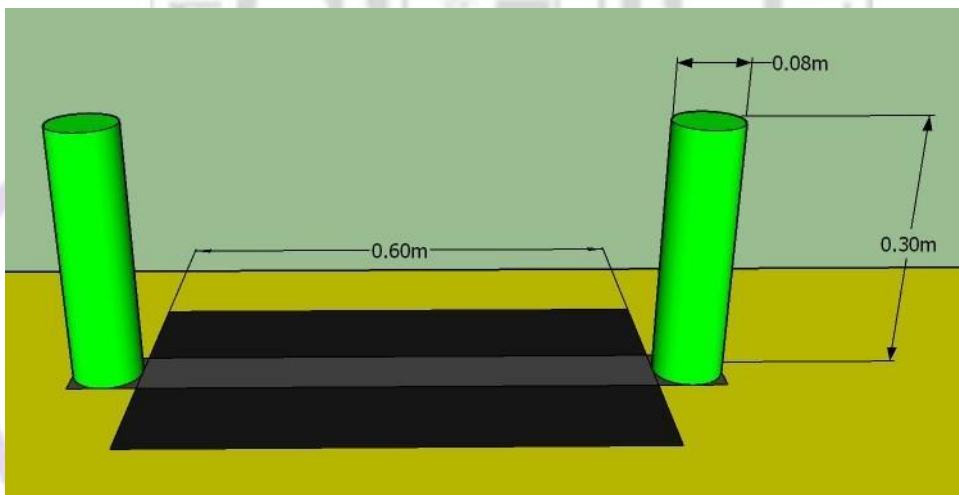
The Manual Robot will slightly push the two green wires towards the middle such that they fall and connect. This signifies turning on the switch.

UNDER BARREL GRENADE LAUNCHER:
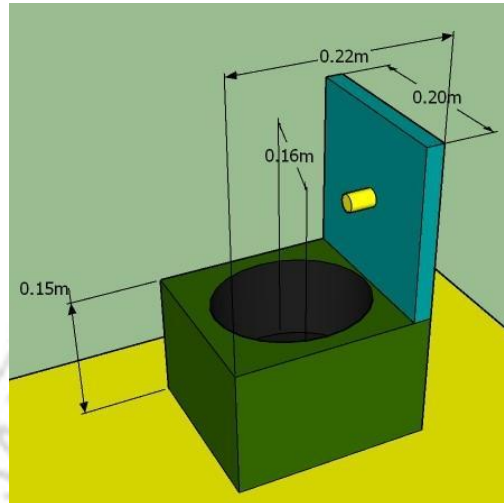
The Manual Robot will place the Uri Handler in the UBGL and then close the lid..

MUZAFFARABAD TERRORIST LAUNCH PAD:
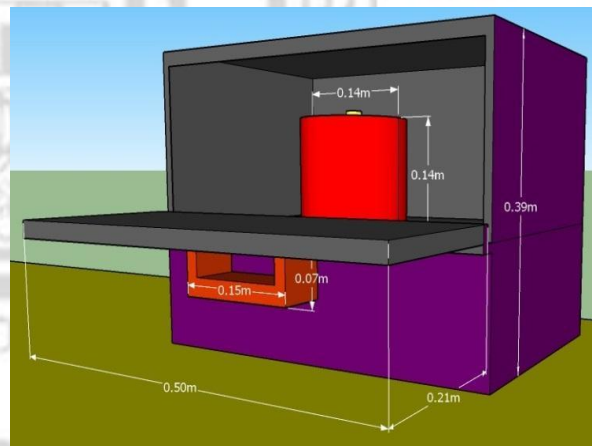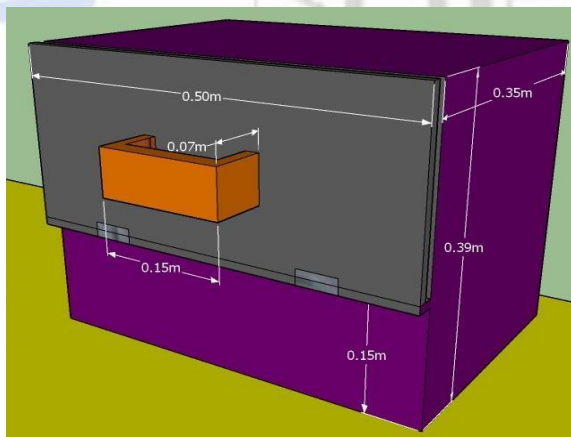
The Manual Robot will give a slight touch to the door using the handle, so that door falls outside and Manual Robot will take The Uri Handler placed inside.

SWITCH (SEE-SAW PLANK):

Auto Robot will pass over this see-saw which will 'Switch On' the Wired Bomb and destroy Terrorist launchpad-1.

GAMEPLAY:

1. The **Manual Robot** will start its work as an **Army Major** and the **Auto Robot** will start its work as an **Army Vehicle** from **LOC Gate.**

2. The **Manual Robot** Opens the **LOC gate** and the **Auto Robot** passes through and goes to **LOC A**.

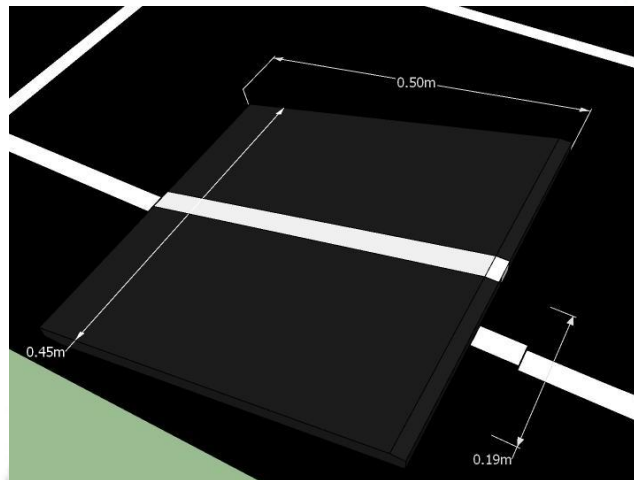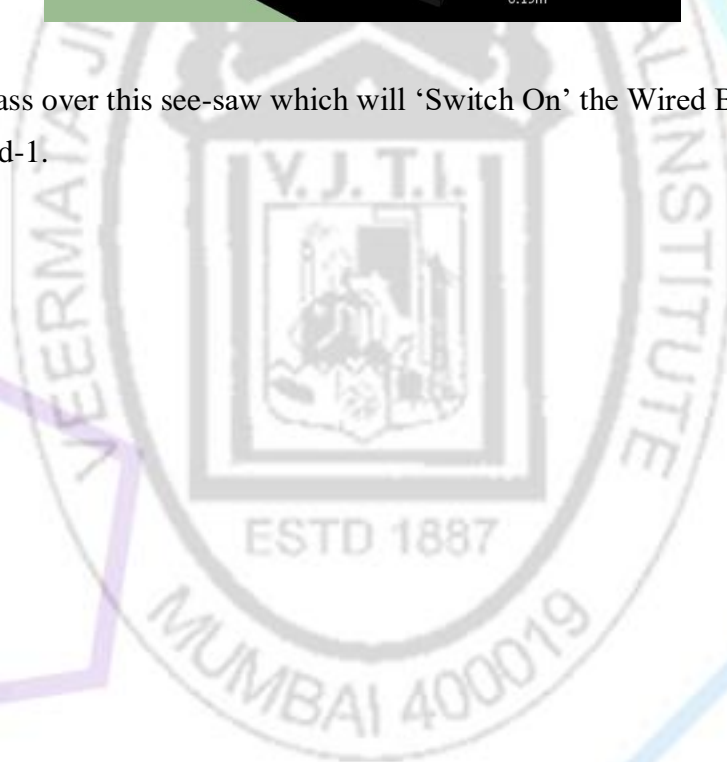3. The **Manual Robot** opens the door of the Head Quarters (High Command) module, picks up the Permission Letter, and places it on the Base Camp, showing that the permission has been granted.

4. Then the **Manual Robot** moves to the **Army Garrison**, opens the door by pulling the handle, picks up the **Wired Bomb**, and places the bomb inside the cavity of the **1ˢᵗ Terrorist Launch Pad**. The **Manual Robot** then pushes the door inwards by using the handle, thus the bomb goes inside and both the wires get connected, one which is on a bomb and another on the top of the **Terrorist launch pad 1** module, thus the bomb is connected now.

5. The **Manual Robot** again goes to the **Army garrison** and collects the **Non-Wired Bomb**, picks it up, and places it on the **Auto Robot**.

6. Then the **Auto Robot** goes over the **See-Saw** causing the switch under it to turn **ON**.

7. Now the **Manual Robot** goes to the **M A (Muzaffarabad A).** The **Manual Robot** then picks up the **Non-Wired Bomb**, places it in the cavity of the **2ⁿᵈ Terrorist Launch Pad**, and slides it inside by using the green handle.

8. The **Army Major** has to switch this bomb on by giving a slight touch to both the wires, so that the wires get connected. This signifies that the bomb has been switched on.

9. The **Manual Robot** then goes to the **Muzaffarabad Terrorist launch pad,** where the **Uri Handler** is present. It pulls the handle slightly outside making the door fall down. **Manual Robot** then picks up the red coloured **Uri Handler,** and puts it on the **Auto Robot** and then the **Auto Robot** goes to **M B (Muzaffarabad B).**

10. The **Manual Robot** picks the **Uri Handler** up and places it in the **Under Barrel Grenade Launcher (UBGL)**. There's a wire on the top of the red coloured **Uri Handler** and also on the top of the UBGL. When the **Manual Robot** places it inside the box and closes the lid, it gets activated.

11. Now that all the bombs and the **Uri Handler** are connected and turned **ON**, all the bombs go off and Explode in their respective launch pads.

FINAL TASK: Finally, the **Manual Robot** and the **Auto Robot** exit from **LOC Gate**, and with this our mission is successfully completed.

Note: While travelling, participants should note that there are some **Landmines** placed on the ground. If the **Manual Robot** touches or goes over those **Landmines** there will be some penalty (refer Landmines).

RULES AND GUIDELINES:

1. Plagiarism will not be tolerated. Any kind of inappropriate or rash behaviour with the organizers or participants will lead to immediate disqualification.
2. The organizers' decision will be final.
3. Layout of rounds can be changed by the organizers of events at any point of time.
4. Timings and dates may be changed any time at the discretion of the organizers. They will be conveyed to the participants.
5. The maximum time given for completing the tasks is 5 minutes.
6. The operator of the Manual Robot cannot be changed during the match.
7. Auto Robot is allowed to move in the Auto Arena and Manual Robot is allowed to move in the Manual Arena only.
8. Manual Robot must pick/place the permission letter, the bombs and the Uri Handler appropriately in their respective locations.
9. If the Manual Robot drops any of the items to be picked up, it must restart the current task.
10. Both the Robots cannot enter the arena of the opponent's team.
11. Time measured by organizers will be final and will be used for scoring the teams. Time measured by any contestant by any other means is not acceptable for scoring. In case of any disputes/discrepancies, the organizer's decision will be final and binding. The organizer reserves the right to change any or all of the above rules as they deem fit. Change in rules, if any will be highlighted on the website and notified to the registered team.
12. The robots are not allowed to leave anything behind or make any marks while traversing or damage the arena.
13. Any ingenious exploitation of the mentioned/gameplay must be notified to and clarified with the organizers beforehand.

NOTE:
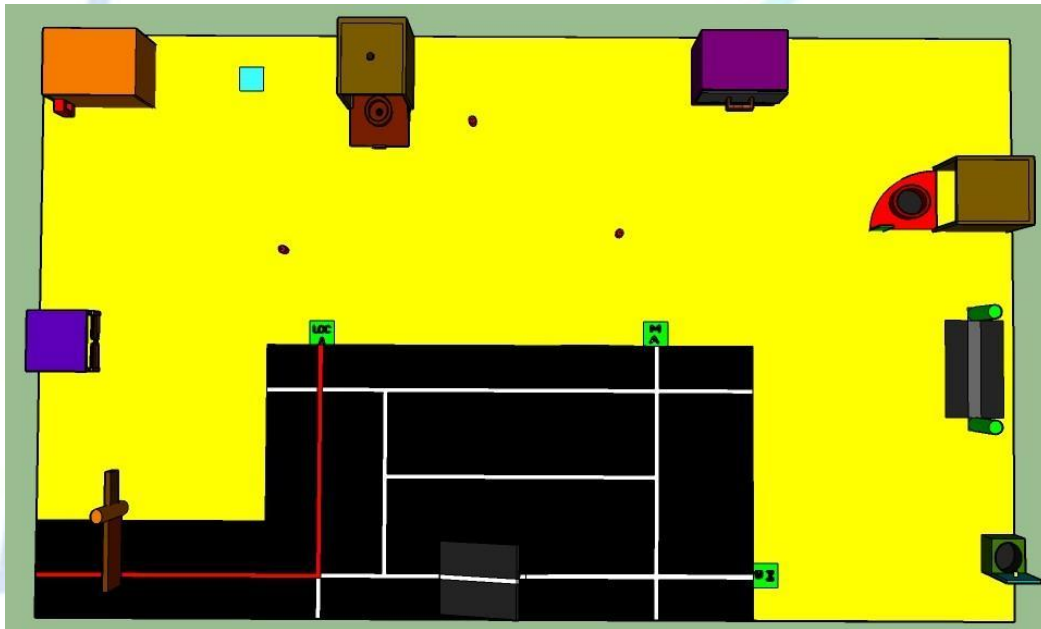**The participants will have to submit robot description file a day before the event on the Google classroom.**
We will send the link of Google classroom on your registered email id. All further instruction will be given on that classroom only.
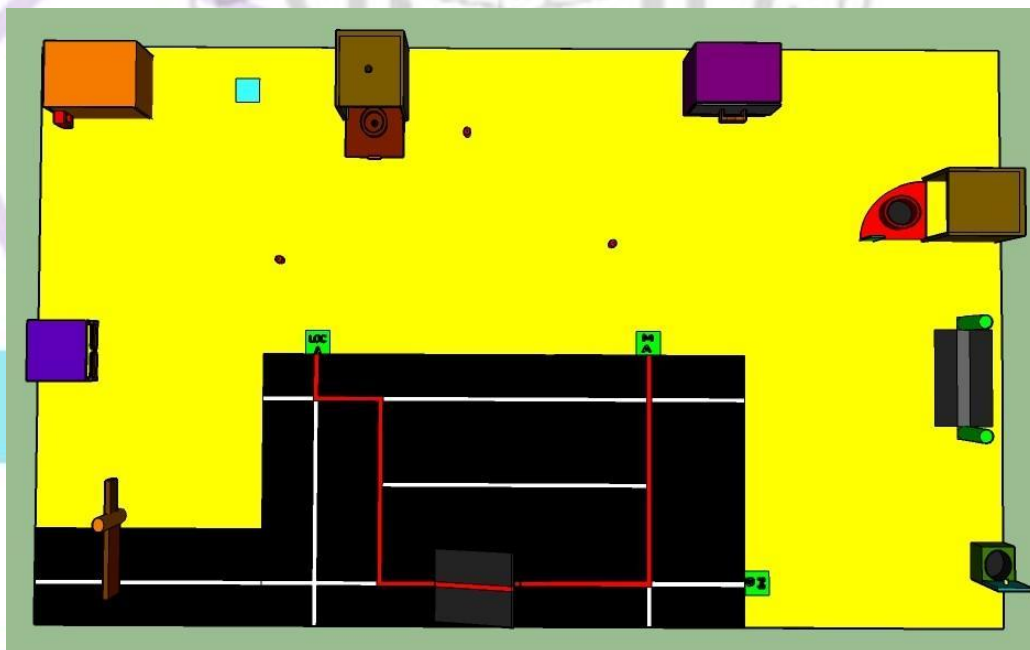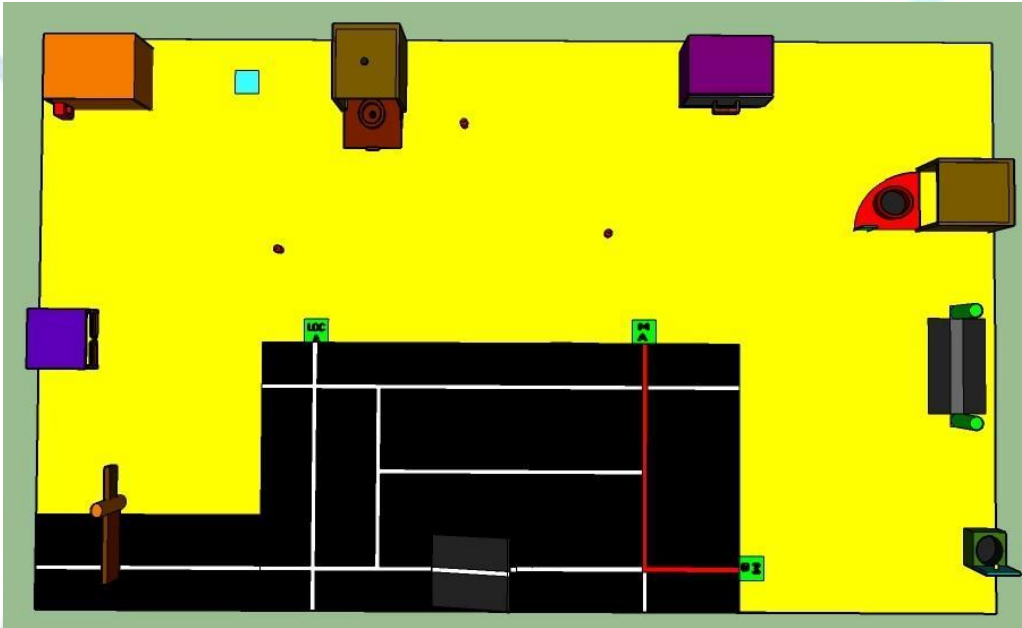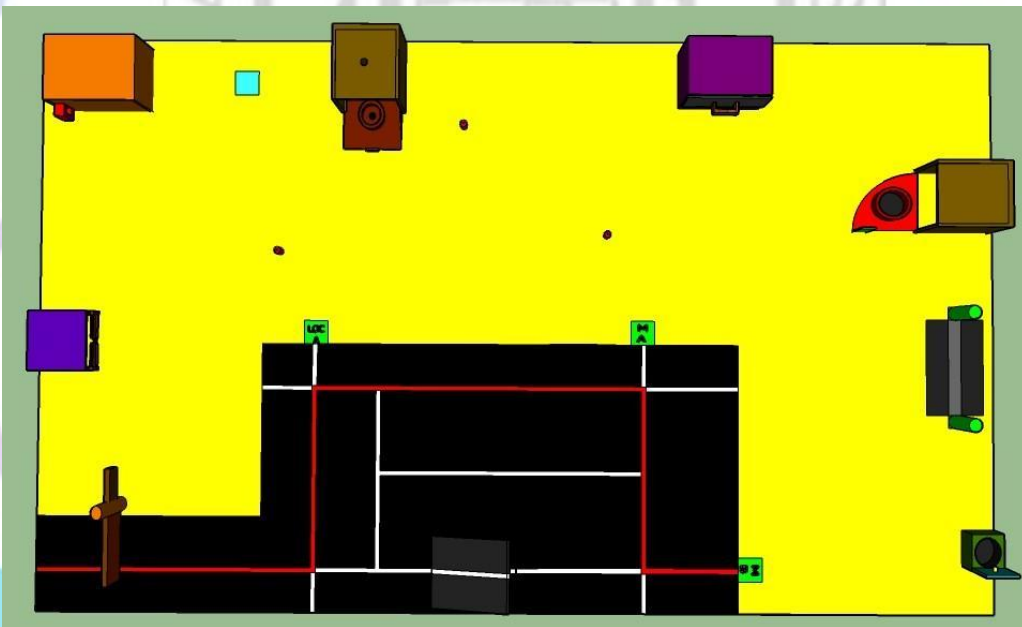
PATHS:

Path 1:

Path 2:

Path 3:

Path 4:

*ALL COLOURS ARE GIVEN FOR REFERENCE ONLY AND MAY BE SUBJECT TO CHANGE. *

JUDGING CRITERIA:

Sr. No.	Task	Points
1	Opening LOC Gate.	5
2	Auto Robot going to LOC A via Path1.	10
3	Picking up Permission Letter from Head Quarters and Placing it on Base Camp.	15
4	Picking up Wired Bomb from Army Garrison, Placing the Wired Bomb in 1st Terrorist Launch Pad and Connecting the Wire.	20
5	Picking up Non-Wired Bomb from Army Garrison and Placing it on the Auto Robot.	10
6	Auto Robot Pressing the Switch and Going to M.A. via Path2.	15
7	Picking up and Placing the Non-Wired Bomb in 2nd Terrorist Launch Pad.	20
8	Connecting Wires Modules to Activate Non-Wired Bomb.	10
9	Picking up Uri Handler from Muzaffarabad Terrorist Launch Pad and Placing on Auto Robot.	15
10	Auto Robot Going to M.B. via Path3.	10
11	Picking up Uri Handler from Auto Robot, placing it in UBGL and Closing the Lid.	20
12	Manual Robot exiting from LOC Gate.	10
13	Auto Robot exiting from LOC Gate via Path4.	10

TOTAL POINTS : 170

SKIPPABLE TASKS WITH PENALTY

1. Opening the door of Army Garrison.
2. Opening the door of Muzaffarabad Terrorist Launch Pad.
3. Auto Robot going to M.A.

10 POINTS WILL BE DEDUCTED FOR EVERY TASK SKIPPED

FINAL SCORE:

1. The team completing all the tasks first and correctly will be considered as the winner.
2. If both the teams could not complete the tasks then the team with maximum points will be the winner.
3. The rules and regulations for the tie break can be changed at any time and would be decided by the organizers.

ROBOT SPECIFICATIONS:

1 Manual Robot and 1 Line follower Robot (Auto Robot) are required for each team.

MANUAL ROBOT:

1. Manual Robot can be controlled.
2. Only one team member is allowed to control the robot in the game field.
3. Robot should not exceed the dimensions of 50 cm × 50 cm × 60 cm (l×b×h). Manual robot can expand, stretch or extend without any limits after the start of the run.
4. Only one Manual Robot is allowed.

AUTO ROBOT:

1. The Auto Robot must be completely autonomous and it must run on principles of line following.
2. The Auto Robot should not exceed the dimensions of size 35 cm × 35 cm × 35 cm (l×b×h). Auto-bot can expand, stretch or extend within a cylinder of length 35 cm considered from the top view. No stretch up in height is allowed.

3. The starting procedure of Auto Robot should be simple and should not involve giving it any manual force or impulse in any direction.
4. The weight of Auto Robot should not exceed 8 Kg.
5. The Auto Robot must be single body and should not split into parts.
6. Only one Auto Robot is allowed.
7. The robot should not receive any kind of input from outside the arena.

RESTARTS:

1. If the Auto Robot drops any item, it must restart from its previous destination.
2. In case of a restart, the timer will not be set back to zero and time will not be paused.
3. During restarts for the Auto Robot, a contestant cannot feed any information to it. However, participants are allowed to adjust sensors and make minor repairs.
4. Any restart for Auto Robot requires the approval of the organizers before it can be removed from the arena. If removed without approval, it will be considered as a violation.
5. If the Manual Robot drops any item, it must restart its current task.

NOTE: Maximum 3 restarts will be allowed for each skippable task. Task will be skipped after that. For non-skippable tasks, unlimited restarts are allowed until time runs out.

VIOLATIONS:

1. The team with five Violations in a match will be disqualified. Negative scores may appear in some cases.
2. When the Violations occur, 10 points will be deducted from the team score. The team must bring the violating Robot back to the point where the referee indicates. The violations are categorized as follows:
   1. Any part of the Robot entering their respective restricted areas or their opponents' arena. The Auto Robot cannot enter in Manual Robot's Arena and vice versa.
   2. Other actions that infringe on the rules without being mentioned in the disqualifications are considered as Violations.

DISQUALIFICATIONS:

1. A team will be disqualified if it commits any of the following actions during the match:
    1. The team performs any acts that are not in the spirit of fair play.
    2. The team fails to obey instructions or warnings issued by the referees.
    3. Auto robots must not receive remote instructions from any human, sent via any form of communication. During so will lead to disqualification.
    4. The team has made five Violations in the same match.
2. Any Robot found damaging the arena will be disqualified immediately.

Rules mentioned above are subject to change any time. Participants should check for the latest updated PDFs on the official website of Technovanza '20. However, this draft is to be followed as the latest version. Technovanza reserves all rights regarding rules and regulations.

CONTACTS:

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