

# ASTYANAX

A bomb is planted in a building and your job is to evacuate the people stuck inside the building with your robots and place the bomb in a given isolated zone.



The prerequisites for the event are to construct two robots of which one would be AUTONOMOUS to detect the people and the bomb while the other bot has to be MANUAL to move the people and the bomb out.

## Procedure:

1. Both the bots should start at their respective starting positions
2. The starting point of the manual bot (bot-M) is named 'Zone-M' and starting point of autonomous bot (bot-A) is named 'Zone-A' which is a pan as shown in the arena. The team can also use 'Zone-A1' as a starting point for their Autonomous bot.
3. Both the bots should be placed and started at the same time
4. A rope over a pulley is tied to the pan on which the bot-A is placed. The bot-M should lift the pan to the next level (first floor) using the rope. If the team finds this difficult, they can also use 'Zone-A1' as a starting point for their Autonomous bot but at the cost of losing some points.
5. Bot-A should follow the given path to find the bomb and the number of people stuck inside the building.
6. It is allowed to follow the given path in any way but it should detect all the people as well as the bomb on the first floor.
7. The bot-A should blink a green color LED whenever it detects the people who are stuck inside the blocks of the building. The blinking of the LED should be not anywhere else but at the site of the block where the people are stuck.
8. The Bot-A should blink a red color LED 3 times when it detects the bomb.
9. Meanwhile the bot-M should come to first floor by stairs (which is an inclined ramp.)
10. Bot-M should rescue people from the blocks named 1, 2,3,4,5 and 6 in the order the bot-A detected.

11. Each block is closed by an obstacle shown in the arena. Bot-M should remove the obstacle and rescue the people from each block
12. In the blocks 1,3,4,5 and 6 there is only one from each to be rescued and in the block 2 there are two people stuck which adds to a total of seven people. All the people should be moved to a safe zone named 'Zone-R'
13. Bot-M is allowed to carry any number of people at a time.
14. After the people are rescued, bomb should be moved out to a danger zone (Zone-D)
15. Bomb and people cannot be moved at the same time.

### Tasks for bot-A:

1. Start in the pan/ Zone –A1
2. Follow the given path
3. Detect the people and bomb
4. Blink Green color LED on detecting the people and Red color LED thrice on detecting the bomb

### Tasks for bot-M:

1. Lift the pan to the first floor if the bot-A starts at Zone A
2. Go to the first floor by ramp.
3. Rescue people and place the bomb in danger zone
4. Remove the obstacle in order to rescue people

## Arena description:

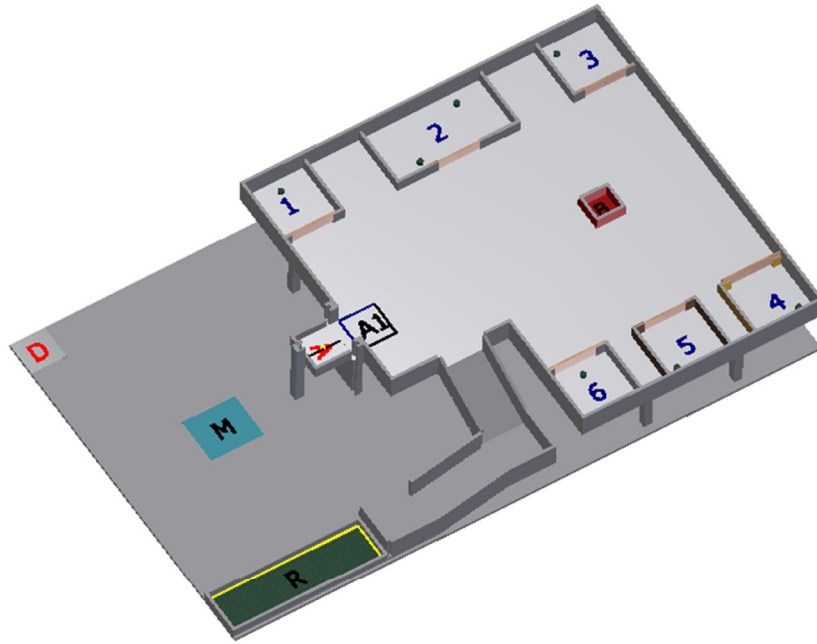


Figure-1

1. The first floor of the building is a platform at 400 mm above from the ground
2. Top view of arena with dimensions

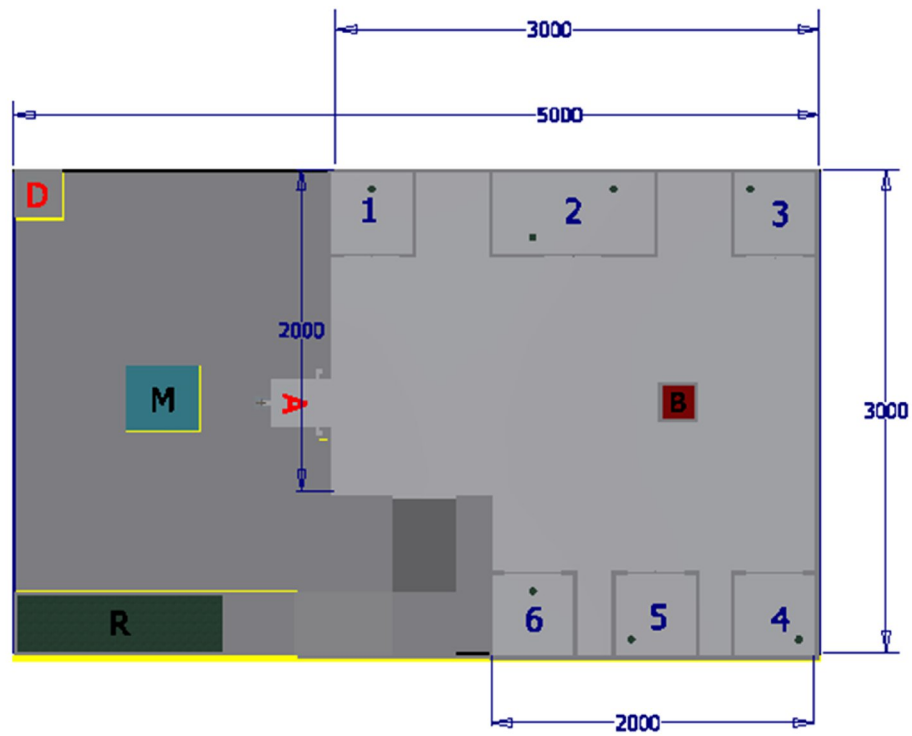


Figure-2

### 3. Pan dimensions:



Figure-3

This pan is connected to a pole and the arena with the sliding mechanism so that it can be freely moved vertically when the bot-M is lifting the bot-A. This pan can be moved up to a height of 400mm only. This is to match the height of the first floor with the lifted pan.

### 4. Pole and pulley with pan(sliding mechanism for the pan to move vertically )

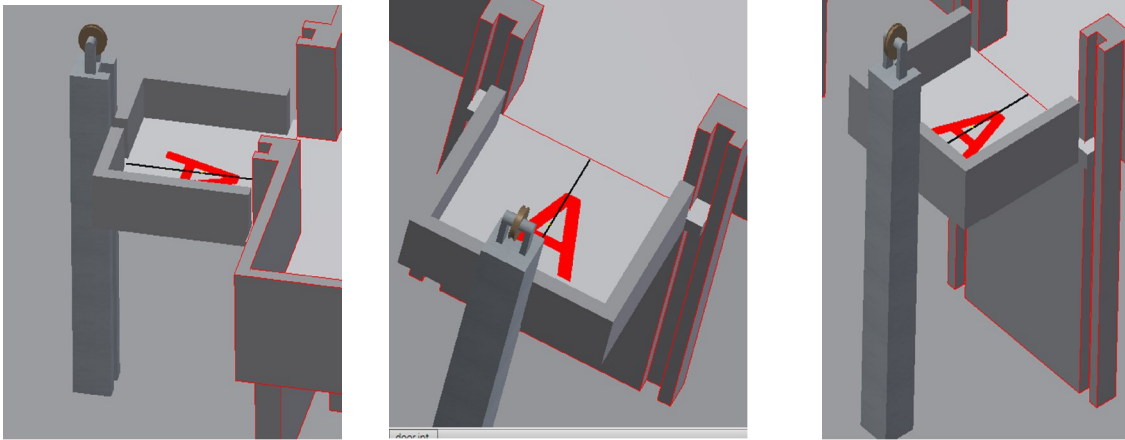


Figure-4

A rope over pulley is connected to the pan. Bot-M should use that rope to pull the pan vertically up. The diameter of rope is 10mm.

#### 5.Obstacle :

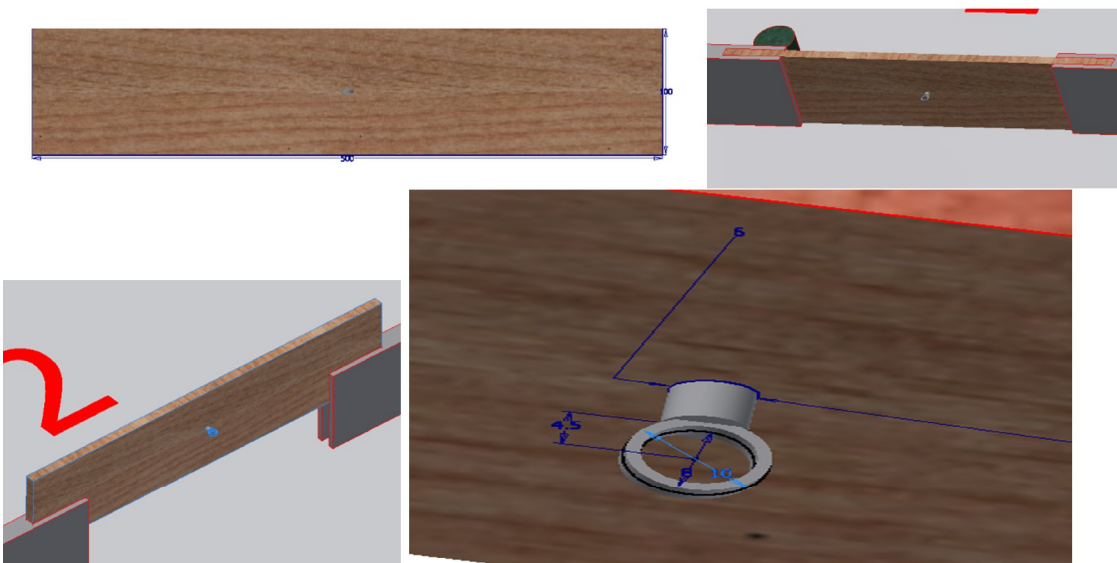


Figure-5

Obstacle is arrested at only one degree of freedom to move vertically up and is provided with a hook of dimensions shown above.

#### 6.Ramp:

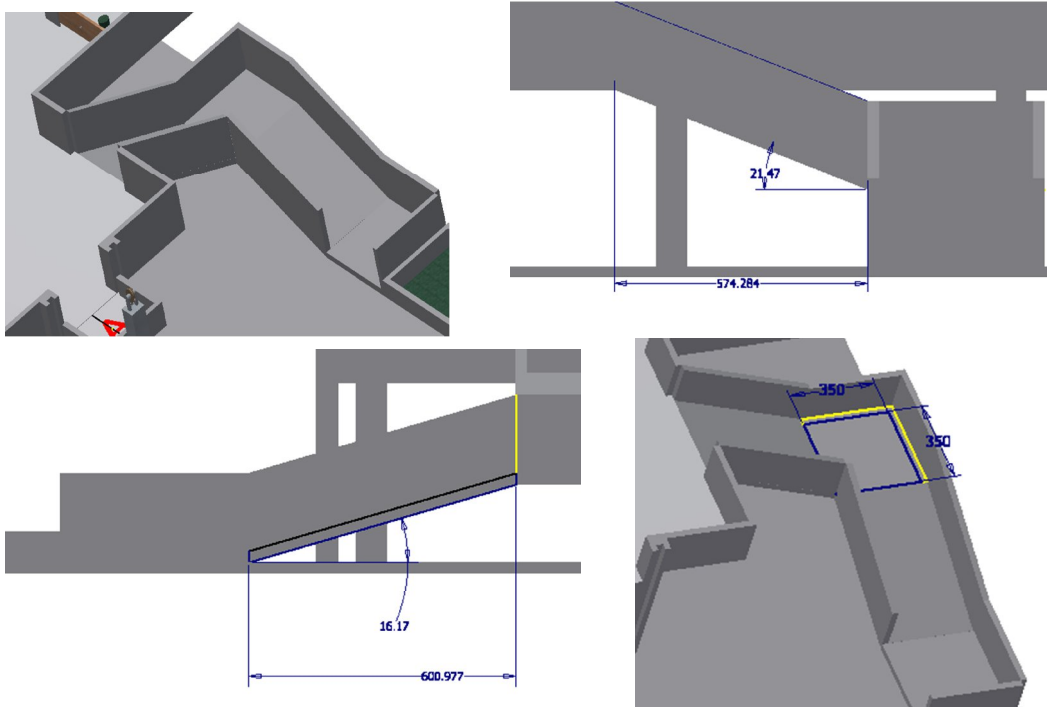


Figure-6

7.Blocks:

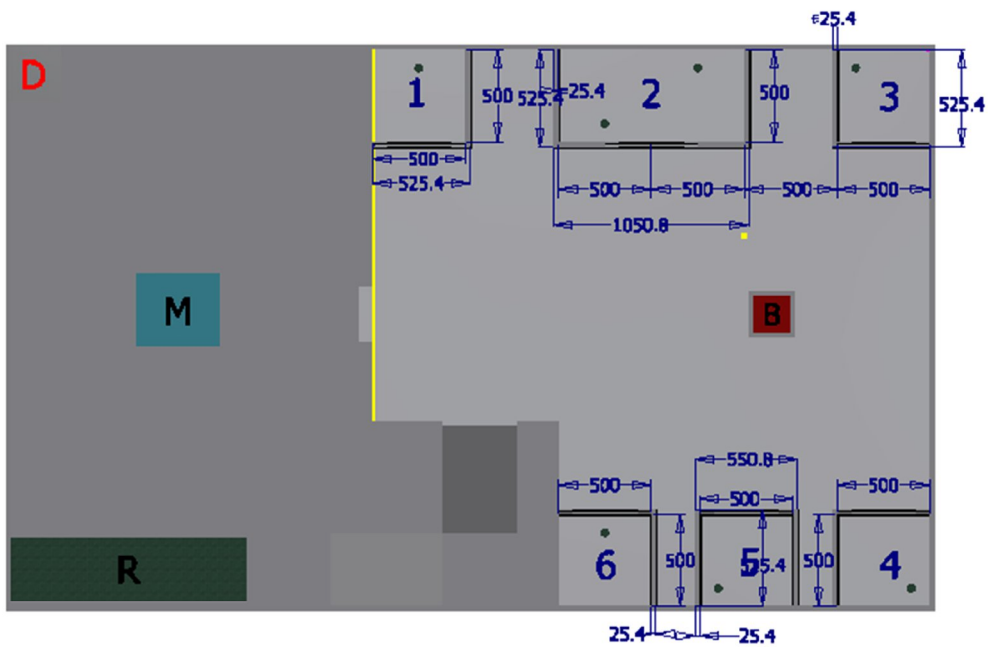


Figure-7

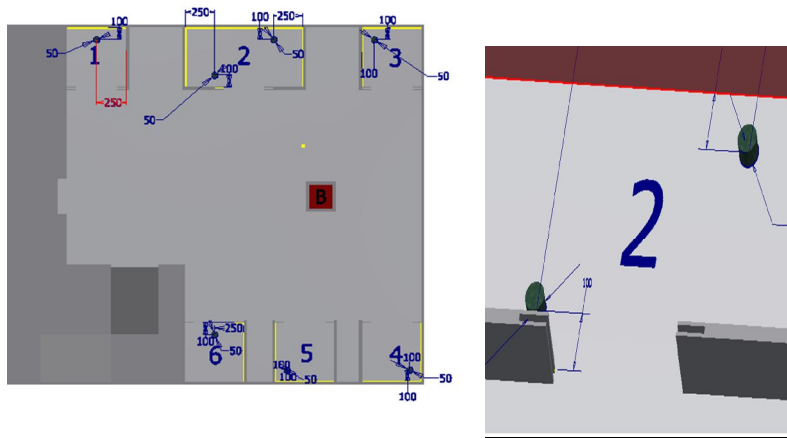


Figure-8

Hard tennis balls which represent people are placed in each block on the green color cylinders as shown above. Cylinder height is 25mm. Ball( hard tennis ball) diameter is 80mm(approx).

8.Path to follow:

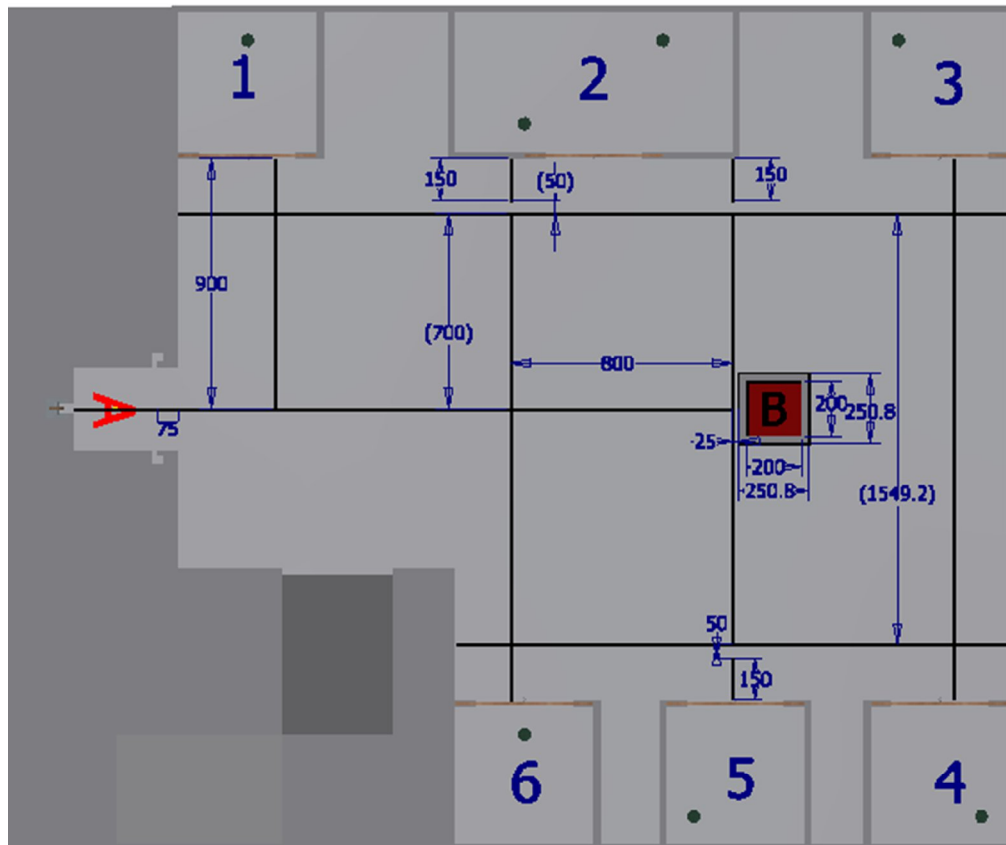


Figure-9

The path shown above is the center line of a 30mm thick black line on white surface and starts in the pan.

### 9. Rescue zone:

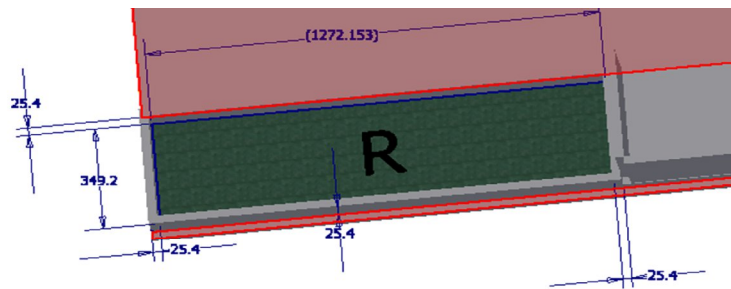
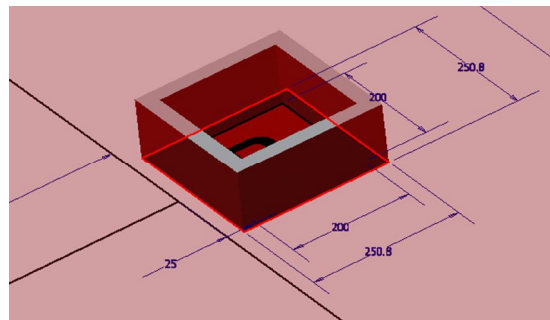


Figure-10

Rescue zone has a wall of 70mm height

### 10. Zone-B



Zone-B is the zone in which bomb is placed. Bomb is placed at the center of the zone at an height of 25mm and the zone has height of 100mm. Bomb is a ball( hard tennis ball) of diameter 80mm(approx).

11. Material of the arena is wood.

### Bots specifications:

1. Bot- A maximum allowed dimensions are 250\*250\*200 mm
2. Bot-M maximum allowed dimensions are 300\*300\*300mm
3. Power supply should be separate for both bots at maximum 12v
4. Bot-A should have no connection from outside
5. All circuits for the bot-A including the battery should be on the bot itself.
6. None of the two bots should not be separated into several parts once the game starts.
7. Power supply is not provided in the match, teams should bring their own power supply. But power supply will be provided to recharge the batteries.



9. Only one person is allowed to control the bot-M

10. If the controlling of bot-M is through wired communication then use a wire of length of 3m or more

### Points distribution:

| Task   | Points  |
|--|---|
| 1.Taking the bot-A to the height   | 100   |
| 2.Bot-M climbing ramp  | 100   |
| 3.Bot-A blinking green led at the correct positions  | 10  |
| 4.Bot-A blinking the red led thrice at the position of bomb  | 20  |
| 5.Bot-M removing obstacle at each block  | 20  |
| 6.Bot-M moving the people out from the blocks to the rescue zone<br>a. One at a time<br>b. Two at a time<br>c. Three at a time<br>d. Four at a time<br>e .Five at a time<br>f. Six at a time<br>g. Seven at a time | 10 for each<br>20 for each<br>30 for each<br>40 for each<br>50 for each<br>60 for each<br>70 for each |
| 7.Bot-M moving the bomb to danger zone   | 100   |

### Negative points:

|   |  |
|---|--|
| 1.Dropping balls in the arena<br>a. One at a time<br>b. Two at a time<br>c. Three at a time<br>d. Four or above at a time | -10 for each<br>-20 for each<br>-30 for each<br>-50 for each |
| 2. Dropping the bomb in the arena   | -50  |
| 3. If the bot-A starts from the Zone-A1   | -50  |

### Game rules:

1. Person who is controlling the bot-M is not allowed touch the bot.
2. Bots should not damage the arena

### Team Specifications:

1. Maximum of '5' members per team is allowed.