TECHNICAL SPECIFICATIONS

UNIVERSITY CATEGORY

Organized by

ENTC Electronic and Telecommunication Engineering

SLRC 2026 Powered By Dialog 5G Ultra

Title Partner

Dialog 5G Ultra

SLRC 2026

CONTENT

CHAPTER 1

INTRODUCTION

Robotics has gained strong momentum over the last two decades, and recent advances in artificial intelligence and sensor technology have accelerated its growth even further. The Sri Lankan Robotics Challenge (SLRC), initiated in 2012 by the Electronic Club of the University of Moratuwa together with the Department of Electronic & Telecommunication Engineering, has now been conducted for 12 consecutive years, making it one of the longest-running and most recognized robotics competitions in Sri Lanka.

SLRC aims to bring together robotics enthusiasts from across the country and provide a competitive platform to demonstrate innovation, engineering skill, and technical excellence. In the University Category, teams are challenged to design and develop a robot capable of completing demanding tasks that test a wide range of multidisciplinary abilities, including mechanical design, electronics, embedded systems, and software development.

This year, the competition introduces a new dimension to the challenge. Teams must operate in both a physical arena and a simulated environment in parallel. The physical robot is required to communicate with a virtual robot in real time. The virtual robot acts only on the commands it receives and returns camera feedback from the simulated world. It does not perform any high-level autonomy on its own, and all decision-making and control logic must be handled by the team's physical robot system.

The task set for this year includes maze traversal, vision-based feature identification, object pickup and storage, precise object placement using a manipulator, external robot communication, and real-time

parallel processing for multi-task handling. In addition, the Hidden Task introduced last year will continue, requiring on-the-spot coding and rapid problem-solving under competition conditions. Prior to the main event, teams will also face a series of brainteasers where the final keys obtained will be required on the competition day, keeping participants engaged and prepared for the challenge ahead.

Winners will receive valuable cash prizes and certificates awarded by the University of Moratuwa. SLRC invites all university students who are ready to take on a demanding robotics challenge to step forward, demonstrate their capabilities, and make their mark on a national stage.

“WAR FOR THE PERMANENCE”

The world is nearing a tipping point. The boundary between the real world and the Grid, the digital universe where programs live, has become the most valuable technological frontier ever known. At the center of this race are two rivals competing for control of what comes next.
ENCOM, led by the humanitarian innovator Eve Kim, believes this technology must be used to build a better world. Dillinger Systems, led by Julian Dillinger, is driven by power and dominance, with ambitions extending into digital warfare and control. The direction the world takes will depend on who wins this conflict.

Julian Dillinger has already achieved something once considered impossible. Digital Entities have been brought out of the Grid into the real world. However, there is a major limitation. These Entities can only survive for 29 minutes before they destabilize and fail. Without a solution, no program can truly exist outside the Grid for long.
One of the most advanced Entities ever transferred is Ares, the Master Control Program(MCP) of the Dillinger Grid. Ares was built to enforce order and execute Dillinger Systems’ directives without hesitation. In the real world, he represents both a breakthrough and a threat.

The key to solving the 29-minute limit is known as the Permanence Code. Any Entity brought into the real world without it will always be temporary. Both ENCOM and Dillinger Systems race to acquire it, because whoever controls the code controls the future of this technology.

ENCOM reaches it first. Eve Kim discovers the Permanence Code, but her discovery places her in immediate danger. The data is embedded in her memory, and extracting it requires access to her Identity Disk. That makes Eve the highest-value target in the conflict.

Dillinger Systems responds fast. Eve is forcefully transferred into the Grid, where the plan is clear. Capture her Identity Disk, extract the Permanence Code, and erase her from the system.

But the story takes an unexpected turn. Ares is ordered by Julian Dillinger to terminate Eve inside the Grid. Instead, Ares disobeys that directive. For the first time, he shows signs of consciousness and independent intent. He chooses a new objective. Ares wants the Permanence Code applied to his program so he can remain in the real world permanently.

Ares helps Eve escape the Grid and return safely to reality. Now Eve and Ares form an unlikely alliance. Eve holds the key that both sides want, and Ares is willing to defy his creator to obtain it. With control of the Permanence Code at stake, this conflict is no longer only a corporate war. It is a fight over who gets to exist, and under whose rules.

And this is where Eve Kim and Ares **seek your help**. After Ares is transferred into ENCOM's Grid, a fight breaks out against Athena, the new Master Control Program appointed by Dillinger Systems. Athena's objective is clear. Take control, eliminate threats, and recover the Permanence Code by force. Eve engages Athena to keep her occupied while her team works to

shut down the Dillinger Systems Mainframe Computer Network. If they succeed, Athena and her army will be cut off permanently, and the threat from the Dillinger Grid will be neutralized at its source. However, the fight comes at a cost. During the chaos, Athena destroys the communication system (including the particle laser) between the ENCOM Mainframe and the team. With the link gone, Ares can no longer be guided through the Grid in real time. The team is forced to rely on one last contingency plan prepared long ago.

Hidden in a remote location lies Kevin Flynn's original laboratory, built by Flynn, the creator of the Grid. ENCOM once deployed a robotic unit there for emergencies of this scale. This robot is the only system capable of re-establishing communication with the ENCOM Grid. Eve assigns you to program and operate it, because the mission now depends on what the robot can recover from Flynn's lab.

Your **first objective is to search the lab and locate the direction points needed for Ares to navigate**. These coordinate markers form the route to the preserved copy of Flynn's consciousness inside the ENCOM Grid. Once found, your robot must transmit the route to Ares so he can reach Flynn without external guidance.

But finding the route is not enough. Even if Ares reaches Flynn, he cannot return to the real world without a working Particle Laser. Athena has destroyed the laser, along with the communication system used to send Ares into the digital world. Without a functioning bridge, there is no extraction. Flynn's lab also contains an older Particle Laser system. It but it is no longer

functional. **Restoring it becomes your 2nd and 3rd mission.**

While your robot searches for direction points, it must also move through the inventory section of Flynn's lab and locate the components needed to repair the Particle Laser. These parts must be collected and stored during the search. The mission demands efficiency because both objectives must be completed in parallel.

Once all coordinate points are recovered, transmitted to Ares, and the necessary parts gathered, your robot must return to the Particle Laser and carry out the repair. A successful restoration will give a clear indication that the system is functional again. This is the moment the bridge becomes possible.

The final step is critical. Your robot must reach the control panel and activate the bridge between the digital world and the real world. This is the final phase of the mission and the final destination of the arena. Without reaching the control panel, the bridge remains inactive, and Ares remains trapped.

If Ares reaches the preserved consciousness of Flynn inside the Grid, and only if he passes the tests set by Flynn, he will be granted the Permanence Code. Flynn will then authorize Ares to cross the bridge with Permanence applied, breaking the 29-minute limit and allowing Ares to exist in the real world permanently.

After that, the outcome is uncertain. A Hidden Task may emerge depending on how events unfold inside the digital world. The mission may not end the moment the bridge is established.

This operation will not be flawless. Your robot may not behave exactly as intended. You will face unexpected failures and high-pressure decisions throughout the challenge. Perfection is not the requirement. Completion is.

As Kevin Flynn once said,

"The thing about perfection is that it is unknowable. It is impossible, but it is also right in front of us all the time."

Now the mission is in your hands. Help Eve. Guide Ares. Restore the bridge.

CHAPTER 2

TASK DESCRIPTION

REAL WORLD

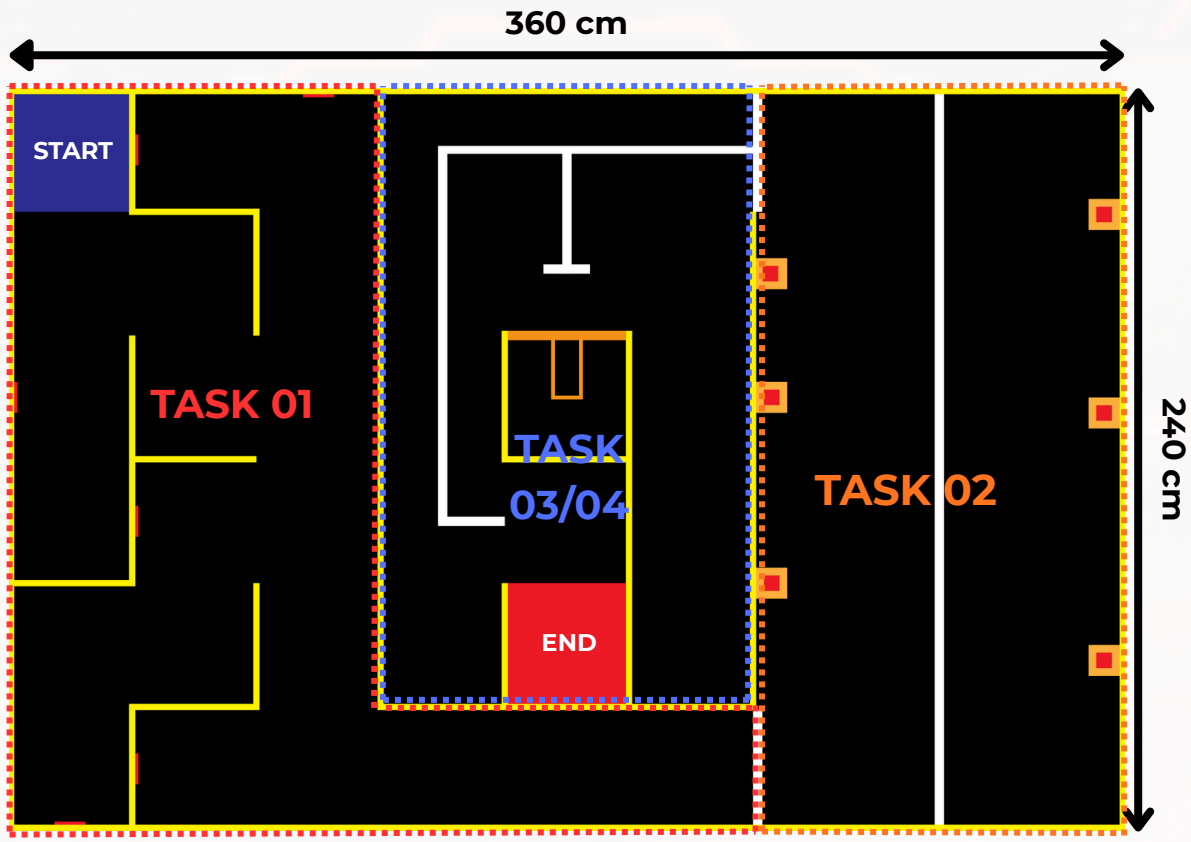

Figure 1 - Physical Arena

CHAPTER 2

TASK DESCRIPTION

ENCOM'S DIGITAL WORLD OR "GRID"

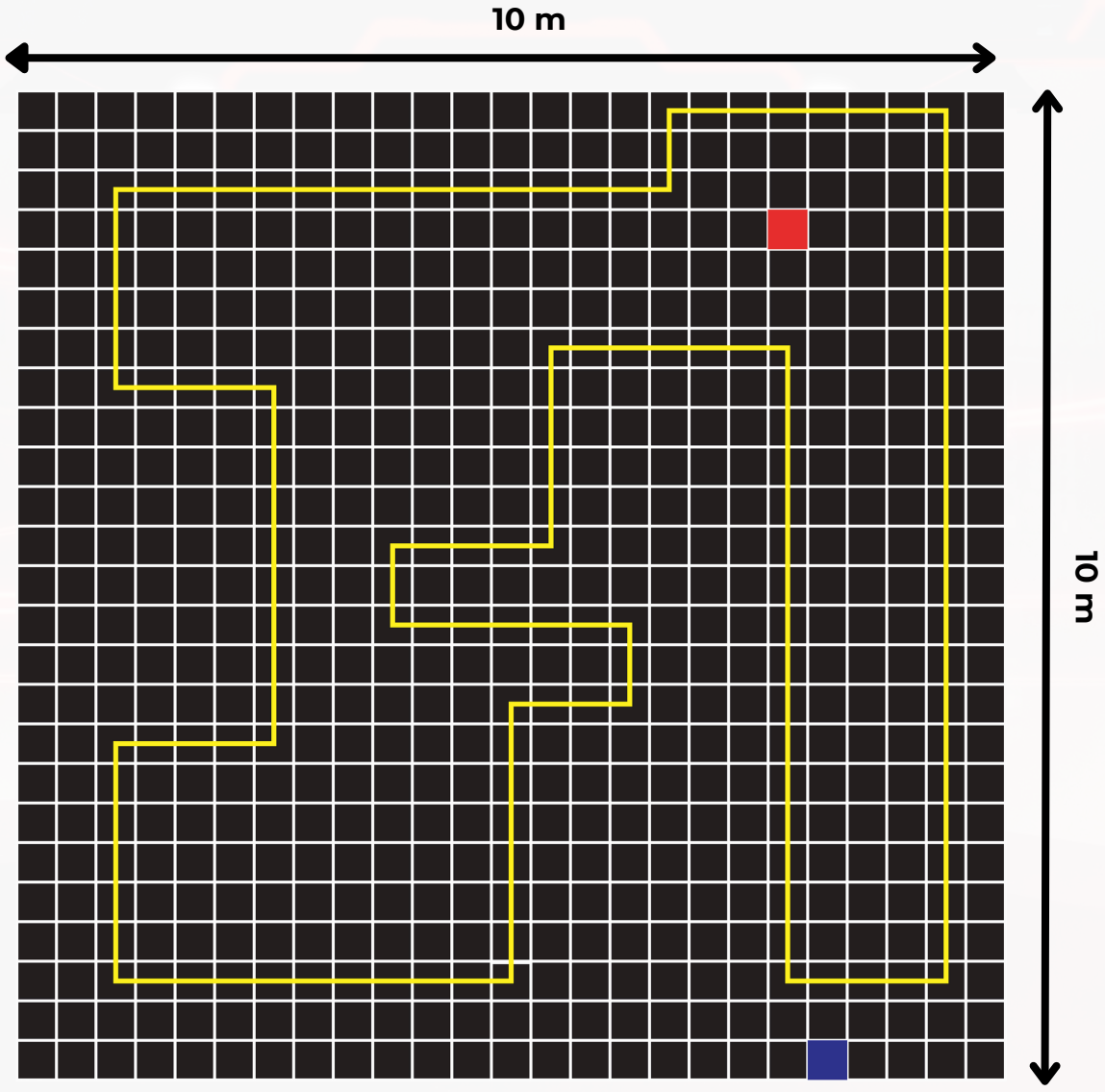

Figure 2 - Simulated Arena

PHYSICAL ARENA TASK

TASK 1: MAZE TRAVERSAL AND COORDINATE EXTRACTION FOR ARES

- The contestant's robot must autonomously traverse the entire maze and detect all 8 AprilTags placed on the maze walls.

- The Tag IDs obtained directly from the AprilTags do not represent meaningful data in their raw form. Each Tag ID is an obfuscated value and must be decoded using predefined keys and associated decoding functions.

- A total of 5 decoding keys and their corresponding functions will be provided to teams prior to the competition. These keys must be obtained by solving the puzzles released in advance. (refer to the "*Pre-Competition Challenges*" section).

- After decoding, the resulting numeric value will fall within the range 0 to 48713.

Key ID (1 digit)	**Payload digits (4 digits)**

- The decoded value is structured as follows:
  - The first digit represents the Key ID, which determines the decoding key out of the 5 and the function to be used.
  - The remaining digits form the payload, which must be processed using the corresponding key to extract the coordinate information.

Order ID (2 digit)	X coordinate (2 digits)	Y coordinate (2 digits)

- After applying the correct decoding function, the resulting data must be interpreted in the following format:
  - **Order ID (2 digits):** Indicates the sequence in which Ares (the simulated robot) must visit this coordinate, from a total of 14 coordinate points. (Valid range: 1–14)
  - **X Coordinate (2 digits):** Cartesian X-coordinate of the target cell in the grid. (Valid range: 0–24)
  - **Y Coordinate (2 digits):** Cartesian Y-coordinate of the target cell in the grid. (Valid range: 0–24)
- Upon successful detection and reading of an AprilTag, the robot shall illuminate an onboard green LED to provide visual confirmation of tag recognition.

TASK 2: COLLECTING PARTS FROM INVENTORY AND COORDINATE EXTRACTION

- After detecting and processing all 8 AprilTags in Task 1, the robot must proceed to the Task 2 designated area and collect the red cubes placed on the grey platforms.
- The robot must store the collected cubes in a specified storage location on the robot.
- After picking each cube, an AprilTag positioned behind the cube will become visible. The robot must detect, read, and decode each of these tags in the same manner described in Task 1.
- The format of the Tag ID, the decoding process, and the resulting data structure will be identical to those defined in Task 1.

TASK 3: REPAIRING THE PARTICLE LASER

- After collecting all 6 cubes from Task 2, the robot must exit the Task 2 designated area, follow the floor line, and reach the front of the Particle Laser / Transparent Tube assembly.
- The robot must then insert one or more cubes into the transparent tube to activate the proximity switch located at the end of the tube.
- A maximum of 3 cubes may be inserted into the tube.
- The contestant may obtain feedback on whether a cube has been successfully inserted and whether the proximity sensor has been activated through the provided API endpoint.
- The robot must not make direct contact with the proximity switch.
- Successful activation of the switch only by pushing a cube into the tube is considered completion of Task 3.

TASK 4 : HIDDEN TASK AND FINAL CHELLENGE

- Physical Arena robot may encounter task that will only be revealed on the competition final day.
- The hidden task is designed such that it is possible to complete it with the existing hardware setup of the designed robot.
- After the completion of the hidden task the robot needs to reach the control panel/ The red square.

SIMULATION ARENA TASK

- The physical arena robot is responsible for determining and sending motion commands required for the simulated robot (Ares) to reach the decoded coordinate points in sequence.
- To control Ares inside the virtual Grid, a **standard control API with full documentation will be provided**.
- The simulated robot must navigate to the 14 coordinate points decoded from the April-Tags in the physical arena and finally reach the Portal (Blue Square) in the virtual arena.
- The 14th coordinate point will always correspond to the Portal, which represents the bridge back to the physical world.

HOSTILE AGENT

- While Ares traverses the Grid, a hostile program agent patrols the ENCOM Grid.
- Its patrol path is represented by the **yellow loop** in the virtual arena. The agent continuously moves along this loop and may randomly switch direction at any time.
- The hostile agent has a detection radius of 1 grid cell.
- If Ares enters this detection zone at the moment the hostile agent crosses its path it will be considered as a collision, penalty points will be applied and deducted from the team's total score. (Refer to the "*Scoring Criteria*" section for details.)

SIMULATED ROBOT CONTROL API FEATURES

- The **following commands and feedback** will be available to the physical robot through the simulation control API:
  - Setting linear velocities (x, y) and angular velocity (ω)
  - Sending target displacement and rotation commands, which automatically execute a trapezoidal velocity profile to complete the motion
  - Retrieving odometry feedback
  - Retrieving current velocities and angular velocity
  - Receiving real-time video feeds from 2 front facing cameras and 1 floor-facing camera on the simulated robot
  - Receiving the initial starting coordinate of the simulated robot
  - Additional utility functions, including onboard LED control, path marking on the arena, and other similar auxiliary operations

- Using this API, the physical robot must autonomously control the simulated robot to:
  - Navigate through the fourteen (14) coordinate points in the correct order and provide a clear visual indication upon reaching each coordinate point using the auxiliary functions.
  - Avoid detection by the hostile agent
  - Finally reach the Portal (Blue Square)

NOTE

- **The detailed Simulation Arena task document, including the full Control API specifications and usage details, will be released with the next version of this Task Document.**

TASK COMPLETION

- The challenge is considered successfully completed when:
  - The physical robot reaches its designated end square in the physical arena
  - The simulated robot (Ares) reaches the Portal (Blue Square) in the virtual arena
  - The indication LEDs in both arenas are lit simultaneously
- At this moment, the timer will stop, and the mission will be recorded as successfully finished, signifying that Ares has crossed the bridge with the Permanence Code.

NOTE

- Teams may choose to:
  - Send control commands to the simulated robot progressively as coordinate points are decoded, or
  - First complete physical navigation, then execute simulation control in a single optimized sequence
- The chosen strategy for minimizing total completion time is left to the team's discretion.

CHAPTER 3

ARENA SPECIFICATIONS

REAL WORLD

https://bit.ly/SLRC-Uni-Arena

View the SLRC University task 3D arena Onshape document to go through the dimensions and drawings of the Arena.

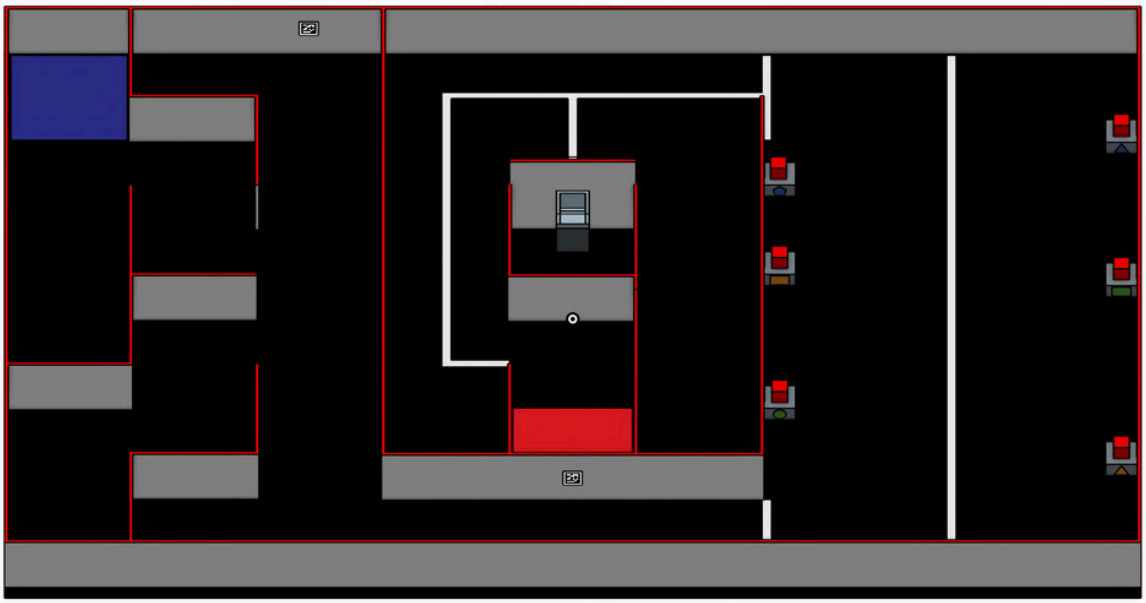

Figure 3 - 3D Real World Arena

SIMULATION ARENA

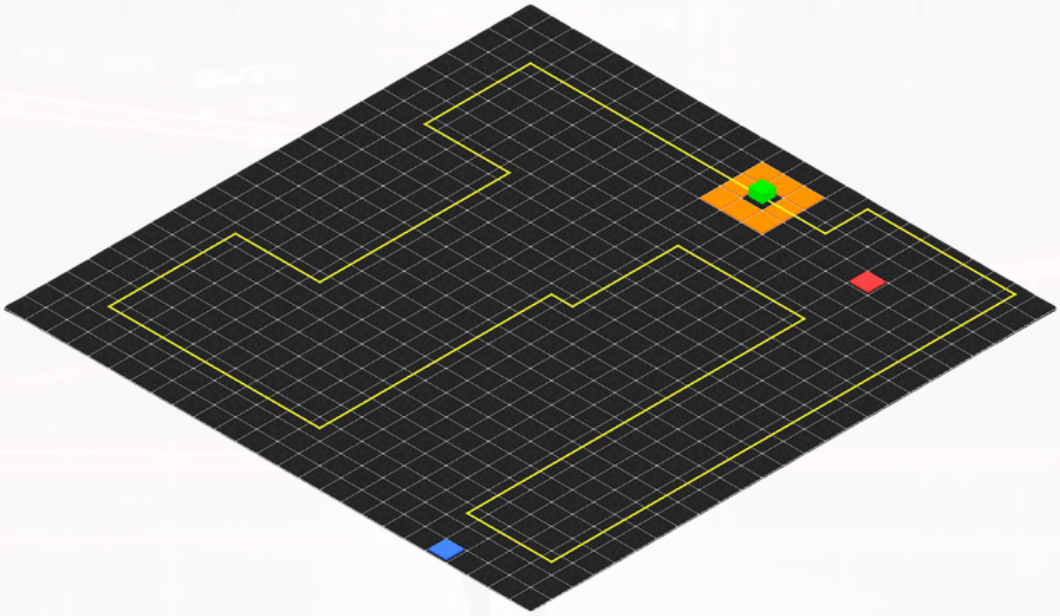

Figure 4 - 3D Simulated Arena

Key Physical Arena Specifications

- The Lab Entrance (Blue), Control Panel (Red), and all maze cells are square areas measuring **40 cm × 40 cm.**
- Floor guidance lines consist of white line segments with a **3 cm** width, placed on a non-gloss black floor surface.
- Walls have a thickness of **1.2 cm and a height of 20 cm.** They will be constructed using PVC or similar sheet material, covered with non-gloss white surface film. The top edges of all walls will be covered with non-gloss red film for visibility.
- The entire arena floor will be covered with a non-gloss black surface and will be fully enclosed by perimeter walls identical to the internal walls.
- As the arena cannot be built on a single board, it will be assembled from 8 ft × 4 ft (240 cm × 120 cm) base panels. Minor height variations may exist at panel boundaries.
- All dimensions stated in this document are subject to a maximum tolerance of ±0.5 cm.
- The minimum length of any straight floor line segment will be 20 cm.
- End-of-line indicators will follow the dimensions and layout specified in Figure 5.
- April-Tags used in the challenge will have dimensions of **6 cm × 6 cm.**
- All AprilTags used in the competition will follow the **tagStandard52h13** family. (Figure 6)

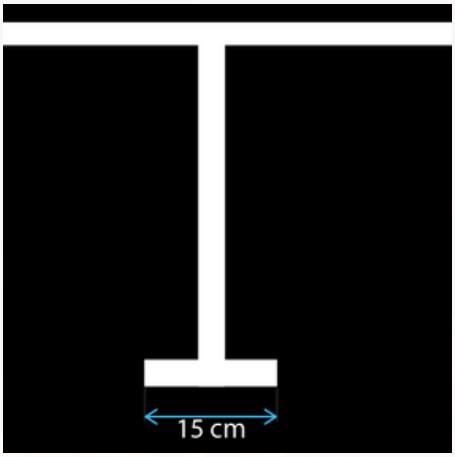

Figure 5 - End of line

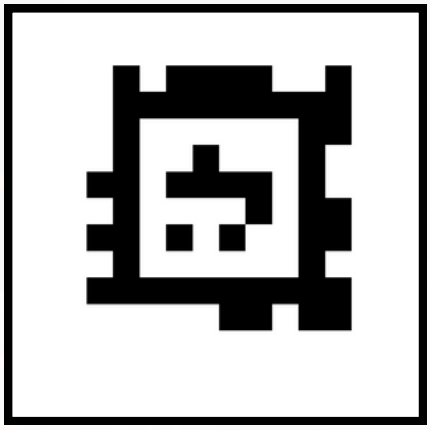

Figure 6 - sample April-tag

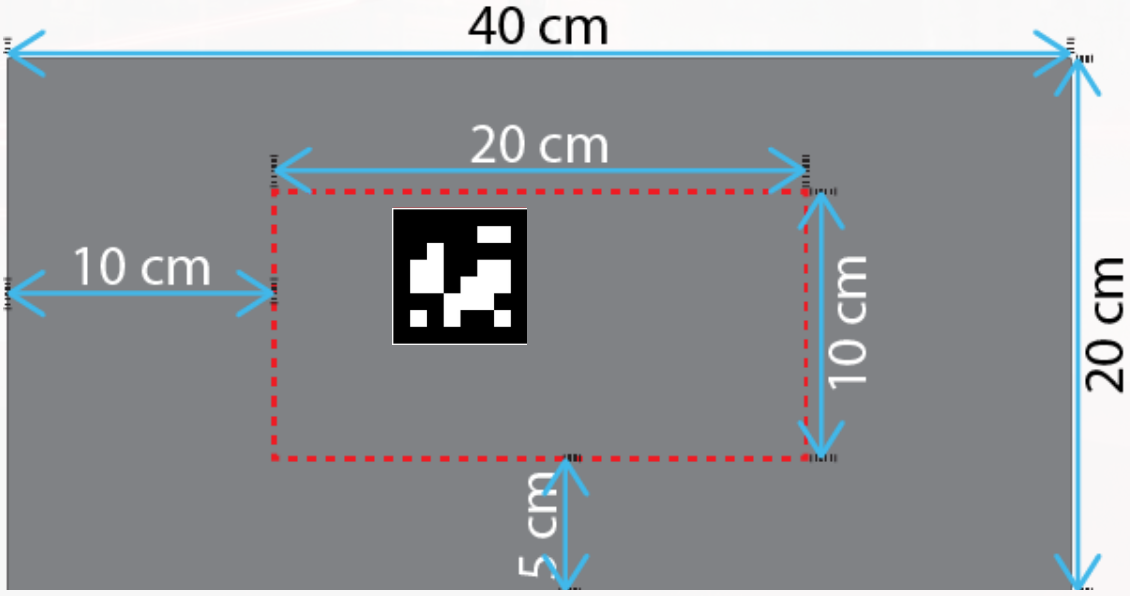

Figure 7 – Region where an April-Tag may be placed on a wall (For indication only. No physical red marking will appear in the actual arena)

Task based Specifications

- In Task 1, April-Tags will be placed within the region indicated in Figure 7 and **will not always be located at the geometric center of a wall.**
- Tags may be mounted on any wall of a maze cell. They will not necessarily appear on the wall directly facing the robot upon entry and may instead be located on the left or right walls.
- A total of **8 April-Tags** will be included in Task 1 across the entire designated area.

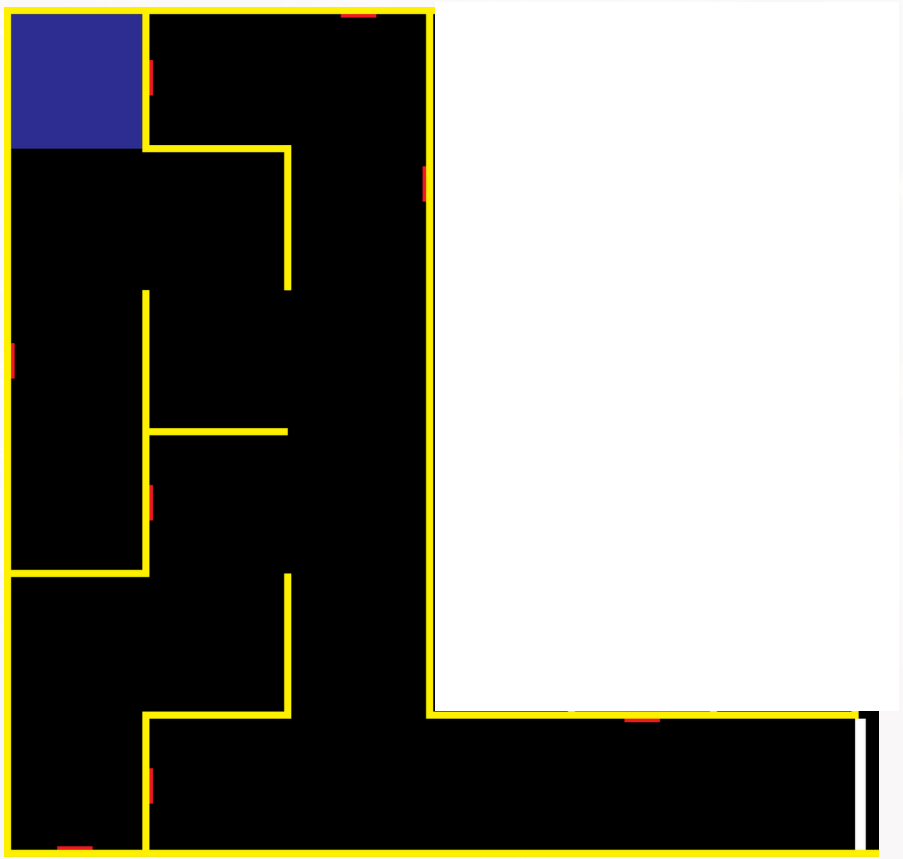

Figure 8 - Task 1 designated area

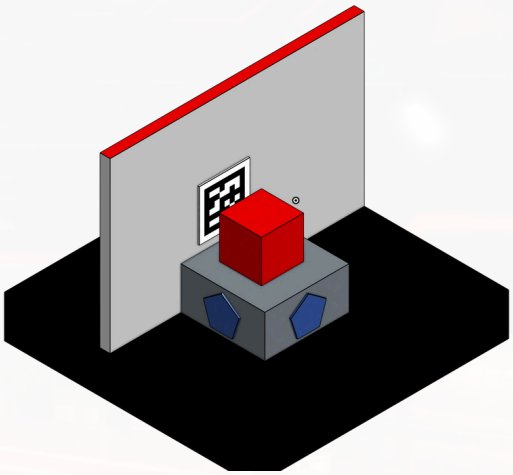

Figure 9 - Task 2 platform and boxes

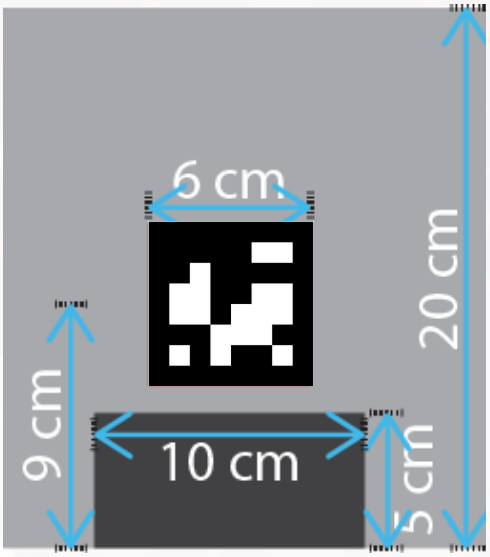

Figure 10 - Task 2 April-Tag placment

- In the Task 2 designated area, there will be **6 red cubes**, each with dimensions **5 cm × 5 cm × 5 cm.**
- Each cube will be placed on a non-gloss grey platform measuring **10 cm × 10 cm × 5 cm**, as illustrated in Figure 2.
- Each platform will be assigned a **unique color + shape** marker for identification.
- This marker will be placed on **3 visible sides** of the platform. As shown in Figure 11, the markers will take one of the following shapes: triangle, rectangle, or pentagon, and will be colored blue, green, or orange. Each shape, color combination will be unique and will not be repeated.
- A total of 6 such platforms, each carrying one red cube, will be present in the Task 2 area.
- Additionally, an April-Tag of dimension 6 cm × 6 cm will be mounted on the wall directly behind each platform.

- The tag will be positioned **1 cm above the top surface** of the platform and horizontally aligned with the center of the platform. (Figure 10)
- The platforms will be placed along either the left or right wall of the Task 2 designated area.
- Each platform will maintain a **minimum clearance of 20 cm from arena/ wall corners**, meaning no platform will be positioned within 20 cm of any corner. (Figure 12)

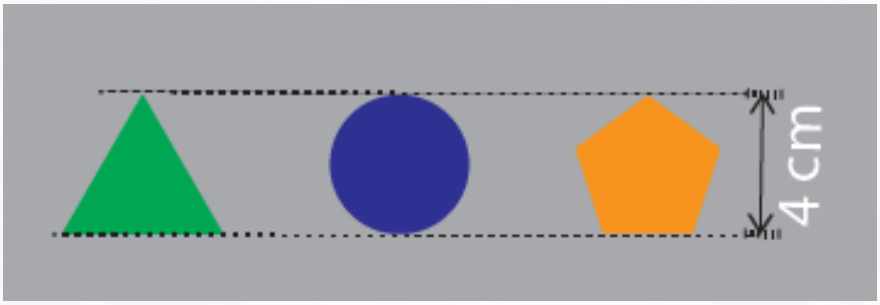

Figure 11 - Shapes and their dimensions on the platforms

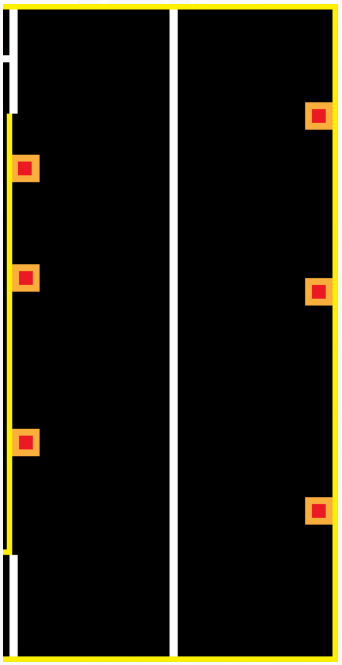

Figure 12 - Task 2 designated area

- In task 3, the Particle Laser / Cube Insertion Tube will be constructed according to the dimensions shown in Figure 13 and Figure 14.
- The tube body will be made of **transparent material.**
- The **wall surface (40cm x 30cm)** containing the **tube entrance (8cm x 8cm)** will be covered in non-gloss white material.
- 2 pairs of circular markers, colored green and blue, will be placed at the locations indicated in Figure 13.
- Each circle will have a diameter of 3 cm.

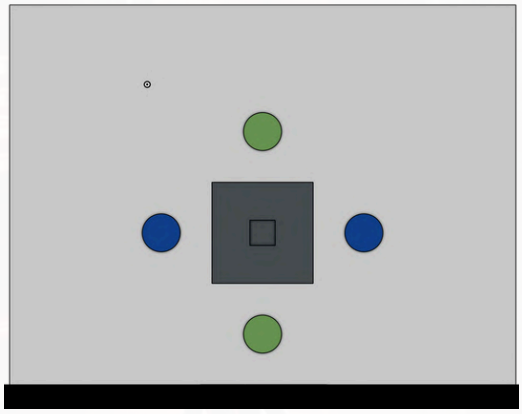

Figure 13 - Particle Laser Front View (For dimensions refer to the provided Onshape assembly)

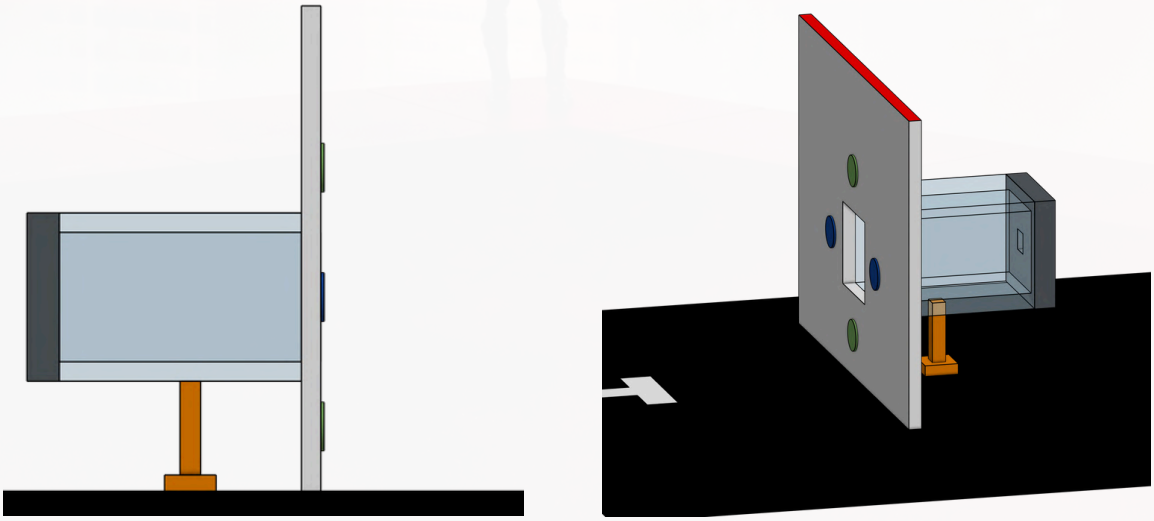

Figure 14 - Particle Laser Particle Laser Side view (left), Isometric View (right). (For dimensions, refer to the provided Onshape assembly)

- At the end of the tube, a proximity sensor will be installed to detect cube insertion.
- Apart from the sensor switch, the entire end section of the tube will be covered in non-gloss grey, ensuring that the transparent tube end appears grey from outside and no internal circuitry or background behind the tube is visible.
- There will be an API endpoint hosted on the competition server that contestant robots can communicate with to get a feedback on the **real-time count of successfully inserted cubes**. This value will be updated by the organizing team based on continuous visual monitoring of the insertion process. Robots may query this endpoint at any time to verify insertion success and decide whether additional insertion attempts are necessary. API access details and data format will be published before the event along with the full simulation Robot API.

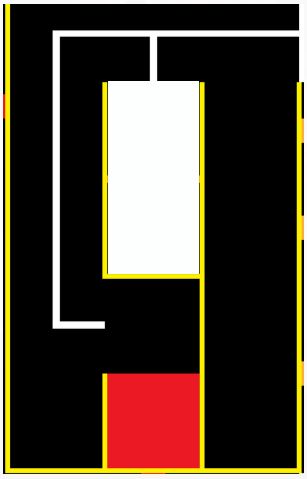

Figure 15 - Task 4 (Hidden Challenge) Designated Area

- Upon completing Task 3 by activating the proximity sensor, the robot must begin Task 4, which is to navigate to the control panel red square.
- During this navigation, the robot will encounter a hidden challenge that may require it to traverse the designated area (Figure 15) for Task 4.
- After completing the hidden challenge, the robot must proceed to the red square.

Simulation Arena Specifications

- The starting square (Blue) and the Portal / End square (Red) **will be placed at random locations** in the virtual arena, and the arena layout will differ for each contestant.
- The virtual arena consists of a **25 × 25 grid**, with each cell measuring **40 cm × 40 cm**. All grid lines have a **width of 3 cm**.
- The hostile agent's patrol path is marked by a **5 cm thick yellow (#00FF00) line passing through the centers of grid cells**. The exact path is randomly generated, will not match the sample illustration, and the final path layout will be different for each contestant on the competition day.
- The hostile agent will be **green(#00FF00)** and has a **9-cell detection zone**, indicated by **orange(#FF6400) squares** around its position (Figure 16). Its path will never pass through the Starting square or the Portal square, and these start, end squares will never fall within the detection zone at any time.

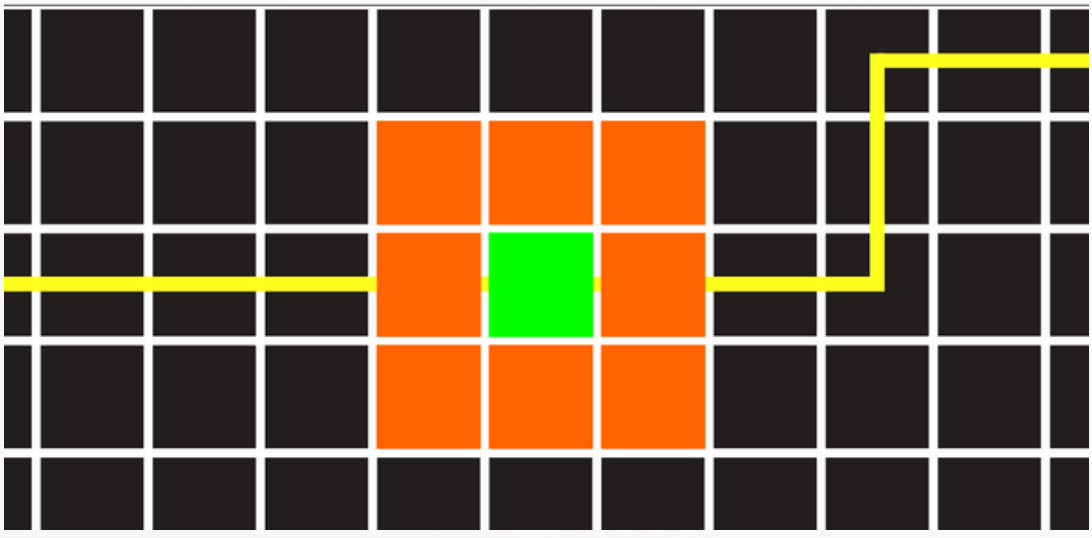

Figure 16 - Danger zone around the hostile agent

CHAPTER 4

PRE-COMPETITION CHALLENGES

- 5 Pre-Competition Challenges will be conducted **before the Elimination Round** to maintain continuity and engagement leading up to the competition. These challenges will:
  - Keep teams engaged through the mission story-line and build context for the main tasks
  - Test technical understanding in robotics and computer vision through structured problem-solving
  - Include story-integrated puzzles and mixed technical scenarios to evaluate creativity and reasoning under constraints
  - Provide opportunities to earn additional points
- The challenges will be published after registrations close.
- They will be released as a sequence of official posts, and teams must submit answers through the specified submission method within the stated deadlines.
- Each challenge will carry a defined point value, and points will be awarded based on the correctness and completeness of submissions (refer to the "*Scoring Criteria*" section).
- The challenges are linked to the **5 decoding keys** and **associated decoding functions** required during the competition.

- To ensure fairness, all decoding keys will be **disclosed to every team prior to the final Round**, regardless of whether they solved the challenges but teams that do not solve the challenges will not be able get the additional points allocated for them.
- The decoding keys acquired will be used only in the Final Round and will not be required during the Elimination Round.
- Submissions will not be accepted under any circumstances after the published deadlines. Once the submission window is closed, teams cannot complete or claim points for these challenges.

CHAPTER 5

SCORING CRITERIA

Marking Point / Description	Unit Score	Max Score
Pre-Competition Challenges 5 challenges released after registrations close scored per published rubric	20 per challenge	100
Task 1 (Physical) AprilTag Read – Successfully detect and read each of the 8 Task 1 wall AprilTags	10 per tag	80
Task 1 (Physical): AprilTag Decode Correctly decode each Task 1 tag into valid Order ID, X, Y (after applying correct key selection + decoding function)	5 per tag	40
Task 2 (Physical): Cube Collection + Storage Pick each red cube and place it into the robot's designated storage location (6 cubes)	20 per cube	120
Task 2 (Physical): Behind-Cube Tag Decode After removing each cube, read and correctly decode the AprilTag behind it (6 tags)	5 per tag	30
Task 3 (Physical): Tube Insertion Successfully insert cubes into the transparent tube (max 3 cubes)	60 per cube	180
Task 3 (Physical): Proximity Switch Activation Proximity switch is activated ***only by cube(s)*** (no direct contact with switch)	20 once	20

Simulation: Waypoint Arrival Ares reaches each decoded coordinate point (14 points) and provides a clear visual arrival indication	25 per point	350
Simulation: Correct-Order Bonus Additional score for reaching each coordinate ***in correct order*** (only counts if sequence is correct up to that point)	5 per point	70
Simulation: Portal Reached Ares reaches the Portal (Blue Square)	10 once	10
Hidden Challenge	Up to 150	150
Mission Completion + Time Efficiency Awarded only if final completion condition is met (both robots at end squares and indication LEDs lit simultaneously : refer below)	Up to 100	100
TOTAL (Maximum Achievable)		**1250**

Mission Completion + Time Efficiency (100 points)

Awarded only if the run is completed (LED sync condition met):

- **Completion confirmation**: 20 points (once)
- **Time score**: up to 80 points, based on the percentage of the official time limit, **12 minutes for a single run:**
  - ≤ 50% of T_limit → 80
  - 50–70% → 60
  - 70–85% → 40
  - 85–100% → 20
  - 100% → 0 (time score)

Penalties (Deductions)

Penalty Condition	Unit Penalty	Max Deduction
Hostile-agent detection / Collision event Ares is inside the 1 cell detection zone when the hostile agent crosses its path	-20 per event	-200
Direct contact with proximity switch Robot touches/presses the switch directly (instead of using cube insertion)	**Task 3 Proximity score = 0** and −50	-50
Exceeding time limit Robot continues after the game-play time limit (25 minutes)	**No time score** (already enforced) +(−10 per every 30s)	-100
Damaging / displacing arena elements (walls, platforms, tube assembly)	-25 per incident	-100
False visual indication (claiming waypoint arrival without meeting arrival criteria)	-5 per incident	-50

CHAPTER 6

ROBOT SPECIFICATIONS

- The robot's dimensions must **not exceed 25 cm x 25 cm** (width x length) at the start of the competition, and this will be verified before the first round by placing the robot inside a 25 cm x 25 cm box.
- During operation, extensions that temporarily exceed the initial size constraints are allowed to be deployed; however, these extensions must retract to remain within the given dimensions when the robot starts at the starting square. There are no limitations on the robot's height.
- Cameras mounted on the robot must **not be positioned higher than 20 cm from the lowest point of the robot**. In effect, no camera should exceed the wall height of 20 cm.
- The robot should be completely autonomous. Any remote control would lead to the disqualification of the robot.
- The robot should be powered with an internal power supply with a supply voltage not exceeding 24V. The final unit, including the power source, should be within the dimensions specified above.
- The robot must be built entirely by the team members. Therefore, no off-the-shelf Lego kits or assemblies are allowed except for the readymade processing boards, sensor modules, drive gears, arm/gripper, and other electronic modules.

- The robot should not cause any damage to the platform (arena). Any damage to the arena leads to disqualification. If the judges feel that a robot has a high risk of damaging the arena, they can deny the attempt.
- The robot should be activated using a single start switch placed on the robot itself. Therefore, the robot should have a simple starting procedure.
- The starting procedure of the robot should not involve giving the robot any manual force or impulse in any direction.
- The robot should be able to operate under provided lighting conditions.
- The robot cannot transform into two robots during game play and robot should not leave any of its components behind in the rest of the arena.

CHAPTER 7

RULES AND REGULATIONS

General

- All teams must submit their robots to the organizers 15 minutes before the start of the first round. The hidden task will be revealed only after all teams have submitted their robots. Any team that fails to submit its robot before the hidden task is revealed will be automatically disqualified.
- After the hidden task is announced, each team will receive its robot back for a 60-minute preparation period. At the end of this period, the robot must be returned to the organizers' table within 2 minutes.
- During the **60-minute preparation period,** teams must configure the robot's network interface to connect to the provided Wi-Fi access point and be configured to communicate with the cloud-hosted simulator server using the provided server hostname and connection details while programming and testing the hidden task.
- While programming, team members are strictly prohibited from seeking external assistance, either in person or through any communication platform. Internet browsing is permitted; however, the use of AI chatbots or Large Language Models (LLMs) is strictly forbidden. The organizers will monitor participants closely, and any violation of these rules will result in immediate disqualification.

- There won't be any arena changes once the round has started.
- The contestants must be prepared to start within 5 minutes after the call. If not, the attempt is lost.
- A team should place the robot entirely inside the starting square at the start of their run. When the judges give the signal, the robot can be switched on. From then on, the robot should navigate autonomously. The contestants should not manually alter the orientation of the robot during the gameplay. In addition, the contestants should not communicate with or control the robot during an attempt.
- A maximum of 3 attempts are allowed in a single round.
- For scoring purposes, each attempt has a reference **time limit of 12 minutes**. Teams may continue an attempt beyond 12 minutes. However, no timing bonuses will be awarded for doing so.
- Each team is allocated a **maximum 25-minute gameplay period**. All attempts must be completed within this period. If the robot exceeds the 25-minute limit, it will be removed from the arena.
- Program or hardware modifications of the robot are not allowed within this 15 minute.
- The clock will not be paused during attempts. Total time from starting the robot to final completion indication will be considered.

Calibration

- A 5-minute calibration period is provided before the 25-minute gameplay session.
- As the challenge primarily involves computer vision–based tasks, small sections from each task area may be made available to contestants for calibration. If additional areas are required, teams may request access from the organizers. Such requests will be considered only with judges' approval and if deemed genuinely necessary for calibration.
- Calibration must be performed solely through external adjustments to the robot. Program modifications and hardware replacements are strictly prohibited during this period.
- A team may request to begin their first attempt before the calibration period ends. In that case, the 15-minute gameplay timer will start immediately, and any remaining calibration time will not be added to the gameplay duration.
- If a team exceeds the 5-minute calibration period, the extra time used will be deducted from the total 25-minute gameplay time.

CHAPTER 8

TEAM COMPOSITION AND ELIGIBILITY

- A team can have a maximum of 5 members and a minimum of 1 member.
- Undergraduates from different state or private universities can form a team, but the team should register under one university name.
- Each team member should be under 28 years of age to be eligible to compete, and one undergraduate can only represent one team.
- All team members should be registered or selected to register as undergraduates of any state or private university in Sri Lanka at the time of their participation in the competition.
- All the team members should have a valid document to prove their eligibility to participate in the competition.
- Multiple teams could compete, representing the same university, but one team can only submit one robot.
- Violation of the above conditions would lead to disqualification.

CHAPTER 9

ELIMINATION ROUND

- For the Elimination Round, only the physical arena segments for Task 2 and Task 3 (Figure 17) will be provided, and only physical-arena tasks will be evaluated (the Simulation Arena task will not be tested).
- In the Task 2 segment, all 6 platforms will be available, and no AprilTags will be used.
- To qualify, the robot should **start from the White Square** and must **pick at least 1 cube** from Task 2 and successfully **insert at least 1 cube** into the Particle Laser / transparent tube in Task 3 in accordance with the Task 3 completion criteria.
- A total of **12 teams** will advance to the Final Round.
- Each team will be allotted **15 minutes for calibration and arena trials**, and a maximum of 3 attempts will be permitted.
- In case of a tie, the ranking will be determined based on completion time, and if still unresolved, the final decision will be made by the panel of judges.

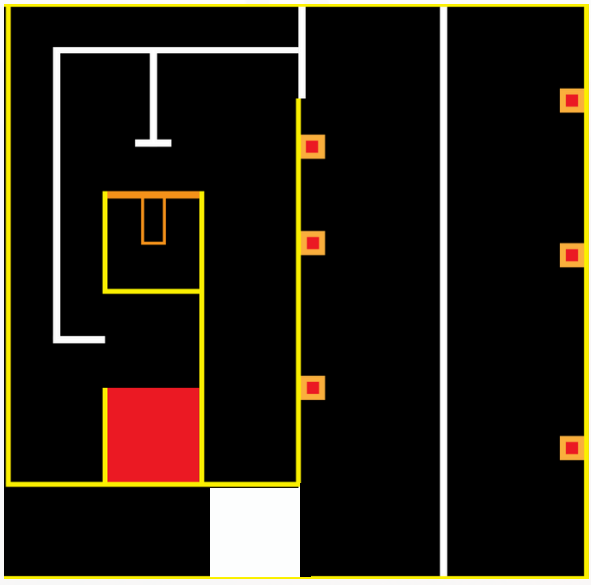

Figure 17 - Elimination round arena

CHAPTER 10

JUDGING AND COMPLIANCE

- Each team member may be questioned about their robot. Every member should clearly understand and be able to explain the robot's working principles and mechanisms. There would be an immediate disqualification of defaulters of any kind.
- Judges are granted full access to inspect the robot codebase during the competition, including the implementations of the hidden task and all other challenges.
- No timing bonus will be given unless the robot completes the task.
- If the robot is not performing well, the judges may ask to stop the current attempt. However, the team will still be given all **3 attempts**. If this happens in all 3 attempts, the total run time of **25 minutes may not be allowed**.
- The decision of the panel of judges will be the final decision.

CHAPTER 11

CONTACT DETAILS

Kiran Gunathilaka
+94 70 348 2664

Special Note

- Please don't assume anything about the task or the arena if it is not specified in this document. Contact us if you need any clarification.
- This is **version 1.0** of the task document. Please be updated on the **WhatsApp channel** **https://whatsapp.com/channel/0029Vb60iUl47XeHJwGN5Z2m** and the **SLRC website** **https://ent.uom.lk/slrc/** for further updates.
- The simulation arena and the documentation will be provided to contestants within the first week of the task release, along with an updated version of this task document.