RC -- AI Targeting Challenge

Revised on 2025.11.15

Introduction: Within a specified time, the robot starts from the starting area and sequentially completes three intelligent tasks: achieving autonomous navigation through path planning, identifying and precisely striking designated targets, and collecting resources and transporting them to a designated camp. This comprehensively tests the robot's perception, decision-making, and execution capabilities.

A. Junior

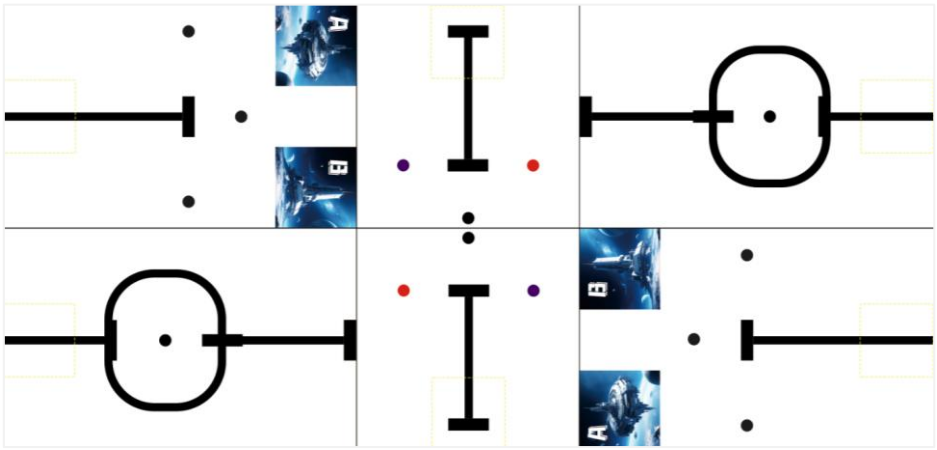
B. Senior

1. Field Setup

1.1 Field Example

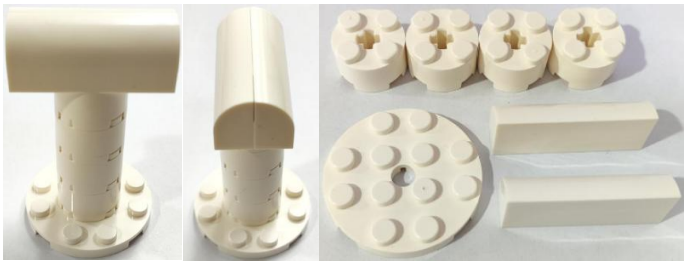
A. The competition field measures 120cm * 240cm, with a border width of approximately 5cm.

B. The competition field surface area is 110cm * 230cm.



*The field example is for reference only.

1.2 Prop Stand Examples

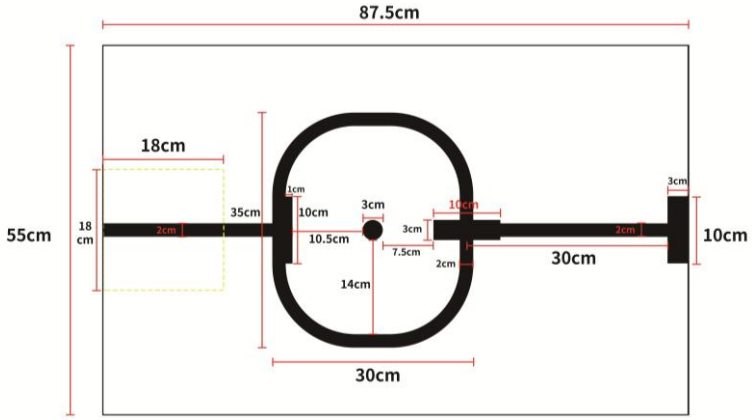


*The prop examples are for reference only.

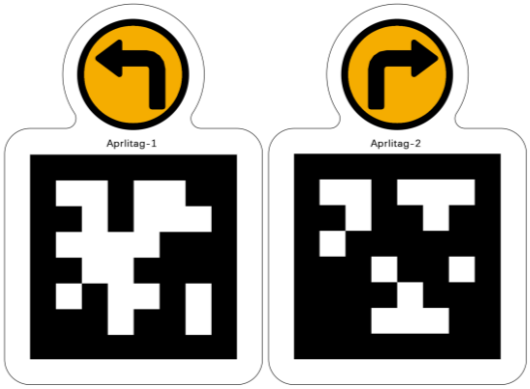
1.3 Task Descriptions

1.3.1 Path Decision

A. Field example (dimensions ±2cm).



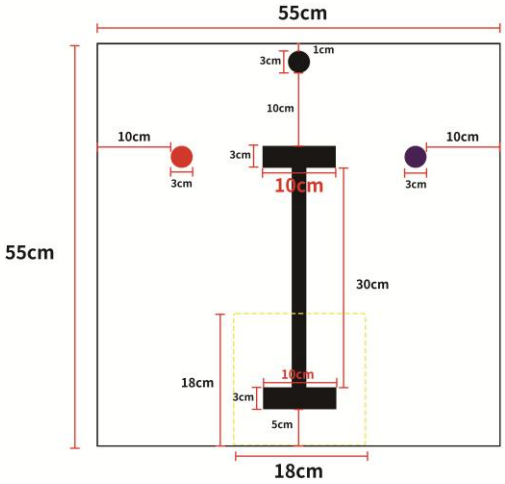
B. Prop Card Examples.



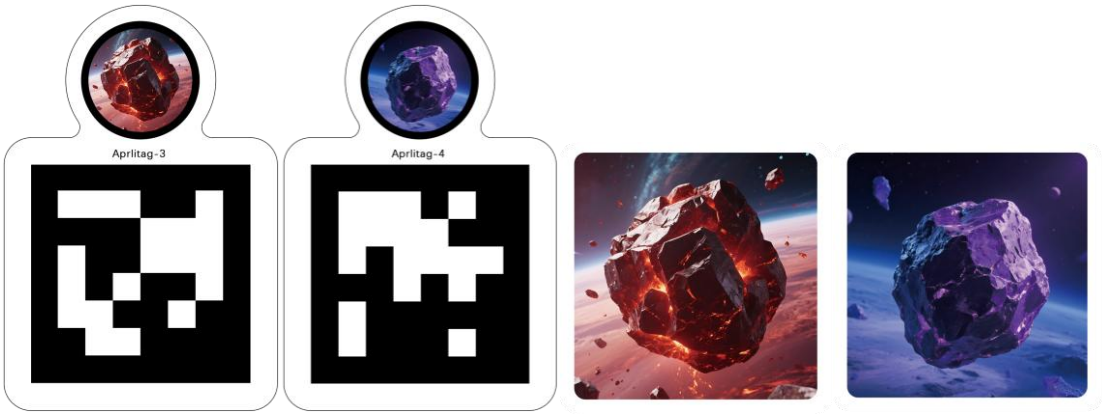
C. The robot starts from the starting area. Upon arriving at the task point, it scans a code to make a path decision. It navigates according to the prop card's instruction until it reaches the other side and stops. This is considered task completion.

1.3.2 Meteor Interception

A. Field example (dimensions ±2cm).



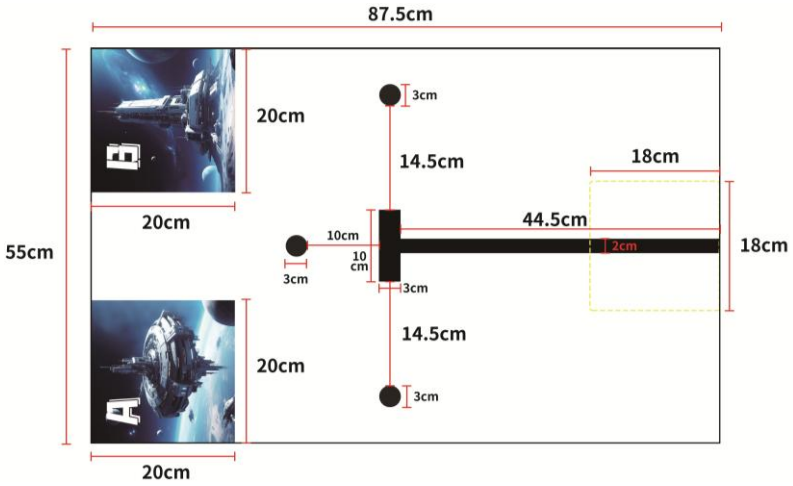
B. Prop Card Examples.



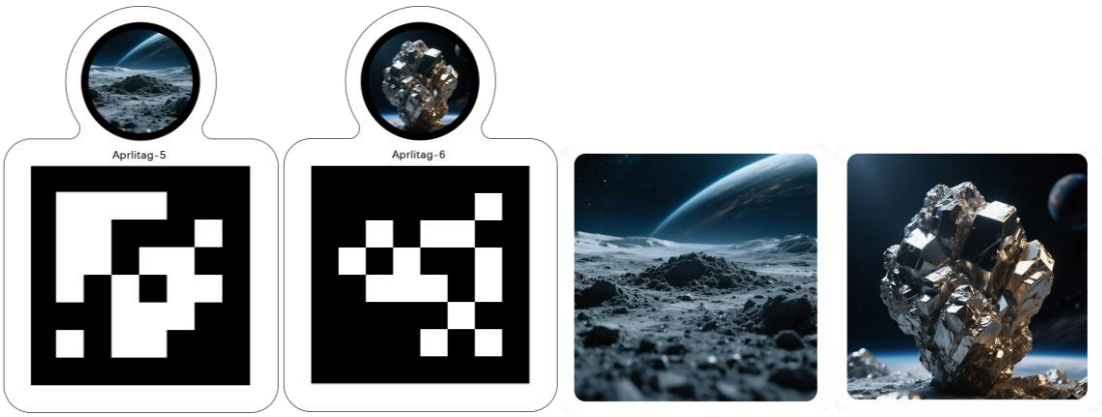
C. The robot starts from the starting area. Upon arriving at the task point, it scans a code to determine the interception target. It performs the meteor interception according to the prop card's instruction. After interception, it returns and stops with the robot entering the starting area. This is considered task completion.

1.3.3 Resource Collection

A. Field example (dimensions ±2cm).



B. Prop Card Examples.



C. The robot starts from the starting area. Upon arriving at the task point, it scans a

code to determine the collection target. It performs resource collection according to the prop card's instruction. Soil is transported to Camp A, and Ore is transported to Camp B. The collection process must involve a grasping action, and the placement process must involve a releasing action. This is considered task completion.

2. Equipment Requirements

A. Participating teams must bring their own equipment and computers.

B. Battery capacity: 7.4V 2000mAh. Robot dimensions (L×W×H): 18cm × 18cm × 18cm.

C. Main processor: ESP32-S3R8, external 32MB NOR FLASH. Co-processor: STM32F103VCT6.

D. The launcher and manipulator used for robot expansion must use a 4P Grove standard interface, with I²C communication signal type.

E. Robots must use their own camera to recognize AprilTags on prop cards. The referee will check the program for confirmation. Camera requirement: OV2640 2-megapixel.

3. Competition Rules

3.1 Competition Process

A. Random grouping before the competition. Teams draw lots sequentially to determine the navigation direction for Path Decision, the target for Meteor Interception, and the exploration content for Resource Collection. The referee records all teams' draw results in the score sheet. Teams sign for confirmation and record their own draw results. The draw is conducted once, and the same tasks apply for both rounds.

B. Based on their assigned tasks, all teams simultaneously begin programming. The referee times 30 minutes for programming, testing, and program downloading. Teams must not debug or download programs again after the time ends.

C. If all teams finish within the specified time, and with the consent of all teams, the referee may end the practice time and officially start the competition. If some teams haven't finished within the specified time, they must stop debugging when time ends, and the competition officially starts.

D. The competition consists of 2 rounds, with a break between rounds.

3.2 Rule Specifications

A. Teams must execute the tasks in order: "Path Decision," "Meteor Interception," and "Resource Collection." They must not skip or reverse the order. Each task

has only one attempt. The robot is considered to have used an attempt when its vertical projection crosses the starting area boundary.

B. At the start, the robot's vertical projection must be entirely within the starting area (i.e., within the yellow line box). Once a team starts a task during their turn, they cannot interrupt it. There is one attempt per round.

C. After the robot starts, team members must not manually intervene until the robot completes the current task and stops on its own. After the referee signals, manual adjustment of the robot's position to start the next task is allowed. If the robot completely veers off course and touches another area of the field, the referee has the right to stop the robot promptly.

D. Teams start their robot upon the referee's command, beginning the competition and starting the timer simultaneously.

E. Each of the three tasks per round has a maximum time limit of 180 seconds. If a team exceeds this time, the referee will stop them, recording the score for completed tasks and setting the time to 180 seconds.

F. If a robot fails a task, the team may signal the referee to abandon the current task. Upon confirmation by the referee, they may manually adjust the robot to proceed to the next task. If abandoning the last task, the referee stops the timer. The abandoned task scores 0 points.

G. Observe competition etiquette. Treat all participating teams amicably and respect the referees' decisions. Serious arguments, fights, or other misconduct may result in disqualification. The final score is subject to the referee's decision, and the referee holds the right of final interpretation.

4. Scoring Criteria

4.1 Scoring Rules

A. Task 1, Path Decision completion: 30 points.

B. Task 2, Meteor Interception completion: 40 points.

C. Task 3, Resource Collection completion: 50 points.

D. At the end of each round, the referee records the score and the time taken.

4.2 Score Table

Judge Item	Value	Points	Score
1. Path Decision Completed	0 (N) 1 (Y)	30	
2. Meteor Interception Completed	0 (N) 1 (Y)	40	
3. Resource Collection Completed	0 (N) 1 (Y)	50	
	Total Score		
	Remaining Time		

4.3 Ranking Rules

A. The sum of the scores from two rounds constitutes the final score. The recorded time for the final score is the time taken for the single round with the highest score. If the scores of two rounds are the same, the shortest time among them is recorded.

B. The total score sum is the primary criterion. If two teams have the same final score, the team with the higher single-round score ranks higher.

C. If single-round scores are the same, the team with the shorter time taken ranks higher.

5. Statement of Objections

A. No objections shall be raised against the referee's decision.

B. In the event of any misunderstanding during the execution of these rules, the team captain may raise an objection with the referee.

6. Flexibility of Rules

A. These rules shall be sufficiently flexible to accommodate changes in the number of participants and the competition content, provided that the concepts and fundamentals of these rules are adhered to.

7. Liability

A. Participating teams are always responsible for the safety of their robots and for any accidents caused by their team members or machines.

B. RobotChallenge Organization and organizing personnel shall not be held responsible for any accidents caused by participating teams or their equipment.