



RCAP  
2022

Middle Size League Rules and Regulation

# RoboCup Asia-Pacific 2022



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community together

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# Middle Size League Rules and Regulation for RoboCup Asia-Pacific 2022

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## 1. General

The match will be held by demonstrating the robotic abilities of each competing team and will be watched by judges and other members online. Basically, MSL RoboCup Asia-Pacific 2022 applies the rules that apply in MSL RoboCup such as robot size, ball size, how to dribble, how to score goals, etc. as far as possible to comply with the main rules. The details of the match are explained in the following description.

## 2. Robots

The robots used in Middle Size League RoboCup Asia-Pacific 2022 are the same robots used in the MSL RoboCup:

- **Number of robots:**
  - Two, namely Robot 1 (R1) and Robot 2 (R2)
- **Robot type:**
  - Attack robot
- **Robot size, weight, and shape:**
  - The projection of the robot to the floor is a minimum of 30cm x 30cm and a maximum of 52cm x 52cm.
  - The minimum height of the robot is 40cm and the maximum is 80cm.
  - If the height of the robot is more than 60cm, then the robot part that is above 60cm from the floor must fit into a 25cm diameter cylindrical chamber.
  - Robot's maximum weight: 40kg.
  - Robot form: free.
  - Robot color: black.
- **Robot identity**
  - The markers are clearly colored with the words "**R1**" for Robot 1 and "**R2**" for Robot 2. The background color is **cyan** for Robot 1 and **magenta** for Robot 2.
- **Robot control**
  - The robot must be able to be controlled remotely using a Wi-Fi connection. So that in one network there is a control computer (base station) and two robots.
  - After the game starts, the robot cannot be controlled, but must be able to operate autonomously to find, dribble, pass and kick the ball.
  - The robot must be equipped with a dribbling and kicking mechanism so that when dribbling the ball, the ball does not lift and must rotate naturally and only a third of the ball may enter the robot.
  - When catching the ball, half of the ball may enter the robot for one second.

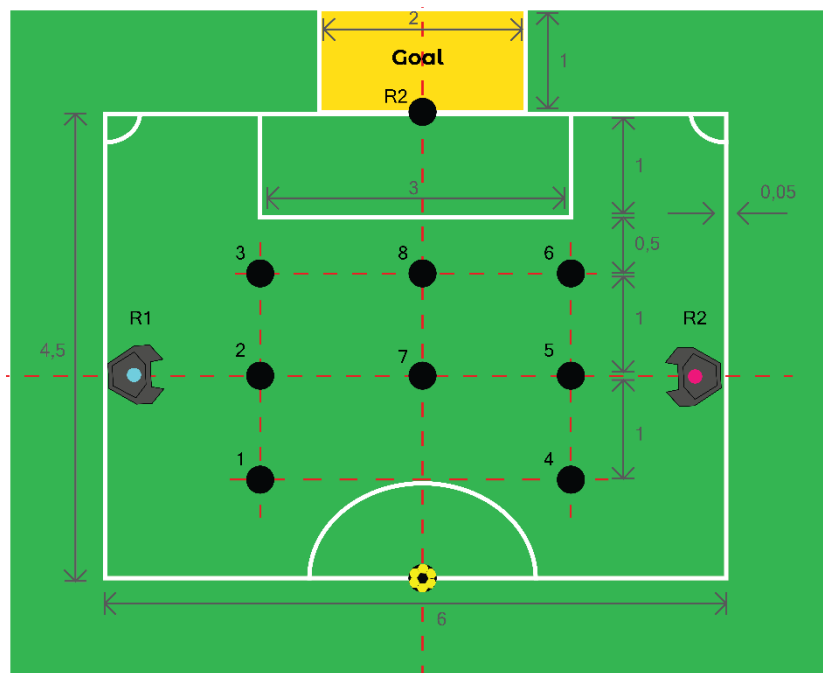


**Figure 1.** Robot with magenta for R1 (a) and cyan for R2 (b)

### 3. Field

The field and match equipment must be provided by each competing team.

- The playing field can be made using a plain floor or carpet (not necessarily green) with light colored lines and contrasting with the color of the field (preferably white).
- Line size should be at least 4.5-5cm wide (like duct tape).
- The size of the starting box is 75cm x 75cm.
- Field side guards may or may not be installed.
- Field sizes are shown below:

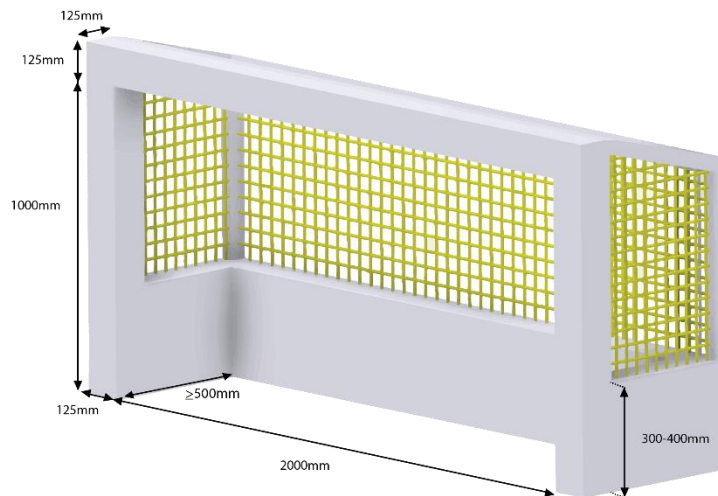


**Figure 2.** Field format and size

### 4. Goal

The goal must be sturdy so that it does not fall or move if it is hit by a ball or robot. If the goal is knocked down by the ball and a goal is scored, the goal is considered

invalid. The goal must have a net or similar so that it can be determined whether the ball goes into the goal or not.



**Figure 3.** Goal format and size

## 5. Dummy Robot

Dummy robots are block-shaped objects that are simulated like opposing robots that block or make it difficult for the robot to kick the ball. The minimum and maximum size of the dummy robot is the same as the size of the real robot. The size of the dummy robot for goalie can have a maximum height of 90cm. There are 2 attacking dummy robot and 1 goalkeeper dummy robot on the field. All three will be placed in a random position which will be drawn before playing. The color of the dummy robot is black. Robot markers "R1" and "R2" on the dummy robot can be installed or not installed.

## 6. Match Concept

The following is the match concept used in the 2022 Asia-Pacific Middle League RoboCup.

- The competition will be held in 2 (two) rounds. The first round (qualification round) consists of 2 (two) sessions, the second round (final round) only consists of 1 (one) session

### **Qualification 1 → Qualification 2 → Final.**

- In each session, the matches will be held as follows:
  - Each team will show their robot performance for 3 (three) minutes.
  - Each session begins with a draw for the configuration of the dummy robot's position on the field. Then the dummy robot is placed in the appropriate place by the competing team members.
  - After the dummy robot and real robot are placed on the field, all team members must leave the field.
  - If the team is ready to play, team members can notify the judges by saying "ready".
  - After the judges know the readiness of the players, then the judges will give a signal and immediately start the timer.

- The robot can be started from the control computer (base station) and score as many goals as possible.
- The game ends when the 3 (three) minute timer is up.
- If something goes wrong with the robot, the player can retry by saying "retry" and return the robot to the start box. Then the team can immediately continue the match.
- The scoring mode will be explained as follows. The idea of this game is a tiki-taka style of human play. In 1 (one) game session, the robot is required to perform 3 (three) modes of passing sequences **sequentially** and **repeatedly**:
  - ✓ Right-side kick-off: R1 → R2 → R1 → R2 → Dribble → (R1) → Goal
  - ✓ Left-side kick-off: R2 → R1 → R2 → R1 → Dribble → (R2) → Goal
  - ✓ Corner-kick: R2 → R1 → R2 → (R1) → Goal
  - **Right-side kick-off:**
    - R1 goes to the ball, then passes to R2.
    - R2 must be able to catch the ball while R1 move at least 1m closer to the goal.
    - R2 passes to R1.
    - R1 must be able to catch the ball while R2 move at least 1m closer to the goal.
    - R1 passes to R2.
    - R2 dribbling the ball at least 2m in any direction.
    - R2 kick the ball to the goal directly or can be passes to R1 one more time so R1 can kick the ball to the goal.
  - **Left-side kick-off:**
    - R2 goes to the ball, then passes to R1.
    - R1 must be able to catch the ball while R2 move at least 1m closer to the goal.
    - R1 passes to R2.
    - R2 must be able to catch the ball while R1 move at least 1m closer to the goal.
    - R2 passes to R1.
    - R1 dribbling the ball at least 2m in any direction.
    - R1 kick the ball to the goal directly or can be passes to R2 one more time so R2 can kick the ball to the goal.
  - **Corner-kick:**
    - R2 goes to the ball, then passes to R1.
    - R1 must be able to catch the ball while R2 move at least 1m closer to the goal.
    - R1 passes to R2.
    - R2 kick the ball to the goal directly or can be passes to R1 one more time so R1 can kick the ball to the goal.
- The robot must complete the modes in the following order: **Right-side kick-off → Left-side kick-off → Corner-kick → Right-side kick-off → Left-side kick-off → Corner-kick → so on.**
- Switching from each mode can only be done after scoring a goal in the previous mode. Switching modes can be done directly without waiting for the judge's signal.

- If the ball goes out of field, or something else happens then this is called a **dead ball**. When a **dead ball** occurs, the team must retry in the **same mode**.
- During the retry, the robot can be lifted and positioned manually. Team members who may enter the field are a maximum of 5 (five) people. When ready, team members must say "retry" and can continue the game.
- Dead ball conditions:
  - A valid or invalid goal.
  - A violation has occurred.
  - Ball is out of the field.
  - The robot does not move for more than 5 (five) seconds, and the team members request a retry.
- Valid goals:
  - Goal is scored according to the mode order.
  - Goal is scored from outside the penalty box.
  - Goals are not scored from body reflections of other real robots or dummy robots.
  - Goal is scored from the bounce of the goalkeeper robot.
  - The ball crosses the goal line completely.

## 7. Violation

If the following conditions occur, then the robot is considered to have committed a violation and must retry. Some of these conditions include:

- The robot failed to catch the ball that was passed.
- The passing robot does not move from its position.
- When dribbling the ball, the ball lifts or rotate unnaturally.
- The distance between attacking robot is less than 1m.
- Robot is not started remotely.
- Team members enter the playing field or touch the robot without giving a "retry" signal.

## 8. Penalty

The following penalties will be imposed on the team that violates the rules. These penalties include:

- A penalty of 0.25 points is awarded for every dummy robot touched by the attacking robot.
- A penalty of 0.25 points is awarded for each robot that cannot receive a pass.

## 9. Media Setup

Competing teams must be able to provide multimedia equipment to broadcast and receive audio/video online. The type of camera that can be used is not specified if the image can be seen clearly. Cameras and audio equipment must be positioned so that they meet the following requirements:

- All field boundaries must be visible so that it can be seen whether the ball has left the field or is still in the field.



- The goal must be visible as it can be seen whether a goal has been scored.
- The control computer (base station) must be visible so that it can be ensured that the keyboard is not being held during the game.
- The judge's voice is clearly audible to all team members and is tuned so that there is no echo or voice feedback.



**Figure 5.** Example of a correct view: all lines, computer and goal seen. The part that is not visible must be visible from the other camera.

## 10. Winner Determination

The winner will be determined as follows:

- Scores in qualifying round 1 and qualifying round 2 will be added up and ranked to determine which team will compete in the final round. If there are not enough teams playing, the winner is determined by adding up the qualifying scores 1, qualifying round 2, and final round (all teams will compete in the final round).
- Only teams ranked 1 (one) to 8 (eight) will compete in the final round.
- Scores in the final round will be ranked to determine the winner.
- If the 8th, 9th, and 10th ranked teams have the same score, then the three players will compete in the final round. And so on.
- In the final round, all goals scored from the previous session do not count.

- The team with the highest goal score from the final round match will be the 1st, 2nd, and 3rd winner.
- If the scores are the same, then the winner is the team that scores the first goal the fastest.
- If there is still the same score, then the winner is the team with the fewest fouls.
- When participants are less than or equal to 4 (four) then the match will go straight to the final round.

## 11. Judge's Decision

The jury's decision is explained as follows:

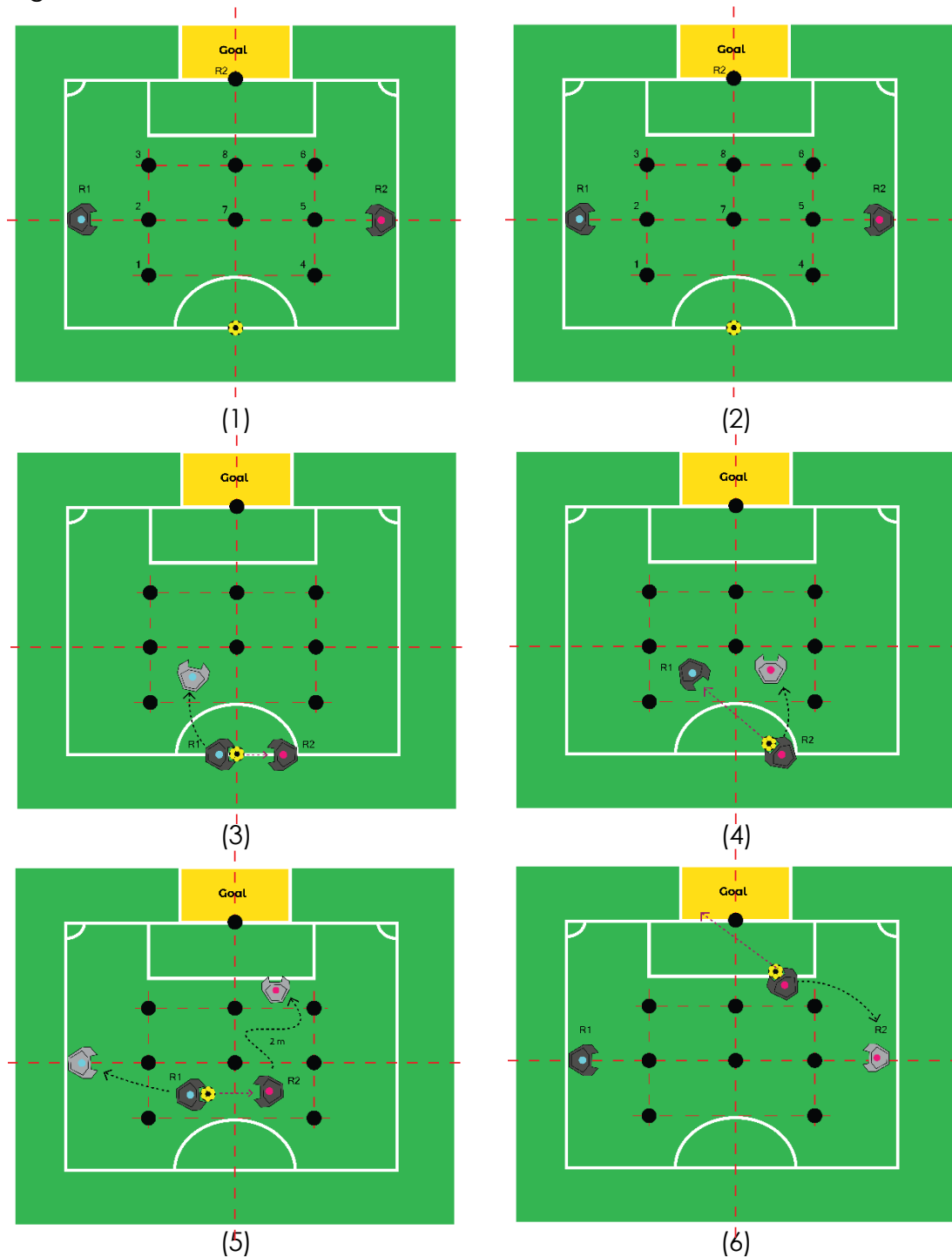
- The jury's decision is only based on monitor observations from cameras in the field. Therefore, the image on the camera must be clear and can cover the entire game area.
  - In the event of any event other than those described in this rulebook, the jury's decision shall prevail and with the agreement of all competing teams.
  - The judges' decision will be final.
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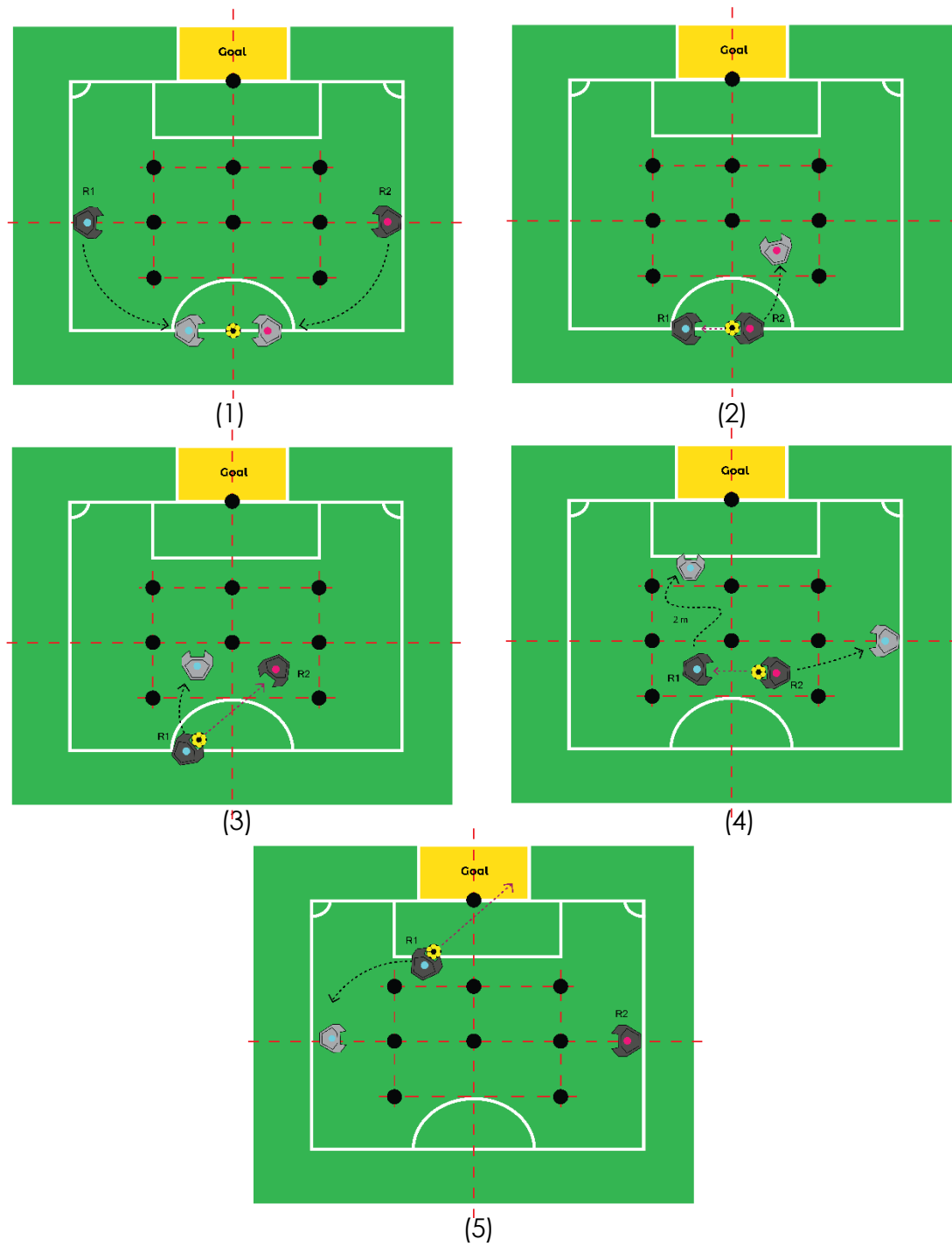
## Match Set-up and Position before retry

The example of match concept is explained as follows:

- Right-side kick-off:



- Left-side kick-off:



- Corner-kick:

