



**ASIAN
ROBOTICS
LEAGUE**

**The third annual
Asia-pacific region
robot tournament
– BDS robotic
basketball
competition rules**

Version number. 1.1

The third annual Asia-pacific region robot tournament–BDS robotic basketball competition

Objective: By using cutting-edge IT technology, the game simulates basketball games through autonomous robots. It evaluates the players' comprehensive practice capability of controlling robots, which aims to motivate teenagers to devote themselves into science, engineering and problem-solving cases, and enrich their knowledge of scientific sports.

Players: High-school students and primary school students

Rules of Competition

1. Overview of Competition

In BDS robotic basketball competition, players must construct robot device and controlling program according to the BDS Robotic Basketball Competition Rules. So, the robots can compete in certain designated arenas by both autonomously control and driver control.

2. General Description of Competition

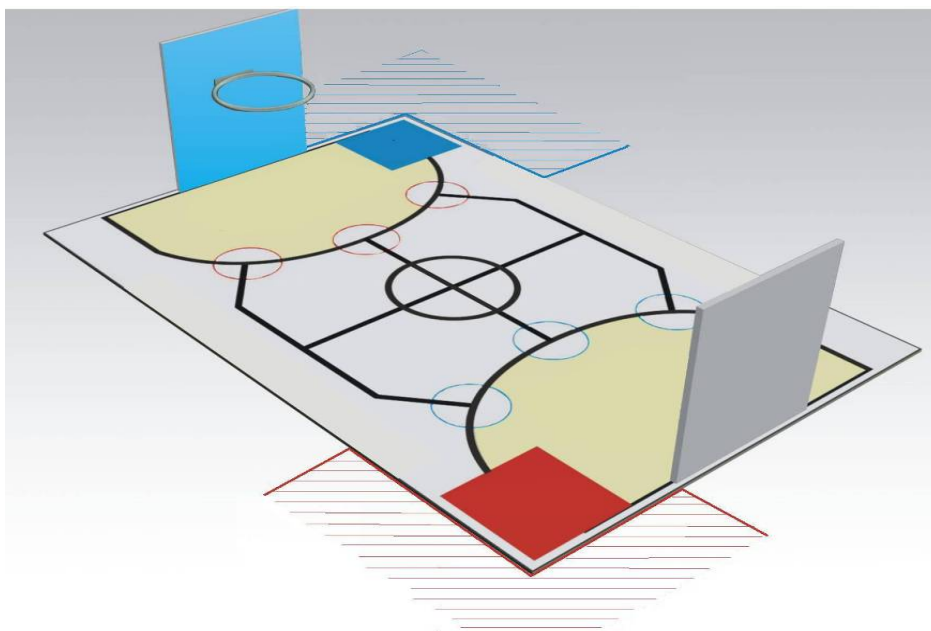
In any games of the robotic basketball competition, one robot from both Red and Blue team will go through autonomous event and driver controlled event respectively. The robot will start from red or blue starting zone, and then move to the designated shooting zone. The object of the game is to attain a higher score than opponent team by shooting more balls into the hoop from the designated shooting zone within a certain time.

3. Arena & Environment

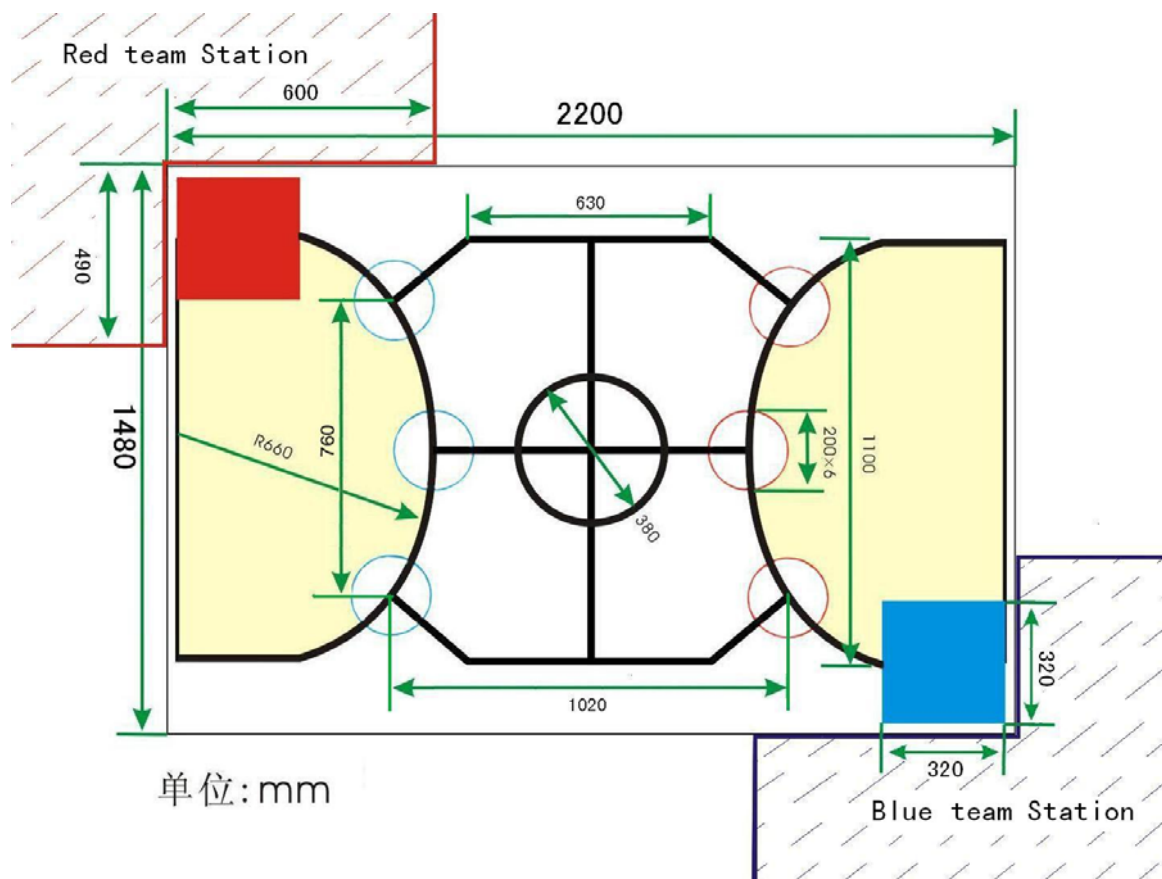
3.1 Overview

The games are played on the field within the dimension of 2200mm * 1500mm, as shown in Picture 1

Picture 1



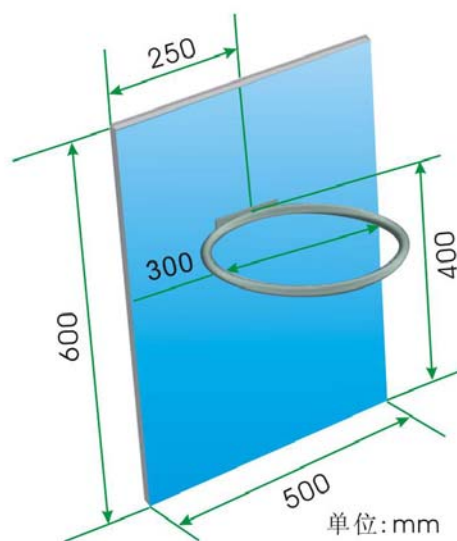
Picture 2



3.2 Arena

3.2.1 The field is covered by venue matte paper, with a 600mm-high backboard at the both sides. In the middle of each board, sets a hoop with radius of 300mm at 400mm height. (As shown in Picture 3)

Picture 3



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- 3.2.2 The field marks 200mm-wide black guide lines. It is all refer to the midline of the guide line whenever the following rules mentioned “black line”.
- 3.2.3 The starting zone for red or blue team is respectively a red or blue square area with the dimension of 320mm long by 320mm wide. (Colored area as shown in Picture 2)The designated hoop which the red team should shoot into is the one at the same side of the red starting zone; similarly, for blue team, the designated hoop should be at the same side of the blue starting zone.
- 3.2.4 The shooting zone for red or blue team is respectively 3 red or 3 blue circles with a diameter of 200mm.The red team should shoot from the red shooting zone into the blue team hoop while the blue team should shoot at the blue shooting zone into the red team hoop.
- 3.2.5 Each team station is outside the field beside the starting zone. It is an “L” shaped area within the dimension of 490mm wide, 600 mm long (shadowed area as shown in Picture 2). During the game, drivers are allowed to operate robots or preload balls only at their own team stations.
- 3.2.6 The balls played in the game are international standardized white ping pong ball with 40mm in diameter and 2.7 grams in weight.

3.3 Environment of Arena

The arena is cold-light, low illumination without magnetic interference. However, uncertain factors may exist: for example, field surface is loose or uneven, change of light conditions etc. All teams are strongly recommended to concern about these uncertain factors.

4. Definition

Driver Controlled Robot Event: event which all robots operate and react to players’ remote controller

Autonomous Robot Event: event when all *robots* operate and react only to sensor inputs and to commands pre-programmed by the team into the onboard *robot* control system. Human control or interaction with the *robot* is not permitted

Autonomous Period: A 60-second time period in which *robots* operate and react only to sensor inputs and to commands pre-programmed by the team into the onboard *robot* control system. Human control or interaction with the *robot* is not permitted

Driver: A student team member responsible for operating and controlling the *Robot*. Only two drivers are allowed per team on the field at any given time.

Driver Controlled Period – The 120 seconds time period in which the *robots* are operated by the drivers.

Game- A game consists of an autonomous period followed by a driver controlled period for a total time of 180 seconds

5. Game Rules

The opposed red and blue team will be randomly assigned by drawing, and compete

The third annual Asia-pacific region robot tournament–BDS robotic basketball competition in both autonomous robot event and driver control robot event. During two events, reasonable confrontation tactics are allowed.

5.1 Autonomous Period

5.1.1 Robots from red and blue team are allowed to pre-load 6 ping-pong balls at the maximum by players before they start off from their respective starting zones.

5.1.2 It is required for robots to precisely walk along “the black guiding line” from starting zone to the designated shooting zone in the field. During shooting, robots can’t leave the designated shooting zone. After shooting, robots can walk back to the starting zone autonomously, and reload 6 other balls to repeat preceding operation until the end. The autonomous time will be only 60 seconds.

5.2 Driver Controlled Period

5.2.1 Robots from both red and blue team are allowed to pre-load 6 ping-pong balls at the maximum by players before they start off from the starting zone.

5.2.2 It is required for robots to shoot balls from any of designated shooting zone, then “walk” back to the starting zone to load balls, and then “walk” to the shooting zone to shoot again. The driver controlled time will be 120 seconds

5.3 The designated shooting zone will be announced before the game. When referring to arrival of the designated shooting zone, it means part of robot’s perpendicular projection is within the colored (red or blue) boundaries of the shooting zone.

5.4 When referring to at the starting zone, it means part of robot’s perpendicular projection is in the boundaries of the starting zone, without direction requirement.

5.5 If the robot of red team shoots the ball into the red team goal during the game, the point should be scored to the blue team, vice versa.

6. Robot

There are specific rules and requirements for designing and constructing robots. All robots are required to pass full inspection before competition, which will ensure all rules and requirements are met.

6.1 Robots should be built by only official components from BDS robotic design system. To determine whether the parts are official or not, please consult www.bds-tech.com.

6.2 At the starting zone, the maximum allowed size for robot is 360*360*340. During the game, robots are not allowed to exceed to this size limitation. Robot should be the same one in both autonomous event and driver controlled event.

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6.3 Robots should be marked by the team number. For enhancing appearance and identifiability, robots can be decorated if it will not affect game.

6.4 There is no limitation for the number of microcontroller, motor, smart sensor and other mechanism components on any robot.

6.5 All robot parts should be firmly fastened. Any parts will be prohibited to fall off during the competition.

6.6 Dangerous components which may damage the field are prohibited.

6.7 Robots should start by only one action, e.g.: by pressing a button or turning on a switch.

6.8 Robots must have space to hold identification flag (flag won't be count in robot's size)

6.9 All robots in the game should use the 2.4GHz remote controller.

7. Game

7.1 Team

Every team should consist of two students and one coach (teacher or student) from the same primary school or high-school. The student status must be eligible until June 30, 2009

8 Scoring

8.1 The final score of each team will be the sum of autonomous event score and driver controlled event score. Team who attains highest score wins.

8.2 Scoring Rules

8.2.1 In autonomous event, scores are calculated by the goals, the times of entering into the shooting zone and the way of robot's startup.

The winning team: 5 points

The losing team: 0 point

In a Tie: 1 point each team

8.2.2 Every time when robots arrive at designate shooting zone is scored 1 point.

8.2.3 Each eligible ball in the goal is scored 1 point.

8.2.4 Robots start off by voice operated switch will be awarded for 1 bonus point, both autonomous event and driver controlled event count.

9. Violation & Disqualification

9.1 The first false start will be warned by the referee, while the second false start will result in disqualification for the entire game.

9.2 Intentionally detaching parts strategy during game is considered as violation of

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rules. Serious violation may result in disqualification for the entire game

9.3 Coaches are not allowed to make intentional contact with the robot, neither impact or disturb the referee. This violation will result in disqualification for the entire game.

9.4 Reasonable confrontation is the normal part of the game but should not be over 5 minutes each time. Otherwise, the offending team will decrease 1 point. If a team's fouls are already three times in a row, it will result in disqualification for the entire game

9.5 Disobedience of referee's instruction will result in disqualification of the entire game

9.6 Using mobile phone or other communication equipments in the preparation area or the competition area will result in disqualification for the entire game immediately without any exception.

10. Others

10.1 For any other behaviors that are not specified in the rules, Competition Referee Committee is given full authority to make the final decision.

10.2 Any explanation and amendments to the rules will be announced by the Competition Referee Committee