ROBOCON
National Robotic Contest
PUNE - INDIA

ABU ASIA-PACIFIC ROBOT CONTEST

ROBOCON

2017

PUNE - INDIA

THEME & RULES

"The Landing Disc"

ABU Asia-Pacific Robot Contest 2017 Tokyo

Host Organising Committee

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Figures and information on contest-related articles (Appendix) will be a separate file.

Preface

The rules provided in this Rule Book take inspiration from Japan's traditional game **Tosenkyo.**

The theme revolves around the word **"asobi"** (play), which is also a fundamental philosophy behind Robocon. In "asobi," playful, unique, original show of skills is often more important than winning or losing, as everyone – friend and foe alike – can applaud and enjoy them.

So, in the "asobi" spirit: we encourage playful, unique, original robot designs and strategies!

Looking forward to meeting fun robots with the "wow" factor!

The Importance of Safety

In ABU Robocon, safety is a top priority.

Participants shall give safety precedence over everything at all times, from the robot designing and building stages to taking part in the actual contest. They are also asked to cooperate fully with the organizer in order to ensure a safe running of the contest for everyone involved, including team members, spectators, officials, and staff, as well as for the surrounding environment.

Team members are required to wear shoes with rubber soles, helmets, and safety goggles at all times including practice and test runs, in addition to actual games.

Domestic Contests

All domestic contests held in order to select the representing teams that will participate in ABU Robocon 2017 Tokyo should adhere to the rules laid out in this Rule Book. However, it is understood that if (a) material(s) is/are not available, organisers are to employ the best possible replacement(s) available in their country/region.

Contest Dates

ABU Robocon 2017 Tokyo

19 August, 2017 (Sat.) ----------Test runs
20 (Sun.) ----------Contest
21 (Mon.) ----------Friendship Exchange

Venue: Ota-City General Gymnasium (Ota-ku, Tokyo)

Contest Rules

0. Terms and Definitions

Terms	Definitions
Robot	The robot that will throw the flying discs.
Flying disc	The flying disc to be used in the contest. Product name: Volley® Soft Saucer Colors: Red and Blue A team uses fifty (50) in each game. Abbreviation: Disc
Spot	The place to land the discs. On the field are seven (7) with different heights and areas. In the center of each is a hole with a diameter of 150mm. At the start of the match, a beach ball rests on each.
Beach ball	The beach ball (inflated diameter 30cm) on the spots. Seven (7) colors. Abbreviation: Ball
Start Zone	Zone from where the robot starts the game. Abbreviation: SZ
Loading Area	Area where the discs are placed. The robot loads the discs here. Abbreviation: LA
Throwing Area	Area from which the robot throws the discs. Abbreviation: TA
No Contact Area	Area which the robot cannot come in contact with. The robot is able to enter the space above. Abbreviation: NC

1. Contest Outline

1.1 Each game will be conducted between two teams, each with one (1) robot.

1.2 The game field is a rectangle divided into two sides for each team. (see Figures)

1.3 Each side consists of a Start Zone, Throwing Area, and Loading Area as seen in Figures.

1.4 On the field are seven (7) spots consisting of a circular table attached to a column with varying heights and areas.

1.5 Of the seven (7) spots, five (5) are placed along the center line dividing the sides, while the remaining two (2) are placed near to each side.

1.6 The heights and sizes of each spot are as shown in Figures.

1.7 At the start of the game, a beach ball rests on the center of all the spots.

1.8 The number of discs a team can use during the game shall be fifty (50) placed at the Loading Area.

1.9 After the start of the game, the team may load discs onto its robot when the robot reaches the Loading Area.

1.10 The robots of both teams may throw discs at any ball on any spot to knock the balls off the spots.

1.11 Scores will be counted when a team's disc lands on a spot where its ball has been knocked off.

1.12 When all the balls have been knocked off of their spot and a team successfully lands its discs on all the spots, that team reaches "APPARE!", and is declared the winner of the game.

1.13 If neither team reaches "APPARE!", and either both use up the fifty (50) discs or the game time of three (3) minutes passes, the game shall end. The winner will be decided by who has the higher score at the said end of the game.

2. Game Procedure

2.1 Set-up

2.1.1 Prior to each game, a one-minute set-up time is given to the teams through the signal from the referee.

2.1.2 The three (3) team members and up to three (3) pit crew members shall be allowed to participate in the set-up.

2.1.3 Each team shall commence set-up when the signal is given, and must stop when the one (1) minute is up.

2.1.4 If a team fails to complete its set-up within the given one (1) minute, it may resume set-up after the start of the game by obtaining permission from the referee.

2.2 Start of the game

2.2.1 After the end of set-up time, the game shall begin at the signal from the referee.

2.2.2 Teams that complete their set-up after the start of the game shall obtain permission from the referee at that moment to commence moving their robots.

2.3 Team members during the game

2.3.1 Team members are not allowed to enter the game field without permission from the referee.

2.3.2 Team members are not allowed to touch their robot other than after referee permission during a retry or disc loading.

2.3.3 If a team is controlling the robot manually, one (1) pre-registered operator may do so from the designated area outside the game field.

2.4 Handling of the discs

2.4.1 During the game, a team may load the discs when all parts of the robot touching the game field floor completely enter the Loading Area, and permission is given by the referee.

2.4.2 Team members may load the discs manually.

2.4.3 Jigs and containers such as magazines may be used during loading, but if these are to remain attached to the robot, they shall be included in the

robot size.

2.4.4 After loading, a team may restart after permission from the referee. Until then, no part of the robot may touch the floor outside the Loading Area. If a team is deemed to be in violation, the robot must return to LA for a mandatory retry.

2.4.5 The robot may throw discs only when it is in contact with the Throwing Area and no other area.

2.4.6 The discs for each team will be prepared by the organiser.

2.4.7 If a disc that was loaded onto a robot falls on the floor in or outside the game field during the game, that disc becomes invalid and can no longer be used.

2.5 Score

2.5.1 After the start of the game, a team is given the following points when its disc lands on a spot without a ball

1) The spot nearest to the team: 1 point, regardless of number of discs
2) The five spots aligned in the center: 1 point per disc
3) The spot farthest from the team: 5 points per disc

2.5.2 Points shall be given regardless of whether the ball is knocked off before or after that disc lands.

2.5.3 The score shall be finalized after the referee counts all the discs on the spots without their balls, after the end of the game.

2.6 End of the game

2.6.1 Once a team reaches "APPARE!", the game shall end in that instant.

2.6.2 The game shall also end if neither team reaches "APPARE!" and the game time of three (3) minutes passes.

2.6.3 The game shall also end if both teams use up the fifty (50) discs without reaching "APPARE!"

2.7 Deciding the winner

2.7.1 The winner shall be decided in the following order of priority:

1) The team who reaches "APPARE!"
2) The team with the higher score
3) The team with more points from landing on the farthest spot
4) The team with more spots from which they gained points

5) The team with a higher total score gained from the center spots
6) Judges' decision

3. Retries

3.1 A retry is allowed only after the referee gives permission upon request from a team member.

3.2 The team granted a retry shall immediately carry its robot to the Start Zone and begin work there.

3.3 A team may ask for as many retries as necessary.

3.4 A team may not load discs during a retry.

3.5 The team may use discs already loaded on the robot before the retry is granted.

3.6 The team shall restart after permission from the referee.

4. Violations

4.1 The team who commits the following shall be deemed to be in violation of the rules and subject to a mandatory retry.

4.1.1 The robot or a part of the robot comes in contact with the No Contact Area.

4.1.2 A team member touches the robot without referee permission.

4.1.3 A team makes a false start.

4.1.4 Any other acts deemed to be an infringement on the rules.

5. Disqualifications

5.1 If a team is deemed to have committed the following intentionally, the team shall be disqualified for that game.

5.1.1 Any acts that pose danger to the game field, its surroundings, the robots, and/or people.

5.1.2 Use of wind as obstruction, and any other activity that can be judged to have no other purpose than to obstruct the opponent.

5.1.3 Any act of disobedience against a referee's warning.

5.1.4 Any other act that goes against the spirit of fair play.

6. Teams

6.1 One (1) representing team from each country or region shall participate in ABU Robocon 2017. As the host country, Japan shall be represented by two (2) teams.

6.2 A team consists of three (3) team members who are students and one instructor, who all belong to the same university/college/polytechnic.

6.3 In addition to the abovementioned 6.2, three (3) members are allowed to be registered as the pit crew. The members of the pit crew shall also be students from the same university/college/polytechnic as those in 6.2. The pit crew may assist in the work in the pit area, in carrying the robot from the pit area to the game field, and during set-up.

6.4 Graduate students cannot participate.

7. Robot

7.1 Each team may bring one (1) robot only to participate in the contest.

7.2 The robot must be hand-built by students from the same university/college/polytechnic.

7.3 The robot may be fully automatic or controlled manually. It may be controlled wirelessly or by cable.

7.4 The robot must not split into parts during the game.

7.5 Robot size

7.5.1 The robot (excluding the controller and cable) must fit into the Start Zone at the start of the game, including the space above.

7.5.2 Throughout the game, the robot together with any containers used in disc loading shall not exceed length 1500mm x width 1500mm x height 1800mm.

7.6 Robot weight

7.6.1 The total weight of the robot, any containers that will be attached to the robot after disc loading, controller, cables, and any other equipment the team brings for use in the game must not exceed 25kg.

7.6.2 Back-up batteries (of the same type as that originally installed in the robot) are exempt.

7.7 Power source of the robot

7.7.1 Each team shall prepare its own power source.

7.7.2 All batteries used in the robot, controller, and any other device used during the game shall not exceed 24V.

7.7.3 The maximum voltage within the circuit(s) shall not exceed 42V.

7.7.4 Teams using compressed air must use either a container made for the purpose, or a plastic soda bottle in pristine condition that is prepared appropriately. Air pressure must not exceed 600kPa.

7.7.5 Any power source deemed dangerous may be banned from use.

8. Safety

8.1 The robot must be designed and built so as to pose danger to no one, including the team, the opposing team, the people in the surroundings, and the venue.

8.2 Safety rules

8.2.1 The use of the following are prohibited: lead-acid batteries (including colloidal), power sources that involve flames and/or high temperatures, anything that may contaminate the game field, as well as anything that may cause the robots to break down and/or create a situation that hinders the procession of the contest.

8.2.2 If laser is used, it shall be class 2 or less. Full care must be taken not to damage the eyes of anyone in the venue, from the design and practice stages.

8.2.3 Emergency stop buttons must be built on all robots.

1) Specifications: it shall be a red button on a yellow base.
It is recommended that teams adhere to ISO 13850, or JIS B 9703.
(JIS = Japanese Industrial Standard)

2) Placement: it shall be placed where it is easy to find and activate, so that team members or the referee can stop the robot immediately in an emergency situation. The referee and organisers will check to make sure the robot meets the safety requirements, and prohibit any team that does not meet them from participating.

Others

9.1 For anything not mentioned in this Rule Book, the teams are required to obey the decisions of the organisers and referees.

9.2 Dimensions, weights, etc. of the game field described in this Rule Book have a margin of error of plus or minus 5% unless otherwise stated.

9.3 Questions must be sent in through the contact page on the ABU Robocon 2017 official website, [aburobocon.net].

9.4 Any additions/changes to the rules will also be posted on the ABU Robocon 2017 official website [aburobocon.net]. News of the updates will be sent out via the Twitter account [@ABUrobocon2017].

9.5 For anything that has to do with the safety of the robots and/or the people in the vicinity, the teams are to obey the directions from the organisers and referees.

9.6 Transporting of the robots

9.6.1 The organiser shall arrange for the transport of the robots participating in the ABU Asia-Pacific Robot Contest 2017 Tokyo. Details will be given separately to each representing team.

9.6.2 For ABU Robocon 2017 Tokyo, the robot must fit inside a single box of length 1000mm x width 1600mm x height 14

Participants should take note in designing and building their robots to accommodate for this box size; its dimensions are smaller than that allowed for the robots during the contest.