ABU ASIA PACIFIC ROBOT CONTEST 2013
DANANG - VIETNAM

THEME & RULES

THE GREEN PLANET

ABU ROBOCON 2013 DANANG - VIETNAM

THEME & RULES

THE GREEN PLANET

SAFETY GUIDELINES FOR ABU ROBOCON 2013

FOREWORD

Safety is the most important issue to continue the Robot Contest to the future. Therefore every participant has a duty of developing robot safely. Besides an ethical aspect, keeping workplace safety will not only minimize the delay of robot development but also promote the completion of robot according to the schedule in case of accident. *(An accident could lead to discontinuation and/or delay of project due to workers' injury, investigation of the accident and implementation of the recurrence preventive measures)* Every participant in the ABU Robocon 2013 must conform to the 'Importance of Safety'of the Rulebook provided by the ABU Robocon 2013 Contest Committee and build robot under the sufficient safety measures.

OBSERVANCE OF A STATUTE

Every participant in the Robocon project who builds robot must observe the related laws, regulations and 'Safety and Health Guidelines' defined by the participant's university or equivalent regulations. Participants must develop, build and practice robot safely under the supervision and instruction of the university instructor. On the contest day, sufficient safety should be considered to the staff and the audience in the venue.

SAFETY MEASURES

Due to robot operator's operation mistake or by a reckless run of a control system or fracture of parts, the robot could stop, accelerate and turn suddenly causing the operator to collide with the robot's sharp parts (cut surface of the structure) or come into contact and be caught in the movable parts (such as gears) and crush the ambient environment. Therefore, in addition to following examples, please take necessary safety measures.

Proposals for measures (examples)

- ☆ As structural measures, securing front view, covering sharp parts or attaching cover to movable parts, should be considered.
- ☆ As personal protective measures, wearing helmet protective glasses, gloves and clothing which is not easily caught in the robot, etc., should be considered.
- ☆ As operational measures, placing emergency staff who can carry out emergency stop in addition to the operator, avoiding practice alone so that members can immediately respond to an accident, implementation of various checks, re-examination of practice environment, keeping the workplace clean and etc, should be considered.

Due to design mistake or reconstruction of the robot, over-current to a circuit, short circuit of the battery by a shock or a fire could cause a major accident. In addition to the following examples, please take necessary safety measures.

Proposals for measures (examples)

- ☆ As structural measures, re-examination of fuse, wiring of suitable thickness, attachment position and isolation from combustibles etc., should be considered.
- ☆ As operational measures, prohibiting disapproval reconstruction and using suitable battery charger etc., should be considered.
- ☆ In addition to above, various dangerous events could be triggered by the unique feature of each robot. Please take effective safety measures according to the characteristics of an individual robot.

OTHER

In addition to above, various dangerous events could be triggered by the unique feature of each robot. Please take effective safety measures according to the characteristics of an individual robot.

THE GREEN PLANET

The galaxy is vast and has experienced billions of years of collision and gravity attraction. Objects were thus formed and life began. The planet that is called **THE EARTH** has been chosen to nurture the seeds of life.

The first Ring that stirred to wake chose for itself the color Green - **the color of life.**

The green spreads from ancient woodlands to fields and plains, creating a soft, refreshing space that nourish the soul.

Along with economic development, people and their negative impacts have been causing the green to disappear on the planet. It is spreading like an epidemic, threatening the green planet and the life on it. Natural disasters, floods, climate change ... The nature is raging.

People's and individuals' awareness is the best vaccine to prevent the disasters that the Earth is having to suffer.

Vietnam has chosen the theme **THE GREEN PLANET** for the ABU Robocon 2013 with the message: "Each nation is a piece of the puzzle that forms the world; the responsibility to protect the earth thus lies on the shoulder of each person living on it.

Awareness and actions - that is what we need to sustain life in our common home **THE EARTH**".

QUICK GUIDE:

☆ Duration of the game is 3 minutes

☆ Each team will have 2 Robots

+ 1 Automatic Robot.

+ 1 Manual Robot.

☆ The Manual Robot picks up the Leaves in the “Leaves Store” and places them in the 3 Rings in the Southern Hemisphere.

☆ Then, the Manual Robot loads "Leaves" which have been picked up from the “Leaves Store” onto Automatic Robot.

☆ The Automatic Robot must place at least 3 leaves in the Northern Hemisphere (including two leaves in its own zone and at least one leaf in the common zone), then it is allowed to touch the Bud(s) in the Northern Hemisphere.

☆ The Automatic Robot goes to the North Pole Zone and picks up the Buds (made by the team) and loads them into the Manual Robot.

☆ The Manual Robot stands below the Limit Line 2 and throws the Bud(s) at the Moon. If the team's Bud stands successfully on the moon, the team achieves “THE GREEN PLANET” and wins the game.

1. TEAM MEMBERS

1.1. Each team shall comprise of 4 members consisting of 3 students and 1 instructor, from the same university, polytechnic or college. However, only these 3 students are permitted to enter the Game Field.

1.2. Team members must be enrolled in their University/Polytechnic at the time of the international contest. Exceptions are allowed for those who were enrolled in a University/Polytechnic at the time of the domestic contest.

1.3. Post graduates are not allowed to be engaged in the team's robot production process in any ways.

2. GAME FIELD AND OBJECTS

2.1. The Game Field consists of an area having the dimension of 13000mm x 13000mm made by emulsion painted plywood and surrounded by a iron fence (100mm height-50mm thickness). The game field is divided equally by an iron fence (60mm height, 30mm thickness), along the Prime Meridian.

2.2. The Game Field is divided into 2 parts as follows:

2.2.1. The Earth Zone (*see drawing for more details*).

2.2.1.1. The Earth Zone is in Sphere Shape. It has a diameter of 8500mm. The white guidelines made of matt (non-shiny) sticker of 30mm width represent the Meridian and the Parallel.

2.2.1.2. A picture of a green tree is drawn, inside the Earth Zone.

2.2.1.3. There are 7 steel Rings (painted in dark green) in which to place the Leaves in each team's Earth Zone. Each Ring is of following dimension; 50mm height; 25mm thickness and the inside diameter is 350mm. The surface of the game field where the Rings are placed in the Common Zone are painted in yellow. The surface of the game field where other Rings are placed are painted in white (*see drawing for more details*).

2.2.1.4. The Northern Hemisphere (*see drawing for more details*) is the upper half of the Earth Zone. There is the Common Zone that covers 4 spaces in the center of the Northern Hemisphere (*see drawing for more detail)*. Also, there is the North Pole Zone defined by The First Parallel, where each team arranges their Buds before the game start. (*see drawing for more details*)

2.2.1.5. The Southern Hemisphere is the lower half of the Earth Zone.

2.2.2. The Space Zone surrounds the Earth Zone (*see drawing for more details*).

2.2.2.1. There is the Moon in the Space Zone. The Moon is a round plate laid flat on top of the cylindrical stand. The height from the surface of the Moon to the surface of the contest field is 1500mm; The Moon is positioned along the Prime Meridian and the distance from the North Pole to the center of the Moon is 2700mm.

2.2.2.2. There are 2 Limit Lines (30mm width), namely Limit Line 1 is the continuation of the Equator; Limit Line 2 is drawn at 2950mm north of the Equator. *(see drawing for more details)*.

2.3. The Manual Robot Area

The Manual Robot Area is the Space Zone and it is painted cyan.

2.3.1. Manual Robot Staring Zone

The dimension of the Manual Robot Starting Zone is 700 mm x 700 mm which is painted in red for Red Team and in blue for Blue Team.

2.3.2. Leaves Store

Each team's Leaves Store is located at the bottom of the game field. Before the Game starts, 12 Leaves will be arranged in the each Leaves Store *(see drawing for more details)*.

2.4. The Automatic Robot Area

The Automatic Robot Area is the Earth Zone and the surrounding area. There are 02 Automatic Robot Staring Zones that have the dimension 700 mm x 700 mm, painted Red for Red Team and Blue for Blue Team.

2.5. The Leaf

Leaves are in the shape of a cylinder (250mm Diameter, 200mm Height, 200g Weight). Leaves are made of high-density polystyrene and are coated with emulsion paint, in red for Red Team and blue for Blue Team. The top and the bottom of the leaves are both pained in green.

2.6. The Bud

2.6.1. Each team must make 3 'Buds' in the shape of a tree.

2.6.2. The height of the Bud must exceed 500mm.

2.6.3. The diameter of the widest part of the 'Bud' must exceed 300mm

2.6.4. The diameter of the bottom of the Bud must exceed 150mm.

2.6.5. The maximum weight must not exceed 300g.

2.6.6. The 'Buds' must be placed by each team before the start of each match. The 'Buds' can be arranged in any ways as long as they are placedwithin the team's North Pole Zone.

2.6.7. The robot must be designed so that the 'Bud', under no matter what condition, cannot travel more than 8m when the 'Bud' is thrown from the robot. The travel distance of the 'Bud' will be measured from the 'Bud' to the robot's contact surface of the game field.

2.6.8. The Bud which has been thrown once cannot be used again in the same match.

3. ROBOT

To compete in the contest, each team must design and construct the Manual Robot and Automatic Robot by themselves.

For each match, each team is allowed to have 1 Manual Robot and 1 fully Automatic Robot.

3.1. Manual Robot

3.1.1. The Manual Robot has to be operated via remote control using a cable connected to it or remote control using infrared rays, visible rays or sound waves. Controlling using radio waves is not allowed. Operators are not allowed to ride on their Manual Robot.

3.1.2. When operating via cable, the connecting point of the cable to the robot must be at least 1000mm from the ground. However, the length of the cable from the Manual Robot to the control box must not exceed 3000mm.

3.1.3. There is a size limit (700mm L x 700mm W and 1200mm H) for the Manual Robots at the Manual Robot Start Zones when the game starts.

3.1.4. After the game starts, the Manual Robot's size and form may be changed. However, the extension limit is 3m in diameter when checked from above.

3.1.5. Manual Robots are not permitted to separate during the game.

3.1.6. Only 1 member of each team is allowed to control the Manual Robot in the Game Field.

3.2. Automatic Robot

3.2.1. Automatic Robot must be completely autonomous.

3.2.2. When the Automatic Robot starts, team members are not allowed to touch the Robot.

3.2.3. Automatic Robot should fit within the size of 700mm L x 700mm W and 1000mm H at its Start Zone before starting.

3.2.4. After the game starts, the Automatic Robot's size and form may be changed. However, the extension limit is 2m in diameter when checked from above.

3.3. Retry

After a "retry" request is granted by the Referee, team member(s) must bring the Robot(s) that need to be retried back to their Starting Zone and restart the Robot(s) as soon as possible.

3.4. Power Supply

3.4.1. Allowed power supply for Robot(s) shall not exceed 24VDC.

3.4.2. The pressure of the compressed air power (if any) must be less than 6 bars.

3.4.3. Power supply that is considered dangerous or unsuitable by the Contest Committee shall not be permitted.

3.5. Weight

All Manual and Automatic Robots, including their power sources, cables, remote controller and other parts of each Robot shall be weighed prior to competition. The total allowable weight of all Robots for each team to be used throughout the contest must not exceed 40kg.

4. MATCHES

4.1. Duration of the Match

4.1.1. Before the match begins setting of the Robots need to be completed within 1 minute after receiving the signal for setting.

4.1.2. Each match shall last for 3 minutes.

4.1.3. However, the first team to achieve "THE GREEN PLANET!" wins the match regardless of the point collected by the opponent. The match ends when "THE GREEN PLANET" is achieved.

4.2. **Competition Rules**

4.2.1. The Manual Robot picks up the Leaves in the "Leaves Store" and places them in the 3 Rings in the Southern Hemisphere.

4.2.2. After placing Leaves successfully in the 3 Rings in the Southern Hemisphere, the Manual Robot can load Leaves onto the Automatic Robot in the Automatic Robot Start Zone or the Manual Robot can carry the Leaves to the Limit Line 1 and drop the Leaves onto the floor of the Game Field. Any parts of the Manual Robot which are in contact with the floor of the Game Field shall not be allowed to cross over the Limit Line 1.

4.2.3. After the Manual Robot fulfilled the task under 4.2.2, the Automatic Robot is allowed to start.

4.2.4. The Automatic Robot goes to place the Leaves in the Rings in the Northern Hemisphere of their own game field and the Common Zone.

4.2.5. The Automatic Robot can place maximum of 5 Leaves in the Rings in the Northern Hemisphere and the Common Zone. However, it is allowed to place only 1 Leaf in the opponent's side of the Common Zone.

4.2.6. After the Automatic Robot successfully placed at least 3 Leaves in the Northern Hemisphere including 2 Leaves outside of Common Zone.

4.2.6.1. The Automatic Robot is allowed to pick up the Bud(s) which are placed in the North Pole Zone.

4.2.6.2. Once the Automatic Robot picked up any Bud(s), the Automatic Robot cannot place any more Leaves in the Rings.

4.2.6.3. The Manual Robot can cross the Limit Line 1 to receive the Bud(s) from the Automatic Robot and throws the Bud(s) at the Moon. However, when throwing the Bud(s) at the Moon, the Manual Robot has to stand behind Limit Line 2.

4.2.6.4. Once the Bud(s) thrown by the Manual Robot successfully stands in the Moon, "THE GREEN PLANET" is achieved and the match ends immediately. If neither team achieves "THE GREEN PLANET" within 3 minutes, the team with more score will win the match.

4.3. Points Award`

4.3.1. The team gains point when their Robots successfully place their own Leaves in the Rings.

4.3.2. Scoring:

4.3.2.1. Place the Leaf in the Earth Zone: 10 points/Leaf

4.3.2.2. The Manual Robot receives the Bud from Automatic Robot: 10 points/Bud

4.4. Violations and deduction of points

The following actions will be regarded as violations and 10 points will be deducted for each violation:

4.4.1. Robot enters or extends over opponent's zone (except Common Zone).

4.4.2. The Manual Robot enters the Earth Zone.

4.4.3. The Automatic Robot starts before it is allowed pursuant to 4.2.2.

4.4.4. Automatic Robot continues to place Leaves after picking up the Bud(s).

4.4.5. The act of using adhesives for the 'Buds' to stand in the Moon or to pick up objects in the game field and leaving adhesives on any objects, contest tools and the game field is strictly prohibited.

4.4.6. Robots move out of the game field.

4.4.7. Start before referee's whistle or signal.

5. DECIDING THE WINNER

5.1. The first team to achieve "THE GREEN PLANET" shall be the winner.

5.2. If the two teams achieve "THE GREEN PLANET" at the same time or neither team achieved "THE GREEN PLANET" within 3 minutes, the winner will be decided by the following priorities:

5.2.1. Total scores after points deduction in that match (if any).

5.2.2. Time record of the first Bud(s) to be received by the team's Manual Robot.

5.2.3. The first team accomplishes the mission in 4.2.1.

6. DISQUALIFICATION

The following behavior shall be considered for disqualification of the whole team by the referees.

6.1. The team intentionally damages or tries to damage the Game Field, facilities, equipments or opponent's robots.

6.2. Team's members touch their own Robots intentionally.

6.3. Robots enter the opponent's game field.

6.4. Remove the opponent's Leaf.

6.5. Using the radio waves (refer to 3.1.1) to interfere in opponent's Robot operation.

6.6. Performing any act against the spirit of fair play.

7. IMPORTANCE OF SAFETY

7.1. All Robots must be built so that they will not harm any team members, the referees, match officials, audience, equipment and the Game Field.

7.2. To ensure safety, when using a laser beam, it must be less than or equal to Class 2 laser, and used in a way that will not harm any operators, the referees, match officials, audience.

7.3. The Bud must be soft material and safety for operators, the referees, match officials, audience.

7.4. Safety guidelines for the mechanism to shoot the 'Buds'

7.5. The robot must have a structure that is easy to check its safety by the judges in the robot check video or during the test run.

7.6. Combustible-fuel-driven engines, explosives, high-pressure pneumatics, power-generating chemicals, are all prohibited, for motion propulsion or expansion of robot's size.

8. OTHERS

8.1. Any other behaviors not specified in the rules, referees are given full authority to make the decision and the decision is final in the event of a dispute.

8.2. The tolerance about dimension of Game Field and tools is ± 5%.

8.3. Any amendments to the rules will be announced by the Contest Committee and be updated on website as the "FAQ":

aburobocon2013.vtv.gov.vn

8.4. All teams are encouraged to decorate two Robots in their own styles within the regulations set by this Rulebook.

8.5. When requested by the Contest Committee, each participating country will be asked to provide information on their robots, including the videotape, which explains the structure and the movement of the participating teams' robots, prior to the shipment of the robots.

8.6. For the International Contest, the maximum external dimension of robot the packing box should not exceed (1m Width x 1.6m Length x 1.4m Height).

9. QUESTIONS REGARDING THEME AND RULES

Questions regarding theme and rules should be addressed by e-mail to the Committee in English. They can be contacted at:

aburobocon2013@vtv.gov.vn

10. FREQUENTLY ASKED QUESTIONS (FAQ)

The "FAQ" shall be updated on:

aburobocon2013.vtv.gov.vn

Updated: Aug 14th, 2013

Appendix 1: Games Field's Color Code

No.	Description		Color	Automatic CAD Color Index (ACI)	RGB - Pantone		
					R	G	B
1	Blue team's Starting Zone			5	0	0	255
2	Red team's Starting Zone			1	255	0	0
3	Red Leaf	Top and Bottom		116	0	127	63
		Surround		1	255	0	0
4	Blue Leaf	Top and Bottom		116	0	127	63
		Surround		5	0	0	255
5	The Manual Robot Area (The Space Zone)			4	0	255	255
6	Earth Zone			142	0	153	204
7	The Moon			52	204	204	0
8	The picture of a green tree			104	0	153	38
9	The Fence			116	0	127	63
10	The Ring			116	0	127	63
11	The surface of the game field where the Rings are placed in the Common Zone			52	204	204	0
12	The surface of the game field where the other Rings are placed.			7	255	255	255
13	White Guidelines			7	255	255	255

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS.	Robocon	TITLE	game field - Layout
PROJECT	ABU ROBOCON 2013 DANANG - VIETNAM	JOB No.	2012.V0

REV. 0

PAGE-1

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE GAME FIELD

JOB No. 2012.V0

REV. 0

PAGE-2

THE MOON

(Structured drawing)

(Detail drawing)

THE SURROUND FENCE

(The Fence Material: Rectangular box shaped steel 50x100x2.5)

THE LEAF

(MATERIAL: HIGH DENSITY PLYSTYRENCE - 20KG/M3)

THE DIVIDED FENCE

(The Fence Material: Rectangular box shaped steel 30x60x2)

THE RING

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE OBJECTS

JOB No. 2012.V0

REV. 0

PAGE-3

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE A PICTURE OF A GREEN TREE

JOB No. 2012.V0

REV. 0

PAGE-4

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE THE EARTH ZONE

JOB No. **2012.V0**

REV. 0

PAGE-5

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE COMMON ZONE - NORTH POLE ZONE - SOUTHERN HEMISPHERE

REV. 0

JOB No. 2012.V0

PAGE-6

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE NORTHERN HEMISPHERE

JOB No. 2012.V0

REV. 0

PAGE-7

REV.	DATE	CONTENTS	DGN'D BY	CHK'D BY	APP'D BY
3					
2					
1					
0	10/8/2012	ROBOCON_GAME_FIELD	VTV	VTV	VTV

CUS. **Robocon**

PROJECT ABU ROBOCON 2013 DANANG - VIETNAM

TITLE THE MANUAL ROBOT AREA

JOB No. 2012.V0

REV. 0

PAGE-8

ROBOCON

DANANG-VIETNAM 2013

ABU ASIA-PACIFIC ROBOT CONTEST