



Asia-Pacific Robot Contest 2007

Hanoi, Vietnam

THEME & RULES

HALONG BAY DISCOVERY

THEME AND RULES

INTRODUCTION

The legend of Ha Long has it that, “Once upon a time, soon after the Viet people established their country, invaders came. The Jade Emperor sent Mother Dragon and her Child Dragons down to earth to help the Viet people fight against their enemy. Right at the time invaders’ boats were rushing to the shore, the dragons landed down on earth. The dragons immediately sent out from their mouths a lot of pearls, which then turned into thousands of stone islands emerging in the sea like great walls challenging the invaders’ boats. The fast boats couldn’t manage to stop and crashed into the islands and into each other and broke into pieces.

After the victory, Mother Dragon and Child Dragons didn’t return Heaven but stayed on earth at the place where the battle had occurred. The location Mother Dragon landed is nowadays Ha long Bay and where Child Dragons descended is now Bai Tu Long.

Ha Long is the wonderful and skilful masterpiece of the Creation and of nature that only Vietnam was bestowed. Ha Long has become the pride of not only the locals but also of all Vietnamese people when it was twice recognized as the World Natural Heritage by UNESCO for its geographical and geomorphologic values. With its unique beauty, Ha Long is one of the most ideal destinations in Vietnam.

The rules of Robocon 2007 are built basing on this legend of Ha Long. A team of robots(symbolizing dragons) will carry the blocks having the shape of cylinder(symbolizing pearls) to build various kinds of islands symbolizing “Ha Long”; and “Bai Tu Long” .The first team to complete the building of “Victory islands”(in the shape of letter V in the centre of the Game Field) will be the winner. Duration of the game is three minutes.

GAME DESCRIPTION AND RULES

OUTLINE and OBJECTIVE of the GAME

Red team and Green team will operate Manual Machines (symbolizing Mother Dragons) and Automatic Machines (symbolizing Child Dragons) to put the “Pearls” on the “Islands”. The team which puts the “Pearl” on top of an “Island” gets the “Island”.

The first team to complete the shape of letter V with the “Islands” at the centre of the Game Field is considered “VICTORY ISLANDS!” and will be the winner. In the case that neither team accomplishes “VICTORY ISLANDS!”, the team that scores more points wins.

Duration of the game is three minutes.

1. TEAM MEMBERS

- 1.1 Each team shall comprise of four (4) members consisting of three (3) students and one (1) instructor, from the same university, polytechnic or college. However, only these three (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 Postgraduates are not eligible to enter the competition.

2. THE GAME FIELD and OBJECTS

► The game is played on a square Game Field (14000mm x 14000mm), which is surrounded by a wooden fence (100mm height-30mm thick);

- ▶ The floor of the Game Field is made of 20mm thick ply-wood, and is fully coated with emulsion paint;

- ▶ It consists of a Manual Area and an Automatic Area.

2.1. Manual Area

The Manual Area surrounds the Automatic Area, and is painted light blue with emulsion paint;

There are two (2) Manual Machine Start Zones and Pearl Storages in this area.

2.1.1. Manual Machine Start Zone

Manual Machine Start Zone is in square shape (1000mm x 1000mm) and is located in the Manual Area. There are two Manual Machine Start Zones. They are painted with emulsion paint, red for Red team and green for Green team.

2.1.2. Pearl Storage

Pearl Storage for each team is located at the corner of the Game Field. Before the start of each match, fifteen (15) pearls are arranged available in each storage. *(See attached drawings for more details)*

2.2. Automatic Area

Automatic Area is placed in the centre of the Game Field. It is in the shape of 10-side regular polygon and is coated with blue emulsion paint, which is surrounded by a wooden fence 100mm height and 30mm thick (See the attached drawing for more details);

Inside of the Automatic Area, 6 guidelines with 660mm distance are arranged parallel with the 10-side polygon and 20 guidelines are arranged radially. The guideline is made of white, non-shiny sticker with width 30mm;

(See attached drawings for more details)

The Automatic Area consists of 3 zones namely Automatic Machine Start Zone, Ha Long Zone (Outer Zone), Bai Tu Long Zone (Inner Zone).

2.2.1. Automatic Machine Start Zones:

There are two (2) Automatic Machine Start Zones, one (1) for each team. They are shaped square (1000mm x 1000mm) and painted with emulsion paint, red for Red team and green for Green team.

2.2.2. Ha Long Zone: (Outer Zone)

Ha Long Zone is in the outmost ring of the polygon and is coated with blue emulsion paint. Ten (10) cylinder ISLANDS (360mm in diameter, 230mm H) for pearls to be put on shall be located in this Zone.

(See the attached drawing for the details)

Before starting the game, five (5) pearls shall be placed in this zone for each team (as in the drawing).

2.2.3. Bai Tu Long Zone: (Inner Zone)

The Bai Tu Long Zone is inside the Halong zone.

The Bai Tu Long Zone shall be coated with dark blue emulsion paint. There are ten (10) ISLANDS (360mm in diameter, 230mm H) in this zone. *In the centre of this zone, the shape of letter V using 3 islands for red and green team is respectively drawn with straight-line (width 30mm).*

(See attached drawing for more details)

2.3. Pearls

The Pearls are in the shape of cylinder (Inner diameter = 100mm, Outer diameter = 300mm, Height = 200mm, Weight = 300g). Pearls are made of high-density polystyrene and are coated with emulsion paint red, for the Red Team, and green, for the Green Team.

(See attached drawing for more details)

3. MACHINES

Each team must design and construct by itself Manual and Automatic Machines to compete in the contest. For each match, the number of Automatic Machine(s) is no more than three (3) and only one (1) Manual Machine is allowed for each team.

3.1. Manual Machine

- 3.1.1. The Manual Machine 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 are also not allowed. Operators are not allowed to ride on their Manual Machine.
- 3.1.2. When operating via cable, the connecting point of the cable to the machine must be at least 1000mm from the ground. However, the length of the cable from the Manual Machine to the control box must not exceed 3000mm.
- 3.1.3. There is a size limit (1000mm L x 1000mm W and 1500mm H) for the Manual Machines at the Manual Machine Start Zones when the game starts.
- 3.1.4. Once the game starts, The Manual Machine's size and form may be changed but its height is limited to 2000mm. Furthermore, Manual Machines are not permitted to separate during the game.
- 3.1.5. Only one (1) member of each team is allowed to control the Manual Machine in the Game Field.
- 3.1.6. Team members are not allowed to touch the Manual Machine once the game has begun.
- 3.1.7. Manual Machines are permitted to operate in the Manual Zone and Outer Zone only.
- 3.1.8. Manual Machines are not permitted to enter or extend over the Inner zone, the opponent's Automatic Machine start zone and opponent's Pearl Storage
- 3.1.9. Manual Machines are not permitted to touch its own team's Automatic Machines.

- 3.1.10. Manual Machines are not permitted to touch opponent's Automatic Machines in the Automatic Area.
- 3.1.11. Manual Machines are not allowed to prevent the opponent from taking the pearls at opponent's Pearl Storage.
- 3.1.12. Manual Machines are prohibited to move directly / indirectly the opponent's pearls in the Automatic area, except for pearls which have been placed on the islands (refer to clauses 4.2.2 and 5.2).
- 3.1.13. When Manual Machines of both teams interfere with each other, the referee will decide the right way to go for each team.
- 3.2. Automatic Machine(s)
- 3.2.1. Every Automatic Machine must be autonomous after being started by team members.
- 3.2.2. Once a game begins, all automatic machines should be started one by one. Each Automatic Machine must be started by one operation.
- 3.2.3. After all Automatic Machines are started, the team member(s) responsible for starting the machines must leave the Game Field.
- 3.2.4. Once a machine(s) start(s), team members are not allowed to touch the machine(s).
- 3.2.5. All of the Automatic Machines should fit within the size of 1000mm L x 1000mm W and 1500mm H at their Start Zones before starting.
- 3.2.6. The Automatic Machines' size and form may be changed but limited to 2000mm Height and 1500mm Width (measurement shall be made at flat projection by any direction).
- 3.2.7. Once the game starts, the Automatic Machines can be separated (but the number of automatic machines is no more than 3).
- 3.2.8. Anything that separates from an Automatic Machine is considered to be another Automatic Machine, and therefore must also be autonomous.

3.2.9. There is a 'certain place' around the Automatic Machine Start Zone for each team that opponent's Automatic Machine without Pearl cannot enter within 30 seconds after the game began. See drawing for the details.

3.3. Retry of Automatic Machine(s)

3.3.1. For Automatic Machine(s), a "retry" is permitted once per game for each team.

3.3.2. After a "retry" request is granted by the Referee, team member(s) must bring the Automatic Machine(s) back to Automatic Machine Start Zone and restart the machine(s) as soon as possible. Automatic Machine(s) that is granted retry should follow Rule 3.2 Automatic Machine(s).

3.3.3. On "Retry", any parts of the machines should not be replaced. Also, power sources of the machines should not be refilled nor added.

3.3.4. When a "Retry" results in a change in the score or violation of the rules, it is up to the referees to rule on the situation, including with regard to the validity of the "Retry".

3.4. Power Supply for Machines

3.4.1. Each team shall prepare its own power supply for all its machines during the games.

3.4.2. Allowed power supply for Machine(s) shall not be exceeded 24VDC.

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 Machines including their power sources, cables, remote controller and other parts of each machine shall be weighed prior to competition. The total allowable weight of all machines for each team to be used throughout the contest must not exceed 50kg.

4. MATCHES

4.1. The Duration of Matches

4.1.1. Before the match begins, setting of the machines shall be completed within one (1) minute after receiving the signal for setting.

4.1.2. Each match shall last for three (3) minutes.

4.1.3. However, the first team to achieve “VICTORY ISLANDS!” wins the match regardless of the point collected by the opponent. The match ends when “VICTORY ISLANDS!” is achieved.

4.2. Competition rules

4.2.1. The Manual Machines may either go to their Pearl Storage for taking and placing the pearls onto the islands located in the Halong Zone for scoring or they can put the pearls at suitable position so that the Automatic Machines can take these pearls for scoring more points on islands located in the Inner Zone.

4.2.2. Manual Machine is not allowed to take or moves pearls which have been placed successfully on the island by the opponent. However, it can change the position of these pearls to score point or place them to another island.

4.2.3. Automatic Machine(s) is allowed to take the pearl(s) to be available on the Game Field or pearl(s) given by its Manual Machine for further scoring at Inner Zone.

4.2.4. Manual or Automatic Machines success in placing their pearl(s) on the top of opponent's pearl(s) which is already located on the island(s), then the opponent's point(s) at that island shall be lost and point(s) shall be added to the successor pursuant to the pearl(s) that they scored accordingly.

4.3. Points Awarded

4.3.1. The team gains point when they successfully put their own pearl on top of each island. However, pearls contacting any part of their own machines will not be counted for points.

4.3.2. Points are awarded as follows:

	Location	Points
i)	The Outer Zone Ten(10) islands on the first guideline : (counted from outside to inside)	1
ii)	The Inner Zone Five (5) Islands on the third guideline : (counted from outside to inside)	2
iii)	The Inner Zone Five (5) Islands on the sixth guideline : (counted from outside to inside)	3

4.4. VICTORY ISLANDS!

“VICTORY ISLANDS!” is achieved when following two conditions are satisfied;

4.4.1. Team’s pearls are placed on top of the 3 islands specified for each team in the centre of the Inner Zone creating the letter V;

4.4.2. At least team’s 2 pearls are placed including the topmost pearl on these islands and none of the pearls has contact with their own machines.

4.5. Deciding the Winner

The winner of the match will be decided based on the following conditions:

4.5.1. The team first accomplishing “VICTORY ISLANDS!” will be the winner;

4.5.2. In the case that neither team accomplishes “VICTORY ISLANDS!”, the team;
that scores more points wins. This is done by adding up all the points awarded and subtracting points for violations;

4.5.3. In the case of a draw, the winner of the match will be decided by the following rules, in the order listed bellows:

4.5.3.1. The team having more pearls on top of 3 - scored Island in the inner zone wins the match;

4.5.3.2. The team having more pearls on top of 2 – scored Island in the inner zone wins the match;

4.5.3.3. When no clear winner can be selected by the above order, the referees and the judges will decide the winner.

5. VIOLATIONS AND DEDUCTION OF POINTS

5.1. Once a game begins, the following actions will be regarded as violations and one (1) point will be deducted for each violation.

5.1.1. Manual Machine or its operator enters or extends over Inner Zone and opponent's Automatic Machine Start Zone.

5.1.2. Manual Machine touches its own team's Automatic Machines.

5.1.3. Automatic Machines without Pearl entering the places defined in Rule 3.2.9 within the first 30 seconds of the match.

5.1.4. If above violations continue intentionally, one (1) point will be deducted for every five (5) seconds.

5.2. Two (2) points will be deducted for each of the following actions:

Manual Machine takes or moves the opponent's pearls which have been placed successfully on the island by the opponent. However, points are not deducted if these pearls are replaced in that or other island before the game ends.

6. DISQUALIFICATION

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

6.1. Causing or attempting to cause damage to the Game Field, its equipment, or the opponent's machines, including the arrangement of the opponent's Pearls at opponent's Pearl Storage.

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

- 6.3. Manual Machine directly or / and indirectly blocking, touching, attacking the opponent's Automatic Machine in the Automatic Area.
- 6.4. Manual Machine takes or changes the position of the opponent's pearls which are placed in the Automatic area, except for pearls which have been placed on the islands (refer to clauses 4.2.2 and 5.2).
- 6.5. Start before the starting whistle (or signal) of the referee more than once
- 6.6. When 3 points are collected by violation as defined in clause 5.1
- 6.7. Performing any act against the spirit of fair play.

7. SAFETY

- 7.1. All machines must be built so that they will not harm the operators, the referees, match officials, audience, opponent's equipment and the game field.
- 7.2. To ensure safety, when using a laser beam, it must be less than a Class 2 laser, and used in a way that will not harm any operators, the referees, match officials, audience, opponent's equipment and the game field.

8. OTHERS.

- 8.1. For any other behaviour 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. Any amendments to the rules will be announced by the Contest Committee and be updated on website as the "FAQ": www.vtv.org.vn/robocon.
- 8.3. All teams are encouraged to decorate their machines in their own styles using the symbol of a dragon.
- 8.4. Only hand-made machines are allowed in the contest.
- 8.5. When requested by the Contest Committee, each participating country will be asked to provide information on their machines, including the videotape,

which explains the structure and the movement of the participating teams' machines. The Contest Committee will verify whether each participating machine complies with the rules through viewing the videotapes, prior to the shipment of the machines.

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 these addresses:

robocon2007@vtv.org.vn

robocon@vtv.org.vn

10. FAQ

The “FAQ” shall be updated on www.vtv.org.vn/robocon.

Robocon 2007's Theme and Rules was drafted by the consultative council including these members:

Dr. Ngo Thai Tri – Vietnam Television

Prof.Dr. Nguyen Thien Phuc – Hanoi University of Technology

A.Prof.Dr. Le Hoai Quoc – HoChiMinh City University of Technology

A.Prof.Dr. Nguyen Tang Cuong – Le Quy Don Univercity

Prof.Dr. Phan Ky Phung – DaNang University of Technology

And other Robocon 2007's Contest Committee members.

APPENDIX

A1. MATCHS

The contest is played according to the format below:

- ▶ Preliminary round in groups: round robin
- ▶ Winner from each group shall advance to the Quarter-Final stage.
- ▶ Quarter-finals: knock out
- ▶ Winner from each Quarter-Final shall advance to the Semi-Final stage.
- ▶ Semi-Final Stage: knock out
- ▶ Winner from each Semi-Final shall advance to the Final
- ▶ Final: Knock out

A2. AWARDS

Prizes shall include awards for the winners, runner-ups, best idea, best technology, and best design and ABU Robocon award, Sponsors' awards.

A3. COSTS OF PRODUCTION AND CARRIAGE

A3.1. Cost of Production

The ABU Robocon Organizing Committee shall provide USD 1000 as a subsidy for machine construction to each committee member organization.

A3.2. Cost of Carriage

The transport company, specified by the committee, will ship your machines to the playing venue in Hanoi, Vietnam. Details will be announced later.

A4. Games Field's Color Code

No.	Description	AutoCAD Color Index (ACI)	RGB - Pantone		
			R	G	B
1	Manual Machine Area	140	0	191	255
2	Outer Automatic Machine Area	152	0	82	165
3	Inner Automatic Machine Area	164	0	31	127
4	Green Team		13	177	75