



EUROBOT 2012 rules



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Presentation

Eurobot and Eurobot Junior are two events open to young robotics amateurs working in teams. These teams can be composed of students involved in Eurobot as a school project, group of friends, or independent clubs. Eurobot and Eurobot Junior share the same objective: to allow young people to be active in their learning, applying their knowledge and know-how by participating in a friendly event.

About Eurobot



The age limit for participating in the Eurobot final is 30 years. Each team may have a supervisor for whom the age limit does not apply. Teams that do not respect this age limit will not be allowed to participate in the Eurobot European final. The technical challenge is to build an autonomous robot as well as an optional secondary autonomous robot.

About Eurobot Junior

The age limit for participating in the Eurobot Junior final is 18 years. Each team may have a supervisor for whom the age limit does not apply. The technical challenge is to build a remote controlled robot as well as an optional autonomous robot.

Be careful, according to your country's educational organisation, this age limit may be slightly different. Check the registration requirements stated by your National Organising Committee.



A team is a group of young people who have built one robot (and optionally a secondary robot) for the event. One person can be part of one team only, even if both teams belong to the same organisation, but we encourage teams to share their experiences. The project can be supervised by someone over the age limit (teacher, parent, group leader, etc.), but the robot must be designed and built by the team's members, not the supervisor.

One organisation (club, school, etc.) can register several teams, if permitted by the registration requirements set by your National Organising Committee. The acceptance of these requirements is compulsory.



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Eurobot and Eurobot Junior are intended to take place in a friendly and sporting spirit. As in sports event, refereeing decisions are final, except if an agreement between all parties is met.

Countries where more than 3 teams register must organise a national qualification to select the 3 teams that will attend the international finale. Teams from countries with fewer than 3 registered teams can attend the international finale without the need for a national qualification event. These finale events take place in Europe, but remain open to countries from other continents.



This year, the Eurobot and Eurobot Junior rules are almost identical. This means that some parameters have been merged. Accordingly, please read all the rules carefully even the chapters that may seem familiar to you (playing field dimensions, robots dimensions, etc.).

The aim of this approach is to provide an almost common platform for the Eurobot event, dedicated to autonomous robots, and for Eurobot Junior event, dedicated to wire-guided robots. Thus:

- a Eurobot organiser has also the ability to organise a Eurobot Junior contest, and vice versa.
- Exchanges of experience, emulation, are favoured between participants from the 2 events

WARNING! Although there are very few differences between Eurobot and Eurobot Jr rules, the document you are currently reading describes only the **Eurobot rules**.





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1. GAME OBJECTIVES

The robots have become pirates, and take part in a treasure hunt in order to gain as many coins as they can. They will have to undertake the following tasks:

- a. The treasure map: The robots must retrieve the map that shows the way to the treasure.
- b. The treasure of the island: each robot must bring as many gold bars and coins as possible back to their ship.
- c. Bottles in the sea: The robots have to discover the messages sent in bottles.

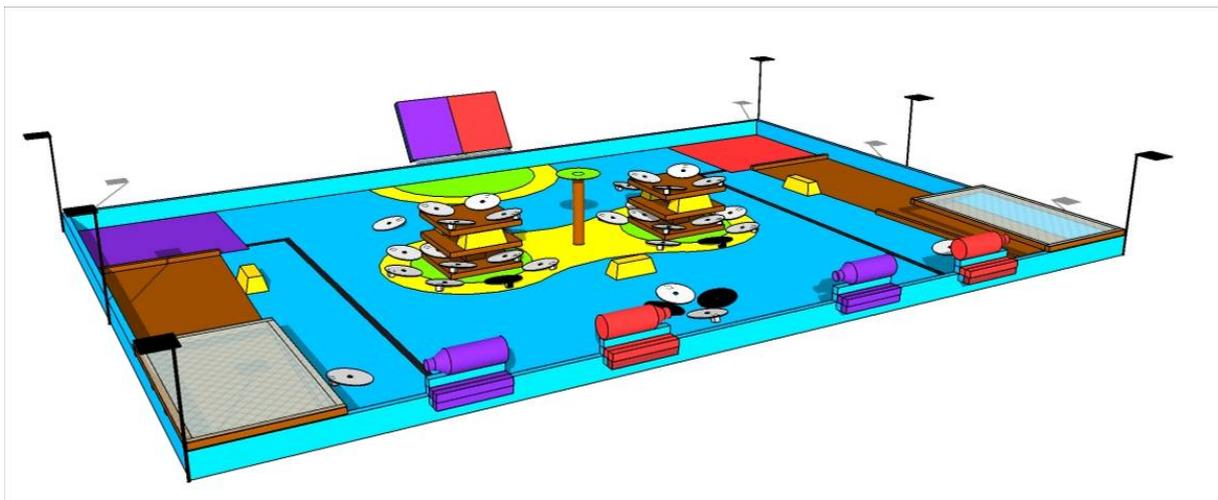


Figure 1 General overview of the playing field and the playing elements



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2. DETAILS OF THE PLAYING AREA AND ACTIONS

Important information:

While the organizational team strives to be as accurate as possible while building the playing area, there may be deviations from the official dimensions because of manufacturing tolerances. No complaints will be accepted regarding these deviations. If any modification are made to the specifications, they will be made available in a complimentary document on the website of your National Organising Committee.

Please note that the surface finish of the painted areas may differ between each playing field, and may deteriorate over time. The rules, the specifications of the playing field and of the playing elements might be changed if problems are discovered. We strongly recommend that teams regularly check both Eurobot website <http://www.eurobot.org/> and the website of your National Organising Committee to check for updates to the rules or specifications. Teams should also follow the discussions on the forum <http://www.planete-sciences.org/forums> and the information published therein.

2.1. The playing area (identical for both Eurobot and Eurobot Junior)

The playing area is a rectangular plane 3000 mm by 2000 mm that can be made of two 1500 mm by 2000 mm pieces, depending on the woodworker, and inclined 10% toward the public for Eurobot Junior. It is painted mostly with a blue colour. (See reference in the appendix)



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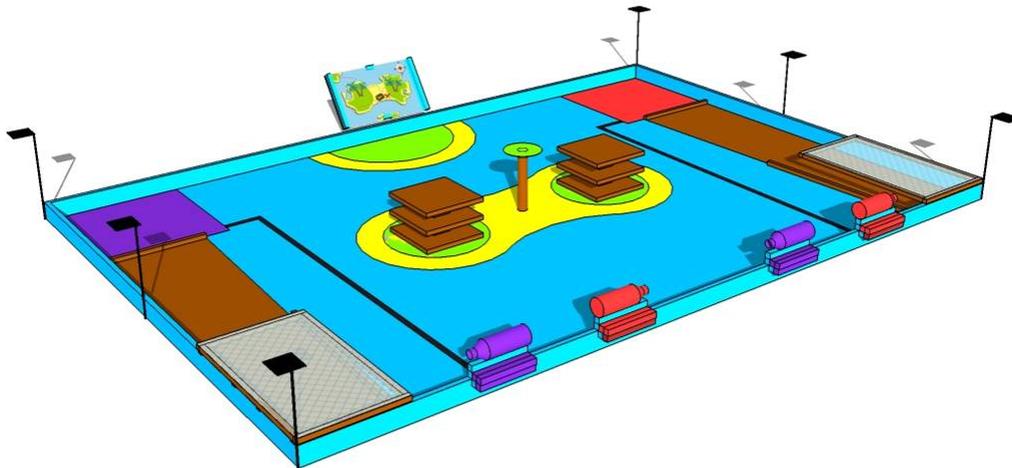


Figure 2 View of the playing field



The dimensions of the playing field as well as the placement of the movable playing elements are indicated on the drawings in the appendix.

2.2. Start areas

The start areas are located in the top corners of the playing field and are shown by a square painted in the team's colour. (Purple on the left, red on the right, as seen by the audience).

Before the start, the robots must be entirely contained within the start areas. If your team have built a secondary line following robot (see below), you may place the secondary robot in such a way that the sensor used for the line detection is at the beginning of the black line, slightly outside your start area. The rest of the robot must, following the previous rule, be inside the start area.



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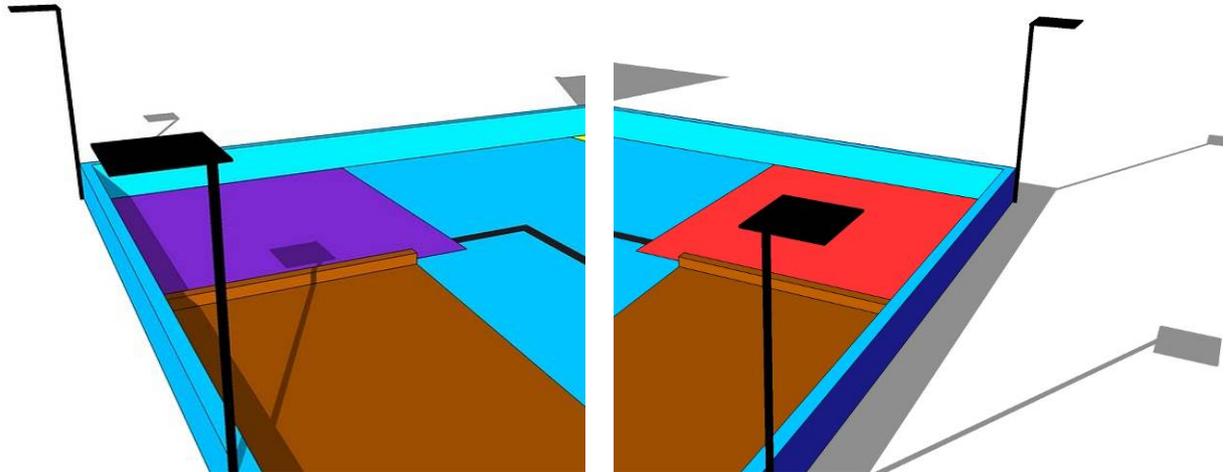


Figure 3 View of the start area

If neither robot of a team leaves the start area before the end of the match, the match will be declared disqualified for that team.

2.3. Treasure map

As any respectful pirate who needs to find his way, getting the treasure map is essential. Robots will have to make their way through tropical forest to get the map of Peanut Island and find its hidden treasure.



a. Playing elements and position at the beginning of the game

For this action robots have at their disposal the following elements:

- Treasure map: a thin plank leaning against the back border, represents the treasure map. It cannot be moved and, at the beginning, it is hidden by pieces of fabric.



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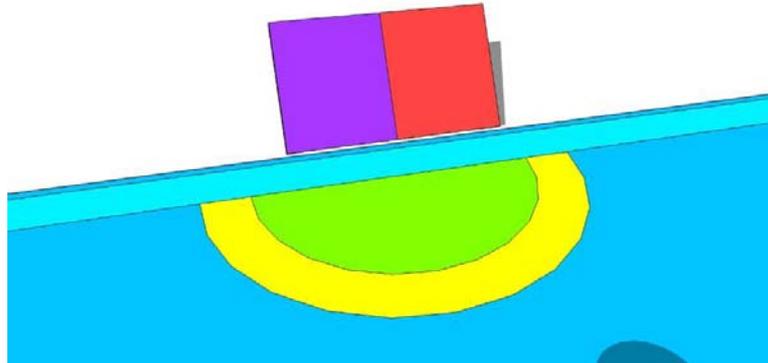


Figure 4 The treasure map

- The Tropical forest: Two pieces of fabric, identical in shape but of different colour (red and purple) represent the tropical forest. Pieces of Velcro pad are affixed at each corner of the fabric pieces (“hook” part of Velcro)

At the beginning of each game the tropical forest is hiding the whole map.

b. Action and constraints

Action

The robot must discover the map by completely removing the piece of fabric of its team colour. This action earns your team five coins.

Constraints

The robot must keep the piece of fabric with it during the match. Please remember to give it back to the referees before leaving the game area!



Figure 5 Treasure map at the end of the game



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2.4. The treasure of the island

A long time ago, pirate ships landed on Peanut Island, in the middle of the Pacific Ocean, in order to hide their treasures. They scattered their coins and their gold bars all over the island. Your robot pirates will have to gather and bring back in their ship as many coins and gold bars as possible.



a. Playing elements and position at the beginning of the game

For this action the robots have the following playing elements:

- Peanut Island is drawn in the middle of the playing area and has the shape of a peanut. It consists of two jungles, represented by green disks, surrounded by the beach (yellow area) that has the shape of a peanut.
- The palm-tree is a decorative element
- The Totems are made of fixed alternating layers of cubes and rectangular boards, forming a system of shelves. The shelves allow, at the beginning of the match, to place 4 coins on the first shelf, two gold bars on the second shelf and four coins on the top shelf. They are located in the middle of both jungles on Peanut Island. The dimensions and the exact positions of the totems are given in the appendix.
-

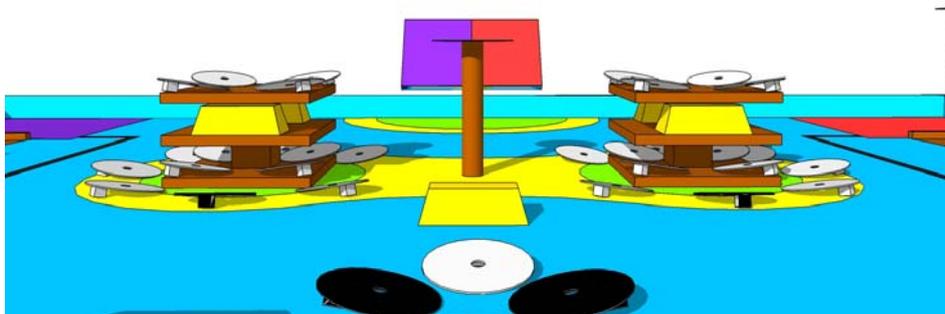


Figure 6 The two totems with coins and gold bars on the peanut island



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- The ships are represented by the brown parts painted on the playing area as well as the start areas. They are located along the side borders of the playing field, one on the red side and one on the purple side. Each ship is made of three parts:
 - The captain's bedroom, being the start area.
 - The hold is the portion bounded by a brown piece of wood on the side and on the front corners of the playing area. It's covered with a lid. This lid is initially closed and can be opened by any means to an angle of 45°. The opening is mechanically limited by a string on the side, outside of the playing field).
 - The loading deck is the brown coloured area located between the hold and the captain's bedroom.

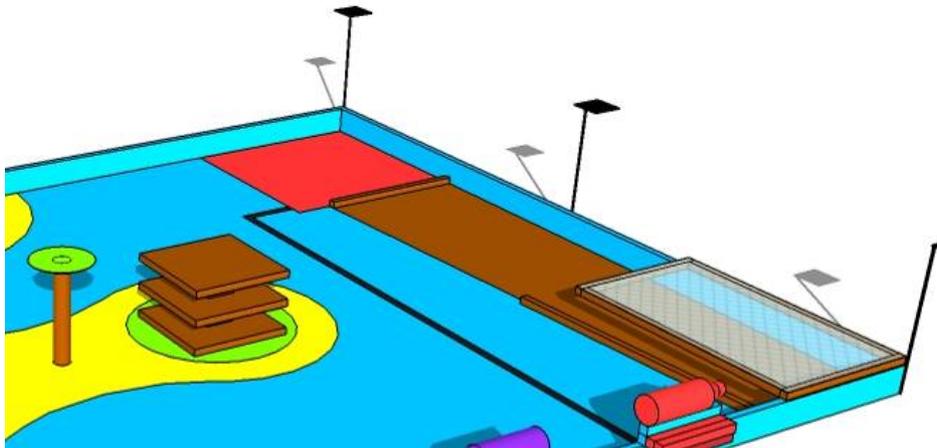


Figure 7 The three parts of the ship

- White coins are thin disks with a cube fixed on one of the sides, allowing it to be slightly raised, making the handling easier by the robots. There is a total of 38 pieces (black and white) on the playing area, that are common for both teams. The dimensions and the position at the start of the game are described in the appendix.
- Black coins are identical to the white ones but are black in colour. There are four black coins, which randomly substituted for four of the white coins before the start of the match. Coins located on the sea in front of the captain's bedroom are always white.



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- Gold bars are represented by trapezoidal pieces of wood, with the shape of real gold bars. They are yellow. There are a total of seven gold bars and they are common to both teams. The dimensions and the positions at the beginning of the match are described in the appendix.

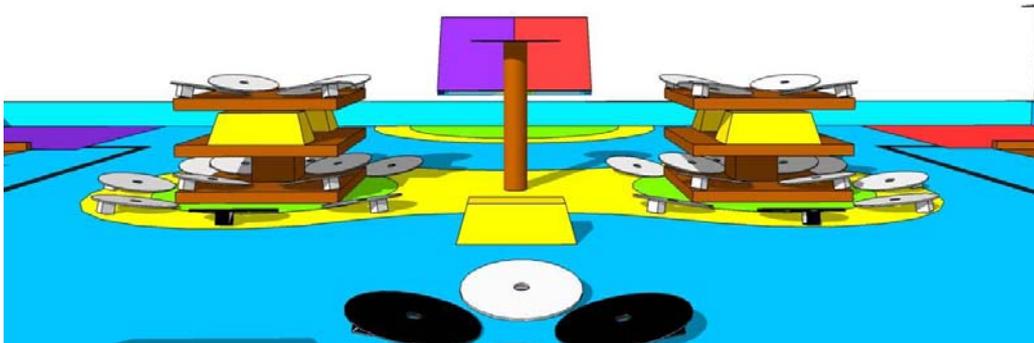


Figure 8 The white and black coins and the gold bars on the playing field

b. Actions and constraints

Actions

Each robot must recover as many gold bars and coins as it can, and bring them back to their ship (place them in the loading deck, the hold or the captain's bedroom). Caution: the black pieces of money do not count for any points!

To increase their treasure, the robots may go to their opponent's ship to get its treasure (gold bars or coins). When getting opponents treasure, it may only be taken from the loading deck or the hold, not the captain's bedroom! Note that the ship's hold is covered at the beginning of the match, but the robots are allowed to lift it.

At the end of the match, only the golden bars and coins completely contained within the area of the ship are counted. Each golden bar is counted as 3 coins and each coin as 1 coin.



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Figure 9 Example of playing field at the end of a match

Constraints

The robots are not allowed to go into the opponent's captain's bedroom.

Each team can store only a single gold bar and up to four coins inside its own captain's bedroom. No extra playing element will be taken into account when counting points.

Only elements on the loading deck and in the hold of the opponent's ship may be "stolen" by opponent's robot.

The elements within the opponent's ship's hold may be taken only if the cover has been raised up.

A coin or a gold bar is only recognized if its vertical projection is fully included in the boat. For the playing elements between the captain's room and deck load, the contact between the surface and the playing area will determine whether the object is considered in one or other area. In the absence of contact with the surface, the playing element will be invalidated.



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Bottles in the sea

All Peanuts Island's secrets have still not been discovered!

The pirates have left some enigmatic notes put into bottles and thrown in the sea. Robots have to find the bottles and discover their secrets.



a. Description of the playing area elements and position at the beginning

For this action, the robots have the following playing elements:

- bottles are represented with real plastic bottles, decorative. They are located on the outside of the border facing the public. The colours of the 4 bottles alternate (red-purple-red-purple). Each team can manipulate two bottles (the one of their start area's colour). A push-button device allows unrolling the message. At the beginning of the match, the push-buttons are not in contact with the border of the playing field, but they are in the axe of the required movement to validate the action.

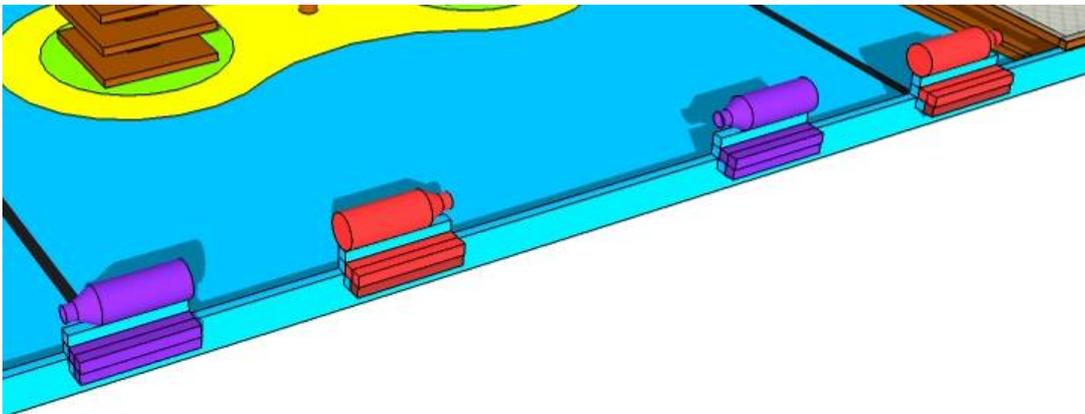


Figure 10 Bottles in the sea, containing messages

- there is a black line from the start area to the nearest bottle of the team's colour. Your secondary robots may choose to follow this line. Please note: the building of this secondary robot is optional.



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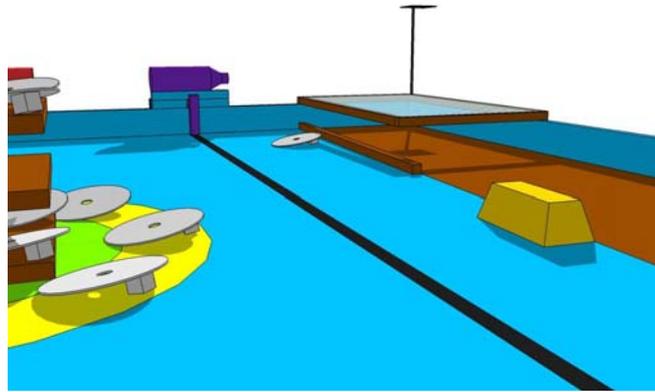


Figure 11 The black line connecting the start area to the nearest bottle of the same colour.

b. Action and constraints

Action

Each robot has to push the buttons of its colour against the border of the playing area in order to unroll the piece of fabric representing the message. Only buttons completely pushed against the border of the playing area will be counted. Each button completely pushed counts as 5 coins.

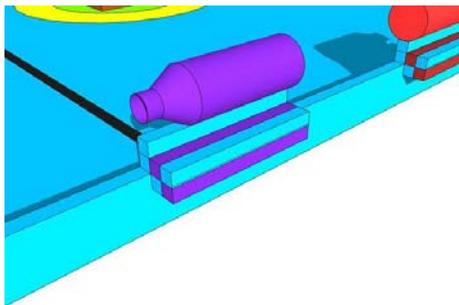


Figure 12 Invalid action

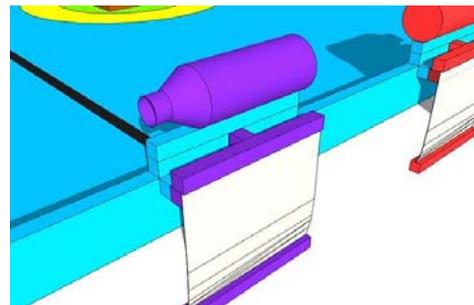


Figure 13 Valid action

Constraints

You should not push the buttons of the other team (otherwise you will give points to the other team).



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3. PROJECT PRESENTATION

Both Eurobot and Eurobot Junior encourage you to practice science through entertainment. One of the fundamental objectives is to assist and value your work and projects of this year. For this, we require you to make a Pilot study and a Poster.

3.1. Pilot study

Over the year, each team is required to submit a pilot study to the refereeing committee; the submission deadline is specified by your national organiser.

The purpose of this paper is to provide a clear and concise vision of your project focusing on 2 topics:

- General information (team, schedule, budget)
- Technical information (strategy, technical choices, etc.). It should include details about mechanics, electronics and the software your team plans to use. If possible, your pilot study should include illustrative diagrams and pictures. This part must be written using a template (downloadable from the registration website).

The goal of the pilot study is not to give the teams more work, but to help them complete their project successfully. The refereeing committee will study it in order to identify possible misunderstandings of the rules, etc. as soon as possible in the development process. Thus it will allow us to recognize doubtful solutions and to help teams to avoid failure situations.

3.2. Technical poster

Each team is required to provide a technical poster.

This poster should present information related to the design of the robot (drawings, technical references, design specifications, etc.). It should be at least DIN A1 (594x841 mm) in size, and ideally should be printed. The poster is intended to promote exchange and communication between teams.

Effort should be made to make the poster understandable to a non-technical audience. Ideally the poster should include pictures and diagrams to help explain the concepts.

The poster must also include:

- the name of the team,
- the names of the team members,



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- the nationality of the team.

This poster will be displayed in the team's pit. An English version of the poster must be supplied. Optionally, the team can provide other language versions as well. The poster must be supplied to the Eurobot association in PDF Format. The chosen resolution of the PDF must guarantee that all texts on the poster will remain readable. If possible, the file size of the PDF should remain below 25 MB. The PDF Version of the poster may be sent to Eurobot beforehand via your National Organising Committee, or may be provided on CDROM or USB key at the time of the competition, during the approval of your robot.

In general Eurobot encourages the teams to communicate about their projects, for example by posting information on Internet, in the Eurobot forums, etc.

4. THE ROBOTS

4.1. General notes

- Each team can use up to two autonomous robots, a "Main Robot" and a "Secondary Robot" with different dimensions.
- Building the secondary robot is optional. One of these objectives is to allow teams with many members to work on a second project. It is recommended for novice teams to focus on building a single robot first. Indeed, it is better to have one robot that works well instead of two that don't move!
- The path leading to the playing fields may include stairs, especially when accessing the stage. Two team members only are allowed into the backstage area and on the stage. Therefore, we recommend to develop easily transportable equipment.
- The "Secondary Robot" can play only with the "Main Robot" with which it was designed and approved. It cannot be "re-homologated" with another "Main Robot".
- Except in front of his own boat, a Main or a Secondary robot must not block the robot(s) of the other team. If the referees suspect such action is intentional, the team may be penalized.
- A robot may not cause intentional damage to the opponent robot, the playing area, or any of the playing field elements.



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- The Main Robot and the Secondary Robot must both be made of conjoined parts (they cannot drop parts or components on the playing field).
- It is not fair play to use colours or objects in the construction of your robot(s) that look similar to the elements of the playing field. This can confuse the opponent. This detail will be checked during the approval of your robot.
- Robots may not attach themselves to the playing field (e.g. by using suction). At any time during the match, the force required to lift the robot must not be greater than its own weight.
- Robots will not be approved if they are using systems that deliberately vibrate the table or use systems designed to make any other illegal action. If you have any doubts please contact the referees.
- Be creative! For example, as an innovation but also to provide to the public and the media an attractive show, your robot can use sounds, display expressions...

4.2. Dimensions

Warning: In order to facilitate Eurobot Junior participants to take part to Eurobot, in this year rules the size of the Main Robot and the Secondary Robot are changed. The dimensions are the same for both contests and a robot built for Eurobot Junior is potentially approvable for Eurobot.

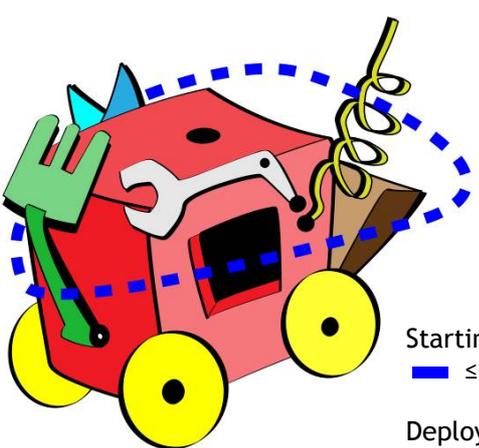


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Dimensions of the Main Robot and the Secondary Robot.
We measure the perimeter of a robot as in the attached drawing:

Main Robot dimensions:	Secondary Robot dimensions:
 <p>Starting position ■ ≤ 1200 mm</p> <p>Deployed configuration ■ ≤ 1600 mm</p>	 <p>Starting position ■ ≤ 800 mm</p> <p>Deployed configuration ■ ≤ 1000 mm</p>

The perimeter of the Main Robot should not exceed 1200 mm at the time of departure. The perimeter of the Main Robot fully extended must not exceed 1600 mm during the match.

The perimeter of the Secondary Robot is independent of Main Robot's. It should not exceed 800 mm at the beginning and not exceed 1000 mm fully extended during the match.

The height of the Main Robot and the Secondary Robot must not exceed 350 mm, excluding beacon support and possible sensors and electronic circuits associated to the beacon and integrated in the beacon support's mast.

However, it will be tolerated to have the emergency stop button exceeding this height limit to 375 mm.



In any case, at the beginning of the match the set (Main + Secondary Robot) may not exceed the start area. An exception is granted for the parts of the secondary robot needed to follow the line.



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4.3. Energy Sources

- All forms of energy sources stored in the robot are allowed (batteries, springs, compressed air, gravitational energy...), with the exception of energy sources with use of chemical reactions like combustion or pyrotechnic processes, which are prohibited for safety reasons. In addition, the use of corrosive products is prohibited and the splash of liquids is not allowed.
- If you have any doubt about an unusual energy source, ask the refereeing committee ahead of time.
- To avoid the risk of fire it is requested to pay special attention to the choice of conductors, depending on the intensity of current passing through them. It's also recommended to protect the wiring with a fuse, wired to the nearest battery.

Battery

Robots must be able to play three consecutive games. Note that this includes the time required for the stand by, during which the robot is powered on and waiting to start. Therefore, we strongly recommend that teams bring several sets of batteries, and provide easy access to them in the robot for their replacement, keep permanently a set of batteries fully charged.

For Note on the use of Lithium-based batteries see chapter 4.5.5

4.4. Other design constraints

4.4.1. Visibility

Two rectangular areas of 100 x 70 mm should be left free on two sides of the robot (choice of the sides left at the discretion of the team).

The teams will receive stickers printed by the organization (number of the team, sponsors of the event). These stickers must be placed on these 2 rectangular areas.

Teams are strongly encouraged to make visible the mechanism inside the robot(s). This in order to allow the audience and other participants to see how the transport of elements is managed inside the robot(s).



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4.4.2. Starting cord

The robot(s) must be equipped with a starting device that shall be easily accessible on the robot. It shall be triggered by pulling a cord at least 500 mm long. This cord shall not remain attached to the robot after it has been started. Any other system (remote control, toggle switch directly activated by hand, etc.) will not be approved.

4.4.3. Emergency OFF button

The robots must include an emergency off button, with a diameter of at least 20 mm painted in red (for example a safety emergency stop button). It shall be placed on the top of the robot, in a conspicuous position and in a zone that is not dangerous and that is immediately accessible to the referee at any time during the match. The stop button must be actuated by a simple downwards motion (such as a hit with the fist).

Pressing the emergency button must result in the immediate shut down of all of the robot's actuators, leaving them limp (not actively braked nor energized).

4.4.4. Automatic shutdown

All autonomous robots shall accommodate a system that shall stop the robot automatically at the end of the 90 seconds match duration.

4.4.5. Obstacle avoidance system

Teams are required to equip their robots with an obstacle avoidance system. The system is intended to prevent collisions between robots, and resulting damages, during a match,

This will be systematically checked during approval. Teams are not allowed to disable deliberately their avoidance system after the approvals.

4.4.6. Robot localization beacon support

It is strongly recommended to design the robot(s) with a support to accommodate a localization beacon prepared by the opposing team.

If desired, the support can be designed to be detachable, so that it is only used if the opponent needs it. In this case the design must allow the support to be quickly installed before the match.



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However, a team may choose not to propose a beacon support. In this case, if the opponent has a beacon and wants to use it during the match, the team will be disqualified (for the match) for not providing the support.

The beacon support shall at all times comply with the following constraints:

- It is an 80x80 mm square surface, located 430 mm above the floor level, allowing placing the other teams beacon.
- The platform surface of the support shall be fully covered with Velcro™ (rough "hook" side)
- This area must be in the middle of the undeployed robot and must remain as centrally as possible on the deployed robot.
- The structure supporting this platform must stay within the vertical projection of this platform
- The mast can only host sensor and electronic circuits
- The mast should be stable and must be able to support at least a weight of 300 g.

4.5. Safety

4.5.1. Overview

- All the systems (robot(s) and beacons) shall respect existing national and European laws and specifications. Specifically, the systems used shall comply with legal safety regulations and must not endanger the participants or the public both during matches and in pits and backstage.
- The robots must not have any protruding or sharp parts that may be able to inflict injury or to be dangerous.
- The use of liquid, corrosive, pyrotechnics and of living things is prohibited.
- All robots must comply with the legal standards concerning "low voltage". Therefore, the internal voltage of the robots shall not exceed 48 V.
- It is permitted that potentials higher than 48 V exist, but only inside sealed commercial devices (such as lasers or LCD display back lighting) and only if these devices have been left unmodified, and if they comply to national and European regulations.
- As a general rule, any device or system considered as potentially dangerous by the referees will be rejected. It must be removed from the robot prior to competition, or will result in the team's disqualification.



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4.5.2. LASERS

Only considerations based on laser class definition (in the “EN 60825-1:2007, Edition 2 -Safety of laser products- Part 1: Equipment classification and requirements” standard) will be taken in account. Teams using a laser will have to provide the classification notice of the equipment, or the data sheet of the laser component. Not being able to provide such documents will prevent the robot to be approved.

Based on the classification, it is allowed to use lasers of Class 1, 1M, (2, 2M). All other classes (3R, 3B and 4) are strictly forbidden.

Lasers class 2 and 2M are accepted if and only if the laser beam is never projected outside the table.

CAUTION: disassembling or modifying devices using laser sources often leads to a change of class. The laser devices should be used in the state of their marketing (laser device = Source + Electronics + Optical).

4.5.3. Powerful lights

When high intensity light sources are used, be aware that the light intensity can be dangerous for the human eye. Note that some commercially available high power LED devices can exceed this limit. Be responsible! Your machines are evolving in front of an audience that is not informed of the specificities of each robot!

4.5.4. Compressed air systems

All pressure systems must comply with the “Conseil Général des Mines” Decree 63 of January 18, 1943 and Ministerial Order of July 25, 1943:

- Maximum service pressure: 4 bars
- Maximum pressure x Tank volume < 80 bar.liter

4.5.5. Lithium-based batteries

This type of battery is allowed under the following conditions:

- A suitable charger must be shown at approvals
- Li-Ion Batteries are permanently contained in special fireproof bags (either inside the robot or on the stand, even in storage)

A system to detect underloading is also highly recommended



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These conditions apply except in the case of Lithium-based batteries used in LEGO Mindstorm/laptop/cell phone, as long as:

- they are not removed from the initial device
- they are used for the use intended by the manufacturer.

5. BEACON LOCATION SYSTEM

5.1. General points

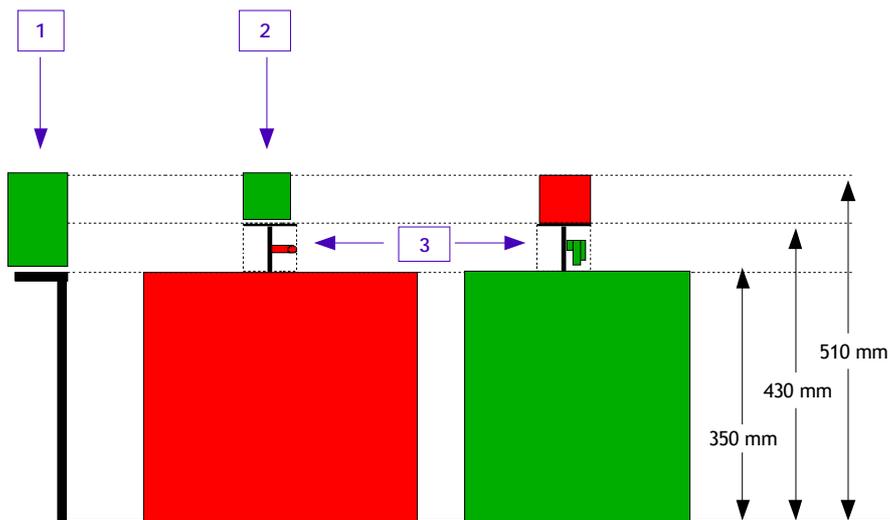
The playing field includes beacon supports for the teams wishing to develop beacon-based localization system.

The beacon supports are placed on the playing field and on the robots as described below. They are positioned outside of the table.

The bottom sides of the beacons (fixed ones and embedded ones) must:

- be equipped with a Velcro (loops side) so that it can be fastened to the supports.
- stay on their supports during the whole duration of the game.

All the safety rules regarding the robots also apply to the beacons.



Legend:

- 1: fixed beacon (maximal size L x W x h: 80 x 80 x 160 mm)



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- 2: embedded beacon (maximal size L x W x h: 80 x 80 x 80 mm)
- 3: support's mast (can accept sensors and associated elements only if they remain inside the vertical projection of the support)

5.2. Localisation Beacon placed on the robot

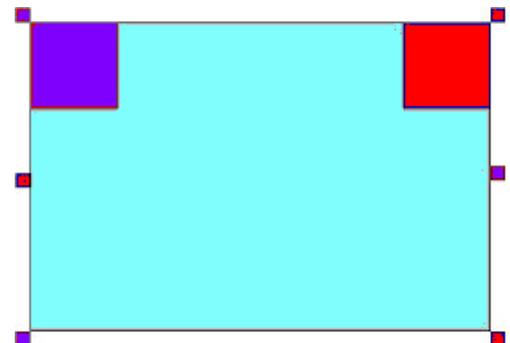
A beacon can be placed on the opposing robot in order to localize it. This beacon must be fixed on the dedicated support on the opposing robot. The maximum size of an embedded localisation beacon is a cube of 80 mm side. According to fair play, the elements used in the beacon must have a real use. The topside of the beacon must be covered with Velcro (hooks side) in order to receive the identification tag of the robot with the same colour as the team.

5.3. Fixed Beacons

Each team can place a beacon on each of the fixed support attributed to the team and placed around the playing field. (See appendix for the allocation of beacon support to each team)

The beacons must be fully contained in a square base of 80 mm sides and must be no taller than 160 mm height.

The fixed beacons can be connected to each other by a cable. This cable must not disrupt the match. The installation of the whole system must be possible in the 3 minutes allowed for the preparation of the game and must not disturb the opposing team.



5.4. Communication signals

In order to prevent interference between the two teams, it is recommended to code the communications signals. We strongly recommend to teams using infrared devices to take into account the strong lighting conditions used during the games. Moreover, those lighting conditions can change during the game, and may vary depending on the location of the playing field in the room.

We also remind you that the organisers' teams often use high frequency radio devices and that they cannot, in any circumstances, be held accountable for any malfunction experienced by the robots.



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5.5. Robot Identification

During the game, the robots will be assigned a coloured tag in the form of a small module in the colour of the team. This marking is intended to help the public understand which robot belongs to which team.

The weight of this tag module is negligible, and is placed on the beacon support of the robot.

6. THE MATCHES

Every match lasts 90 seconds.

Only 2 members from each team are allowed to access to the stage area (and backstage).

6.1. Set up

Initially, the playing elements and the playing field are placed as shown in the drawings in the appendix.

Upon arrival at the playing field, both teams have 3 minutes to prepare their robots.

Then the referees or the stage team randomly remove 4 white coins and replace them with 4 black coins.

A robot that is not ready when the 3 minutes deadline is reached is disqualified for the match. Please note that the other team's robot will have to play the match alone on the playing field and score some points to be declared the winner.

When both teams have prepared their robots, the referee asks the participants if they are ready. No objection regarding the placement of the playing elements will be accepted after the beginning of the match.



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6.2. The match

Once the referee gives the start signal, the robot is turned on. Under no circumstances it is allowed to touch the robots, the playing elements or the playing field during the match. Any manual intervention on a robot, a playing element or the playing field, without explicit permission from the referee can lead to a disqualification for the match.

No element accidentally falling from the playing field may be put back before the end of 90 seconds.

At the end of the game, no one but the referee can touch the robots or the playing elements. The referees count the points; they give the match result, including the points scored by each team. If both teams agree, they sign the score sheet, and can then pick up their robot and return to their pit. If the teams do not agree, they talk things through calmly. The robots remain in place until the dispute is resolved. Refereeing decisions are final.

In the event of an undecidable situation, the referees reserve the decision to replay the match.

If neither of the two teams has scored during the 90 seconds, the match result will be a double defeat.

A team is declared disqualified for the match either when none of its robots entirely exit the starting area during the match or as a result of a referee's decision.

6.3. Scoring system

This year, at the end of a match, the points are counted as "coins". The referees will count the points for each team as follows:

- 5 coins for the discovery of the map.
- 1 coin per coin brought into the hold, the deck, or the captain's cabin.
- 3 coins per gold bar brought back in the hold, the deck, or the captain's cabin.
- 5 coins per button completely pushed against the edge located under the bottles.



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Penalties

A penalty results in a loss of 5 coins on the match scoring and the global classification rank. A negative score will be rounded to 0.



Reminder:

Penalties are intended to compensate for damage or disadvantages occurring after an incident during the course of a match. A penalty situation is considered as a non-compliance with the rules: such situation must remain exceptional! In case of repeated penalties by a team, the referees reserve themselves the right to declare the team permanently disqualified. The refereeing committee will also pay attention to the cumulated penalties allocated during the qualification phases (regional if some, national).

7. CONTESTS

7.1. Forewords

Eurobot events are organised up to 3 levels:

- Regional qualifications organised when much teams from the same country register to participate (actually the case only for Eurobot Junior in France). It allows qualifying locally teams for the national qualification.
- National qualifications: in countries where more than 3 teams are registered, it allows the qualification of 3 teams for the International finale.
- International finale: it brings together, always in the same friendly spirit, teams:
 - qualified on the previous step, or coming directly to the final (countries with less than 3 teams registered)
 - mostly coming from different European countries, but also from countries outside Europe.

7.2. Approval phase

- PreApproval: Before the matches begin, the robots are reviewed by a referee who checks their compliance with the rules. The robots should be capable of demonstrating all of their possible actions.
- Approval: Robots must, within 90 seconds, demonstrate at least one point-scoring action. The robots are tested under match conditions, but without the presence of another team. Some specific features stated in the rules can



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also be checked (timer, avoidance of the opponent for autonomous robots, etc.).

- If the set composed of the main robot and its secondary robot meets these requirements, it is declared approved.
- Significant technical changes after approval. It is mandatory to inform the referees of any significant change (functional, structural, dimensional...) made to the set of robots after its approval. The referees will then verify the changes and may repeat the approval process if they consider it is necessary.

7.3. The qualification rounds

During the qualifying rounds, the approved teams will be able to participate in at least 3 matches (sometimes more, when organisers decide so). After each match, each team is awarded additional points as follow:

- in case of victory: number of accumulated coins + 10 bonus coins
- in case of draw: number of accumulated coins + 5 bonus coins
- in case of loss: number of accumulated coins + 2 bonus coins
- in case of disqualification: no coin

In order to determine the teams qualified for the final round, a ranking is set up, based on points accumulated during the qualifying rounds.

At the end of the qualifying rounds, in case some teams are tied, they will be ranked by comparing their scores without considering the bonus points. In the case the teams are still tied, the referees may decide to organise extra matches. In this case, pairs of teams competing for the same place will be randomly drawn, and the winner of the resulting matches will move on to the final round. In case of an odd number of teams, one extra match will be drawn at random and played on the same basis.

7.4. The finale round

After the qualifying rounds, the first 8 or 16 teams (depending on number of approved teams) will participate to the final phase according to Figure 14.



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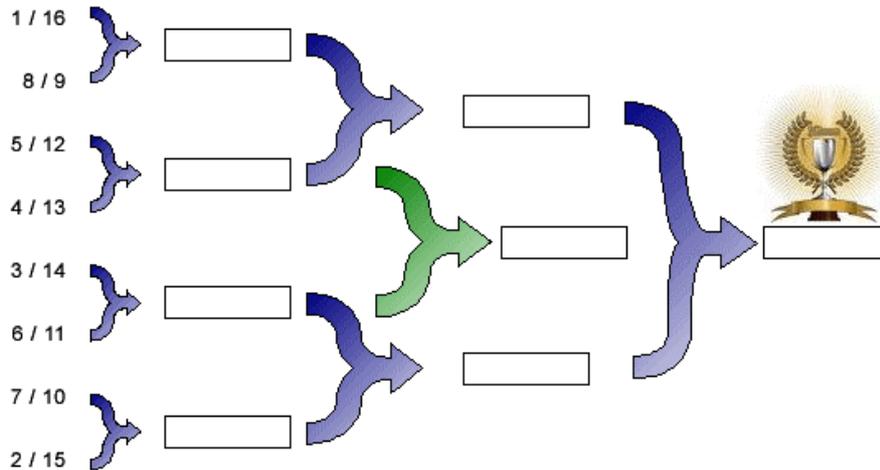


Figure 14 Final phase scheme

The games of the final round are on a knockout basis.

In case of a double disqualification, double defeat or a tie, the match is played again immediately; if this second game is still a case of double disqualification, double defeat or a tie, the winner will be determined according to the points accumulated during the qualification rounds.

The matches for first and second places will be played as "best of three". Watch out: for autonomous robots, make sure to have enough batteries.

7.5. Qualification for the national final

Where there are regional qualifications (like in France), the number of teams qualified at the regional level is proportional to the total number of teams registered at the national level.

Each Local Organising Committee:

- must send to the national finale the teams ranked in the best positions in their regional qualification (at the end of the qualifying rounds, not at the end of the finale round)
- can choose one team freely (a special prize like creativity, fair play, communication... or a team well ranked)



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7.6. Qualification for the international finale

Each country participating in Eurobot and / or Eurobot Junior organises a national meeting to determine the teams qualified for the international phase. The National Organising Committee:

- must send to the international finale the teams ranked at the first and second position in their national qualifications (at the end of the finale round, not at the end of the qualifying rounds)
- can choose the third team freely (a special prize, or the team arrived in third position, etc.)

The organisers of the international final of Eurobot and / or Eurobot Junior reserve the right to open the final meeting to more than 3 teams per country, and in this case will inform the National Organising Committees as soon as possible.

For questions and comments, a volunteer from the refereeing committee will answer you on the forum, in Eurobot, Eurobot Jr sections
<http://www.planete-sciences.org/forums/>

Website of Eurobot and Eurobot Junior
(Contains links to National Organising Committees)
www.eurobot.org

The whole organisation team wishes you much fun and success for the coming months, and looks forward to seeing you soon around a playing field for
TREASURE ISLAND!

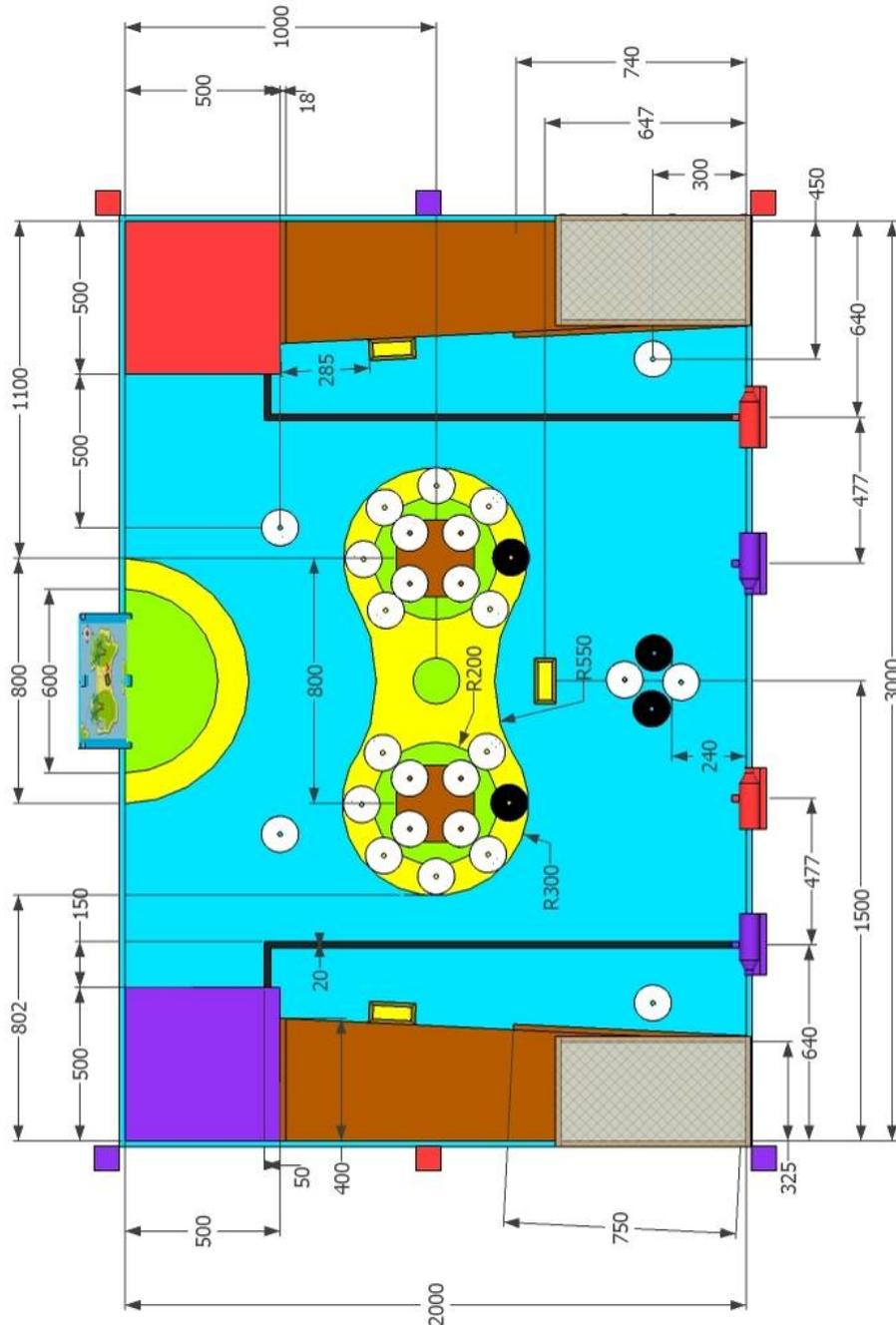


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8. APPENDIX

8.1. Playing area - Top view



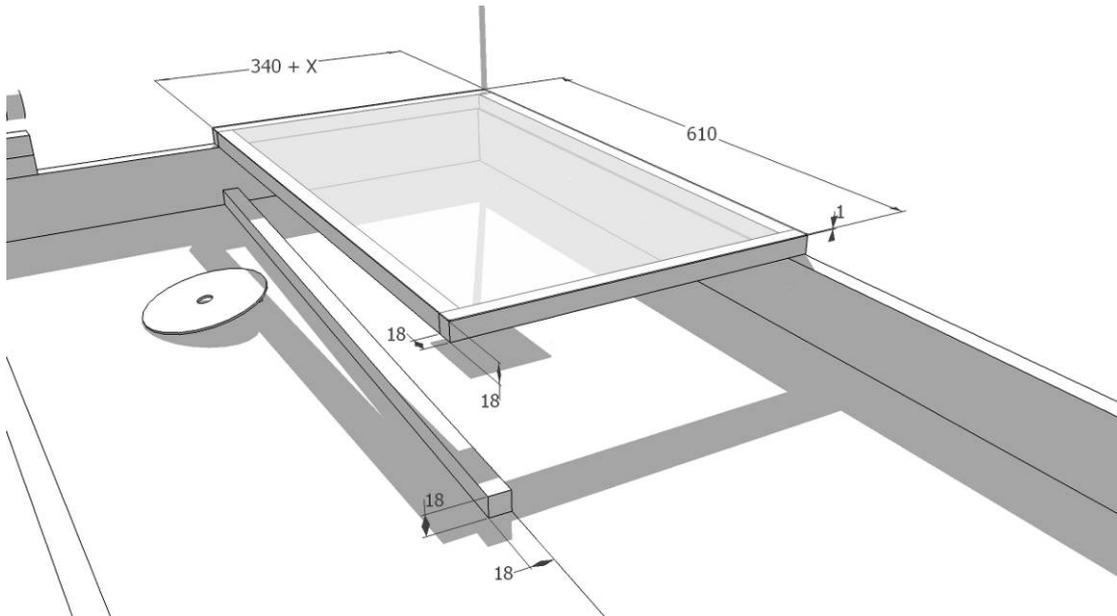


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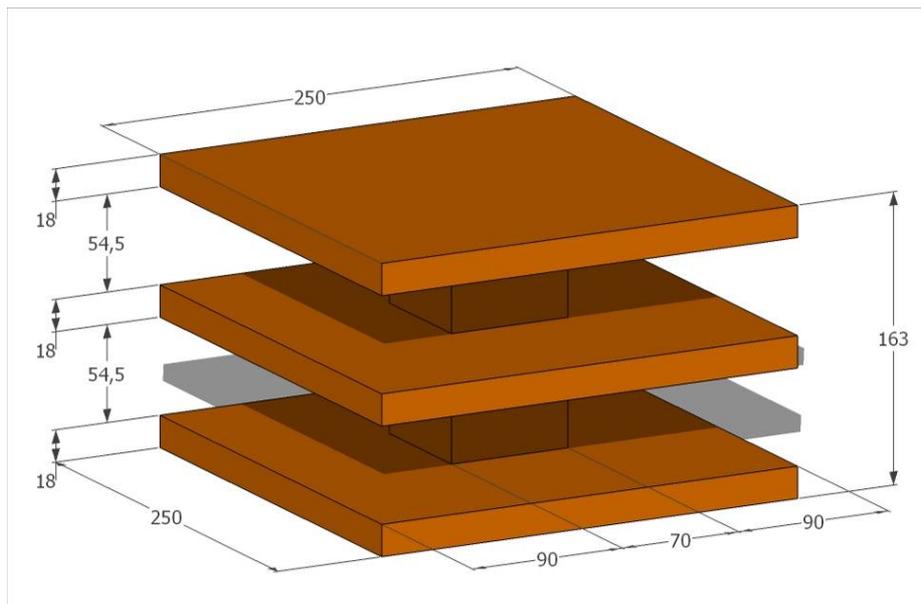


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8.2. Cover of the ship's hold



8.3. Totems



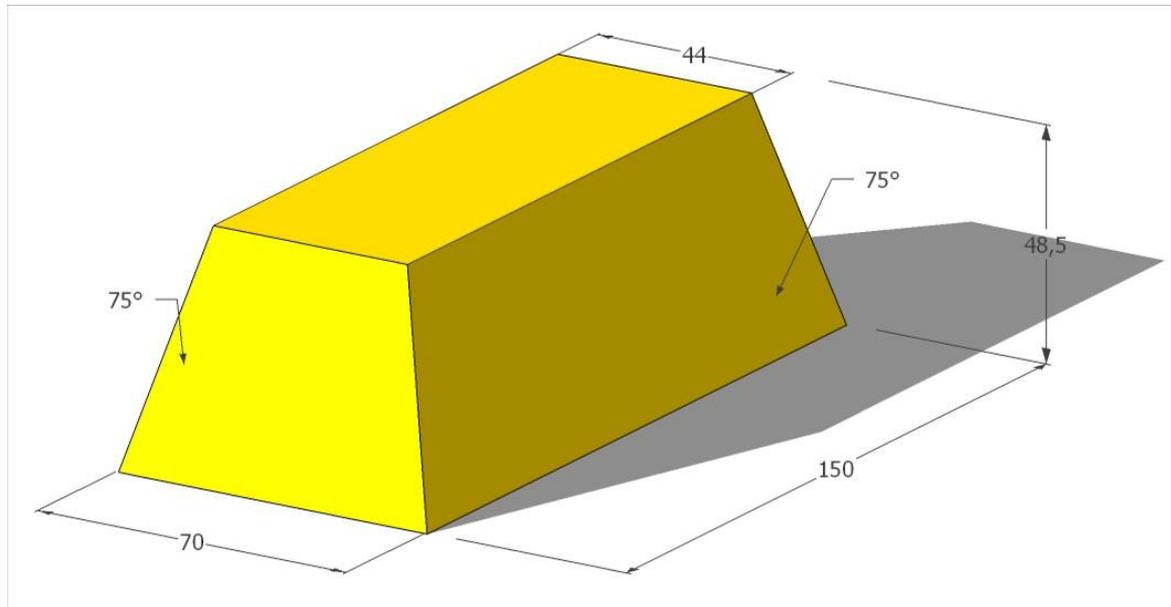


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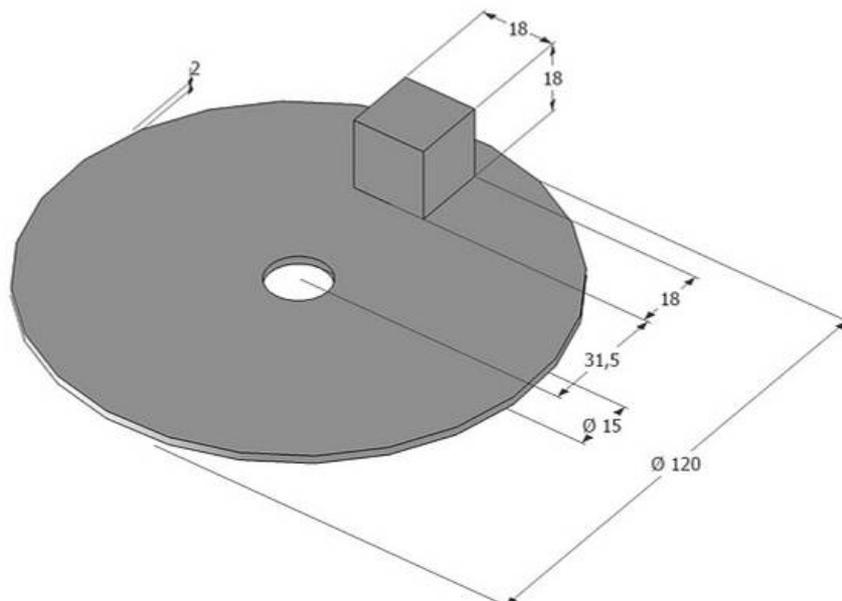


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8.4. Gold bars



8.5. Coins



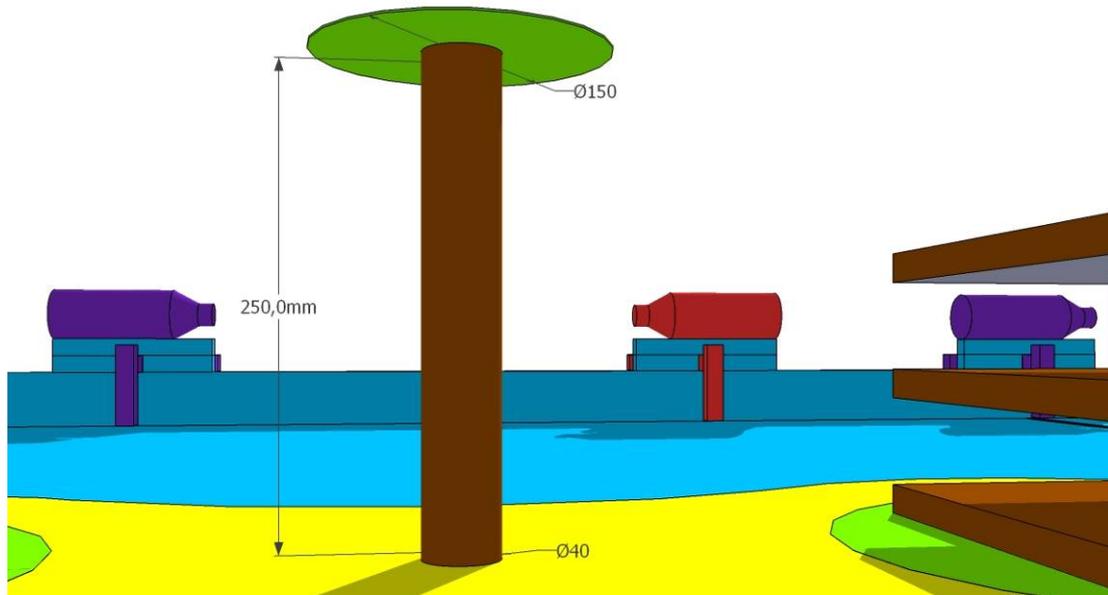


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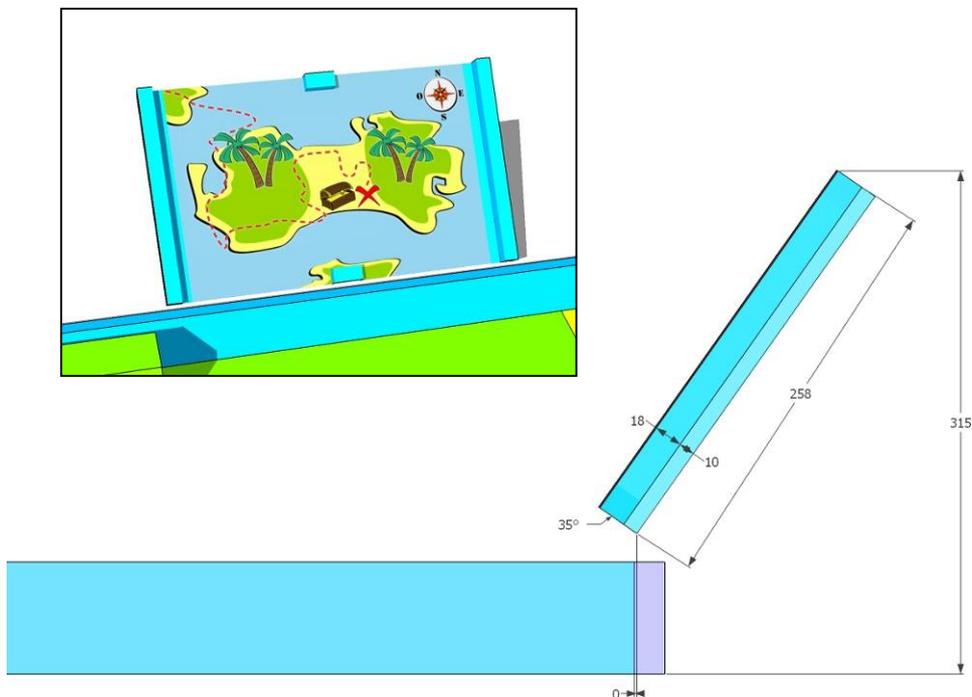


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8.6. Palm-tree



8.7. Support for the treasure map



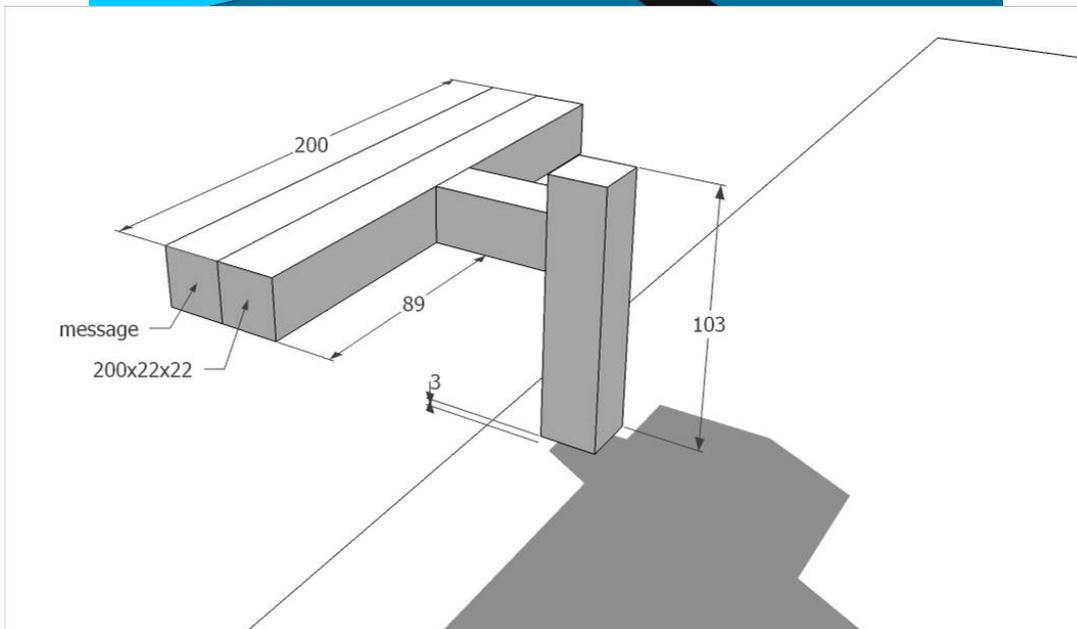
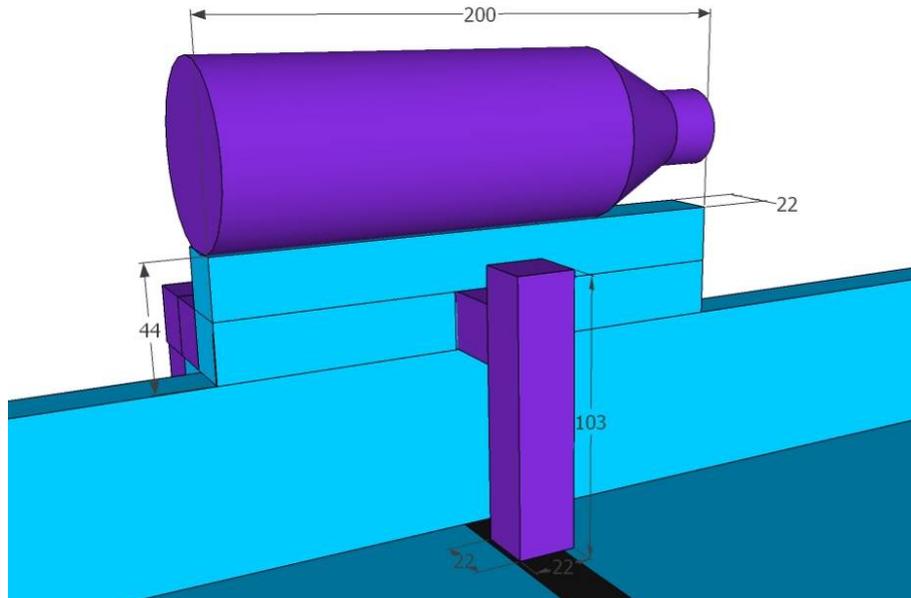


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8.8. Bottle's support and button





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8.9. Paints references

Area	Colour	Reference
Sea (main game area)	Clear blue	RAL 5012 Matt
Island sand, Gold bar	Yellow	RAL 1023 Matt
Start zone, Bottle, Button	Red	RAL 3001 Matt
Start zone, Bottle, Button	Purple	RAL 4008 Matt
Jungle, Island on the map	Yellow-Green	RAL 6018 Matt
Boat, Totem, Palm tree trunk	Brown	RAL 8002 Matt
Line (for secondary robot)	Black	RAL 9005 Matt

8.10. Material references

Elements	Material	Comment
Playing area	Wood	unknown density
Gold bar	Wood	unknown density
Coin	CD-ROM	-
Booster for coin	Wood	unknown density
Cover of the ship's hold	Plastic	unknown density Transparent
Map	Paper	A3
Bottle	Plastic bottle	0,5 litter

The density of the wood used may vary from one country to another. Consequently the weight can change significantly. That's why teams are recommended to test their robot with several types of wood.

The density of plastic may vary from one country to another. We recommend the use of polycarbonate for its robustness to shocks.