Eurobot Junior contest General Rules

OFFICIAL 1.0 version

NOTE: all images in this document are provided as a guide to illustrate the various paragraphs. In no case they can serve as a reference. Only the dimensions, colors and materials indicated in the appendix shall be taken into consideration.

. Contents

A. NOTICE

Changes or clarifications of the rules may be made during the year. We therefore strongly encourage all participants to check our website regularly (www.eurobot.org/) as well as your National Organization Committee (NOC)[1] own website for news. You can also follow discussions, ask questions or get further assistance on our faq (www.eurobot.org/faq/).

Possible changes of the technical specifications will be announced on the Eurobot website, (www.eurobot.org/) or on the website of the National Organization Committee (NOC) in your country.

The FAQ responses from a referee are official responses taken into account for match refereeing and homologation stages.

In case of doubt regarding any point of the rules or the approval of robots, the referee committee may also be contacted at referee@eurobot.org.

Please note that the version of this release is noted down at the end of this page. For any inquiry, only an OFFICIAL version should be considered.

Common parameters of the rules can change from one year to another. Accordingly, please read the rules carefully even if the chapters may seem familiar to you.

Have a good reading!

[1] Contacts and website of the National Organization Committee can be found on www.eurobot.org/noc

B. CONTEST PRESENTATION, OBJECTIVES AND VALUES

The Eurobot and Eurobot Junior robotics contest are two international amateur robotics competitions, which take place in Europe, and which are open to all young people in the world gathered within a club, a group of friends or a school setting. The technical challenge for the Eurobot Junior contest consists of building a wire-guided or remote-controlled robot. The robots of the different teams are required to participate in matches during different meetings organized from January to June.

The rules for both contest, Eurobot and Eurobot Junior, are based on the same concept. As organisers, we intend to provide a common platform for the Eurobot event. This platform is dedicated to autonomous robots for Eurobot while for Eurobot Junior, the robots are remote controlled. In this way, a Eurobot organiser can easily set up a Eurobot Junior contest and vice versa.

B.1. OBJECTIVE

The shared aim of the Eurobot and Eurobot Junior robotics competitions is to give young people the opportunity to engage in their own learning and put their theoretical and practical knowledge into practice, by taking part in a fun and friendly event.

B.2. VALUES

Born in Europe, the Eurobot and Eurobot Junior robotics competitions share as fundamental values the European values of human rights, and respect for human dignity, equality for all and freedom of people and ideas.

The Eurobot and Eurobot Junior robotics competitions seek to act, at their humble level, through sharing and interculturality, to help young people grow, enrich themselves culturally and be protagonists of their own futures.

As an actor in popular education and as a youth movement, the competitions and their volunteers are convinced that bringing people together through scientific, technical and fun projects is a way of expanding our limits in a friendly atmosphere where everyone is and always will be welcome.

The Eurobot and Eurobot Junior meetings are prepared passionately throughout the year by volunteers of all nationalities who believe in the educational values of this experience and are themselves, often, former participants. The Eurobot and Eurobot Junior robotics contest promote the involvement of young people in scientific and technical projects as well as in international projects.

C. RULE STRUCTURE

The Eurobot and Eurobot Junior robotics contest are subject to a set of rules which are set out in various supplementary documents:

- **The general rules of the Eurobot Junior contest**, which are specific to each competition and define the general regulatory framework applicable to all official meetings;
- **The annual rules of the game**, which are common to both competitions, Eurobot and Eurobot Junior, and describe the specific rules for each edition.

For any meeting, **general conditions of participation** may be added by the meetings organizing committee. Those conditions may add additional rules, or clarify the existing rules, to ensure a smooth running of that meeting.

You're currently reading version
Eurobot Junior OFFICIAL 1.0 of general rules.
(this version concerns only the remotely operated robots)

These regulations define the general operation of the competitions, their procedures, the constraints applicable to the different technical components and the running of the matches.

This document must be supplemented by reading the annual game rules.

D. MAIN REGISTRATION REQUIREMENTS

D.1. TEAM MEMBERS

A team is a group of at least 2 young people who have built a robot as well as the associated components for one of the meetings organized as part of one of the Eurobot or Eurobot Junior contests.

A young person can only be part of one team[2] within a competition[3]

A team participating in Eurobot Junior must have at least one supervising member.

D.2. PARTICIPANT MEMBERS AND SUPERVISORS

A team and its project can be supervised by individuals (teacher, parent, facilitator, etc.). The role of these supervisors is to support, advise and transmit skills. Supervisors are not considered as *participating members* of the team, but as *supervising members*.

All elements of the robot(s), and associated components, must be imagined, designed and assembled by the *participating members* of the team.

During a meeting, the *supervising members* do not have the right to directly modify the robot.

The *participating members* of a team must be able to explain how the robot and their project work without the presence of the *supervising members*.

The organizers of a meeting reserve the right to refuse a team's participation at any time if one of its robots has visibly been imagined, and/or designed and/or assembled by one of the *supervising members* and not by the *participating members*.

D.3. AGE LIMITATION OF THE PARTICIPANTS

Participants in the Eurobot Junior finals must be aged up to 18 years old included during the year of the final meeting.

Be careful, depending on your country's educational system, this age limit may be slightly different. Check the general conditions of participation produced by your National Organizing Committee.

D.4. TEAM REGISTRATION

A single organization (club, school, etc.) can supervise and register several teams.

Team registration must be done in accordance with the registration procedures provided by your national organizing committee.

[2] However, we encourage the exchange of experiences between teams.

[3] Note that a young person can be part of a team in each of the Eurobot and Eurobot Junior contests if they meets all the conditions applicable to participants in these contests

D.5. TEAM NATIONALITY

The nationality of a team is defined by the address of the organization which supports the team (club, school, etc.). A team can be composed of members of different nationalities.

D.6. SAFETY AND DECENCY

The Eurobot robotics contests take place with attendance of the general public and families. Consequently, teams must respect the rules of decency and safety (electrical, noise level, etiquette, etc.) applicable in the country of the meeting.

These rules apply equally to participating and supervising team members as well as to supporters of the team and the equipment they bring.

E. PROJECT PRESENTATION

The meetings organized as part of the Eurobot and Eurobot Junior competitions are first and foremost an opportunity to play with science. The main objectives of these meetings are to support and promote your work and projects over the year.

To achieve this, a poster is required, and the organizers may also ask you to create a technical documentation.

The robots must be aesthetically pleasing and, if possible, in keeping with the theme of the rules. Showing creativity and originality will enhance your work as much as having an efficient robot during its matches.

The communication of your project and the visual rendering of your robots will be highly valued, both for the visitors who come to meet you and for your own satisfaction at having achieved something aesthetically and functionally accomplished.

As in previous years, the presentation of your team's project (work carried out over the entire project duration, task distribution ...) as well of your robots (technical systems implemented, chosen strategies ...) is an integral part of the event. Teams should present their projects in a way that is easily understandable and visible to other participating teams and the public.

E.1. CONSTRAINTS

The presentation of the team's project must be made on an A1 (594 x 841 mm) minimum size panel, the medium of this panel is left to the team's free choice [4].

E.2. EVALUATION

The project must be presented to the referees and / or guardian angels during the homologation of the robot, or before the meeting, to enable the teams to show all their work. This presentation will be taken into account in the homologation sheet.

[4] If you wish to use other visual media than paper, this is entirely possible. Let your imagination run wild!

F. THE ROBOTS

F.1. FOREWORDS

Each team must homologate a main robot and can homologate other additional and optional components. Each of these components has specific dimensional constraints, but it must be possible to distinguish its components from those of other teams from the public.

All additional components can only compete with the main robot with which they have been designed and homologated. It cannot be re-homologated with another main robot.

The main robot and additional components must be made up of elements that are connected to each other (so robots cannot leave parts or components on the playing area), with the exception of play elements.

Each team must design a unique and original set of robots, specific to their team. This set includes:

- a wire-guided or remote controlled main robot.
- one or more autonomous SIMA (optional).

A team can, if it wishes and has the time, design several main robots. But these will have to be homologated individually; and for each match, only one robot can be taken backstage and placed on the table.

Be imaginative! For example, as an innovation but also to offer the public and the media an attractive show, your robot can use sounds, display expressions, etc.!

The construction of optional components is not mandatory. The aim is to allow teams with many members to work on a second project. It is recommended for beginning teams to concentrate on building a single functional robot. One well-functioning robot is better than several that don't move.

F.2. USE OF COMMERCIAL COMPONENTS FOR THE ROBOTS

The teams must get involved in a scientific and technical project of their own and which consists of the design of a robot. They can use commercial components as long as they properly integrated into their project.

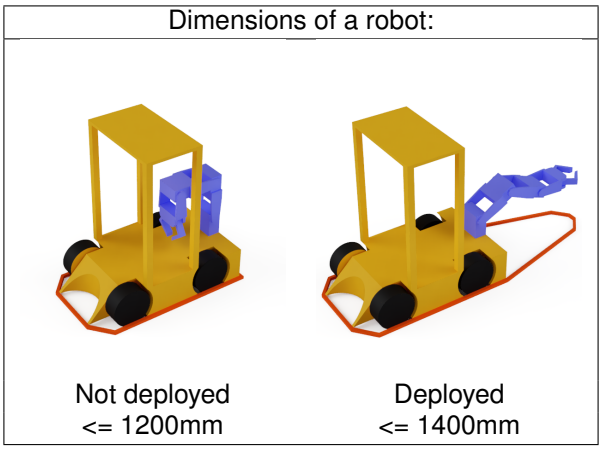
In this context, robots made from a rolling base purchased commercially will be accepted for use by the teams **if, and only if**, the chassis and systems of this rolling base are significantly modified by the participants to meet the competition constraints and fit in with their own scientific and technical project.

F.3. DIMENSIONS

Information: the dimensions of Eurobot robots are identical to those of Eurobot Junior. This means that Eurobot Junior participants will have easier access to Eurobot meetings. The Eurobot Junior robot will only need to be modified to make it autonomous.

Dimensions of the robots :
The perimeter of a robot is the perimeter of the convex shell of its vertical projection on the ground. It is measured by surrounding it as shown in the illustrations below:

Dimensions of a robot:



Not deployed <= 1200mm	Deployed <= 1400mm

The perimeter of a robot must not exceed 1200 mm at the departure time. The perimeter of the fully deployed robot must not exceed 1400 mm during the match. It is allowed to change the convex hull shape during the game, as long as the perimeter of this one always respects the maximum perimeter constraint.

At any time during the match the height of each robot and manipulated object must not exceed 350 mm. However, it can be tolerated that the emergency stop button exceeds this height limit to reach 375 mm.

F.4. DISPLAYING THE SCORE ESTIMATION

The device for displaying the score estimation during the match must be made by the team.

F.4.a. ACTIONS AND CONSTRAINTS

- The team must evaluate the number of points scored in the match by its robots according to the formula specified in the annual rules. For this, there are two exclusive options:
  - Pre-match evaluation on a static display: the team writes the score it intends to make during the match.
  - Evaluation during a match on a dynamic display device, which must continue to show the estimated score after the end of the match.
- The display must be on the robot, the remote computing device or the fixed beacon on the edge of the table.
- The display area and its reading orientation must be easily visible and identifiable by the referees. And if possible visible from the public.
- The estimated score is an integer and must be expressed in decimal system.
- Under no circumstances should the score change once the match has ended, otherwise the bonus will be lost!

- In case of a dynamic display, the pilot control box can be used to update the display, but not to directly show the score.
- The copilot is not allowed to update the score estimation, nevertheless the copilot can compute and relay the score estimation to the pilot, the usage of electric/electronic tools is allowed if its offline.

F.5. SECURITY CONSTRAINTS

F.5.a. GENERAL ASPECTS

All systems (robots and accessories) must comply with all applicable regulations in Europe and in the countries hosting the events.

They must comply with safety regulations and under no circumstances endanger participants, organisers or the public, either during matches or behind the scenes or in the stands. They must not have any protruding or sharp parts that could be dangerous or cause damage.

The use of liquid, corrosive, fuel, pyrotechnic, radioactive, living beings or zombies is prohibited.

In general, any system deemed as dangerous by the referees' committee will not be homologated, and must be removed, in order to be accepted in the competition.

F.5.b. ENERGY SOURCES

The only sources of stored energy authorized in robots and auxillary systems are chemical batteries, CE-certified commercial batteries, springs and elastics, compressed air, gravitational energy. All other energy sources are prohibited.

If you have any doubt about unconventional energy sources, ask the referees' committee as soon as possible, providing the corresponding datasheets.

All robots must comply with standard "low voltage" regulations. As a result, **the on-board voltages must not exceed 48 V DC and 48 V peak to peak AC .**

Potential differences greater than 48 V may exist, but only within closed commercial devices (eg lasers, LCD backlights, etc.) and only if these devices have not been modified and comply with national and European regulations.

Batteries:
If the team chooses a battery power supply, remember that only unmodified batteries can be used.

Teams must be able to play three games in a row. Note that this includes the time required to set up, during which the robot will be powered and awaiting the start (this can take several minutes for some events).

Therefore, we strongly recommend that teams bring several sets of batteries and provide easy access to them in the robot for their replacement. Teams are reminded that it is essential to have a set of spare batteries, fully charged and available at all times.

Note on the use of Lithium-based batteries:
Lithium batteries are known for their lack of stability and can easily ignite when certain precautions are not taken.
This type of battery is therefore authorized under the following conditions:

- Suitable battery charger, which must be submitted for homologation.
- Batteries permanently kept in certified and unmodified fireproof bags.

- A system for detecting under voltage is highly recommended.
- Exception in the case of the following batteries, authorized without the conditions listed above:
  - Lithium-based batteries including a BMS (Battery Management System) integrated by the manufacturer and solid case (LEGO Mindstorm / laptop / mobile phone / power tools / USB charging battery), not dismantled and used for the intended purpose of the manufacturer.
  - Lithium-Iron batteries (LiFePo4)

In the case where a team is in possession of an unstable Lithium battery, the team is fully responsible of all potential damage caused by the defective battery. Thus, the team must :

1. Secure it immediately.
2. Inform the organization of the meeting without delay.
3. Recycle it, by your own means, before the end of the meeting.

Warning! The supply systems must be easily transportable. Teams may have to go up and down the stairs on their way to the stage where the matches take place.

The power source transmitted to the robot can only be electric. The maximum permissible voltage is 13.8 V (measured between any two wires of the cable and the robot) and an emergency stop button must be present on the control console or the power source. This voltage source is not provided on the day of the meeting. On the other hand, the teams have one access to the standard (one power socket at 230 V 50 Hz standard) and can use batteries.

Cable terminals must be insulated.

F.5.c. EMERGENCY STOP BUTTON

All robots have to be equipped with a red emergency stop button of at least 20 mm in diameter, as must all other systems with moving parts (motor, actuator, ...) or potentially dangerous components (laser, powerful light, ...). It must be placed on the top of the robot or on an easily accessible side for the other systems, in a visible position on a free surface and in a non-hazardous area to be immediately accessible by the referees at any time during the match.

The button may exceed the system's height by 25 mm. The emergency stop button must be operated by a simple and quick movement (for example, by hitting it with the fist).
If the emergency stop button is pressed by the referee = end of the match
If the emergency stop button is pressed by the team = forfait
If emergency stop button is pressed by the team at the request of the referees = end of match.

In order to avoid any risk of fire, attention should be paid to the diameters of the wires, depending on the intensity of the currents flowing through them. It is also strongly advised to protect the electrical installation with a fuse, wired close to the batteries.

F.5.d. LASERS

Only laser systems and classes defined according to the IEC60825 international standards are accepted. Teams using lasers must provide the manufacturer's document mentioning **the class of the device** (this information is normally always available on the system itself).

On the basis of this classification, class lasers:

- 1 and 1M are accepted without restriction
- 2 are tolerated only in case the laser beam do not exceed the play area, and if it is switched off when the robot does not touch the play area.
- 2M, 3R, 3B and 4 are strictly forbidden.

WARNING: Disassembling or modifying devices using laser sources often results in a change of class. Laser devices must not be altered and only be used in the state of their commercialization (laser device = source + optics + electronics).

F.5.e. HIGH POWER LIGHT SOURCES

When using a high intensity light source, the light intensity must not be dangerous to the human eye in case of direct contact. Note that some types of LEDs have warnings. Be responsible, as your machines are operating in front of an uninformed public!

In the case of slightest doubt, the organization reserves the right to request the manufacturer's specifications to verify the non-dangerous nature of the lighting system used. If it turns out that the system is potentially dangerous, it may be refused approval in the same way as lasers of class 2M and above.

F.5.f. HIGH POWER SOUND SOURCES

When using a high intensity sound source, the sound intensity must not be exceed 80 dBA at a distance of 1 meter from the robot.

This value can be checked during the homologation. If it turns out that the system is potentially dangerous, it may be refused

F.5.g. COMPRESSED AIR SYSTEMS

Compressed air systems must not exceed 4 bars, except in pre-assembled commercial products, and only if:

1. these devices have not been modified.
2. They are compliant with european safety regulations.
3. they do not present any danger.

The use of pressurised gas cartridges such as CO2 cartridges is prohibited

F.6. COMMUNICATION SIGNALS

To avoid interference between teams, it is recommended to encode the communication signals. We strongly recommend teams using infrared devices, to take into account the strong ambient light used during the encounters. Moreover, this luminosity may vary in time and according to the placement of the playground in the hall.

We also remind teams that the organizing staff uses high-frequency radio devices and under no circumstances can they be held responsible for the malfunctions encountered by the robots.

CAUTION: Beyond the edges of the playing area, there may be elements that may interfere with color detection or communications signals such as:

- decor, lights and objects of the playing area
- people (referees, teams, etc.)
- electronic systems (microphones, cameras, etc.)

It is strictly forbidden to ask people to go away or move away objects/decors around the playing area.

Wifi networks:
At multiple contest locations, the number of active Wifi devices can disturb the robots implementing this technology for communication. To answer this issue, it's recommended (but not mandatory) to use the 5 GHz frequency rather than the 2.4 GHz one.

Control system For the main robot, each team must have a control console operated by a single driver.

It is authorized to pilot your main robot by a wireless remote control. Both solutions, wired and wireless, are allowed this year. Please read the next paragraphs to know the conditions.

F.6.a. THE WIRE CONTROL SYSTEM

The control system It's the housing used for controlling the electrical devices of the robot. It is connected to the robot only by an electric cable. Any other communication type system between the robot and the outside, is strictly forbidden.

F.6.b. THE WIRELESS CONTROL SYSTEM

It is a housing for controlling the controlled robot's electrical devices. It communicates with the robot using wireless equipment. It can be connected to the robot by an electric cable to power it. The wireless control system should only be used for communication between the pilot and the robot. Under no circumstances should it be used to communicate with the outside world during matches.

To avoid interference problems with another team, the public or the equipment used by the organizer, it is strongly recommended that a team choosing a wireless control system be able to quickly change the frequency and/or communication channel. Under no circumstances may the team contest the inconvenience caused by possible interference.

F.6.c. THE CABLE

The electrical cable connecting the robot to its control system is not provided: it must be designed and implemented by each team, according to its needs.

The robot executes a lot of movements on the playing area, therefore the cable must have a minimum length of: two meters between the power outlet and the power supply and five meters between the robot and the control box.

The cable must come out from the top of the robot, so that it does not touch the playing area.

It is held in the air by the co-pilot using a pole provided by the organizers.

During the match, the co-pilot must not interfere in the control or in the settings of the robot (supply voltage for example, with the exception of PAMI starter cords.

The cable must not be used to guide the robot, or direct it in case of reversal. Penalties can be given to co-pilots that use the cable to guide their robot !

F.7. OTHER DESIGN CONSTRAINTS

Visibility : A rectangular, entire and non-deformable space of 100 x 70 mm per robot must be left free on one of the side faces. The teams will receive stickers printed by the organization (team number, sponsors etc), which they have to place on these open spaces.

Starting cord of autonomous robots: One or more present elements of the team on the table need to be equipped with a starting device easily accessible. This device has to be triggered by pulling the end of a cord at least 500 mm long by a team mate. This cord must not stay attached to the element after departure. After the device was triggered, the autonomous robots can start.
No other starting system (remote control, manual rocker switch, etc.) will be homologated.
List of elements that can be had with the starting device :

1. The robot
2. The SIMAs

Avoidance system : All teams are required to equip its robot with a system for detecting opposing team's robots. This system is intended to prevent collisions between robots, during a match. This point will be systematically checked during homologation.
The non-avoidance of PAMIs by robots is tolerated, as long as the shock is not voluntary or violent from the robot and this does not cause damage to the SIMAs.
Robots and SIMA avoidance systems are optional for Eurobot ^{Open} Junior participants.

F.8. SMALL INDEPENDENT MOBILE ACTUATOR (SIMA)

The small independent mobile actuator (or SIMA) must respect the same building and safety constraints as robots (Emergency stop, avoidance, laser, bag for lipo battery,...). Like robots, a SIMA must be able to play a match wahtever of the color of its team.
Teams can use any kind of control system for the SIMA (analog, microprocessor-based, microcontroller, embedded computer, programmable logic, etc.).

These systems must be fully integrated into the secondary SIMA.

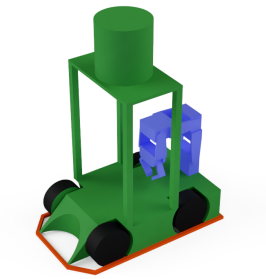
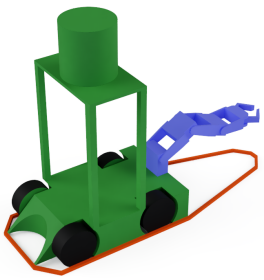
The control system must allow the SIMA(s) to play a match with either one of the colors provided to teams. Ideally, it should be configured shortly before the match with any of the two colours. Consider an immediate start option to facilitate debugging and homologation.

They can be launched at the start of the match by a starter cord, or during the match by the robots themselves. A robot has the right to touch or communicate with a SIMA of its team throughout the duration of the match, but the SIMA must be able to move by itself.

The homologation of a SIMA is neither obligatory nor sufficient to homologate a team, the main robot being the only one with this obligation. However, homologation of the SIMA is mandatory for it to participate in the match, and if the main robot is not available then the SIMA can participate alone in the matches subject to approval of the team and the SIMA.

SIMA must respect the following dimensional constraints:

- All SIMA must enter the SIMA starting area (150 mm by 450 mm).
- The SIMA has a height limit of 150 mm.
- A SIMA must be larger than a 60mm side cube.
- A SIMA can be deployed within the limit of an increase of 100 mm in its perimeter.
- A SIMA can be deployed and move within the limit at a height of 350 mm.
- A SIMA must have a area of 30 x 30mm for the stand number tag.
- The weight of each SIMA must not exceed 1.5 kg.
- The ladybug cannot be activated by an external element outside of the table (team crew, remote control, ...), except the pilote and its remote controler.

Dimensions of a SIMA:	
	
Not deployed = Pmin	Deployed = Pmax <= Pmin + 100mm

As SIMAs have a height restriction, they dont have:

- The beacon mast.
- Beacon support (and therefore do not carry an ArUco marker).

G. ROBOT DISTINCTION SYSTEM

During each match, the robots will be assigned a color which must be visible on the robot via a marker. This marker has two purposes:

- allow the public to identify the team to which a robot belongs;
- allow a vision system on the central mast to identify and locate each robot.

There is 2 option for this:

- integrate an on-board tag support to accommodate the tag in the team color (provided by the organizer), and placed at the top of the tag support;
- have a part of the robot that changes color, this part must be sufficiently visible to be seen from the audience with the strong lighting of the stage, regardless of the orientation of the robot;

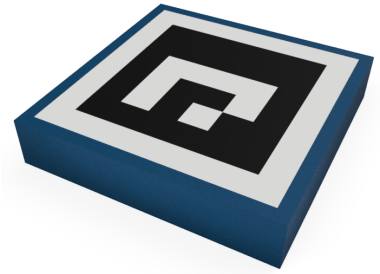
G.1. ON-BOARD TAG SUPPORT

To ease the identification of team robots by players, referees and the public, the robots will include tag support on their tops on which will be placed tags of the color of the team. This support must respect the following points:

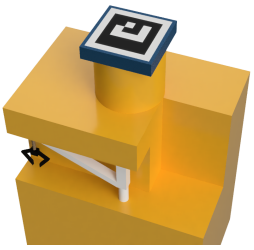
- have its top surface flat, horizontal and positioned at the top of the robot so that it is visible from all directions, and allowing the team's tracking tag to be placed;
- the top of surface of the platform will be fully covered of Velcro^{TM} (hook side);
- the on-board beacon support must be stable, motionless regarding the robot structure.
- Pay attention to the height of the tag support, if it is too high from the top of the robot, it can snag the robots' control wires.

G.2. COLOR TAG

The marker is a square 10cm wide, 2cm thick ($\pm$2mm) and with a mass less than or equal to 100g.
Its upper side is covered with a vinyl with a 7cm ArUco tag (Not used for juniors and can be changed at will).
A 1cm wide white outline is drawn around the ArUco tag to facilitate its detection.
A 0.5cm wide contour in the same colour as the team is drawn at the edge of the upper surface. The team's color also occupies the edge of the marker.(Figure 1a)



(a) Robot identification marker (Tag n°1).



(b) Marker on the on-board beacon support.

H. MATCHES

Only two persons per team are permitted to go backstage and on stage to play the matches.

To ensure that the contest runs smoothly, at least one member of the teams must be present on their booth with the robot(s) and ready to go 30 minutes before the start of each series and until that the game is played.

In case of a problem, it is tolerated by the organization to ask for a delay to go to the match but this delay can never exceed the end of the current series.

H.1. PREPARATION TIME

At the start of a match, the elements of the playing area and the playing area itself are installed as indicated in the diagrams in the appendix.

Upon arrival on the playing area, each team has a maximum of three minutes to proceed with the placement of the robots and other equipment. At the end of the preparation time, the robot are not allowed to move until the start of the match.

A robot which is not ready at the end of this period exposes the team to a forfeit for the match.

Besides, the other team's robots will still play their own game on the playing area. The team will have to score points to be declared the winner.

When both teams have finished setting up, or when the preparation time is over, the referee asks the participants if they are ready, and they place the starting area tag. From this moment, teams are no longer allowed to touch their robots. It will be tolerated that the emergency stop button is pressed by the teams after the preparation time in order to preserve the batteries and actuators while waiting for the beginning of the match. No dispute can be made on the disposition of the elements of play after the beginning of the match.

H.2. THE MATCH

At the signal of the referee, each robot is switched on and it has 100 secondes to do these actions.

No one except the referee can touch the robots and the playing elements unless expressly indicated by the referees.

No elements taken out of the playing area can be put back on the table before the end of the match and the validation of the scores.

H.3. END OF MATCH

At the end of the 100 seconds, the robots must stop and turn off all their actuators. It is allowed to keep on any dynamic displays.

No one except the referee can touch the robots and the playing elements unless expressly indicated by the referees. The referees count the points; they give the result of the match, including the points to the teams. If they both agree, they validate the match sheet, can take back their robot(s) and join their booth. If the teams do not agree, they refer calmly to the referees. The robots remain in place until the dispute is resolved. **Refereeing decisions are final**.
In the event of a situation that is difficult to judge, the referees reserve the right to decide whether or not to replay the match.

The referees are allowed to pronounce the end of a game in advance, before the end of the regular time if both teams agree (if the robots are blocked for example).

H.4. THE PENALTIES

Several actions during the match may result in penalties.
The following actions will result in a **warning** or a **point loss** on the final score if a warning has already been issued for the team (the warning rule is only valid during the series):

- loss of part or element of a robot on the playground: **loss of 20 points**.
- degradation of the table or a game element: **loss of 30 points**.
- pull on the cable to move the robot: **loss of 30 points**.
- false start: **loss of 50 points**.
- robot keeps moving when time runs out: **loss of 50 points**.
- excessive preparation time: **loss of 50 points**.
- robot change its start zone after 3 minute of preparation : **loss of 50 points**.
- unfair or unsportsmanlike conduct: **loss of 50 to 100 points**.
- on arbitration decisions: **loss of 50 to 100 points**.
- on decisions of the organization: **loss of 50 to 100 points**.

The following actions will result in a **team forfeit**:

- no robot and no SIMA exit from its starting area.
- removal of point from an opposing element or protected area.
- entry of the robot into an opposing area with exclusive access.
- repeated excessive preparation time.
- dimensional limitations not respected.
- repeated false start.
- intentionally shoot at people in the vicinity.
- voluntary fixate, vibrate the table.
- intervention of a team member on the table, game elements or robots, after the preparation time (with the exception of the emergency stop button).
- intervention of a team member on the table, the game elements or the robots, during the match.
- the team is unable to play the game before the end of the series.
- following arbitration decisions.
- following decisions of the organization committee.

The following actions will result in **disqualification of the team from the competition**:

- voluntary deactivation of robot avoidance systems.
- design robots that are noticeably similar to robots from other teams (for example: rolling bases or identical actuators). If during the year you see a team building a robot similar to yours, report it to the organization as soon as possible.
- intentional degradation of robot belonging to other teams.
- following decisions of the organization committee.

During the same match, only one penalty may be applied. If several penalties can be applied, then the highest will be taken into account.

The so-called “additional” points are only counted if the previous points of the action are validated.

The score of a forfeited team or a negative score will be reduced to 0.

Only the referees are authorized to intervene on the table or the robots after the preparation time and during the match. In case of concern, ask the referee to intervene to avoid the forfeit.

Video refereeing is prohibited.

A general definition of anti-game: "If the goal is to harm without building, then it’s anti-game".

The appreciation of the penalties and the anti-game remains at the referee’s judgement. They cannot be disputed after the match.

RECALL:
The penalties are intended to compensate for damage caused by a possible incident during the course of the game. A penalty situation is considered as non-respect of the rules of the game, this type of situation must remain exceptional! In some rare situation, a penalty may result in the team’s forfeit. The referees’ committee will also be attentive to the penalties distributed between several levels of meeting (regional/national/European).

I. THE CONTESTS

I.1. GENERAL INFORMATION

The Eurobot Junior meetings can be organized on three levels:

- regional: when they exist (e.g. in France, Eurobot Junior), qualify a number of teams for the national meeting,
- national: it allows to qualify the teams for the European meeting,
- European: this last stage brings together, in the same friendly spirit, teams from different countries in Europe and elsewhere.

Each meeting has several successive steps:

- The static and dynamic approvals of all the robots;
- A qualification phase, with at least 3 series;
- An optional play-off phase;
- A final phase.

The organizers of each meeting can distribute awards, if they want, to the teams in order to reward an aspect of the participation of the team or its robot.

I.2. MEETINGS AND PARTICIPATING COUNTRIES

Eurobot and Eurobot Junior European finals gather teams selected after national qualifications if they were organized. European finals take place in Europe, but all countries can participate. Countries with more than three registered teams, are required to organize a national qualification to select which teams will compete the European finals.

I.3. APPROVAL

I.3.a. STATIC APPROVAL

Before the start of the matches, robots are subject to the supervision of a referee who checks their compliance with the rules. Robots must be able to easily show all their mechanisms.
The ancillary systems (accessories, control panel, etc.) will also be subject to static control (size, mass, presence of mandatory elements, etc.).

I.3.b. DYNAMIC APPROVAL

The robots are put in a game situation but without the presence of an opposing team. Within 100 seconds, The robots and the SIMAs must leave the departure zone, and the robot must validate at least one action. Certain specific features provided for in the regulation will also be checked (timer, avoidance of opponents, etc.).
If the assembly consisting of the main robot and the optional SIMA fulfills these conditions, it is declared approved.

I.3.c. SIGNIFICANT TECHNICAL MODIFICATIONS AFTER THE APPROVAL

It is essential to inform the referees of any significant modifications (functional, structural, dimensional ...) brought to the robot(s) or any other element after approval. The referees will then check the modifications made and re-approve the robot if they deem it necessary. In the event of a breach, the team may be declared disqualified from the contest.

I.4. QUALIFICATION PHASE

During the qualification phase, the registered teams will have the possibility to play at least three games (often more, depending on the local organizers).

A ranking is established according to the accumulated points in order to select the qualified teams for the next phase.

The tied teams are tied by comparing their scores without taking into account their bonus points. Organizers may also use additional matches.

At the end of the qualifying phase, the first teams (according to the matches) are qualified for the next phase.

Number of participating teams	Minimum team selected
N<=16	4
16<N<=50	8
50<N	16

I.5. THE PLAY-OFF PHASE

An additional play-off phase may set up in the event that a meeting hosts two contests, the first of which qualifies for the second. For example:

- a regional meeting (A) and its national meeting (B)
- or a national meeting (A) and the European meeting (B)

The organizer may carry out the qualifying phase of both matches (A) and (B) either in parallel fashion or in a mixed fashion. In this case, a play-off phase may be organised in order to allow teams from the match (A) to qualify for the match (B), exempting them from having to catch up on all the matches from the qualifying phase of (B) in favour of this play-off phase.

The teams participating in this play-off phase are:

- the teams of the match (A), in a number corresponding to its qualification quota, and chosen in the order of ranking at the end of the final phase of (A) or through an award during the regional meeting.
- the teams of the match (B), in a number equivalent to the participants in this phase from (A), chosen from among the last teams normally qualified for the final phase of the match (B).

Example for a national meeting qualifying three teams for its European final whose European final phase has 16 teams. The teams participating in the play-off phase are:

- **the first three teams of the national meeting at the end of the final phase of the national meeting;**
- **and the teams ranked 16th, 15th and 14th in the qualifying phase of the European meeting.**

In this play-off phase, one match will be played for each participating team. The participating teams from the match (A) qualified through the ranking will play, in order of their ranking, with the teams from the match (B) with the lowest ranking. And the team(s) of (A) qualified for this play-off phase through an award will play against the top-ranked teams of (B) in a random order.

Each team that wins its play-off match will be included in the main draw of the final phase of the match (B). At the end of the play-off phase, the tree of the final phase of the match (B) presented in Figure 2 may be revised to more accurately represent the level of each team.

In the event of a tie, the tie will be decided by comparing the scores without taking into account bonus points.

I.6. THE FINAL PHASE

At the end of the previous phase, the qualified teams form the table of the matches of the final phase.

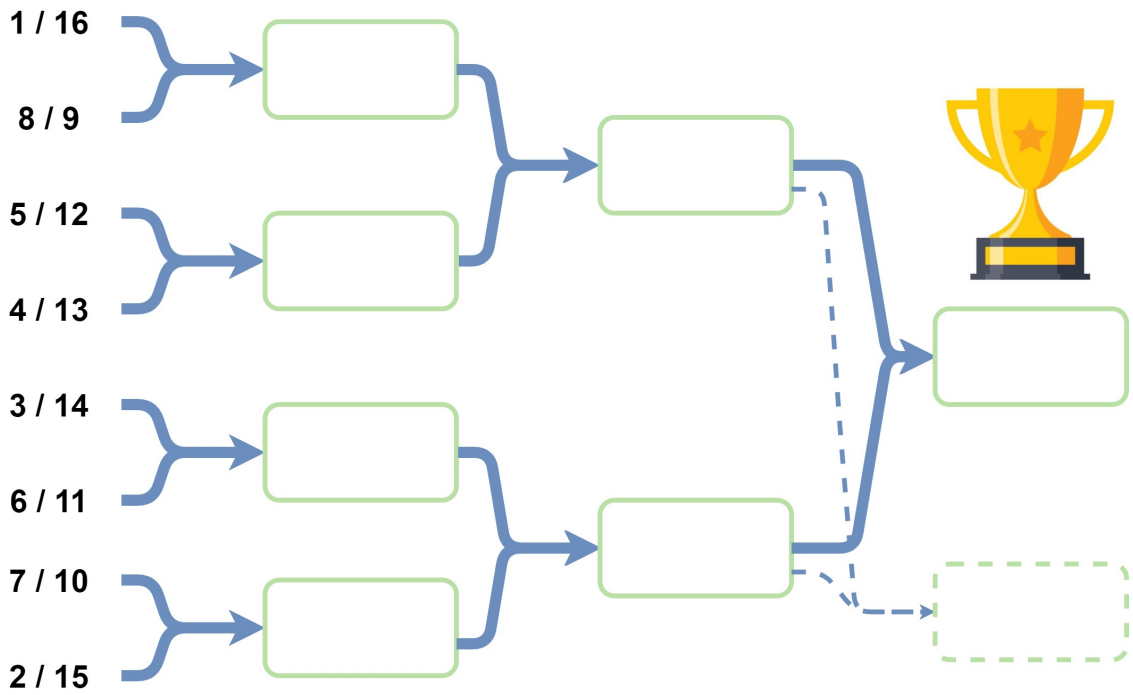


Figure 2: Tree of the final phase

The matches of the final phase are with knockout, unless otherwise organized on some meetings.
In the event of a tie, the tie will be decided by comparing the scores without taking into account bonus points.
In the event of double forfeit, double defeat or perfect tie, the match is replayed immediately; if this second match is still a case of double forfeit, double defeat or equality, the winner is determined according to the points acquired at the end of the qualifying phase.
The final is played in two winning games.

Be careful to provide enough batteries to play all the matches in the final phase.

I.7. QUALIFICATION FOR THE NATIONAL MEETING

When there are regional meetings, the number of teams qualified per regional meeting is proportional to the total number of teams registered at the national level.

The best teams in the ranking established at the end of the qualifying phase of each regional meeting, as well as at least one team chosen by the organizers from the special prizes (e.g. creativity, fair play, presentation, etc.).

I.8. QUALIFICATION FOR THE EUROPEAN MEETING

Each country participating in Eurobot Junior organizes a national meeting to determine the qualified teams for the international meeting.

The number of qualified teams per country is proportional to the total of international registered teams. The top teams in the final rounds (and not the qualification rounds) will qualify for the European meeting. In the event of a tie, the teams are selected by their ranking at the end of the qualification rounds.

News and more information about Eurobot and Eurobot Junior are available on our website

www.eurobot.org

(It also contains links to your local organization)

The whole organization team of Eurobot and Eurobot Junior wishes you a lot of fun and success in the coming months, and looks forward to seeing you soon around our playing areas!

Robotic Regards,

The Eurobot Eurobot Junior organization committee.

J. APPENDIX

J.0.a. GENERAL DRAWINGS

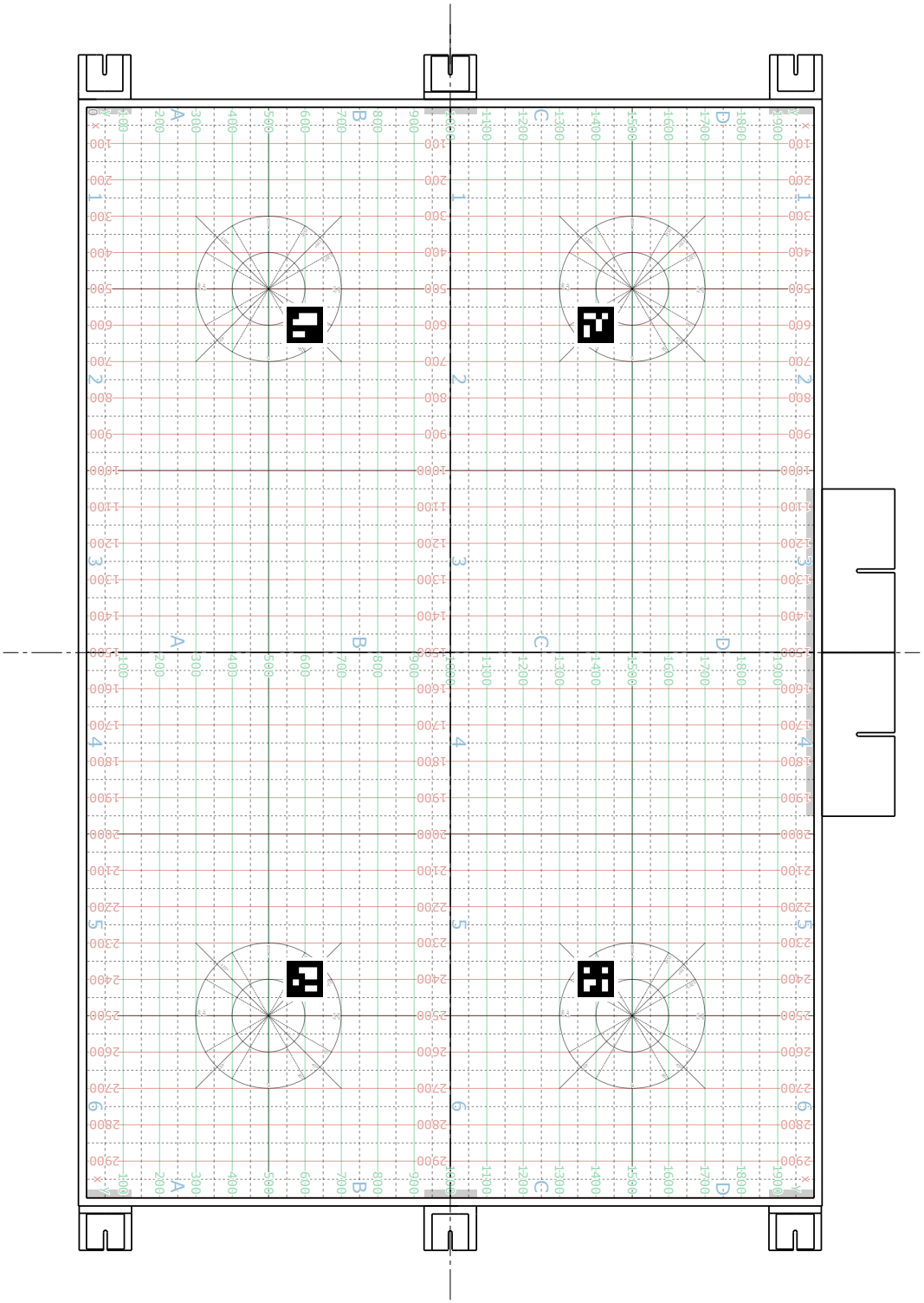


Figure 3: Top view of the playing area.

J.1. MATERIAL REFERENCES

Robot identification marker	3D printed in 40% cover by printed monomeric gripping vinyl and Velcro^{TM}	See STL files, print settings and tutorial on www.eurobot.org

J.2. MANUFACTURING TOLERANCES

All dimensions are in millimeters (or mm). Manufacturing tolerances shall comply with the following rules, unless otherwise specified directly on the drawings.

Dimensions	General Tolerances
≤ 20	± 1.50
> 20 and ≤ 70	± 2.50
> 70 and ≤ 150	± 4.00
> 150	± 5.00

No objections regarding differences in dimensions will be taken into account.

The material's density can change from one country to another. It is highly recommended that the teams try different types of materials since the weight may differ significantly.

J.3. COLOUR REFERENCES

Colors	References	CMYK	RGB
Traffic red	RAL 3020 Mat	0% , 100% , 100% , 10%	187, 30, 16
Mint green	RAL 6029 Mat	100% , 5% , 90% , 30%	0, 111, 61
Traffic Blue	RAL 5017 Mat	100% , 60% , 0% , 10%	0, 91, 140
Traffic yellow	RAL 1023 Mat	0% , 25% , 100% , 0%	247, 181, 0
Signal Violet	RAL 4008 Mat	50% , 90% , 0% , 5%	132, 76, 130
Telemagenta	RAL 4010 Mat	15% , 100% , 15% , 10%	188, 64, 119
Mahogany brown	RAL 8016 Mat	40% , 80% , 70% , 70%	76, 43, 32
White	RAL 9010 Mat	0% , 0% , 5% , 0%	241, 236, 225
Pebble grey	RAL 7032 Mat	15% , 10% , 25% , 20%	181, 176, 161

RAL hues can vary from a printed soil mat to another.