



# **CHANGELOG OF 2020** **for Eurobot<sup>Open</sup> Junior 2021 Rules**

28<sup>th</sup> edition of the robotic contest - Eurobot  
OFFICIAL version

## **SAIL THE WORLD**



## D. PLAYING AREA AND ACTIONS

### D.2. PLAYING AREA

The playing area has evolved. From now on, we can find a new area : the shoal area.

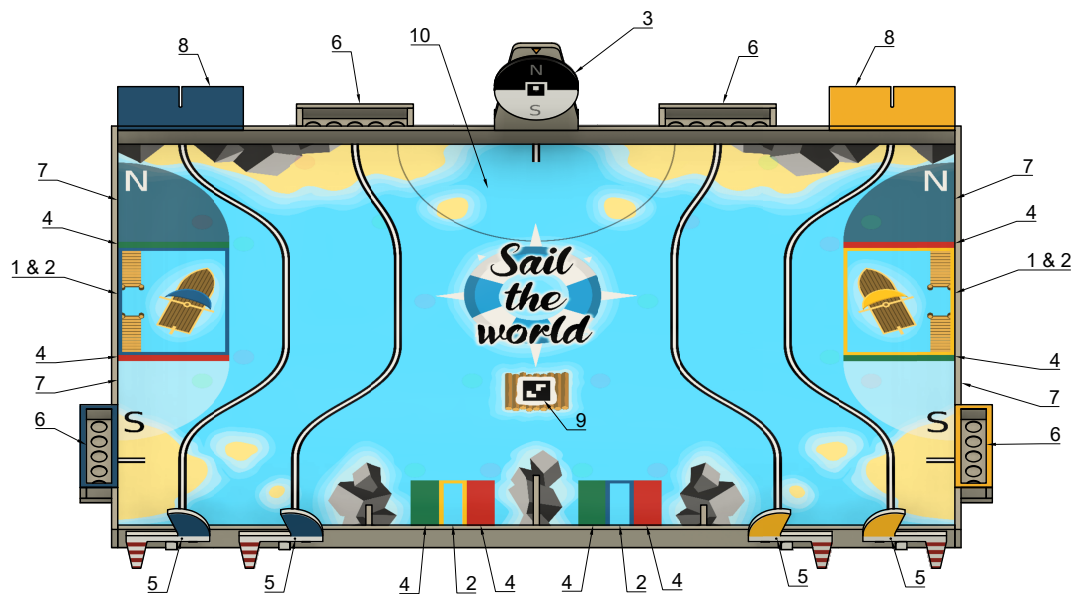


Figure 1 – Detailed view of the playing area

- |                   |                           |
|-------------------|---------------------------|
| 1. Starting areas | 6. Reefs                  |
| 2. Port           | 7. Mooring zone           |
| 3. Weather vane   | 8. Rocky areas            |
| 4. Fairway lines  | 9. ArUco marker number 42 |
| 5. Windsocks      | 10. Shoal area            |

#### D.4. CREATE FAIRWAYS

Six buoys were added in the shoal area.

##### D.4.a. DESCRIPTION AND LAYOUT OF THE PLAYING ELEMENTS

**The buoys:** There are 50 buoys on the table, represented by reusable plastic cups, half of them are red and the other half green. They are initially located on predefined places:

- placed directly on the playing table, these buoys are called "adrift". The 4 buoys around each port are reserved to the owner of the port. The other 14 buoys are common to both teams and are distributed as follows:
  - 6 buoys are randomly placed before the start of the match in the shoal area. These 6 buoys are distributed in groups of 3 on either side of the axis of symmetry of the table. They are entirely included in the area. The 6 buoys include 3 green buoys and 3 red buoys. The colour distribution when the elements are set up is random.
  - 8 buoys have a defined location and colour.
- either on:
  - reefs located along lateral borders, and reserved to the team with the closest starting area.
  - reefs in common for both teams, at the back of the table.

## D.5. LIFT UP THE WINDSOCKS

The condition of validity of the windsocks has changed. A marker is now used to determine whether or not a windsock has been lifted.

### D.5.a. DESCRIPTION AND LAYOUT OF THE PLAYING ELEMENTS



Figure 2 – Windsock and its mark (red circle)

**The mark:** is placed as described in Figure 5 and is used to determine when a windsock is considered raised or not.

### D.5.b. ACTIONS AND CONSTRAINTS

#### Constraints:

- To be considered valid, the windsock mast has to completely occlude the mark at the end of the game.



### ***D.7. ANCHOR SAFELY***

The points associated with this action have been changed. Other clarifications have also been made.

#### **D.7.b. ACTIONS AND CONSTRAINTS**

**Actions:** At the end of the game, the main robot (controlled) robot should stop in the mooring zone indicated by the arrow of the weathervane.

#### **D.7.c. POINTS**

- **20 points** if the main robot (remoted) is valid in the mooring zone indicated by the weathervane;
- **6 points** if the main robot (controlled) is valid in the other mooring zone;

### ***D.9. ESTIMATE THE PERFORMANCE***

Clarifications have been made on the location of the display.

#### **D.9.b. ACTIONS AND CONSTRAINTS**

- The display must be placed either on at least one of the robots or on the lighthouse.

## F. THE ROBOTS

### F.2. DIMENSIONS

A design recommendation has been added.

**The dimensional constraints of the robots and all the elements built by the teams are strict. It is strongly advised to take margins.**

### F.3. ENERGY SOURCES

Further details were provided on the use of lithium batteries.

**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 approval.
- Batteries kept in certified and unmodified fireproof bags (whether in the robot or on the stand, even in storage).
- A system for detecting underloads is highly recommended.
- Exception in the case of the following batteries, authorized without the conditions listed above:
  - Lithium-based batteries for LEGO Mindstorm/laptop/USB batteries/power tools provided that they have not been opened / modified and are charged using the charger recommended by the manufacturer.
  - Lithium-Iron batteries (LiFePo4)

#### F.4. OTHER DESIGN CONSTRAINTS

Details have been added on the label support and on the emergency stop button of the robots.

**Visibility:** A rigid and solid area of 100 x 70 mm per robot must be left free on one of the side faces. As far as possible, this space must be visible from a camera located at the height of the playing field. It must also be visually accessible during the majority of the match. The teams will receive stickers printed by the organization (team number, sponsors etc), which they have to place on these open spaces.

If no space is available on the side of the robot, the beacon mast can be used to stick the label. Teams are strongly encouraged to make all element manipulations visible from the outside. By doing this, you allow the audience and the cameras that film the event to see how the transport of your game elements works.

**Emergency stop button of robots** Robots containing a battery must be equipped with a red emergency stop button of at least 20 mm in diameter. It must be placed on the top of the robot in a visible position and in a non-risking area to be immediately accessible by the referees at any time during the match.

In its higher state, the button may exceed the robot's height by 25 mm. The emergency stop button must be operated by a simple downward movement (for example, by hitting it with the fist).

Pressing this button must stop all robot actuators immediately !

When designing the robots, it is recommended to take into account possible irregularities in the playing areas.

#### F.5.d. COMPRESSED AIR SYSTEMS

Further details were provided on the use of compressed air systems.

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

- these systems have not been modified.
- they comply with European regulations.
- they are safe.

The use of pressurised gas cartridges such as CO<sub>2</sub> cartridges is prohibited.



### I.1.e. WINDSOCKS

The dimensions of the mark of the windsocks have been added.

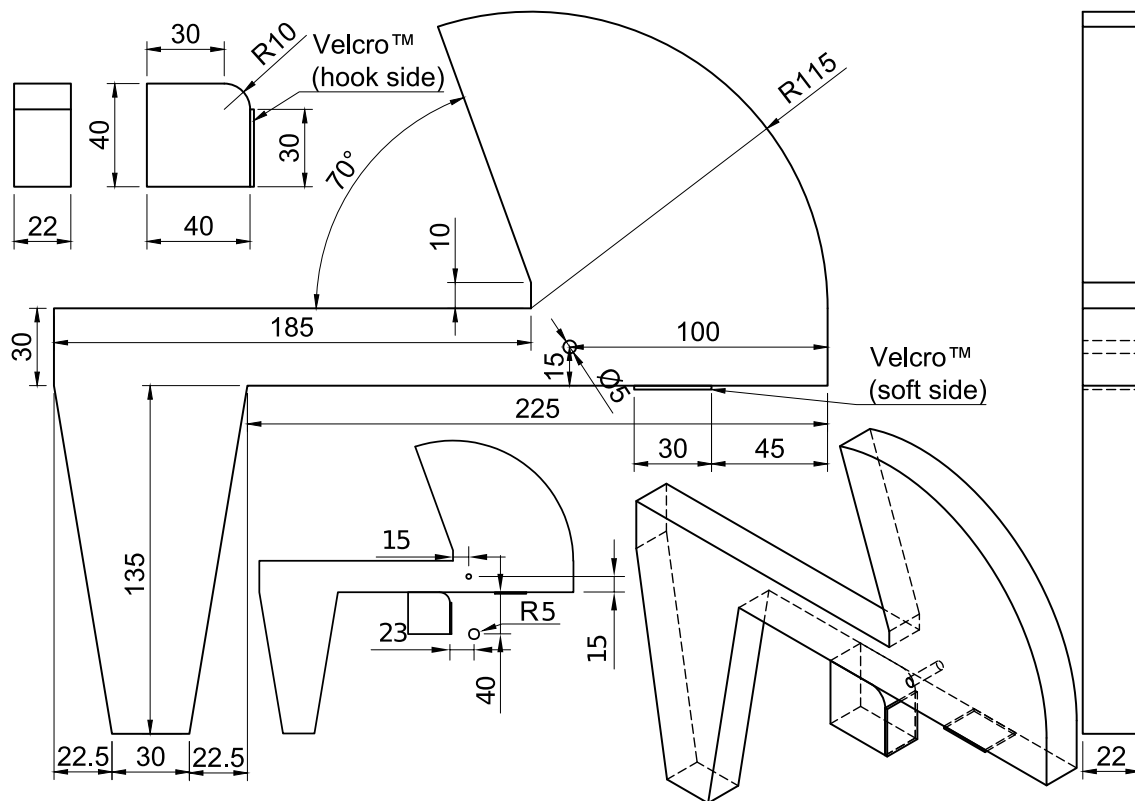


Figure 5 – Windssock