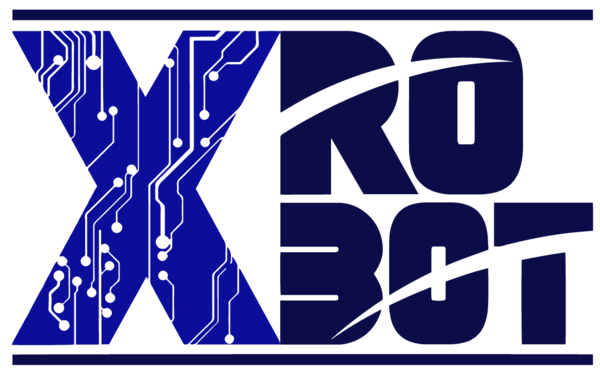
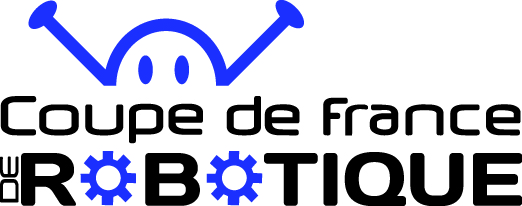
**System requirement specification R1**

**Robot**

**deadline 13th february**

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**Content**

1. **Dimensions**
2. **Energy sources**
3. **Other requirements**
4. **Embedded beacon**
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7. **Design**
8. **Automation**

**1 - Dimensions**

|  |  |
| --- | --- |
| REQU 1 | The perimeter of the robot shall not exceed 1200mm at rest, and 1500mm when deployed |
| REQU 2 | The robot shall start the match at rest |
| REQU 3 | A free space of 100m x 70mm shall be placed on the side of the robot |
| REQU 4 | The height of the robot shall never exceed 350mm. However it shall be tolerated that the height of the emergency stop button reaches 375mm. |

**2 - Energy sources**

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| REQU 5 | The robot shall be powered with electrical batteries |
| REQU 6 | Any Lithium battery shall be protected within an certified fireproof bag |

**3 - Other requirements**

Info : the wedge will help placing the robot on its departure spot.

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| REQU 7 | The robot shall begin to move less than 1s after the string is pulled |
| REQU 8 | The string shall measure >= 500mm |
| REQU 9 | The robot shall have an emergency stop button, activated when pushed from top to bottom |
| REQU 10 | The emergency stop button shall be red |
| REQU 11 | The diameter of the emergency stop button shall be >= 20mm |
| REQU 12 | The emergency stop button shall freeze any action and movement of the robot in less than 1s |
| REQU 13 | The robot shall stop automatically less than 100s after the start |
| REQU 14 | The robot shall be able to receive unambiguously two lasers pointing the soil |
| REQU 15 | The robot shall be designed to receive unambiguously the wedge |

**4 - Embedded Beacon**

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| REQU 16 | The robot shall be equipped with an embedded beacon |
| REQU 17 | The upper face of the beacon shall be placed at a height of 430mm from the ground |
| REQU 18 | The convex envelope of the beacon shall be, at any height, between a circle (diameter 70mm) and a square (length 100mm) |
| REQU 19 | The upper face of the beacon shall be entirely covered with Velcro (hook side) |
| REQU 20 | The beacon shall be placed as near as possible to the center of the robot (when seen from above). It shall be entirely contained in a circle of diameter 200mm, whose center is the mass center of the robot |
| REQU 21 | The beacon can only be filled with sensors. |
| REQU 22 | If a portion of the beacon is removed to integrate sensors, the height of the removed part shall not exceed 20mm. |
| REQU 23 | The beacon shall be able to support a weight <= 300g |

**5 - Match**

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| REQU 24 | The robot shall be installed on the match table in <= 3min by two persons |
| REQU 25 | The robot shall be placed in its departure slot with the help of the wedge |

**6 - Robot abilities**

Definition : the robot is said to have reached a waypoint if the spot of the first laser is within a circle of 1cm of diameter centered on the waypoint.

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| REQU 26 | The robot shall be able to play 3 matches (3 x 100s) in a row when its batteries are fully charged |
| REQU 27 | The robot shall start from its starting zone |
| REQU 28 | The robot shall reach the first waypoint |
| REQU 29 | When a waypoint is reached and the list is not empty, the robot shall reach the next waypoint |
| REQU 30 | When the list of waypoints is empty, the robot shall go back to its starting zone with an accuracy of +/-10cm |
| REQU 31 | The robot shall be able to complete REQU 31 to 35 10 independent times |
| REQU 32 | The robot shall be able to go straight for 1m with an error inferior to 0.5cm |
| REQU 33 | The top speed of the robot shall be >= 0,7m/s |
| REQU 34 | The robot shall reach the speed of 0,5m/s in less than 1s |
| REQU 35 | When rolling at full speed (0,5 m/s), the robot shall be able to brake and stop in less than 200mm |

**7 – Design**

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| REQU 36 | The robot shall have two motor wheels |
| REQU 37 | The robot shall have one motor per motor wheel |
| REQU 38 | The motor wheels shall be placed in the same axis (left-right of the robot) |
| REQU 39 | The robot shall have two rotary encoding wheels |
| REQU 40 | The robot shall have one encoder per encoding wheel |
| REQU 41 | The encoding wheel shall be perpendicular to the motor wheel axis with an error <1° |
| REQU 42 | The robot shall have two rotulas |
| REQU 43 | The design of the robot should prevent him from moving on top of an atom |

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**8 – Automation**

Def : a waypoint is said adequate if its position is within the game table and can be reached with the whole robot being on the table.

Info : The waypoints given to the robot needs to be adequate.

Info : the total length of the course defined by the waypoints needs to be inferior to 6m.

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| REQU 44 | The robot shall receive its waypoint with their coordinates in a text file |
| REQU 45 | The robot shall stop at each waypoint for at least 1s |