

# RoboCupJunior OnStage - Rules 2021

## Onstage Technical Committee 2019:

*Luis Morales (Mexico) CHAIR*  
*Meital Domb (Israel)*  
*Nicky Hughes (UK)*  
*Sara Iatauro (Canada)*  
*Shoko Niwa (Japan)*  
*Sylvia Cerioni (Italy)*

## Onstage Technical Committee 2021:

*Margaux Edwards (Australia) CHAIR*  
*Meital Domb (Israel)*  
*Nicky Hughes (UK)*  
*Christian Häußler (Germany)*  
*Nicholas Doyon (Canada)*  
*Luis Gonzalo Morales (Mexico)*

## RoboCupJunior General Chairs & Execs:

*Irene Kipnis (Israel)*  
*Luis Jose Lopez Lora (Mexico)*  
*Julia Maurer (USA)*  
*Shoko Niwa (Japan)*  
*Nerea de la Riva Iriepa (Sweden)*

## Trustees representing RoboCupJunior:

*Fernando Ribeiro (Portugal) \**  
*Amy Eguchi (USA)*  
*Gerard Elias (Australia)*  
*Gerald Steinbauer (Austria)*

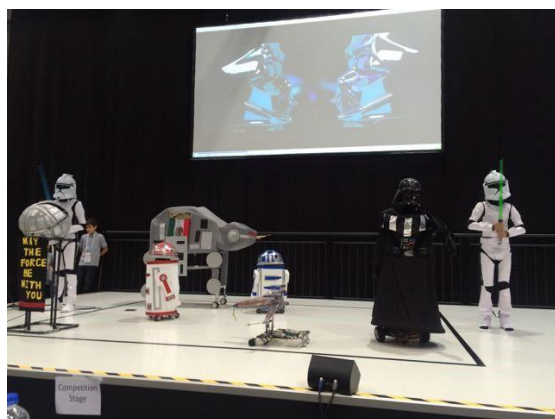
*\* RoboCup Federation Vice President representing RoboCupJunior*

These are the official rules for RoboCupJunior OnStage event **2021**.

- Changes from the **2019** OnStage rules for the remote competition are highlighted in **red**.
- **In person rules that will not apply in 2021 but will apply in future years will be highlighted in green.**

**HOWEVER, teams should make sure they review all the pages of these rules.** The rules have been changed to deepen and broaden the educational benefits of competing in RoboCupJunior. It also considers the evolving technologies available in our time.

**The International English rules have priority over any translations.** They are the official rules of the RoboCup Federation. The rules, score sheets, and all forms of documentation can be downloaded from the official RoboCupJunior website (<https://junior.robocup.org>). Each team has a responsibility to verify the latest version of these documents prior to the competition; changes may be made at any moment. Teams are encouraged to study them in detail.



Official RoboCupJunior site: <https://junior.robocup.org> (Click OnStage tab)

Official RoboCupJunior forum: <https://junior.forum.robocup.org/>



## Preface

RoboCupJunior OnStage invites teams to develop creative, autonomous **physical, or a combination of hybrid simulated and physical** robots that they have designed, built and programmed. The objective is to create a **live-streamed** robotic performance of 1 to 2 minutes that **uses a wide variety of** technology to engage an audience **from your own location around the world (home, classroom, theatre etc.)**. This includes a whole range of possible performances, such as dance, storytelling, theatre or art installations. The performance may involve music, but this is optional. The league is intended to be open-ended. Teams are encouraged to be creative, innovative and entertaining, in both the design of the robots and in the design of the overall performance.

From the 2018 season, the structure of the OnStage league was updated to provide an entry-level competition for novice teams with limited experience at the international level (OnStage Preliminary) and a more challenging category for more experienced teams (OnStage Advanced). These divisions replace previous age categories, but team members must still meet the RoboCupJunior **2021** age requirements (listed below).

The rules are mostly the same for OnStage Preliminary and OnStage Advanced. However, only teams in OnStage Preliminary are allowed to use markings and/or mats on the floor to enable line following. OnStage Advanced teams are expected to use more advanced technologies. We intend to revise the Advanced league rules step by step over the next few years to further differentiate it from the Preliminary league, and may adopt challenges that require certain specific technologies such as image recognition.

**OnStage Preliminary:** An entry-level competition for novice teams new to the league at the international level. The "novice" which is used here does not imply teams are performing at a novice/beginner level - they have to be skilled enough to be qualified.

For the **2021** international competition, if any members of a team have participated in RoboCupJunior international competitions twice or more in any league, the team cannot participate in the Preliminary sub-league. This league is designed for teams where all team members have participated in one or fewer RoboCupJunior competitions.

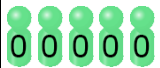



**OnStage Advanced:** A higher-level competition for experienced teams capable of using advanced technologies, skills and knowledge in robotics including programming and robot construction.




This sub-league is open for everyone, including teams that are new to RoboCupJunior. However, this competition expects teams to be able to show more advanced performance than OnStage Preliminary.

For example, teams described below **WOULD NOT BE ALLOWED** to participate in OnStage Preliminary league:

- There are one or more team members who have participated in OnStage twice or more.
- There are one or more team members who have participated in OnStage once and Soccer (or Rescue) once or more.
- There are one or more team members who have participated in Soccer OR Rescue twice or more.
- There are one or more team members who have participated in Soccer AND Rescue one time each or more.

**Table 1:** Examples of eligibility for participation

| Team   | Team members  | Eligibility   |
|--------|---|---|
| Team A |  | <ul style="list-style-type: none"> <li>• Preliminary</li> <li>• Advanced</li> </ul> |
| Team B |  | <ul style="list-style-type: none"> <li>• Preliminary</li> <li>• Advanced</li> </ul> |
| Team C |  | <ul style="list-style-type: none"> <li>• Preliminary</li> <li>• Advanced</li> </ul> |
| Team D |  | <ul style="list-style-type: none"> <li>• Preliminary</li> <li>• Advanced</li> </ul> |
| Team E |  | <ul style="list-style-type: none"> <li>• Preliminary</li> <li>• Advanced</li> </ul> |

-  : Team member who is new in RoboCupJunior international competition
-  : Team member who has participated in RoboCupJunior international competition once in the past in any league
-  : Team member who has participated in RoboCupJunior international competitions twice or more in any league

All teams must comply with the rules for competing in RoboCupJunior **2021**, including the age requirements and team sizes stated. It is the responsibility of the participating team(s) and regional representatives to verify the participants' eligibility requirements, which are as follows:

- **Age requirement (age as of 1st of July):** All team members must be aged **14** to 19 years old
- **Team size:** Each team must have 2 to 5 members.
- **Membership:** Each team member needs to carry a technical role within the team. Every participant can join only one team. No member can be shared between teams or leagues.



## Overview

All Teams are judged in the following areas; Technical Demonstration, Technical Interview, OnStage Performance and separately, a Technical Description Paper (TDP).

**Recorded Technical Video Demonstration:** a 5-minute video demonstration to showcase the capabilities of their robots. Teams should demonstrate and describe the capabilities of their robots such as interaction with humans or with each other using mechanisms, sensor systems, and algorithms that have been developed by the team.

The robots should be presented without their costumes and key features of the technologies used shown to the audience. The team should explain how the capabilities have been developed, the challenges overcome, and the technologies involved.

As an addition to the 2021 competition, teams should also discuss how they overcame the limitations of the COVID-19 and provide examples of their team problem solving solutions.

The Technical Demonstration is assessed on the robot demonstrations, description of robot(s) capabilities, and the quality of the demonstration in a short video presentation. See the Technical Demonstration Score Sheet.

**Technical Interview:** An up to 15 minute live face-to-face interview between the team and the judges in which all robots and programming are judged against technical criteria. This can be held on the stage immediately following the Technical Demonstration. The judges will speak with the team members without any microphones on. Creative and innovative technical aspects are rewarded with higher scores. Judges are interested in determining students' understanding of the robotic technologies they have used. Teams must show authenticity and originality regarding their robots and performance in this interview.

All team members must be prepared to answer questions about the technical aspects of their involvement in the robot design. See the Technical Interview Score Sheet.

Due to the ongoing COVID-19 situation, the requirement for robots not to be reused from previous competitions has been relaxed. Teams should inform the judges if robotic components have featured in a previous international performance.

Please note: Depending on the Judges' discretion, teams may combine the time for the Technical Demonstration and the Technical Interview. However, the total time for both must NOT exceed 20 minutes per team. For example, if a team's Technical Demonstration exceeds 5 minutes, the Technical Interview will be shorter.

Technical Demonstration + Technical Interview = 20 minutes MAX

**OnStage Performance:** 1-2-minutes live performance in which a performance routine is judged according to creative, innovative and entertainment criteria. Teams must show originality, creativity and innovation throughout their performance routine. It is expected that all participating teams perform their performance at their best. See the OnStage Performance Score Sheet.

**Technical Description Paper (TDP):** Each team is required to submit a TDP with the technical demonstration video before the official starting date of the RoboCupJunior competition. The TDP should explain the robot hardware, software (including simulated environments), communication, and algorithms



used. The TDP is used to establish the authenticity of a team's robotic performance. A template for the OnStage TDP will be available for download from the RoboCupJunior website.

### **SuperTeam Technical Challenge:**

At the international RoboCupJunior OnStage competition, teams will also take part in a SuperTeam Performance.

SuperTeam Challenge is a robotic performance created by a group of cooperating teams. SuperTeams comprise of two or more participating teams. The SuperTeams are given a short period of time for collaboration at the competition venue. During this time, each SuperTeam must create a new performance that incorporates the work of each participating team. SuperTeams are encouraged to create an exciting and entertaining robotic performance, expressing their friendship and cooperation and demonstrating what they have learnt from each other. In addition to collaborating to perform collaboratively with new music and a new performance, a specific challenge will be embedded to be included as part of the performance. For example, lifting something, sorting something, recognising and using an object. Rules specific to the SuperTeam Technical Challenge will be presented to the teams when the teams are formed at the end of the second performance.

The SuperTeam Technical Challenge is a special program for the international event and is not obligatory for regional events. The rules of the SuperTeam Technical Challenge are provided in a separate document, teams who participate in the international event are strongly encouraged to carefully read the SuperTeam **2021** rules in advance of the international finals.

# Contents

|   |           |
|---|-----------|
| <b>PREFACE</b>  | <b>2</b>  |
| <b>OVERVIEW</b>   | <b>4</b>  |
| <b>CONTENTS</b>   | <b>6</b>  |
| <b>1. ROBOTS</b>  | <b>8</b>  |
| 1.1. ROBOT TECHNOLOGY   | 8         |
| 1.2. SIZE & NUMBER  | 8         |
| 1.3. DESIGN, CONSTRUCTION AND SAFETY                                  | 8         |
| 1.4. COMMUNICATION  | 9         |
| <b>2. ONSTAGE PERFORMANCE (40% OF TOTAL SCORE)</b>                    | <b>10</b> |
| 2.1. OVERVIEW   | 10        |
| 2.2. ONSTAGE PERFORMANCE JUDGING                                      | 10        |
| 2.3. STAGE PERFORMANCE  | 10        |
| 2.4. RESTARTS   | 11        |
| 2.5. MUSIC & VIDEO  | 11        |
| 2.6. STAGE  | 11        |
| 2.7. SCENERY  | 12        |
| 2.8. HUMAN-ROBOT AND ROBOT-ROBOT INTERACTION                          | 12        |
| 2.9. HUMANS ON STAGE  | 12        |
| 2.10. PENALTIES   | 13        |
| 2.11. PREPARATION FOR THE STAGE PERFORMANCE                           | 13        |
| 2.12. CONTENT   | 14        |
| 2.13. SECURITY AND SAFETY OF THE PERFORMANCE                          | 14        |
| 2.14. AUTHENTICITY AND ORIGINALITY                                    | 14        |
| <b>3. RECORDED TECHNICAL VIDEO DEMONSTRATION (30% OF TOTAL SCORE)</b> | <b>15</b> |
| 3.1. DEMONSTRATION PROCEDURE  | 15        |
| <b>4. TECHNICAL INTERVIEW (30% OF TOTAL SCORE)</b>                    | <b>16</b> |
| 4.1. INTERVIEW PROCEDURE  | 16        |
| 4.2. TRANSLATOR   | 16        |
| 4.3. SECOND TECHNICAL INTERVIEW                                       | 17        |
| <b>5. TECHNICAL DESCRIPTION PAPER AND TECHNICAL POSTER</b>            | <b>17</b> |
| 5.1. TECHNICAL DESCRIPTION PAPER (TDP)                                | 17        |
| <b>6. JUDGING AND COMMENTING</b>                                      | <b>18</b> |
| 6.1. JUDGING CRITERIA   | 18        |
| 6.2. TOTALING   | 18        |
| 6.3. FEEDBACK   | 18        |
| <b>7. CODE OF CONDUCT</b>   | <b>18</b> |
| 7.1. SPIRIT   | 18        |
| 7.2. FAIR PLAY  | 18        |
| 7.3. SHARING  | 18        |



|                   |                               |           |
|-------------------|-------------------------------|-----------|
| 7.4.              | BEHAVIOR                      | 19        |
| 7.5.              | ROBOCUPJUNIOR OFFICIALS       | 19        |
| 7.6.              | MENTORS                       | 19        |
| 7.7.              | SCHEDULING/SETUP DAY          | 19        |
| <b>8.</b>         | <b>ADDITIONAL INFORMATION</b> | <b>20</b> |
| 8.1.              | RULE CLARIFICATION            | 20        |
| 8.2.              | INFORMATION DURING THE EVENT  | 20        |
| 8.3.              | SPECIAL CIRCUMSTANCES         | 20        |
| <b>APPENDIX A</b> |                               | <b>21</b> |

# 1. Robots

## 1.1. Robot technology

Teams are encouraged to create a performance featuring physical or hybrid (with simulated systems) robots.

### 1.1.1. Robots

Teams are encouraged to use technologies creatively. Innovative or unusual use of technology (including sensors) is encouraged and will be rewarded. For example, laptops, notebooks, mobile phones, tablets, Raspberry Pi and other similar devices can be used as robotic controllers that process autonomous programming – but NOT as remote controllers on stage as part of the performance (see rule 1.1.3.).

### 1.1.2. Hybrid Robot Simulations

Due to COVID-19 restrictions, if teams are unable to fully construct particular systems of their robot(s), they may create hybrid simulated robotic elements. Simulated components are only acceptable where restrictions have prevented the creation of all physical systems but where some physical systems still exist. In this case, teams are encouraged to explore any technologies that allow for the simulated components of the systems required in a performance robot (mechanical or electrical systems etc.). Innovative or unusual use of technology (including sensors) is encouraged and will be rewarded.

1.1.3. Teams are encouraged to use technology in unusual, innovative or inspired ways to create an engaging performance. If you are unsure whether the technology you are using is appropriate, please contact the Technical Committee before the competition (refer to 8.1).

1.1.4. Teams should construct their own robot rather than using a commercial kit. A robot that has been built following a commercial kit or following a construction manual must be declared in the Technical interview and will not score highly.

1.1.5. Robots must perform autonomously.

## 1.2. Size & number

1.2.1. A team may have and use any number of robots. Robots may be of any size. Participants should design their robot(s) in sizes which they can carry by themselves. However, using multiple robots does not necessarily result in obtaining higher points. Large robots do not count for more. It is advised to high light interactive systems between robots.

1.2.2. Robots should be of a weight that a team member can carry and lift onto the stage with ease.

## 1.3. Design, Construction and Safety

1.3.1. Teams should design their robot in consideration of the safety. For example, every moving part should be covered with proper materials so as not to cause accidental human contact. When batteries are transported or moved, it is recommended that safety bags be used. Reasonable efforts should be made to make sure that in all circumstances robots avoid short circuits and chemical or air leaks. Appropriately sized and power of motors should be used with regard to health and safety requirements of a performance.

1.3.2. Teams should build a robust robot that does not fall apart easily.



- 1.3.3. Teams are encouraged to design their robot appearance by themselves. If a team wants to use a famous character as their robot, the team should pay attention to the copyright of the character.
- 1.3.4. Under no circumstances will mains electricity be allowed to use on the stage. Every robot should be equipped with some sort of battery. A maximum of 15 volts battery should be used. Lead acid batteries are not considered appropriate unless the team has gained permission before attending the competition from the Technical Committee for a specific reason.
- 1.3.5. Robots with flying capabilities (drones) are not permitted because of safety concerns.

## 1.4. Communication

- 1.4.1. Teams are encouraged to design their robot(s) with a communication function. Robots are encouraged to communicate with each other **during the performance**, for example, with a Bluetooth communication option (refer to 2.7 and 2.8). There must be no communication between off-stage and on-stage devices.
- 1.4.2. The only allowed communication protocols are infrared (IR), Bluetooth (LE and classic) and ZigBee. **It is the team's responsibility to make sure that their communication function does not interfere with other teams' robots when practicing or performing.** No team is permitted to use other radio frequency (RF) signals (like Wi-Fi or Z waves) as this may interfere with robots in other leagues. If you are unsure, please check with the Technical Committee before your performance (refer to section 8).
- 1.4.3. **Additional advice for designing and constructing robots**

**While floor joints will be made to be as smooth as possible, robots must be prepared for irregularities of up to 5 mm in the floor surface. Whilst every effort will be made to make the stage flat, this may not be possible, and teams should be prepared to cope with this uncertainty.**

**Although the RoboCupJunior organizers endeavor to make variable lighting including spotlights available, there is no guarantee that direct or intense spotlights will be available. Teams should come prepared to calibrate their robots based on the lighting conditions at the venue. Teams using compass sensors should be aware that metal components of the staging may affect the compass sensor readings. Teams should come prepared to calibrate such sensors.**

## 2. OnStage Performance (40% of total score)

### 2.1. Overview

- 2.1.1. The OnStage Performance is an opportunity to demonstrate the technical aspects of the robot(s), design and construction through a **performance-stage show**. This could be, for example, a magic show, theatre performance, storytelling, comedy show, dance or art installation. Teams are encouraged to be creative, innovative and take risks in their use of technology and materials when creating their performances. Refer to the OnStage Performance Score Sheet for more details.

### 2.2. OnStage Performance judging

- 2.2.1. Teams will be given up to two opportunities to perform before the judges. If more than one performance is scheduled the highest performance score from each performance will be used. The top scoring teams **may** be invited to perform again in a finals competition. Depending on the number of teams, a finals competition might not occur, in which case the highest performance score will be used to help determine the winner.
- 2.2.2. The stage performance will be judged by a panel of at least three officials. At least one of these judges is a RoboCupJunior official who has judged the Technical Interview as well.

### 2.3. Stage performance

- 2.3.1. The duration of the performance routine must be no less than 1 minute and no more than 2 minutes.
- 2.3.2. **Before the commencement of each teams' performance, they will be connected to the "Backstage Pit" which will allow them to test their AV and streaming connections. Teams will be connected to the main performance "stage" for the commencement of their live performance.**
- 2.3.3. **Performances will be live streamed for general viewing.**
- 2.3.4. **The performance time includes introduction and performance routine, including any re-starts due to factors under the team's control. If the time limit is exceeded due to circumstances outside the team's control (for example problems with starting the music) there will be no penalty. The judges have the final say on any time penalties.**

Each team will have a total of 5 minutes for their performance. A judge starts a stopwatch when a team member takes a step on the stage. This time includes stage set-up, introduction and performance routine, including any re-starts due to factors under the team's control. It does not include time needed for packing up and clearing the stage. If the time limit is exceeded due to circumstances outside the team's control (for example problems with starting the music by the technicians) there will be no penalty. The judges have the final say on any time penalties.

Following each performance, a team must fully tidy up the stage, pack up and remove any objects related to their performance. The performing team has a maximum of one minute to clear the stage after the end of their performance. The maximum total time on stage is therefore six minutes.

- 2.3.5. **Teams will be required to start the music for the performance routine.**

A technician designated by RoboCupJunior officials will start the music and the audiovisual/multimedia presentation for the performance routine.

- 2.3.6. Teams are strongly encouraged to **use the time-while they are setting up-on the stage to** introduce to the audience the performance and the features of their robots.

## 2.4. Restarts

- 2.4.1. Teams can restart their routine if necessary, at the discretion of the judges. There is no limit on the number of restarts allowed within their 5 minute-performance time. Penalty marks will be deducted from the score. (refer to 2.10) The team will be asked to leave the stage after 5 minutes.

## 2.5. Music & video

- 2.5.1. Teams may use music to complement their performance. Teams may find it useful to include a “beep” at the beginning of their music as a start signal.

If music is used teams must provide their own audio music source. If a team uses copyrighted music, they should follow the Copyright Law of the region where the event is held. The preferred transport method is to place the sound file on a memory stick as a MP3 file. The memory stick should be clearly labelled with the team name and category (OnStage Preliminary or OnStage Advanced) and should hold only the MP3 file.

It is essential that the music be given to a sound technician or a RoboCupJunior official before the team's practice period. Teams are encouraged to bring multiple copies of the audio source file.

If music is used teams must provide their own audio music source. If a team uses copyrighted music, they should make sure it applies with live streaming Copyright Laws.

- 2.5.2. The music should start at the beginning of the audio music source with a few seconds of silent lead-time.
- 2.5.3. Teams are encouraged to provide a visual or multimedia presentation as part of their performance. This can take the form of a video, animation, slideshow, etc. However, the content should be made by the team themselves. A projector and screen will be provided. The organizers cannot guarantee the height of the projection screen above the stage or the size of the projection.

Interaction between the robots and the visual display is allowed and encouraged. A VGA and HDMI cable will be available on stage to which a laptop or other device can be connected to the projector. The length of the cable cannot be guaranteed.

## 2.6. Stage

- 2.6.1. The size of the performance stage area will be up to the discretion of the teams however, the performance area must be visible in the camera's field of view.
- 2.6.2. The maximum size of the performance stage area will be a rectangular area of 4 x 3 meters (m) for robots with the 4m side facing the judges. The full horizontal distance (maximum 4 meters (m)) must be in the field of view.

The size of the performance stage area will be marked in a rectangular area of 4 x 3 meters (m) for robots with the 4m side facing the judges. This rectangular area is within a stage with a minimum size of 5 x 4 meters.



The boundary of the performance stage area will be marked with a 50 millimeter (mm) black tape-line. Teams are allowed to use the black boundary to identify the performance stage area. The floor provided shall be made of flat (non-glossy) white painted MDF (compressed wood fiber).

- 2.6.3. The judging camera must be set up as a static camera and should be placed in approximately the position as the judges table at an in person competition. (Appendix A)
- 2.6.4. For simulated performance components (hybrid systems), teams may wish to share their screen or film from their own static camera.

## 2.7. Scenery

- 2.7.1. Static props which do not form an integral part of the performance are discouraged since the focus of the performance should be on robots. The kind of props that are considered "interactive" are:
  - Props interact with robots via sensors
  - Props interact with robots via communication (refer to 1.4).

If a team decides to use static props, they should be placed on the periphery of the defined stage performance area. Robots can sense static props to perform a certain task or trigger a performance as long as they are placed on the periphery of the defined stage performance area.

## 2.8. Human-robot and robot-robot interaction

- 2.8.1. Robots may be started manually by human contact, sensor interaction or with remote control at the beginning of the performance (refer to 1.4 for allowed wireless communication). This is the only physical contact humans may have with their robots or simulated hybrid robotic components during the performance. Any clarifications regarding this ruling should be directed to the judges before the competition to ensure the interaction is permitted.
- 2.8.2. Human-robot interaction is encouraged; humans cannot physically touch the robot, just interact with the robot's sensors. Interaction which is used to alter the robot's behavior directly, e.g. to keep it inside the black lines, will be rewarded far less in comparison to more intelligent interaction (e.g. a robot following a human using a camera).
- 2.8.3. Interaction between robots is highly encouraged. Robots are allowed to physically touch one another and can interact through sensors and wired/wireless communication (refer to 1.4).
- 2.8.4. All communication and robot interactions must be visible on camera for the entire performance. This includes the initial manual start of each robot.

## 2.9. Humans on stage

- 2.9.1. Human team members may perform with their robots on the stage during the performance. Human performers may be inside and/or outside the marked area. There is no penalty for humans not performing with their robots. On the other hand, if the judges can not concentrate and see the robot's performance, the team will not be able to earn points. Teams are encouraged to consider the location of the human team members and acting configurations that can make robot performances better.

## 2.10. Penalties

- 2.10.1. If a team exceeds the time limits explained in 2.3, the team will be penalized by the loss of points (see performance score sheet).

If all the robot(s) ~~'s contact points (e.g. wheels)~~ move outside the static judges' camera field of view (the performance area) the team will receive a penalty score. Teams are recommended to create their own method to prevent robots from leaving the stage area (4x3 metre stage area).

A contact point is the point at which a robot touches the stage. If in doubt of "contact point" in relation to your robot design, please consult with the Technical Committee (refer to 8.1).

- 2.10.2. Unless a problem is not the fault of the team, any restart will result in a score penalty.
- 2.10.3. Due to the ongoing COVID-19 situation, the requirement for robots not to be reused from previous competitions has been relaxed. Teams should inform the judges if robotic components have featured in a previous international performance.
- 2.10.4. However, teams who, in the opinion of the judges, have knowingly produced duplicate robots, costumes or performance movement (duplicate music is allowed) of another team will be subject to penalties. This applies to any previous RoboCupJunior Dance or OnStage performances.

Teams who, in the opinion of the judges, have knowingly produced duplicate robots, costumes or performance movement (duplicate music is allowed) of another team or reused previous years' robots (with or without modifications), costumes or performances will be subject to penalties. This applies to any previous RoboCupJunior Dance or OnStage performances.

- 2.10.5. A team who cannot be punctual will be penalized. If a team cannot get ready for their turn on time and the organizer has to re-schedule, the team will be allowed to show their performance after the end of the last judgment of the day, though it will result in a score penalty. If the team repeats unpunctual behavior, disqualification may be applied.

## 2.11. Preparation for the stage performance

- 2.11.1. It is the responsibility of the team to ensure that the music and video/presentation is playing correctly before their first performance by liaising with the RoboCupJunior OnStage officials.

Depending on the configuration of the stage and the sound system at the venue, it is possible that the human starting the robot will not be able to see the RoboCupJunior OnStage official starting the audio source; and vice versa. Teams should come prepared for these conditions.

### Practice on the main stage

The main performance stage will be made available for teams to practice on. In fairness to all teams who may wish to practice, a booking sheet will be used to reserve the stage for a short practice time. Please be respectful of the allocated time.

Every team who practice on the main stage is responsible for cleaning it after use; the stage must be fully cleaned for the next team willing to use it. Especially, the team who uses the main stage just before starting the performance judging should clean up at least 3 minutes before the judging start.



## 2.12. Content

- 2.12.1. Any performance that includes violent, military, threatening or criminal elements will be excluded. Any team using inappropriate words or images will also be excluded.
- 2.12.2. Participants are asked to carefully consider the wording and messages communicated in any aspect of their performance. What seems acceptable to one group may be offensive to friends from a different country or culture.

## 2.13. Security and safety of the performance

- 2.13.1. To protect participants and comply with occupational health and safety regulations, routines may not include explosions, smoke or flame, use of water, or any other hazardous substances.

To protect participants and comply with occupational health and safety regulations of the host country, RoboCupJunior officials and bystanders, routines may not include explosions, smoke or flame, use of water, or any other hazardous substances.

A team whose routine includes the use of water or any situation that could be deemed hazardous, including the possibility of damaging the stage, must submit a report outlining the content of their performance to the Organizing Committee 25 days before arriving at the competition. The Organizing Committee may also request further explanation and a demonstration of the activity before the stage performance. Teams not conforming to this rule may not be allowed to present their routine.

## 2.14. Authenticity and originality

- 2.14.1. The performance is to be unique and have never been used in any other RoboCupJunior International competitions. Teams are encouraged to carefully check that all robots and costumes conform to this rule.

## 3. Recorded Technical Video Demonstration (30% of total score)

### 3.1. Demonstration procedure

- 3.1.1. Teams will have 5 minutes to give their demonstration. After 5 minutes, judges will stop watching.
- 3.1.2. The technical capabilities of their robot(s) should be demonstrated by both describing what has been developed and demonstrating this capability. This could cover any aspect of the performance or technical capabilities of the robot(s), such as interaction with humans, interactions with other robots or the use of a particular sensor. All teams must discuss how they considered safety whilst developing their robotic performance.
- 3.1.3. Teams are encouraged to remove robots' costumes for showing detailed design. If this is difficult, teams should prepare some photos or movies of inner mechanisms as an electronic presentation. Be aware that not being able to demonstrate how a robot works because the costume prevents this, will result in a lower score. For simulated hybrid robotic components, features of these systems should be described.
- 3.1.4. The technical demonstration will be judged by at least two judges.
- 3.1.5. The Open Technical Demonstration Score Sheet is used in the judging. It is strongly suggested for teams to read the Score Sheet before the demonstration to make good use of the demonstration. This assesses both the content and presentation of the demonstration.
- 3.1.6. If teams wish to present in their native language, full english subtitles and transcript must be provided.

#### Overview

The description of the robots' capabilities should explain to the audience how the robot's capabilities have been achieved. Teams for whom English is not their first language will be provided with a translator to present their written words if required. Teams may use a video or other recorded aid to present the description.

#### Demonstration procedure

Teams will have 5 minutes on stage to give their demonstration. They will additionally have 1 minute to enter and set-up on stage and an additional 1 minute to clear the stage.

The technical capabilities of their robot(s) should be demonstrated by both describing what has been developed and demonstrating this capability. This could cover any aspect of the performance or technical capabilities of the robot(s), such as interaction with humans, interactions with other robots or the use of a particular sensor. All teams must discuss how they considered safety whilst developing their robotic performance.

Teams are encouraged to remove robots' costumes for showing detailed design. If this is difficult, teams should prepare some photos or movies of inner mechanisms as an electronic presentation. Be aware that not being able to demonstrate how a robot works because the costume prevents this, will result in a lower score.

The technical demonstration will be judged by at least two judges.



The Open Technical Demonstration Score Sheet is used in the judging. It is strongly suggested for teams to read the Score Sheet before the demonstration to make good use of the demonstration. This assesses both the content and presentation of the demonstration.

#### Stage

The same stage will be used for performance and the technical demonstration. Limits described in section 2.6 apply for the Open Technical Demonstration.

#### Demonstration presentation

Two microphones will be available for teams to use. Teams are encouraged to produce presentations, videos or use music or a pre-recorded commentary to accompany and assist with their technical demonstration. There is no limitation on the number of team members allowed on the stage.

#### Translator

The Open Technical Demonstration will take place in English. If teams require a translator, they should inform the RoboCupJunior OnStage officials or Local Organizing Committee prior to the event to allow translators to be organized. Extra time will not be given for teams with a translator.

## 4. Technical Interview (30% of total score)

### 4.1. Interview procedure

- 4.1.1. All teams will have up to 15 minutes' technical interview judging during the competition. **This will be a live video call with the interview judging panel and will not be publicly streamed.**
- 4.1.2. Interviews will be judged by at least two RoboCupJunior officials.
- 4.1.3. The Interview Score Sheet is used in the interview judging. It is strongly suggested for teams to read the Technical Interview Score Sheet before the interview to make good use of the interview.
- 4.1.4. **Teams should have all physical and any simulated robotic systems present at the interview with copies of all their programs in a format that can be easily viewed.**

Teams should ensure that they bring all their robots, and copies of all their programs in a format that can be easily viewed. **Teams should expect to screen share copies of their robot(s)' code to the judges.**

- 4.1.5. Each team member must be prepared to answer questions about the technical aspects of their involvement in the robot design and programming.

### 4.2. Translator

- 4.2.1. **The Open Technical Demonstration will take place in English. If teams require a translator, they should inform the RoboCupJunior OnStage officials or Local Organizing Committee prior to the event to allow translators to be organized. Extra time will not be given for teams with a translator.**





- 4.2.2. As per 3.1.6, for the Recorded Technical Video Demonstration, if teams wish to present in their native language, full english subtitles and transcript must be provided.

Same as the Open Technical Demonstration. Please refer to 3.5.

### 4.3. Second technical interview

- 4.3.1. If the judges consider it necessary, teams may be asked to complete a second technical interview. If this occurs, the score from the second interview will be used to calculate the total score.

## 5. Technical Description Paper and Technical Poster

### 5.1. Technical Description Paper (TDP)

- 5.1.1. The Technical Description Paper (TDP) must be completed by teams attending an international event. This allows teams to provide a summary of the robots and technology used prior to their interview. Teams should ensure that they submit this form.
- 5.1.2. The Technical Description Paper (TDP) must be submitted to the judges prior to the event with the submission of the Technical Video.
- 5.1.3. Teams who produce a website, blog or other form of media in conjunction with their performance are welcome to include in the Technical Description Paper.

The Technical Description Paper (TDP) must be completed by teams attending an international event. This allows teams to provide a summary of the robots and technology used prior to their interview. Teams should ensure that they submit this form.

The Technical Description Paper (TDP) must be submitted to the judges prior to judging.

#### Technical Poster (optional)

Teams will be given public space to display a Technical Poster. The size of the poster should be no larger than A1 (60 x 84 cm). The poster should be displayed in the designated location. Teams may bring the poster to the interview if they contain useful information, however the poster will not be judged during the interview. Electronic posters will not be accepted.

The purpose of the poster is to introduce the team, explain the technology used to develop the robots and document the preparation work. Posters should be made in an interesting and engaging format. They will be viewed not only by the judges, but also by other teams and visiting members of the public.

Areas that are useful to include are: team name, division (Preliminary or Advanced), and your region/country, annotated pictures of the robot under development at various stages and an explanation of the innovative robot technologies used.



## 6. Judging and Commenting

### 6.1. Judging criteria

6.1.1. The judging criteria and allocation of marks are given in the respective score sheets.

### 6.2. Totaling

6.2.1. The total score of each team is calculated by combining the scores from the team's Technical Interview and the Technical Demonstration, and the score from the OnStage Performances. The finals, if scheduled, will be used to determine the "Best Stage Performance" award only.

### 6.3. Feedback

6.3.1. RoboCupJunior is an educational project. It is important that team members learn from their experiences with RCJ and have the opportunity to improve in later years if they so choose. The organizers will provide feedback on each team's performance, it could be at the conclusion of the competition or in a maximum of 30 days. The sheet will indicate to the team their areas of strength and areas needing improvement. It is important to note that these sheets are not to be used to debate positions, decisions or competition scores with the judges.

6.3.2. Scores will be given after the first performance to allow teams to better prepare for the second performance.

## 7. Code of Conduct

### 7.1. Spirit

7.1.1. It is expected that all participants, students and mentors, will respect the RoboCupJunior mission. In addition, participants should keep in mind the values and goals of RoboCupJunior.

7.1.2. It is not whether you win or lose, but how much you learn that counts. You will really miss out on a lifelong learning experience if you don't take this opportunity to collaborate with students and mentors from all over the world. Remember this is a unique moment!

### 7.2. Fair play

7.2.1. It is expected that the aim of all teams is to participate in a fair and clean competition.

7.2.2. Humans that may cause deliberate interference with robots or **live performance -or damage to the stage** will be disqualified if part of a team. If not part of a team they will be asked to leave the event.

7.2.3. Remember, helping those in need and demonstrating friendship and cooperation are the spirit of RoboCupJunior as well as making the world a better place.

7.2.4. Participants are encouraged for helping each other. However, too much involvement may result in a disqualification for all related teams. For example, if an Advanced team member contributes significantly to his/her peer Preliminary team in designing, repairing or programming before and/or during the competition, not only the Preliminary team but also the Advanced team may be disqualified.

### 7.3. Sharing



- 7.3.1. It is understood that RCJ events with rich technological and curricular developments should be shared with other participants after the competition.
- 7.3.2. Any developments may be published on the RoboCupJunior website following the event. All winning teams should submit a one-page PDF summary describing their robots for upload to the RoboCupJunior website. The technical form from the 2014 rules can be used as a guideline.
- 7.3.3. Sharing information furthers the mission of RoboCupJunior as an educational initiative.

## 7.4. Behavior

- 7.4.1. All movement and behavior are to be of a subdued nature within the event venue.
- 7.4.2. Competitors are not to enter set-up areas of other leagues or other teams, unless expressly invited to do so by other team members. Participants who misbehave may be asked to leave the building and risk being disqualified from the event.
- 7.4.3. It is expected that every participant behaves with respectful manner towards each other.

## 7.5. RoboCupJunior Officials

- 7.5.1. The officials will act within the spirit of the event.
- 7.5.2. The RoboCupJunior officials shall not have a close relationship with any of the teams in the age group they judge.

## 7.6. Mentors

- 7.6.1. Mentors (defined as teachers, parents, chaperones, translators or any other non-team member) are not allowed in the student work area except to assist carrying equipment in or out of the area on the arrival and departure days.
- 7.6.2. If a problem is encountered with a computer or other device that is clearly beyond the reasonable ability level of a student to repair, a mentor may request permission from the organizers to enter the work area for the sole purpose of advising on that repair. They must leave the work area immediately after this is completed. Rule 7.6.1 still applies at these times.
- 7.6.3. Mentors are not allowed to set up equipment on stage, as this should be the responsibility of team members. Organizers will assign volunteers to teams that need an assistant for stage set-up. Teams should request this assistance to the officials.
- 7.6.4. A mentor found in the student work area may lose his/her access to the venue and the team will be penalized.
- 7.6.5. A mentor found to be involved with mending, building or programming the robot(s) and/or directing choreography may lose his/her access to the venue and the team marks will be penalized. This applies to both the "individual" and "super team" competitions.

## 7.7. Scheduling/Setup Day

- 7.7.1. Please refer to the RoboCup Junior 2021 OnStage schedule for the competition days. Events scheduled with respect to regions' timezones if live streamed.



International competition has five days: one setup day, three competition days and one finals day. There are a lot of activities during the setup day, so participants should come up to the venue this day as early as possible.

## 8. Additional Information

### 8.1. Rule Clarification

- 8.1.1. If any rule clarification is needed, please contact the International RoboCupJunior OnStage Technical Committee, using the Junior Forum (<https://junior.forum.robocup.org>). Once the inquiry is posted on this forum, OnStage TC or OC members will respond as soon as possible.
- 8.1.2. If necessary even during a competition, a rule clarification may be made by members of the RoboCupJunior OnStage Technical Committee (TC) and Organizing Committee (OC).

### 8.2. Information during the event

- 8.2.1. Teams will be responsible for checking for updated information during the event. Teams should check the notice boards at the venue and the RoboCup 2021 website.
- 8.2.2. Newsletters will be disseminated during the event to ensure teams and mentors have the latest information.

### 8.3. Special Circumstances

- 8.3.1. If special circumstances, such as unforeseen problems or capabilities of a robot occur, rules may be modified by the RoboCupJunior OnStage Organizing Committee Chair in conjunction with available Technical Committee and Organizing Committee members, if necessary even during a competition.
- 8.3.2. If any of the team leaders/mentors do not show up to the team meetings to discuss the problems and the resulting rule modifications described at 8.3.1, it will be considered as an agreement.

## APPENDIX A

Figure 1: Layout of the stage and the audio-visual equipment supplied

