

# RoboCup MSL – 2019 Rule Changes

**Disclaimer:** This document contains an overview of the Rulebook changes introduced for the 2019 RoboCup competitions. It was created to facilitate the integration with new rules, but it does not replace the reading of the official rulebook in any way.

The Executive and Technical Committees would like to thank all the contributions of the teams with proposals for rule changes. Rules are adapted with the league roadmap in mind, making sure that the evolution goes towards the RoboCup 2050 goal, along with a steady scientific progress

Any questions or issues regarding the rules should be addressed to the MSL Technical Committee mailing list:

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## **General**

The MSL wiki has been migrated to <https://msl.robocup.org/>. The wiki will not be updated anymore.

## **#1 Consequences of remote interference**

Problem: Inconsistency in terms and consequences related to remote interference. Last year remote interference via the wireless connection was observed: apparently the principle of integrity does not hold.

General Idea: Remote influencing, in any form, via the wireless connection (remote interference RC-12.3.7) of the robots during a game should result in a disqualification of the match.

### Changes:

1. The line “Interfering with the game remotely through wireless communication, e.g.by remotely joysticking a robot, or send commands to robots from a machine not on the robots that convey information about the position of objects on the field or activate particular patterns of actions on the robots” in RC-12.3 has been moved to RC-12.3.7. Parts of RC-12.3.7 have been rewritten.
2. Added in 4.2.5: “Violating the communication-protocol leads to a disqualification of the match.”

## **#2 Penalty on setup time-delay**

Problem: Matches are delayed (heavily?) by teams not being ready

General Idea: Penalize systematic delays.

### Changes:

1. Added in RC-8.1.1: “If, in the opinion of the referee, a team causes a delay of more than 3 minutes, a warning is given to the team. This warning will be registered on the match form.

3 warnings throughout the tournament (systematic delays) will be penalized with 1 point during round robins or 1 goal for the opponent during the knock-out-phase. For each consecutive warning the same penalty is applied immediately, i.e. a 4<sup>th</sup> warning leads to a point reduction or a goal for the opponent again.”

### **#3 Consequences on wrong tackle**

Problem: high speed impacts on another player without “significantly decelerating before a collision.”

#### Changes:

1. In RC-12.3.2, the line

“It is up to the referee to evaluate the number and level of seriousness of pushing fouls. The referee can and should, at is own discretion, show the offending robot either a yellow or a red card whenever a serious pushing foul occurs.”

has been replaced by

“It is up to the referee to evaluate the number and level of seriousness of pushing fouls. The referee can and should, at is own discretion, show the offending robot either a yellow or a red card whenever a serious pushing foul occurs.”

#### **#4 Remove global timer reset on each repair**

Problem: Teams wait to take out robots to reduce the consequences of this rule

Idea: Start individual counters for each robot removed

#### Changes:

1. Removed “This rule doesn't apply to a single particular robot. If a robot is removed from the field, then no other robot from the same team can re-enter the field before the 30s are passed, the RefBox signal is received and the game is stopped. If another robot from the same team is removed during the ongoing 30s period in the next game stoppage, this time is restarted and, for another 30s, no robot of the same team can re-enter the field.” from RC-4.5.1

## **#5 Clarifications w.r.t. the goalkeeper**

Problem: What are the rules with respect to the size limitation of the field players when the goalie decides to move out of the goal area? Is the keeper allowed to move outside of the goal area?

Idea: Allow the keeper to move outside of the penalty area. Outside the penalty-area, no frame-extensions are allowed.

### Changes:

1. Added “Within the penalty area, ...” to RC 4.2.0, alinea 3.
2. Added “The keeper is allowed to move outside the penalty area, but increasing its size outside the penalty area is considered as a violation of the robot-size. In this case, a free-kick will be awarded to the opponent.” to RC 4.2.0, alinea 3.

## **#6 Kickoff**

Problem: FIFA removed the rule that the ball has to be kicked to the defending team.

### Changes:

1. Removed “The ball has to be kicked forward into the side of the defending team.” from FL 8.3
2. Removed “ Kicking the ball into its own half of the field is also allowed.” from RC-8.3



## **#7 Goal**

Problem: Goal drawing is misleading, keeper can easily get stuck in the net.

### Changes:

1. Added “In order to prevent the keeper getting stuck with the upper parts of the nets, the radius of the arc at the upper-back region of the goal has to be below 100mm.” in RC-1.7
2. Updated the goal drawing in RC-1.7.

## **#8 Teams Technical Area**

### **#8 a**

#### Problems:

- Teams have no reserved space for the robots next to the RefBox
- Putting robots in and out takes too much effort from humans
- A lot of “excuse me, we need some space for our robots, we are playing in 5 minutes”

#### Changes:

1. A team technical area, marked blue, is available for both teams, see drawings in RC 1.0. “Spare” robots (robots not in play) must stay there. A description of the team technical areas is given in RC-1.2.4 (new).
2. In order to prevent lifting, a ramp is added on both sides of the field.
3. Removed: “Robots must be repaired in the assigned Team Technical Area, outside of the green area of the field.” In RC-4.5.1

### **#8b**

#### Problems:

- A Safety Zone Distance around the field of 1m instead of 1.5m seems to be enough

#### Changes:

1. RC-1.2.1 Safety Boundary: “It (the safety border) is placed 1.5m outside of each field border” is replaced by “It is placed at least 1.0m outside of each field border.”
2. Updated RC-4.1.2: 1.5m to 1m.

## **#9 Autonomous Substitution**

Idea: Allow three substitutions per match without human intervention. Any human intervention will not count as a substitution, but as a repair.

### Changes:

1. Updated RC-3.2.
2. Added RC-3.3.
3. Added RC-3.4 “All Matches” in FL 3.4.
4. Added RC-3.5 “substitution-procedure” in FL 3.5.
5. Added RC-3.6 “Changing the goalkeeper” in FL 3.6: “Any other robot can substitute the Goalkeeper robot in correspondence with RC-3.5, RC-4.2.0, RC-4.4 and all other related rules.”
6. In RC-8.3; RC-8.6; RC-13.4.1; RC-15.1; RC-16.1 and RC-17.1; “The referee must restart the game within 7 seconds after game stops.” is replaced by “The referee must restart the game within 7 seconds after game stops with the exception for the autonomous substitution procedure defined in RC-3.5.”

## **#10 Repair Time**

Problems: Reduces the play time and often new teams are suffering from this (Change RC-4.5.1).

### Changes:

1. The 30s repair time is reduced to 20s in RC-4.5.1.

## **#11 Lobbing from own half**

Problems: Making a “random” lob-pass to the front can easily lead to a throw-inn for the offending team, as the easily rolls out of the field compared to a grass field. The current requirement of 3m is relatively easy to achieve by the offending team.

### Changes:

1. The 3m requirement in RC-10.1.2 is reduced to 2m

## #12 Penalties

### 12a

Problems: The penalty marker was not updated when the field and goal were increased last year. As a result, penalties tend to not be decisive anymore.

#### Changes:

1. The distance from the goal to penalty marker is increased to 3.6m in RC-1.4.
2. The lines
  - “After the field robot catches the ball, the ball may only move in a direction towards the goal. Until a shot is taken.
  - The robot must kick the ball before the ball enters the penalty area, otherwise no goal is awarded.”

in RC-14.3 and RC-14.4 have been replaced by

- “After the field robot catches the ball, the ball may only move, at most 20cm, and always in the direction towards the goal.
  - The robot must kick the ball before the ball moves more than the above defined 20cm, otherwise no goal is awarded.”
3. Figure RC-1.0 is updated according to this change.

### 12b

Proposal: Require that every penalty is taken by a different robot. Also in case a team has fewer robots, the penalty taker will be cycling. Apart from the keeper, the robots which were on the field during the final whistle of the referee are required to take at least one penalty each.

#### Changes:

1. Updated the rule  
“All 5 penalties of one team are taken sequentially, followed directly by the 5 penalties of the other team”

in RC-14.3 to

“All 5 penalties of one team are taken sequentially, in cycling order by the field-players which were on the field of play at the end of the match, followed directly by the 5 penalties of the other team.”

### **#13 Technical Challenge**

There are several revisions for the Technical Challenge, namely:

1. The team-leader chooses between the tournament-ball and the arbitrary ball, such that only a single ball is on the field.
2. The scoring for using the arbitrary ball in run #1 has been doubled.
3. For run #2: For doing a single forward or a single backward dribble, the robot needs to release the ball each time.
4. The definition of a slalom dribble has been added: “A slalom-dribble is considered as making a "s"-shaped pattern between the objects, i.e. one object is passed on the right side of the robot, while the next object is passed on the left side of the robot and vice versa.”
5. Scoring of Data-logging is added and revised. The idea is that maximum 10 bonus points can be obtained by providing match-logs of the matches. (page 85). The total score of the technical challenge will be the sum of run #1, run #2 and the data-logging.

## **#14 Scientific Challenge**

Problem: providing match-logs is not considered to be scientific.

Idea: Remove the score for valid full-match from the scientific challenge and add them to the score of the 'technical challenge' (F2000 Challenge 1). Revise the scoring of the Scientific Challenge.

### Changes:

1. For the Scientific Challenge (Challenge 2) , the pre-qualification material weighs 10% and the score of the presentation for 90%.
2. The Score for the participation in the standardized datalogging is added to the Technical Challenge.



## **#15 Qualification**

### **15a Scoring**

Because the results of the qualification-process is relevant for several aspects, such as the tournament grouping and the scientific challenge, the scoring has been revised as follows:

Scientific papers (max 40 points instead of 30):

International journal/book chapter (8 points for each paper instead of 6)

International conference (peer-reviewed) (6 points for each paper instead of 4)

National conference (peer-reviewed) (3 points for each paper instead of 2)

Other (e.g. non-peer-reviewed or Ph.D. thesis) (1 points for each paper)

Performance in past events (max 40 points instead of 20):

Ranked among top-3 in WC at least once in the last 3 years: 10 points instead of 0

Proceed to last 8 teams during WC of last 3 years: 5 points instead of 20

Ranked among best 3 in the scientific challenge at least once in the last 3 years in WC: 10 points instead of 0

Ranked among best 3 in the technical challenge at least once in the last 3 years in WC: 10 points instead of 15

Ranked among top-3 instead of just proceeding in local tournaments at least once in the last 3 years: 5 points instead of 10

Qualification video (max 20 points instead of 26): Each action gained 2 points instead of 3.

### **15b Materials**

In CR 1.1, a more detailed description for submitting RoboCup-related publications is given:

“A list of, at most, 5 scientific papers published during the last 5 years of the team which are related to RoboCup. A complete reference must be provided for each paper, including Title, authors, affiliation, Conference or Magazine name, editor (when applied), year of publication and pages of the procedures or magazine were it was published. Abstracts of these papers must also be submitted.”

## #16 Minor Updates & Corrections

### Changes:

1. RC-4.2.0, item 3: "... the goalie is allowed to increase his size instantaneously (at most 1 second) up to a square of 60cm x 60cm width ..."
2. RC-4.2.5: The Measured equipment will be placed at 11m distance, as since last year the goal line is further away. As a result, the maximum received power may not exceed -45dB.
2. Added to 12.0.1, bullet 3: "Forces exerted by the robot onto the ball in order to handle it, may not lift the ball out of the ground. If such situation occurs, a free kick is awarded to the opponent team"
4. RC 12.3 (Indirect free kick as a result of manual interference): The lines
  - "entering the field during the game and breaks without permission of the Referee"
  - touching the robot during the game and breaks"

are replaced by:

- "entering the field during the game without permission of the referee"
  - touching the robot during the game without permission of the referee"
5. RC 12.3.6, bullet 2: "(e.g. touching the robots during game or breaks without the intention to take them out for repair or when a team member instead of the team leader is entering the field of play during the game or breaks)." has been replaced by "(e.g. touching the robots during the game without the intention to take them out for repair)"
  6. RC 13.1.2: "the ball must be touched" has been replaced by "ball must roll freely for 0.5m and then must be touched".
  7. RC-13.4.1, RC-15.1, RC-16.1, RC-17.1: "after receiving a yellow card the robot must be removed from the field for two minutes." has been replaced by "after receiving a yellow card the robot must be removed from the field for 90 seconds."