RoboCup MSL – 2020 Rule Changes

Disclaimer: This document contains an overview of the Rulebook changes introduced for the 2020 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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Clarifications:

#1: Substitution procedure
In order to remain the game-flow, all substitutions required should be requested at once as soon as possible after a game stop and will be send once to both teams. Hereby, the game-flow is kept, as the time for the substitution is required just once (there are no successive substitutions) and discussions or waiting for possible substitutions is limited. Furthermore, to reduce complexity during the substitution procedure, the requirement to enter the field at the centerline has been removed.

As a result, the substitution procedure (FL3.5 and RC 3.5) has been reconsidered and improved.

#2: In game penalty
RC-14.4, in game penalty (red part added):
Only the defending goalkeeper and the robot taking the penalty may leave their position.

#3: Additions in Network Setup
RV-Infinity, Robot Club Toulonnais and IRIS have been added to the network setup for both the unicast and IPv4 communication.

Change #1: Substitution procedure

Problem: the substation procedure is desired to be completely autonomous, human interference from the Team Technical Area (TTA) actually leads to interference with the game-flow.

Changes:

During the substitution, no team-member is allowed to be in contact with the robot substituting an other player. Therefore, in RC-3.5, the first action of the procedure, the following text has been added:

“As an autonomous procedure is required, from this moment on, no team member is allowed to stay in the Team Technical Area at a distance closer than 1m to the robot or robots that are going to substitute the ones being replaced. Any doubt of the referee of (manual) interference is considered as a non-autonomous substitution. A repair will be called, still leading to an increment in the number of substitutions.”

At the 7th action of the procedure, the following text has been added: “Team members are allowed to fully use the Team Technical Area again. ”

Change #2: definition of “Two Robots”

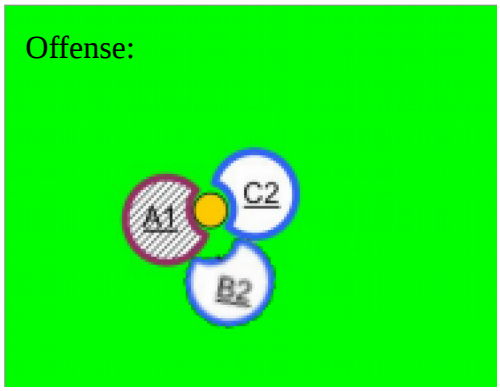
Problem: Robots of the same team get in contact and are penalized with a free kick while no advantage is achieved.

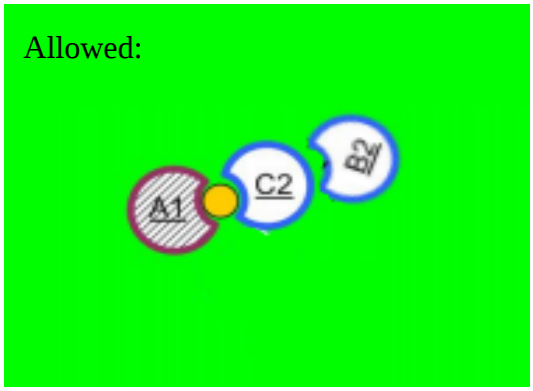
Changes: no foul if robots are head-to-tail, pushing remains prohibited(!). Concretely, this means at rule RC-12.3.2, 9th item

“While two robots from opponent teams are actively disputing the ball,no other robot from either team can produce a direct contact with those robots. If more than one robot is actively trying to intercept an opponent robot which is currently dribbling the ball (example bellow) then, as soon as two opponent robots are able to touch the ball, all other robots should move away, and can no longer be in contact with either the ball or any of the two robots disputing the ball. Violation of this rule will result in a pushing foul awarded to the offended team.”

has been replaced with (red parts added)

“While two robots from opponent teams are actively disputing the ball (example below), no other robot from either team can produce a direct contact with the ball or the opponent team's robot. If more than one robot is actively trying to intercept an opponent robot which is currently dribbling the ball then, as soon as one robot from the team that is trying to intercept is able to touch the ball, the other should move away, and can no longer be in contact with either the ball or the opponent team's robot. Violation of this rule will result in a pushing foul awarded to the offended team.”





Change #3: Team Technical Area possession
Problem: Switching the Team Technical Areas for each team between the first and second half of a match creates a lot of unnecessary work and chaos.

Change: At RC-1.2.4:
“The Team Technical Area is at the defensive side, so teams have to switch after the first half.”

has been replaced by

“The Team Technical Area is at the defensive side of the first half, and does not change afterwards.”

Proposal #4: Active Color team makers

Problem: No active team markers are allowed in order to prevent sensor interference. This creates a lot of work with changing shirts between matches.

Change: In RC-4.2.4, the usage of active markers has been added if explicitly approved by the opponent team. The text

"In order to avoid sensor interference, these markers must be passive (for example, LEDs or other types of screens are not allowed)"

has been replaced by

"The use of active markers (for example, LEDs or other types of screens) is only allowed in case this is explicitly approved by the opponent team before the commencement of the game. In all other cases, teams must provide passive markers in order to avoid sensor interference.
Markers should be static. For example, a marker can only contain one image, and its contents, saturation nor intensity are allowed to change during a match. If at any time the robot markers are no longer fulfilling their function (e.g. are not visible, fail or become detached), the robot needs to be taken out of the field for repair."

Change #5: Clarify active robot
Problem: No clear statement in RC-3.1.1 on what's allowed for proving a robot is active.

Change: At request of the referee, the team captain has to explain how the robot will actively react (turn/move away) by using refbox commands and placing the ball at a certain position. Therefore, RC-3.1.1 is now defined as follows:

"Players not capable of play, e.g. players not able to move, or players with defective or malfunctioning sensing and/or actuating systems, are not permitted to participate in the game. It is up to the referee to judge whether a player is capable of play. In case of doubt, during a stoppage, the referee will ask the RefBox assistant to send a specific command indicating the team and robot number. This robot should then react by rotating left over its center 15º to the left, followed by a similar movement to the right for 30º and finally rotating back to its original position."

Change #6: Scientific Challenge

Problem: Results of the scientific challenge should be awarded based on scientific performance
demonstrated during tournament, not on past results or other irrelevant parameters. Now, by taking the scoring of the qualification into account, these irrelevant parameters are taken into consideration in the result of the scientific challenge. Quality of TDPs and the scientific contributions leaves to be desired as it a stimulation for the qualification preparation.

Change: Scoring of scientific challenge should be based on TDP-result, the quality of papers published by the teams and the scoring of the scientific challenge as described in the rulebook. Therefore, the scoring of the challenge has been updated. Please have a look at the rulebook.

Proposal #7: Code Sharing
Problem: Code is hardly shared between teams, documentation is hardly kept up-to-date and papers often lack implementation details.

Change: The following text has been added to the “Mechanical and electrical description of the robot and software flow chart”-section in the qualification materials:

“Another 20 points will be added by open sourcing the software. eferences to the software components in the software flowchart should be provided. In order to obtain the score, clear statements are required about why a subset of the components is not being open-sourced. At least the version of the software at the time of the last RoboCup tournament the team has participated in should have been made available. For teams who have not participated yet in a RoboCup tournament, this time-criterion is not applied.”

As more points can be obtained in the qualification now, the minimum scoring (CR1.3) in the qualification has been increased from 30 to 50 points.

Proposal #8: Redesign of Technical Challenge

Problem: No major improvements are achieved during the technical challenge towards the major RoboCup-objective in 2050 and the work being done in the challenge hardly comes back as an improvement of the games, leading to less motivation from the teams for the technical challenge. Nice examples of the recent past are for example the Camera System designed by the Falcons, the Human Dribble of Water and the 2-wheel inverted pendulum idea of Robot Sports. The data-logging is kept and will contribute is the overall score as well.

New Challenge: Within a time frame of 10 minutes, teams demonstrate a solution which contributes towards the RoboCup 2050 objective. Although presentations are allowed for explaining the approach, the focus of the Technical Challenge will be on demonstrating the concept. As such, teams are obliged to demonstrate their concept: no score is obtained if there is no demonstration. The judgement will take into consideration the following specific issues, each one of which will be granted between 1 and 10 points

- Criterion 1 (C1): Roadmap compliant (For example: mix team protocol, human compliant (safety!), solutions related to futsal-sized field, arbitrary ball, active hands of keeper, automatic referee, solutions for cost-reduction of soccer platform.)
- Criterion 2 (C2): Open Sourceness and adoptability of solutions for other teams
- Criterion 3 (C3): Demonstration of concept
- Criterion 4 (C4): Level of advancement, i.e. the level of technological progress
- Criterion 5 (C5): Level of reliability and robustness
- Criterion 6 (C6): (Potential) impact on the game
- Criterion 7 (C7): Novelty

The team leader score is determined according to the following weighting:
Score team leader = 2*C1+2*C2+3*C3+2*C4+C5+2*C6+C7

Similar to the Scientific challenge, a normalization procedure is applied to obtain the final score. Please have a look at the rulebook.

Change #9: Ball Contact
Problem: ball almost destroyed during the tournament.

Change: RC-4.2.7: Ball Handling Mechanisms, replace
“Ball handling devices must be designed such that they are safe”

by (red text added)

“Ball handling devices must be designed such that they are safe and non-destructive for the ball. It is up to the referee to evaluate if this situation occurs. In such a case, the referee should write down a note on the game sheet indicating the team name that violates this rule. More than two such comments may lead to team disqualification. This decision will always be taken by the Technical Committee.”

Change #10: Extra Time
Problem: no clear indication of extra playing time.

Changes:
FL7.3: Added the following in accordance with the FIFA-rules: “The fourth official indicates the minimum additional time decided by the referee at the end of the final minute of each half. The additional time may be increased by the referee but not reduced. The referee must not compensate for a timekeeping error during the first half by changing the length of the second half.”

RC-7.3: added “The referee indicates the minimum additional time orally.”