

# RoboCup Standard Platform League (NAO) Hall of Fame Leaderboards

RoboCup Technical Committee

(2025 leaderboard challenges, as of 2024-12-17)

Questions or comments on the leaderboard rules should be submitted via  
<https://github.com/RoboCup-SPL/Rules/issues>, to the #rule-book channel  
on the SPL Discord server, or by mail to [rc-spl-tc@lists.robocup.org](mailto:rc-spl-tc@lists.robocup.org).

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Fastest Walk Leaderboard</b>	<b>2</b>
<b>3</b>	<b>Ball Control Leaderboard</b>	<b>3</b>
<b>4</b>	<b>Best Kick Leaderboard</b>	<b>4</b>
<b>5</b>	<b>Most Passes Leaderboard</b>	<b>7</b>

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# 1 Introduction

Starting in 2025, several leaderboards will be introduced to track and compare team performances across key skills over multiple years. These leaderboards aim to motivate teams to improve in specific areas deemed valuable by the league and to compile a record of the top-performing components and skills. By highlighting these individual skills, the league encourages focused development in areas that contribute to overall team performance, and creates a showcase of the best technical abilities in the league.

## 1.1 Code Publication

Every team participating in a challenge must publish the corresponding code used in that competition according to Appendix A.7 of the SPL rule book, unless a specific challenge states otherwise.

## 1.2 Challenge Rules

Each year, teams can choose to make an attempt at specific leaderboard challenges. The Technical Committee and Organizing Committee will coordinate dedicated time slots at RoboCup for teams to complete three attempts at each leaderboard challenge. Metrics from each attempt will be recorded and added to the appropriate leaderboard. Each leaderboard will be based on unique metrics and procedures, detailed below. Teams should indicate their intention for a leaderboard attempt 2 weeks before the first competition day. Scheduling attempts after this deadline may not be possible.

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## 2 Fastest Walk Leaderboard

This leaderboard will measure how fast a NAO will be able to navigate along both a straight path and one with obstructions.

### 2.1 Setup

This leaderboard challenge will take place on one half of a standard SPL field, and requires 1 active robot and 4 inactive robots. Inactive robots will act as obstacles for half of the attempt and will be placed as follows (illustrated in Figure 1):

- On the penalty mark
- On both corners of the goal area that are not touching the field boundary
- On the corner of the goal area closest to the competing robot's starting position

The competing robot will be placed 50cm behind the touchline<sup>1</sup>, in line with the penalty mark. The end goal is the touchline on the other side of the field.

### 2.2 Challenge Execution

Each attempt will consist of two types of runs, one with obstacles and one without. Participating teams can choose which order they wish to complete these runs. Code changes are not allowed during an attempt, but are allowed between attempts. The participating robot must navigate autonomously and cannot be remote controlled during the challenge.

#### 2.2.1 Obstacles

Robots will be placed on the field as described above, the active robot will need walk from it's starting position to the target touchline, while weaving around the obstacle robots. (see Figure 1 for an example)

#### 2.2.2 Open Field

Robot obstacles will be removed from the field and the active robot will just need to walk from the starting position to the target touchline.

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<sup>1</sup>Measured from the centre of the touchline to the front of the robots foot

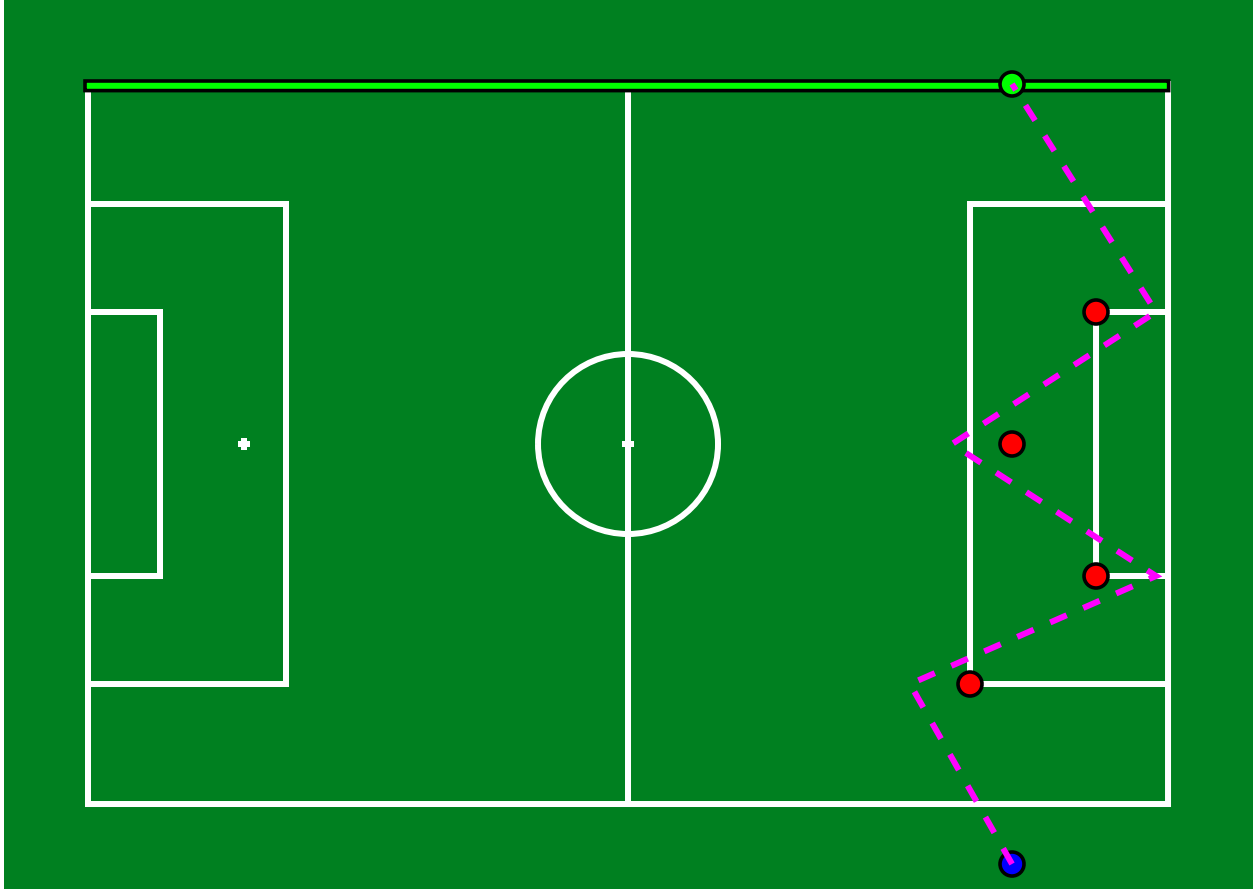


Figure 1: Fastest Walk Leaderboard: Robot completing the attempt is shown in blue, target is shown in green, obstacles are shown in red. An example path is shown in magenta

### 2.3 Scoring

The head referee will start the timer once the robot touches the starting touchline and stops the timer once the target touchline is touched

After all attempts, the shortest time to complete each type of run will be added together and recorded on the leaderboard, times will be rounded to the nearest second.

## 3 Ball Control Leaderboard

This leaderboard will measure how well a NAO can keep control of a ball, while moving it to a target.

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## 3.1 Setup

This leaderboard challenge will take place on one half of a standard SPL field, and requires 1 active robot, 4 inactive robots and 1 SPL Soccer Ball. Inactive robots will act as obstacles for the attempt and will be placed as follows (illustrated in Figure 1):

- On the penalty mark
- On both corners of the goal area that are not touching the field boundary
- On the corner of the goal area closest to the competing robot

The ball is placed on the touchline in line with the penalty mark, with the competing robot placed 50cm behind it.<sup>2</sup>. The end goal is the touchline on the other side of the field.

## 3.2 Challenge Execution

In each attempt, participating teams must start the robot behaviour of their competing robot via a single chest button press. Participating robots will need to dribble the ball around the obstacles and across the goal touchline in as fast a time as possible.

Anytime the ball moves more than 75cm away from the competing robot or the ball comes in contact with an obstacle, “Penalty” is called, and a 30 second penalty will be added to the teams score.

## 3.3 Scoring

Time starts from when the chest button is pressed, to when the robot and ball entirely crosses the target touchline.

The lowest time across all attempts will be recorded in the leaderboard, times will be rounded to the nearest second.

# 4 Best Kick Leaderboard

This leaderboard will measure how far and how accurate a NAO will be able to kick a standard SPL soccer ball.

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<sup>2</sup>Measured from the centre of the touchline to the front of the robots foot

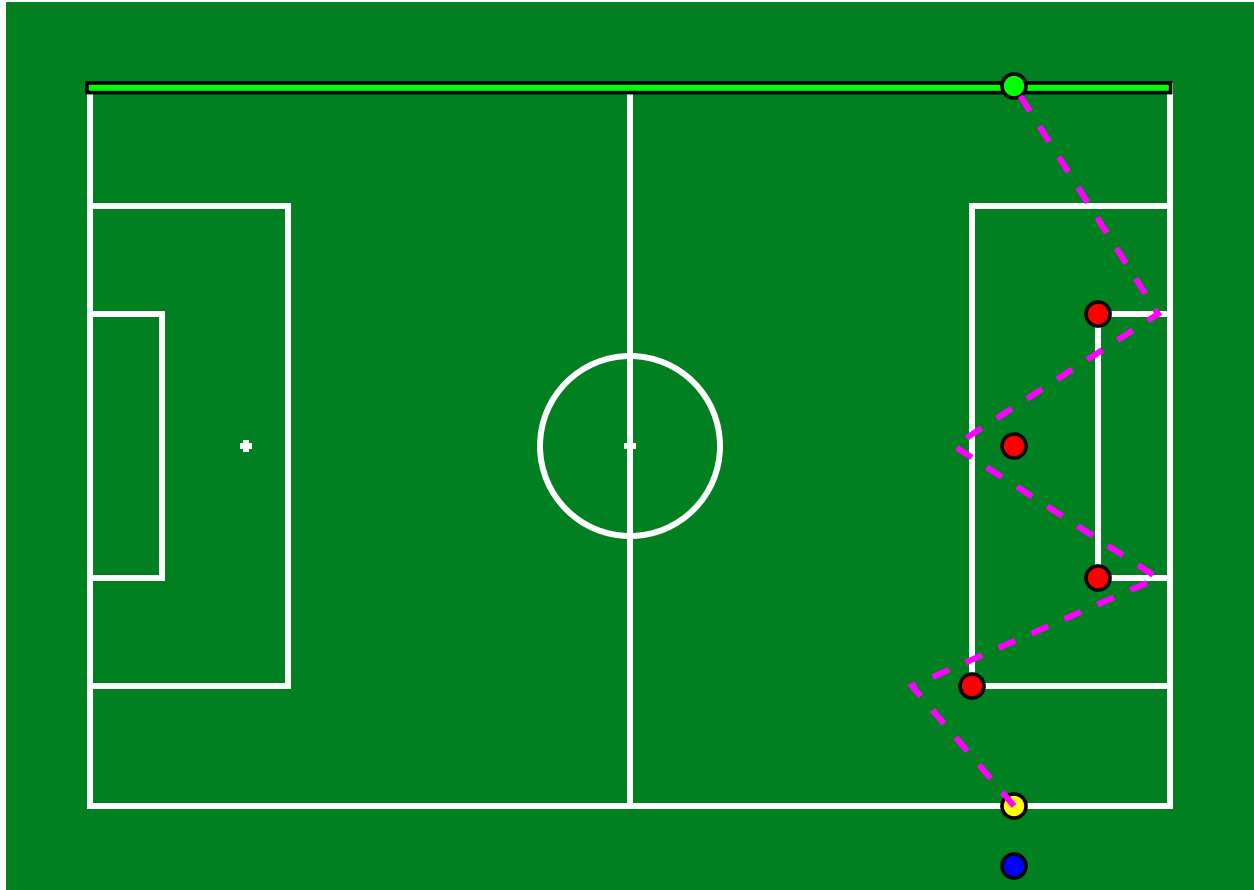


Figure 2: Ball Control Leaderboard: Robot completing the attempt is shown in blue, target is shown in green, obstacles are shown in red and the ball is shown in yellow. An example path is shown in magenta

## 4.1 Setup

This leaderboard challenge will take place on a standard SPL field, and requires 1 active robot and 1 ball. The ball will be placed on the centre of the edge of the goal area. The competing robot will be placed in the centre of the goalline facing the ball

## 4.2 Challenge Execution

Each attempt will consist of kicking towards each of the three targets (illustrated in Figure 3):

- The centre mark in the centre circle
- The penalty mark on the opposite side of the field
- A corner on the opposite side of the field

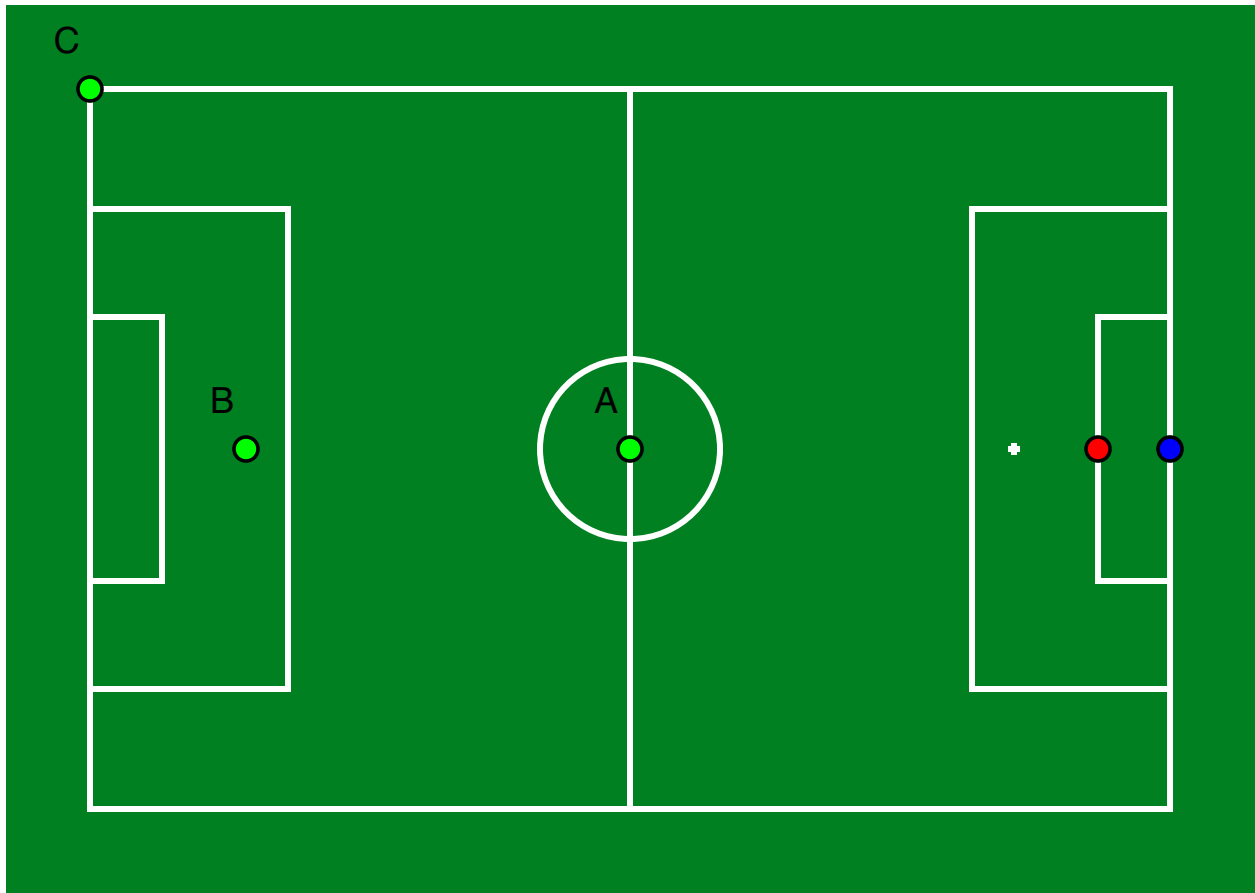


Figure 3: Best Kick Leaderboard: Robot completing the attempt is shown in blue, targets are shown in green, ball placement is shown in red

In each attempt, for each kick, participating teams must start the robot behaviour of their competing robot via a single chest button press. The robot then has 30 s to kick the ball towards the current target. The competing robot must not touch the ball a second time after the ball has clearly moved, otherwise the attempt ends immediately without scoring. Once the ball has come to a complete stop, the distance from the ball to the target is measured.

Code changes are allowed when changing targets.

### 4.3 Scoring

After all attempts, the best score for each target will be added together and recorded in the leaderboard. Distances are rounded to the closest half-centimetre.



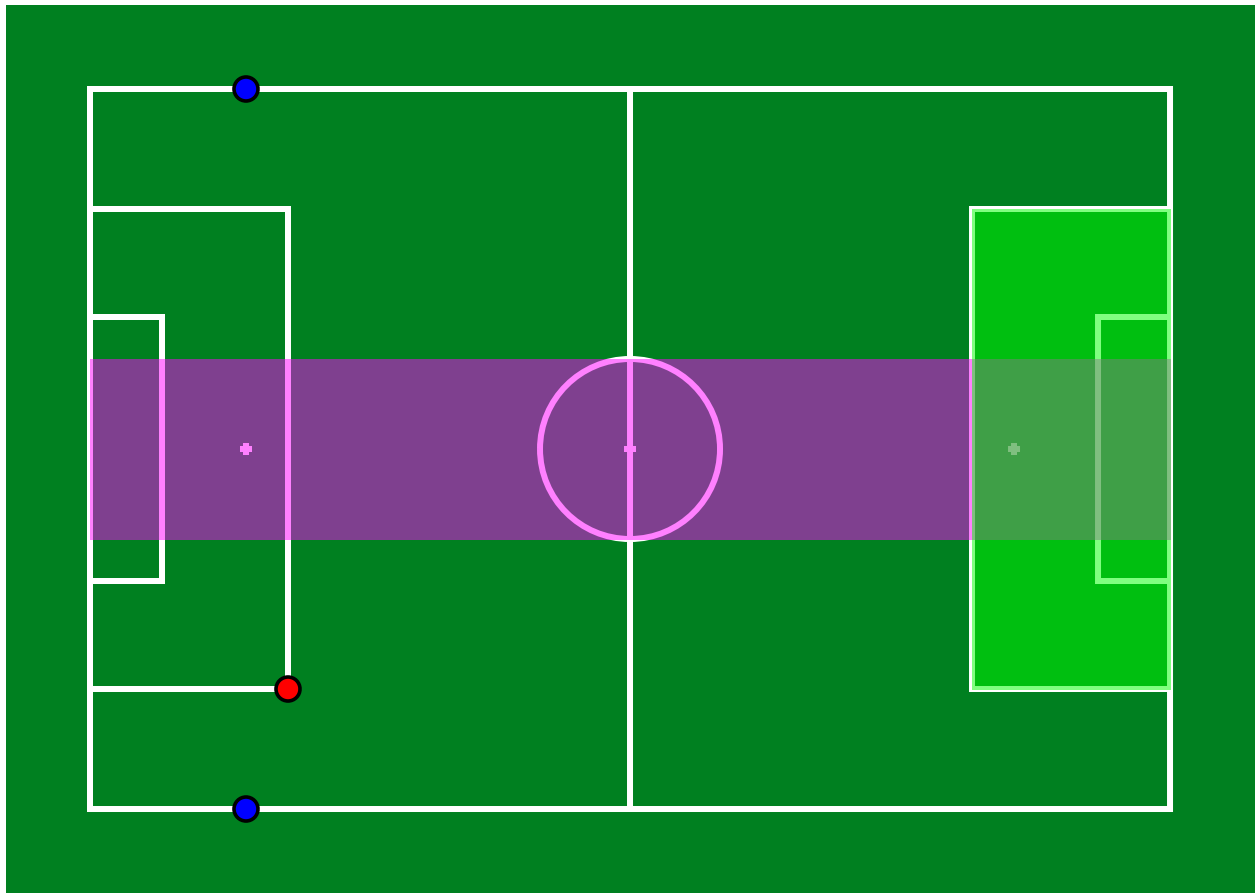


Figure 4: Most Passes Leaderboard: Robots completing the attempt are shown in blue, target area is shown in green, exclusion area is shown in magents and ball placement is shown in red

## 5 Most Passes Leaderboard

This leaderboard measures the highest number of successful passes a team can complete in a given timeframe, emphasizing passing accuracy, speed, and coordination.

### 5.1 Setup

This leaderboard challenge will take place on a standard SPL field and requires 2 competing robots, a Game Controller and 1 standard SPL soccer ball.

Competing robots will be placed on the touchlines on opposite sides of the same half of the field, in line with the penalty mark. The ball will be placed on either corner of the penalty area.

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## 5.2 Challenge Execution

In each attempt, a playing packet will be sent from the game controller to indicate the start of the attempt, and will begin counting down the timer. Teams will then have at most 180 sec to move the ball from the starting position to the target area while completing as many passes as possible. The centre 1.5 metres of the field (Centre Circle Diameter) is an exclusion zone, no robots are allowed within this area, if a robot enters this area, or the ball comes to a complete stop within this area, the run is ended immediately. If the ball is kicked off the field, it is placed back on the touchline where it crossed.

The ref will announce each time the ball crosses the exclusion zone, and whether this will count as a successful pass. This is then captured by the Game Controller.

Once a robot has made contact with the ball within the target area, the ref will announce that the attempt has finished, then the finish signal will be sent from the game controller and the timer will stop.

## 5.3 Scoring

1 point is awarded every time the ball crosses the exclusion zone, with an additional point awarded for a "successful pass". A "successful pass" is defined as when the ball stops in an 180° arc with radius 75cm in front of the receiving robot.

No points are counted if the time runs out before a robot has possession of the ball within the target area, the ball hasn't crossed the exclusion zone at least once or if the run ends prematurely as per the above rules.

A time bonus is calculated based on the points scored by passing and the percentage of time remaining, once the challenge has ended. This is calculated using the following formula:

$$\text{Time Bonus Points} = \text{Base Points for Passes} \times \frac{\text{Remaining Time (seconds)}}{\text{Total Time (seconds)}}$$

The final score is the base points plus the time bonus points, rounded to 2 decimal places. The highest score of all attempts will be recorded in the leaderboard.