RoboCup Brazil TDP Template

# 1st Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

# 2nd Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

# 3rd Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

***Abstract*—The abstract should briefly summarize the descrip- tion paper in 150–250 words. It is important to add changes, lowlights, and highlights.**

**e.g.**

**This paper briefly overviews the main systems of a Small Size League (SSL) team intending to participate in RoboCup Brazil. This year’s ETDP focuses primarily on the wireless communication protocol. The nRF24L01+ module is widely used in the SSL. The wireless protocol is explained in depth to lower the burden for new teams and eventually improve the performance of existing teams’ radio quality.**

***Index Terms*—RoboCup Brazil, Wireless Control, Another keyword.**

1. Overview

## Please include an overview of your project. It is highly recommended that previous key changes be highlighted, as well as their explanation.

e.g.

A Small Size League (SSL) team has been working on significant improvements and redesigns for RoboCup Brazil. This includes changes to both the mechanical and electrical systems of the robots, as well as enhancements to the wireless communication protocol.

## It is highly recommended to state the innovation team is bringing to this RoboCup event. It might be inspired by other teams or leagues, and for that, teams must reference others’ work; however, it is important to present the changes you are bringing to the event. e.g.

*A. Innovation*

1. *Mechanical and Electrical Innovations:*
   * **Motor and Wheel Enhancements:** The upgrade to 50W motors and larger wheels with more rollers has improved traction and movement smoothness.
   * **Redesign of Electronics Board:** Consolidation to a sin- gle STM32H7 microcontroller has simplified the system and improved performance.
2. *Wireless Communication Protocol:*
   * **Network-Capable Base Station:** This design reduces latency and improves the integration and control of robots within the network.

Identify applicable funding agency here. If none, delete this.

* + **Custom UDP/IP Stack:** Our implementation ensures high throughput and reliability, crucial for the demands of SSL matches.

1. Mechanical and Electrical System

This year marks a major redesign of the robots since the team’s first participation. The key changes include:

* + Substitution of 30W motors with 50W variants, leading to smoother movement and higher top speed.
  + Replacement of the dribbling motor with a more robust and cost-effective one.
  + Complete redesign of the main electronics board, con- solidating from 5 microcontrollers to a single microcon- troller.

*A. Robot Setup*

## Visuals and tables are suggested to share project con- figuration and its change from past years.

e.g.

Table I outlines the technical details comparing the previous and new versions of the robots.

TABLE I

Robot Specifications

|  |  |  |
| --- | --- | --- |
| **Robot version** | **2020** | **2023** |
| Dimension | Ø178 x 148mm | Ø180 x 148mm |
| Total weight | 2.8kg | 2.4kg |
| Max. ball coverage | 12.5% | 19.5% |
| Driving motors | Maxon EC-45 flat 30W | Maxon EC-45 flat 50W |
| Gear | 15:50 | 1:1 |
| Wheel diameter | 51mm | 57mm |
| Dribbling motor | Maxon EC-16 30W | Maxon EC-max 22, 25W |
| Dribbling bar diameter | 12mm | 17mm |

1. Wireless Communication

## Teams may choose each section as they prefer. It is important to overview the project to readers. However, it is important to focus on previous years’ changes, tests, and validations.

Wireless communication is crucial, especially in the fast- paced SSL, where robots are centrally controlled. Our ap- proach includes a network-capable base station that offers sev- eral advantages, such as lower latency for position updates and easier integration with various programming environments.

Compared to last year, the new network reduces latency from 20ms to 12ms.

The new wireless network consists of...

## To provide reference to previous works and other teams, you can cite articles [1], A TDP [2], a book [3], and a homepage [4].

Acknowledgment

Optionally, works can contain acknowledgments; for exam- ple, This study was funded by X (grant number Y)

References

1. Author, F.: Article title. Journal **2**(5), 99–110 (2016)
2. Author, F., Author, S.: Title of a TDP paper. In: Competition, 2016
3. Author, F., Author, S., Author, T.: Book title. 2nd edn. Publisher, Location (1999)
4. LNCS Homepage, [http://www.springer.com/lncs,](http://www.springer.com/lncs) last accessed 2023/10/25

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