# Roborace System Requirements

Contents

[Roborace System Requirements 1](#_Toc80956637)

[S.2.0 System 1](#_Toc80956638)

[RQ-S.2.0.01. 1](#_Toc80956639)

[RQ-S.2.0.02. 1](#_Toc80956640)

[S.2.1 Perception module 1](#_Toc80956641)

[RQ-S.2.1.01 1](#_Toc80956642)

[RQ-S.2.1.02 1](#_Toc80956643)

[S.2.2 Mapping and localization module 1](#_Toc80956644)

[S.2.3 Planning module 1](#_Toc80956645)

[RQ-S.2.3.01 1](#_Toc80956646)

[RQ-S.2.3.01.01 1](#_Toc80956647)

[RQ-S.2.3.01.02 1](#_Toc80956648)

[RQ-S.2.3.01.03 1](#_Toc80956649)

[RQ-S.2.3.02 1](#_Toc80956650)

[S.2.4 Control module 1](#_Toc80956651)

[RQ-S.2.4.01 1](#_Toc80956652)

# S.2.0 System

RQ-S.2.0.01 The system shall be able to complete a given number of laps on a predefined racetrack without obstacles autonomously (with no intervention of human pilot)

RQ-S.2.0.02 The system shall be able to avoid virtual obstacles and collect virtual bonuses.

# S.2.1 Perception module

RQ-S.2.1.01 The Perception module shall detect and localize obstacles and another vehicles

RQ-S.2.1.02 The Perception module shall provide object tracking and path prediction

# S.2.2 Mapping and localization module

Mapping and localization data is currently provided by the Roborace

# S.2.3 Planning module

RQ-S.2.3.01 The Planning module shall calculate the racing line (path and velocity) for a given track.

RQ-S.2.3.01.01 At every position on a raceline the speed in the velocity profile shall not exceed the maximum racecar's speed.

RQ-S.2.3.01.02 At every position on a raceline the centripetal acceleration shall not exceed the maximum racecar's centripetal acceleration (6 m/s2 if not changed by the mission rules or team's decision).

RQ-S.2.3.01.03 At every position on a raceline there must be a safety distance not less than 15 cm from each of race car's wheels to the racetrack borders.

RQ-S.2.3.02 The Planning module shall generate local path which takes into account vehicle's current state, obstacles on a road, and converges to a global path when possible.

# S.2.4 Control module

RQ-S.2.4.01 The control module shall generate steering, throttle and brake control commands to match the desired speed and path