Roborace System Requirements

Contents

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