

0.1 Why FreeRTOS

When designing an autonomous vehicle factors like: precise timing, responsiveness, and predictability are crucial for the software. If the software does not process inputs from sensors fast enough it could result in an accident. These factors can be forfeited by using a real-time operating system like FreeRTOS. With RTOS task scheduling, actions like stopping movement when an obstacle is blocking the way, is executed within a specified time constraint. Meaning that the action of stopping the vehicle is not blocked by another action, thus preventing accidents.

0.2 FreeRTOS flavor

One of the reasons we choose the ESP32 MCU was to utilize its capability with FreeRTOS. The ESP32 library uses a custom made flavor made for the ESP32 by Espressif. One of the key differences for this flavor is its support for Dual-Core processors. Meaning that tasks can be distributed across two cores, instead of the original one core support in FreeRTOS.