AUTONOMOUS RACING CAR CONNECTIVITY POWERED BY RUTX11

SUMMARY

Not that many years ago, driverless cars sounded like a concept from a science fiction genre. Today, self-driving vehicles are beginning to emerge and are expected to reach USD 61.93 billion by 2026. Although the potential is enormous, the adoption in consumer lives is still out of reach regardless of previous predictions by the leading names in the tech and automotive sectors. Despite considerable efforts to make autonomous cars a part of our everyday lives, more engineering work still needs to be done before they are safe for everyone on the road. However, this does not stop from developing independent driverless cars and hosting various competitions and races.

CHALLENGE

Every driverless car needs a stable wireless connection to the internet. Live monitoring and parameter control requires reliable zero-latency connectivity for timely adjustments and safety. For example, the team can access the vehicle's central control unit from a distance to limit the speed, adjust the maximum power of the motors, or fine-tune the driving dynamics controls. The security aspect is also essential, just as the resistance to high and low temperatures, humidity, and vibrations.

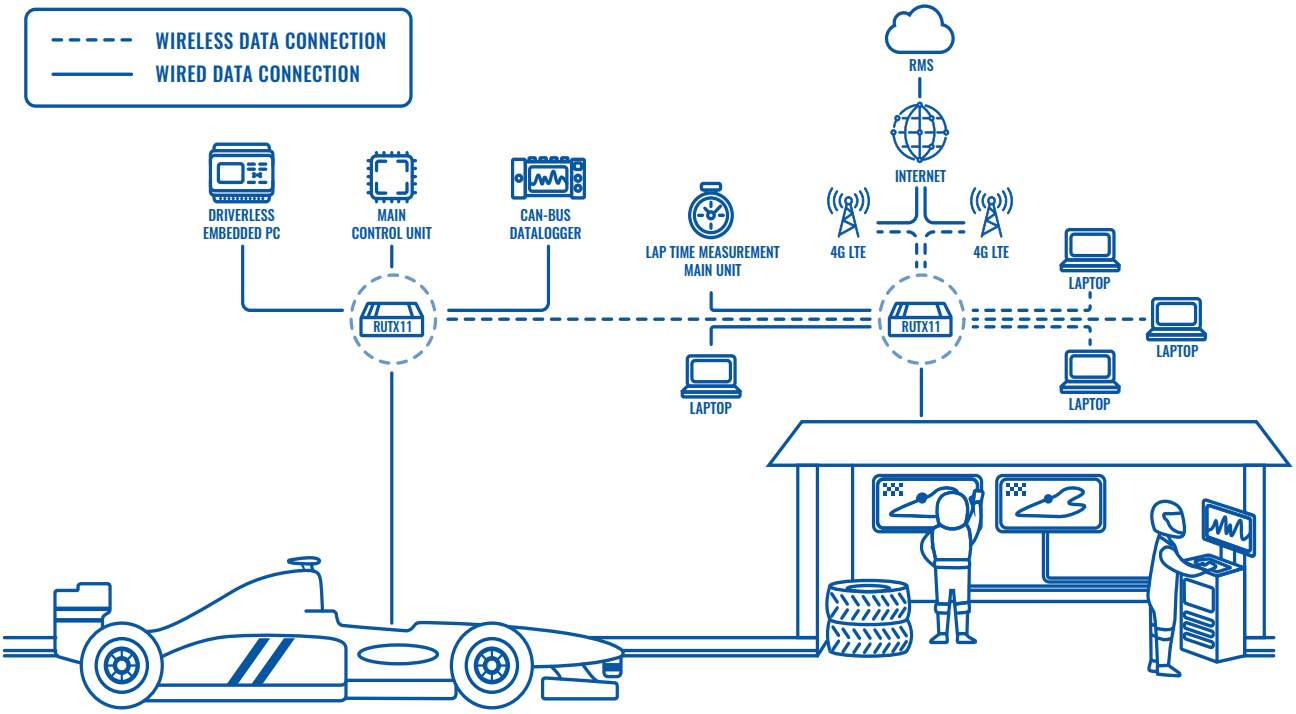
PARTNER -

StarkStrom Augsburg is a non-profit organization for the promotion of student research in the field of electromobility and autonomous driving. It is made up of committed students of Mechanical Engineering, Electrical Engineering, Mechatronics, Environmental and Process Engineering, Business, IT, and Design. Every year, student groups develop a formula car with an electric drive system to be demonstrated as part of the international Formula Projekt Formula Student competition.

SOLUTION

Two Teltonika Networks Dual-SIM RUTX11 routers provide connectivity in this solution: one in the driverless car itself and the other in the base station. The router in the vehicle dials into the base station network to establish a stable connection between the two routers.

TOPOLOGY



The team members can connect to the base station via Ethernet or Wi-Fi and can use it to access the car for live monitoring and adjustments, including speed, battery voltages, motor temperature, and other parameters. A Lap Time Measurement Unit connects to the same router via Ethernet to accurately measure the lap and finish time. It transmits the time data synchronized by GPS via Wi-Fi.

When the race cars are back in the workshop, the routers automatically connect to the local network. Then the team members can access them to pull out data from the data logger, reprogram the control unit or make changes on the driverless vehicle embedded PC.

BENEFITS

- Multiple connectivity options to connect different equipment inside the driverless car and in the base station.
- Highest level security ensured by advanced features like top-trusted multiple VPNs, Firewall, Access Control, Attack Prevention, and more.
- Optimized traffic flow with load balancing functionality.
- Industrial device can sustain heat and cold, up to 90% humidity, vehicle vibration and has numerous mounting options.
- GNSS capabilities enable real-time location services and time synchronization.

WHY TELTONIKA NETWORKS?

As per Board Member of Starkstrom Augsburg, experienced in managing vehicle controls and Head of Electric, Daniel Lengerer:
“The goal for the components of our race car is always that they are as small and light as possible. In addition, the router must support Gbit Ethernet due to the large data volumes of the driverless sensors, ensure a stable wireless connection to the race car and withstand the harsh environment in which it is installed. Only the RUTX11 router from Teltonika Networks fulfills all of these requirements.”