CELLULAR ROUTER FOR AUTONOMOUS ROBOTIC VEHICLE CONNECTIVITY

HIGHLIGHTS

- COMING, one of the leading ICT companies in Serbia, partnered with academic experts from the University of Niš to develop AgAR, an autonomous robotic vehicle designed for small and medium-sized farms.
- To ensure stable communication among the robot's key components, including navigation systems, sensor arrays, and onboard processing units, while maintaining connectivity with remote servers and operators, a powerful networking device was needed.
- To meet the demands of robust, real-time connectivity in rugged agricultural settings, Teltonika's RUT901 cellular router and TSW210 Ethernet switch were selected.

THE CHALLENGE – STABLE & LOW-LATENCY COMMUNICATION

Agriculture is under increasing pressure to modernise due to global food demands, labour shortages, and rising sustainability requirements. For instance, the global agricultural robots' market was valued at $4.9 billion in 2021 and is projected to grow to $11.9 billion by 2026, at a compounded annual growth rate (CAGR) of 19.3%.

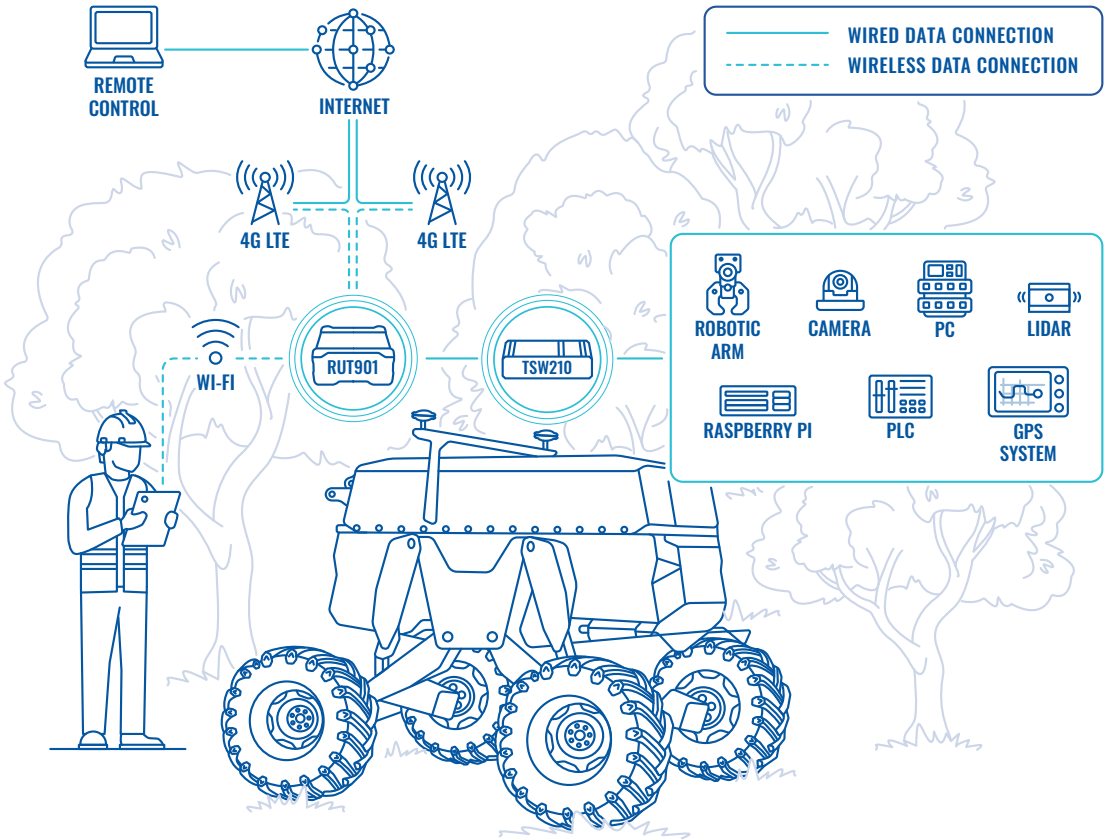
While large-scale automation is often out of reach for smaller farms, there remains a clear need for adaptable, intelligent tools that can automate complex and time-consuming operations such as mowing, spraying, or tilling.

COMING, our Serbian partner, identified an opportunity to address these challenges through the development of AgAR – an autonomous, all-terrain robot capable of performing a wide range of agricultural tasks.

However, for this vehicle to function effectively, it needed to maintain stable, low-latency communication with a diverse array of subsystems including navigation units, cameras, sensors, and control platforms.

These requirements created a clear demand for a connectivity device that could support multiple interfaces, operate reliably in rugged outdoor environments, and offer both on-site and remote connectivity with minimal latency and high data throughput.

TOPOLOGY



THE SOLUTION – POWERING AUTONOMY WITH SEAMLESS CONNECTIVITY

Enter Teltonika's RUT901 cellular router and TSW210 Ethernet switch combo!

To enable AgAR's autonomous operations, COMING integrated the RUT901 cellular router and the TSW210 Ethernet switch as the core components of the robot's communication system. This networking setup was chosen for its reliability, industrial-grade design, and the specific features it offers to support real-time connectivity and seamless data exchange between essential subsystems.

The RUT901 cellular router provides stable Ethernet communication through its four rj45 ports, which are used to connect to the industrial computer, LiDAR, RTK GPS unit, and a Raspberry Pi-based PLC controller. These connections ensure uninterrupted communication between critical modules responsible for navigation, data processing, and system control.

The router also includes a dual SIM card feature for mobile 4G connectivity. This mobile connection allows the robot to receive GPS path corrections in real time, enabling precise movement along predefined routes.

Furthermore, the RUT901 4G router supports Wi-Fi access, allowing users to connect to the robot via an Android application installed on a smartphone or tablet. The Wi-Fi must be fast and stable, with a strong signal range, as it serves as the main communication link between the user and the robot during local operation.

Another critical advantage of the RUT901 mobile router is its detachable antenna design, which enables extended antenna positioning on the robot's chassis to improve signal reception in remote environments.

The TSW210 Ethernet switch, connected to the RUT901 via Ethernet port, complements the industrial router by providing additional LAN ports for the integration of expansion modules, such as a robotic arm and one or more cameras. The number of required ports varies depending on the number of visual sensors installed.

With its industrial build and plug-and-play functionality, the TSW210 industrial switch ensures a reliable data connection between all peripheral devices without adding complexity to the system architecture. Its use is especially important in managing high data traffic from multiple sources, ensuring that no delays or congestion interfere with the robot's operations.

By deploying the RUT901 cellular router and TSW210 Ethernet switch, COMING was able to build a compact, efficient, and scalable communication platform within AgAR. These devices support both local and remote control, real-time data flow, and secure connections to all critical components of the system.

According to our partner, the combination of mobile connectivity, high-speed Ethernet, and flexible device integration has enabled AgAR to operate autonomously in the field with the precision, responsiveness, and reliability required for modern agricultural applications.

If you're currently working on an IoT project, don't hesitate to reach out and discover how our connectivity devices could support your next IoT solution!