



MOBILE ROUTER FOR REMOTELY OPERATED UNDERWATER VEHICLES

HIGHLIGHTS

- ✔ [Lastella Trade](#) is an Italian e-commerce website developer for the industrial electronics and automation sector. Its digitX platform is an online distributor of industrial networking equipment.
- ✔ With the help of its partner, [ET Solution](#), Lastella Trade helped develop a remotely operated underwater vehicle solution for its client, [Deep Sea Technology](#).
- ✔ The networking device chosen for this industrial IoT solution is Teltonika's RUT956 mobile router. Utilising its wide range of interfaces, the OPC UA protocol, both wired and wireless connections, and our RMS remote management tool, this 4G router enabled seamless and uninterrupted remote communication and control capabilities.

THE CHALLENGE – CONNECTIVITY UNDER THE SEA

When implementing Industry 4.0 in any sector, environmental factors are a significant factor to account for. Some environments present more challenges than others, but few can claim to be as challenging as the underwater and maritime sector.

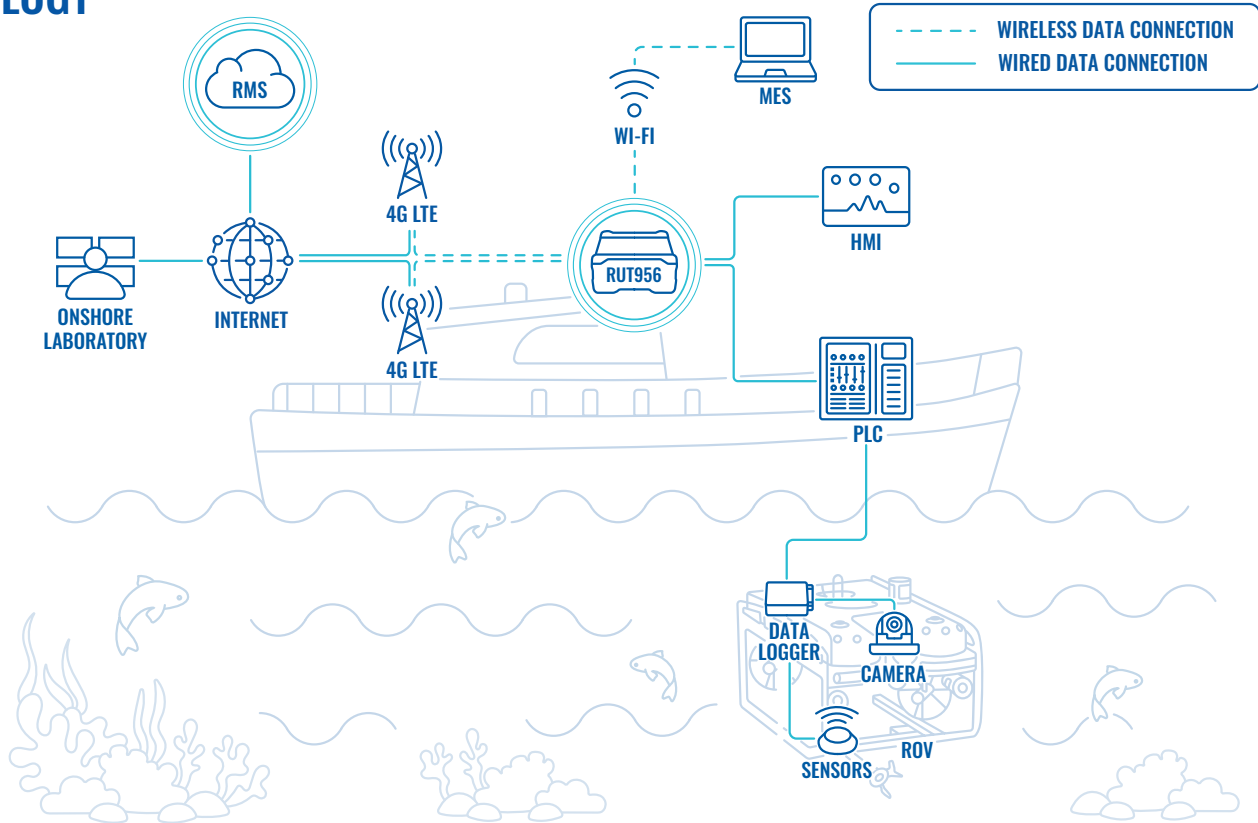
Ranging from underwater [research](#) and recovery to the installation and maintenance of [aquaculture systems](#), subsea pipelines, and offshore structures, this sector covers a lot of ground. Or rather—of water.

Yet, in order to reap the benefits of present-day digitisation, underwater operations need reliable and uninterrupted connectivity. Achieving that in a single maritime vessel is one thing, but what about remotely operated vehicle?

Remotely operated underwater vehicles, also known as underwater ROVs, carry with them a suite of sensors, cameras, and other equipment with which to survey underwater operations. Both their remote operation and the transmission of the data they collect to an above-water control unit necessitate connectivity as smooth as ocean waves, underwater.

This was the challenge our partner, Lastella Trade, was tasked with solving for its end client, Deep Sea Technology. Together with its partner, ET Solution, they developed a remotely operated underwater vehicle solution equipped with our RUT956 mobile router.

TOPOLOGY



THE SOLUTION – MOBILE ROUTER FOR UNDERWATER ROVS

Installed inside of each remotely operated underwater vehicle is Teltonika's RUT956 mobile router. This cellular router is connected via RJ45 to the HMI and PLC of the underwater ROV. It is then connected to a data logger, which itself is connected to end equipment such as a sonar device, temperature and proximity sensors, and a video camera.

The data is then transmitted wirelessly, via the OPC UA protocol, to a control unit with a manufacturing execution system (MES) on an above-water ship. This 4G router also transmits the data to a remote onshore laboratory via its LTE Cat 4 connectivity.

The connectivity of the RUT956 remains uninterrupted thanks to its dual SIM card slots with auto failover, backup WAN, and other switching scenarios. These ensure that if the connection from one carrier is disrupted for any reason, the router will automatically switch to a different carrier with no hiccups in between.

A key feature of this industrial cellular router in this IoT solution is the flexibility offered by its interfaces. The RUT956 is equipped with four RJ45 ports—three LAN and a single WAN, as well as an RS232 port, an RS485 port, and two I/Os. These enable a wired connection to a wide range of end devices, leaving room for both expansion and modification of the underwater ROV.

Continuing with flexibility, although OPC UA was chosen as the best-suitable industrial protocol for this IoT solution, this mobile router supports other key protocols that may be handy at a future point. Included among them are [Modbus](#) TCP and RTU, Bacnet, MQTT, and many others.

In addition to the mobile router, this IoT solution also relies on Teltonika's [Remote Management System](#) (RMS). This remote management tool provides this solution with real-time remote monitoring and control of the ROVs as well as centralised device management.

This streamlines routine processes such as troubleshooting, maintenance, configuration, and firmware updating, which can all be performed remotely and easily thanks to RMS.

It's important to note that in a marine setting, where security breaches can be costly and dangerous, the ability to remotely and securely manage your fleet of devices is of great importance. This ensures that only authorised personnel can access and control the system. The RUT956 mobile router's support of staple VPN services, including [ZeroTier](#), WireGuard, and Stunnel, among others, offers a secure remote connection.

The RUT956 was chosen to ensure stable and reliable communication between the remotely operated underwater vehicle, the control unit, the onshore laboratory, and RMS. As you can see, the result was expedited telemetry, increased operational efficiency, and optimised performance.

