THE LARGE HADRON COLLIDER'S SPY BUG

HIGHLIGHTS

- The European Organization for Nuclear Research (CERN) is the world's top physics research organization, working tirelessly to uncover the mechanics of the universe while creating and implementing cutting-edge technologies in pursuit of that goal.
- In order to provide real-time monitoring of environmental conditions within its Large Hadron Collider, CERN needed a connectivity device to be part of its innovative Train Inspection Monorail (TIM).
- CERN our RUT956 cellular router for this important role. Its combination of low power consumption, connection stability with added security features, and a versatile array of I/Os make the RUT956 the perfect fit to be added to the TIM's core.

CERN supplier

THE CHALLENGE – LIGHTSPEED WORK ENVIRONMENT

The Large Hadron Collider is the world's most famous particle collider, used by CERN to test hypotheses in the field of physics. That includes firing particles at just a smidge under the speed of light, which is pretty damn fast. Calling it incredible would be an understatement, to say the least.

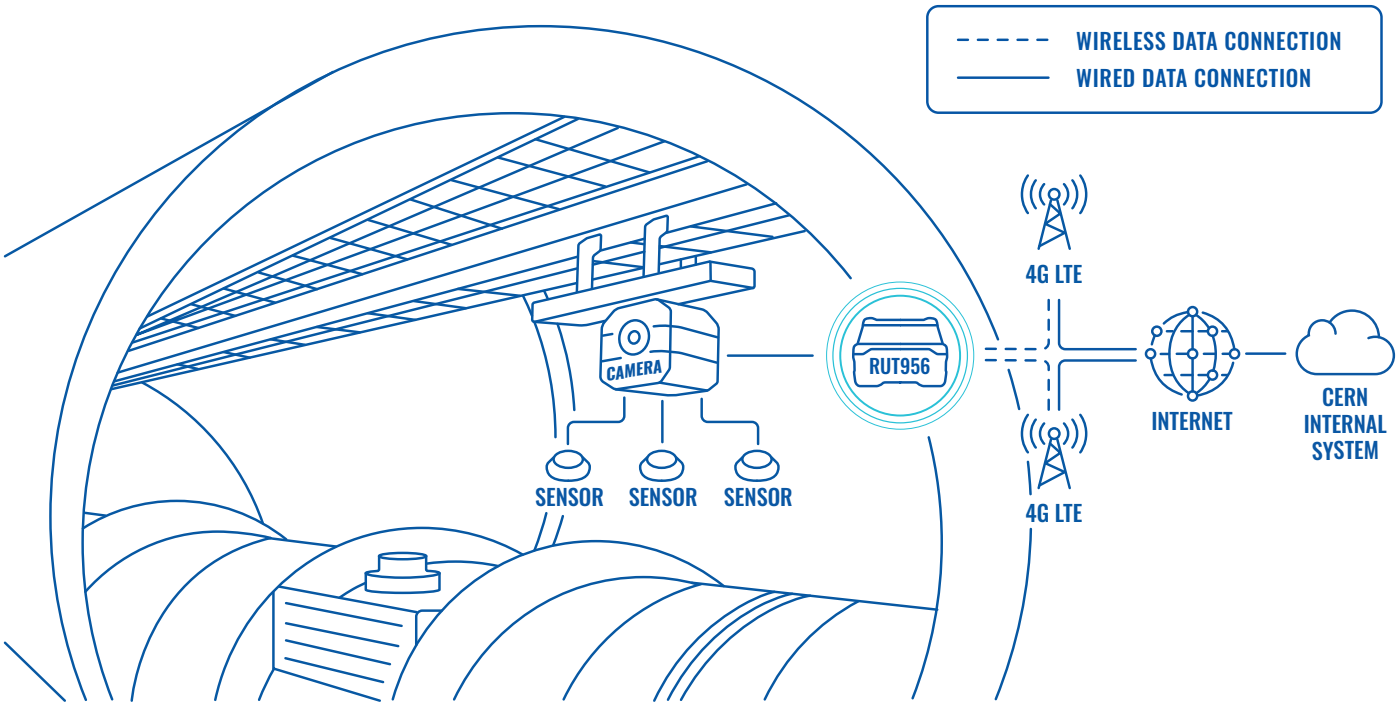
As you can probably imagine, these experiments require rigorous control of the environmental conditions within the Collider, such as its oxygen levels, temperature, and whether its thousands of supercooled electromagnets or any other structural pieces are all intact and in place. The deeper into physics you go, the less room you have for errors.

Specialized sensors and cameras are great for monitoring an industrial environment, but they can only get you so far by themselves. The Collider is a 27km (16.7 miles) tunnel, so the amount of equipment needed to cover it in its entirety is colossal, not to mention all the extra wiring and the trouble of connecting every single device to CERN's internal network. Without the latter, the scientists won't have direct access to the data collected.

Since CERN is full of very smart people, it came up with a simpler alternative: a small, mobile vehicle equipped with a set of cameras and sensors, suspended from the tunnel's ceiling and moving around the Collider using a monorail system. It is known as the Train Inspection Monorail, though there are some who call it TIM.

TIM goes around the tunnel and surveys critical variables like an advanced spy bug, thereby solving the needless complexity issue. However, to solve the connectivity issue, TIM needed a device that could connect all sensors and cameras equipped to it and send their data to CERN's internal network. Without one, the data ceases to be real-time, and when you do things at the speed of light – that's just not good enough.

TOPOLOGY



THE SOLUTION – TO CONNECTIVITY AND BEYOND!

To resolve the connectivity issue, CERN added our RUT956 cellular router to TIM's core, establishing a stable and secure 4G connection that sends the aggregated data to CERN's internal network, where the scientists can access it in real time.

The main feature that elevates RUT956 to this prestigious role is its versatile set of I/Os, reducing complexity when connecting the different cameras and sensors, each with its own interface. Other cellular routers may excel in other features but would narrow down the range of compatible devices. Using the RUT956, that range can remain wide so that CERN can work with the best ones for the job.

Additional security features like a built-in VPN and stability measures such as dual SIM failover further bolster the value this router provides to TIM, while its low power consumption is critical since TIM runs on a battery. And all of that from a sturdy, compact, and industrially-designed device that can handle the extreme temperatures and vibrations of such a hazardous working environment.