

# Real-time Control of an Additive Manufacturing Process Using Closed-loop Control Enabled by Telefónica's 5G

The goal of this project is to implement closed-loop control through 5G technology and Telefónica's Virtual Data Center (VDC) service, enabling real-time monitoring and action in a Laser Metal Deposition (LMD) additive manufacturing process. This aims to achieve real-time quality control of the produced parts without the need to wait for the process to complete.

Additive manufacturing allows for the construction of metal parts layer by layer. Therefore, real-time process control involves monitoring with sensors or cameras, transmitting data for processing, analyzing the information, and, if deviations beyond the tolerance threshold are detected, sending corrective instructions back to the industrial robots for the subsequent layers. To feed this data back into the process, a complete closed-loop system must be established, from data collection by sensors or cameras to robot actions on the part. Achieving an appropriate latency is essential for rapid response times and real-time adjustments, which is why the combination of Telefónica's 5G network and VDC is crucial.

The main achievement of this pilot project is the successful implementation of a closed-loop control system for additive manufacturing using Telefónica's 5G network. This enables real-time interventions on the part being produced, paving the way for new innovations in part design and material development, while significantly enhancing quality, reducing anomalies and waste, and ultimately leading to more precise and efficient manufacturing.

Industry 4.0 is rapidly advancing towards process automation, making it vital to provide the sector with low-latency, high-performance, and robust network capabilities to improve and optimize production processes.

## Telefónica Press Release

