MoySEST successfully trials a complete FRMCS solution in a real railway environment

- An end-to-end 5G mission-critical communications solution has been tested on a high-speed rail line, ensuring voice services, signalling and positioning data, and video transmission in line with FRMCS specifications.

- The tested solution integrates private 5G infrastructure, onboard equipment, dispatch systems, and terminals with MCX server and client technology, all within a cybersecurity-focused framework
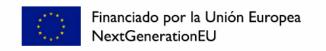
Zaragoza, 23 November 2025

The MoySEST project has reached an unprecedented technological milestone by successfully completing the first field trials of a fully integrated FRMCS (Future Railway Mobile Communication System) solution. The solution incorporates private 5G infrastructure, onboard equipment, dispatch systems, and terminals with MCX server and client technology, all deployed within a cyber-secure environment.

At a time when the current train-to-ground communication system, GSM-R, is entering a phase of obsolescence, the MoySEST project marks a new milestone on the path toward a next generation of railway communications capable of meeting the demands of modern, digital, and secure transport.

"MoySEST was born with the ambition of driving a critical, resilient, and interoperable solution that complies with FRMCS standards and helps consolidate the transition toward a new railway communications context, analysing the deployed technologies from all angles, particularly efficiency, performance, and reliability. After 36 months of collaborative work, the project has demonstrated its proposal in two real-world usage scenarios," explains Teltronic CTO Alfredo Calderón.

Throughout 2025, during the final phase of the project, observation and validation of the technological solution were carried out across two real-use scenarios under controlled conditions. The first testing phase took place in Durango (Biscay), on a section of the commuter rail network, in collaboration with ETS (Euskal Trenbide Sarea) and Euskotren. A private 5G network, onboard equipment, and dispatch systems were deployed. This scenario, combining open-air track sections and tunnels, enabled validation of communication assumptions in urban and metropolitan environments.

The second and final testing phase, even more ambitious and entirely pioneering, was conducted on the high-speed rail line between Madrid and Alicante. An ADIF laboratory train, equipped with MCX and 5G onboard systems, operated for more than a week along a 40 km test section where a high-performance 5G infrastructure optimized for this scenario had been deployed. Communications were carried out while correct operation was monitored from a dedicated control center set up for the trials.

The results were conclusive. Under real railway operating conditions, the solution demonstrated its ability to guarantee the required transmission rates, priorities, and quality of service for each type of train-to-ground communication. The high-availability and security architecture ensured uninterrupted communications at all times, supporting voice services, critical data services (signalling and positioning), and real-time video. From a cybersecurity perspective, every induced anomaly was detected, logged, and counteracted.

"The trials carried out within the MoySEST project have, for the first time, demonstrated the smooth and complete operation of an end-to-end solution. The interaction of all elements, including 5G infrastructure, onboard systems, control center, terminals, and MCX applications, under an integrated approach, proves the robustness of the solution. It allows us to understand the optimal deployment footprint for each usage scenario and reinforces the path toward adopting FRMCS as the new reference standard for railway communications," Calderón notes.

MoySEST represents a clear example of applied innovation, with an international outlook and a strong commitment to interoperability. At a time when rail is consolidating its role as a cornerstone of sustainable mobility, the project anticipates the future with a solid and scalable proposal, enabling the introduction of new applications that will make transport even more efficient and secure.

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