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Safer rail through integrated engineering

Elemaster connects design, testing and repair into one engineering chain for rail safety – an essential integration to make artificial intelligence actually testable.



Elemaster's headquarters in Lomagna, north-east of Milan, Italy

Quelle: Elemaster

The railway industry is becoming more electronic, connected and software-intensive. New functions and architectures must be innovative, but also safe, verifiable, industrialisable and maintainable over decades-long lifecycles.

Elemaster is a global group spanning design, PCB manufacturing (Eleprint), industrialisation, production and repair, with sites across several countries on four continents. Eletech, the Group's Head of R&D division, focuses this network on hardware, embedded software, safety engineering and testing for rail, always to IRIS ISO 22163:2023, EN 50129 and EN 50657/50716 requirements. Rail has been part of Eletech's work for years, with dozens of SIL2 to SIL4 projects: fire detection and suppression, wheel-slip protection, high-voltage line monitoring for the ETR1000 high-speed train, hydrogen safety cut-off switches and automated coupler control for freight with cybersecurity design to EN 62443, plus EMC and shock/vibration validation of legacy propulsion equipment. In 2016, Eletech was also one of the eleven European partners of Safe4RAIL, the EU project on next-generation train control architectures.

For Eletech, testability is designed in from the start, not verified at the end. The flagship case is the Gap Hazard Detection System, a SIL3 control unit under development to detect a person trapped between train and platform, built on a dual-channel architecture with FMEA/FTA analysis, static analysis, unit testing, code coverage and a dedicated HIL test bench.

This same rigour continues after delivery. Through its new Repair Centre, built on the acquisition of CR&C and over 40 years of repair and remanufacturing experience across telecommunications, energy and industrial electronics, Elemaster extends testing into fault analysis, debugging and verification of restored products.

This is the ground on which Elemaster is putting artificial intelligence to work today: not yet to operate the railway system, where verifica-

tion standards are still maturing, but to strengthen testing and repair, where the evidence already exists. Elemaster's position is distinctive. Owning the physical chain of verification, laboratories, HIL benches, production and its own Repair Centre, means owning the infrastructure that can generate and structure this evidence. The relevant advantage is not the best algorithm, but the data and testing depth needed to prove that it works.

Eletech, Elemaster's Automatic Test Equipment (ATE) platform engineered and certified for SIL-rated boards, natively applies AI analytics to test and signal-integrity data: a combination of certified SIL testing and AI-driven diagnostics built for railway maintenance, overhaul and manufacturing.

This is the loop Elemaster is building across its network: Eletech's R&D, production sites, Eletech benches and the Repair Centre design, verify, observe failures, repair, and feed what is learned back into products, test processes and, increasingly, into the data that trains AI itself.



Eletech: HW/SW design to EN 50129, EN 50657, EN 50128, SIL2-SIL4, FMEA/FTA, HIL testbenches

Repair Centre (CR&C): 20,000+ RMA and 25,000 units repaired per year

Meet Elemaster at InnoTrans Berlin 2026: Hall 27, Booth 300

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