

WHO WE ARE

Futures Tech BSN is engaged in the design and production of electronic materials, diagnostic tools, and monitoring equipment for the railway sector.

Continuous research and a strong commitment to improvement are the strengths of this young and forward-looking company – driving innovation, station after station.

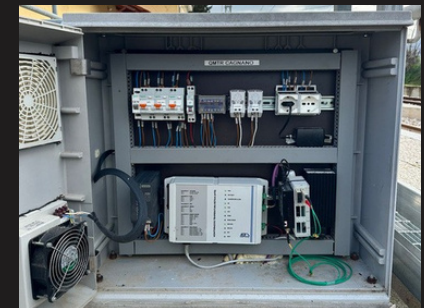
Our work is made possible thanks to our team: Giandomenico Buchagiar, CEO and Co-founder; Andrea De Gregorio, Commercial Director and Co-founder; and Spiro Buchagiar, Chief Operating Officer and Consultant, with over 30 years of experience in electronic materials for railway safety.

FIND US

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MTR 2.0

Monitoraggio Temperatura Rotaia
(Rail Temperature Controller)

A Significant Innovation

MTR 2.0 (Monitoraggio Temperatura Rotaia, i.e. Rail Temperature Controller) is an automatic temperature detection system featuring several technological innovations.

It can detect rail temperature values in real time and remotely, providing acoustic and visual alerts when predefined temperature limits are reached.

The system complies with the technical specification of the Italian railway network, RFI DTCST SF IS 00 120 1 A.

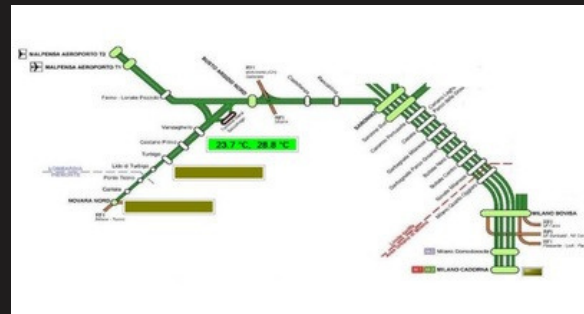


Safety-Oriented Design

MTR 2.0 offers numerous strengths. The system centralizes data at the Central Checkpoint (CC) using the ISO1 protocol required by IS737 and transmits it through multiple channels.

It can create its own WiFi APN, allowing railway operators to configure and monitor the equipment remotely, without approaching the tracks, via a dedicated application.

This feature enhances operator safety, as the RTDAM (Rail Temperature Data Acquisition Module) can be installed near the rails (1.7 m) while minimizing exposure.



High-Quality Materials

Each PROBE board uses three 1-Wire temperature sensors. Constructed from anodized aluminum, the probe also protects the mechanical integrity of the rail. Thanks to two small 10 mm holes, it can be easily removed for maintenance or in case of malfunction.

The RTDAM is equipped with a LAN port (10/100) and two serial ports, one RS232 and one configurable via dedicated software as RS232 or RS485. Data can be transmitted via ETH lines, existing voice modems, GSM or GSM-R modems, MQTT protocol in IoT environments, or optical fiber connections. The Central Checkpoint can centralize data using the dedicated ISO1 protocol via TCP or UDP over ETH lines, via MQTT in IoT environments, or serially through modems, fiber lines, or RS232/RS485 connections.

Collected data are managed by an SQL database and made available to all connected operators through dedicated client software. All materials used for RTDAM and PROBE are industrial-grade, ensuring durability and long-term reliability.

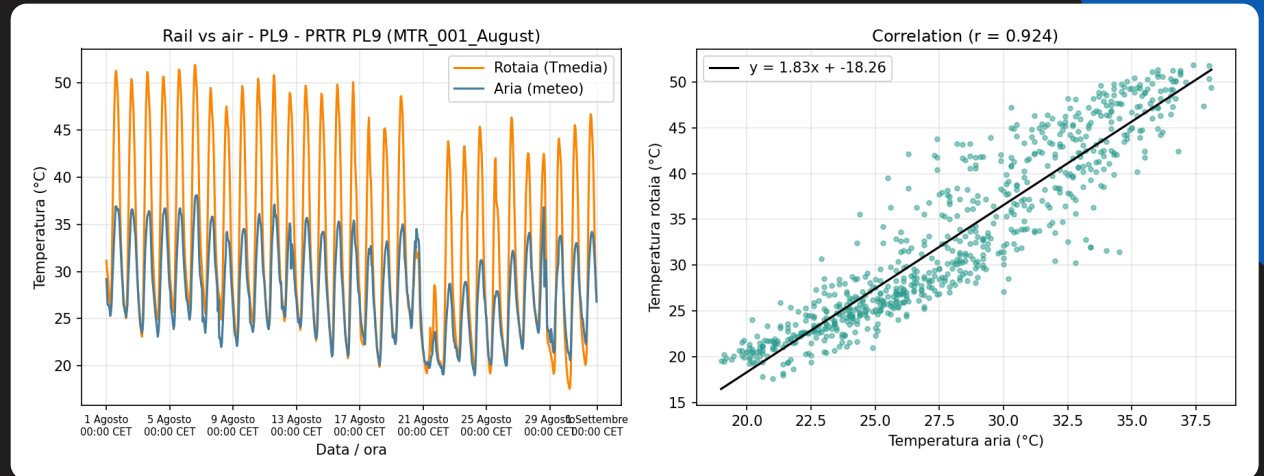
Predictive diagnostics

In addition to real-time monitoring, MTR 2.0 offers an additional service: **predictive diagnostics**.

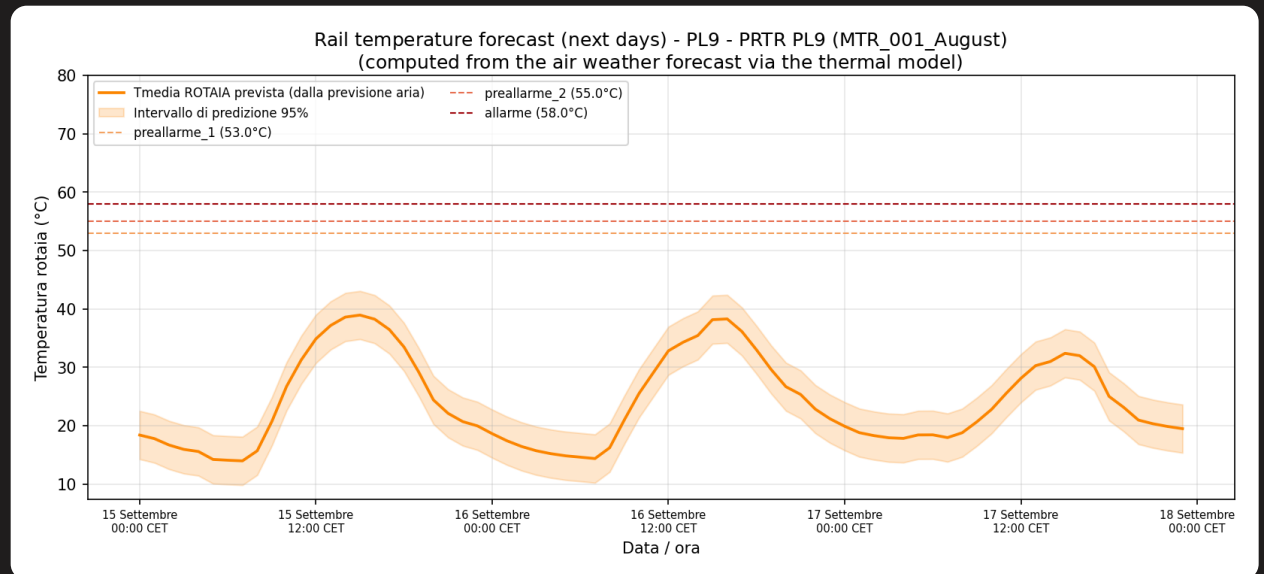
Using the data acquired by the equipment, a targeted analysis can be run to predict threshold exceedances, combining a **thermal model** extrapolated from the data itself with the **weather forecast** for the following hours, using AI algorithms.

The goal is to predict possible rail temperature exceedances that would compromise traffic safety, so that **preventive measures** can be taken in advance.

- 1 **Data**
acquired in the field by MTR 2.0
- 2 **Thermal model + weather**
AI algorithms on air and rail data
- 3 **Prevention**
early warning of threshold exceedance



The thermal model. Rail temperature closely follows air temperature (correlation $r = 0.924$): field data are used to derive the model linking the two.



The forecast. Applying the model to the weather forecast for the coming hours estimates rail temperature, with its 95% prediction interval, against the pre-alarm thresholds (53 °C and 55 °C) and the alarm threshold (58 °C).