RAILWAY
SYSTEMS
by voestalpine

SAFE PERFORMANCE ON TRACK®

Axle Counting System
UniAC[2]

voestalpine
ONE STEP AHEAD.

voestalpine Signaling Poland is the leader of the competence center for Axle Counting Systems within voestalpine Railway Systems Group with more than 20 years experience gathered in close and constant contact with the Customers and his needs.
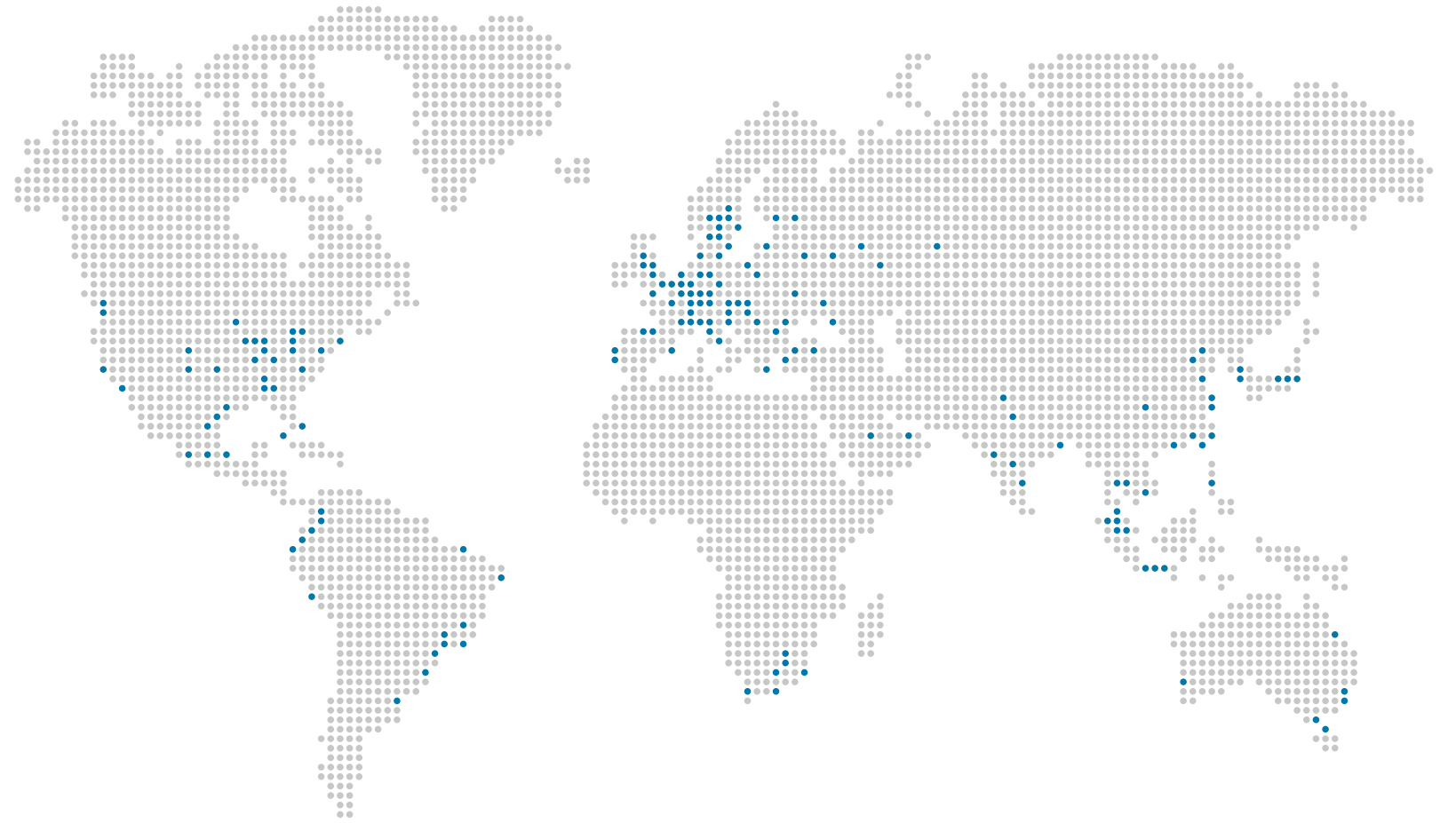
COMPETENCE UNIT AXLE COUNTING SYSTEMS

OUR CONTRIBUTION – YOUR ADVANTAGES

» State of the Art SIL4 Track Vacancy System

» Outstanding system reliability and availability thanks to modern and future-oriented hardware design and redundancy capabilities built into the system

» Cost optimized system maintainability though advance monitoring and diagnostic features

» Integration capabilities due to the future-oriented design of hardware, software and configuration

» System cyber security included by design of hardware, software and tools

» Excellent rolling stock compatibility thanks to an advanced Wheel Sensor and intelligent evaluation algorithms

» UniAC[2] can be used by all sectors in the rail industry, and irrespective of infrastructure concept and age

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CYBERSECURITY

During development of the SIL4 assessed UniAC[2] axle counting system cyber-security measures, such as authentication, authorisation, integrity, and cryptography were considered to address the identified vulnerabilities and threats.

Most security related tasks are supported by embedded dedicated hardware such as crypto authentication modules and processors.

INTEGRATION

Software and Hardware are designed to be ready for future needs, especially integration with different types of Interlocking systems via safe and secure communication protocols such as EULYNX SCI-TDS.

Next to the implementation of voestalpines' own protocol va-DTDS (voestalpine Digital Train Detection Systems) various customers protocols have been implemented and assessed to CENELEC SIL4 standards.

MODULARITY & REDUNDANCY

The modular system architecture of the 2oo2 (two-out-of-two) CENELEC SIL4 approved UniAC[2] Axle Counting System is based on a combination of multipurpose modules - AXM. This one type of the module, depending on configuration, can perform all required functions of a state of the art track vaccancy system.

This future-oriented design already considers redundancy in many areas and makes it possible to customize the product to meet new and demanding requirements from different customers and, at the same time, keep an unchanged platform design.

UniAC[2]
YOUR FUTURE-READY AXLE COUNTER

The UniAC[2] Axle Counting System is based on modular architecture that enables various implementation possibilities of the Axle Counting System.

Thanks to the holistic approach to system design, the UniAC[2] platform has a lot of benefits for system integrators, operators and maintenance teams.

Various interface options allow you an easy integration of the UniAC[2] Axle Counting System with various types of signaling systems.

Modern electronic components, together with an smart hardware and software design allow the system to reach outstanding RAM parameters, leading to reduced Life Cycle Cost.

ADVANTAGES

» **reduced complexity for maintenance actions**

» **no DIP-switches – configuration is stored on the backplane slot**

» **in-built cryptography chip supporting cybersecurity**

» **redundant power supply**

» **redundant communication**

» **no trackside electronics**

» **working with twisted pair & star quad cables**
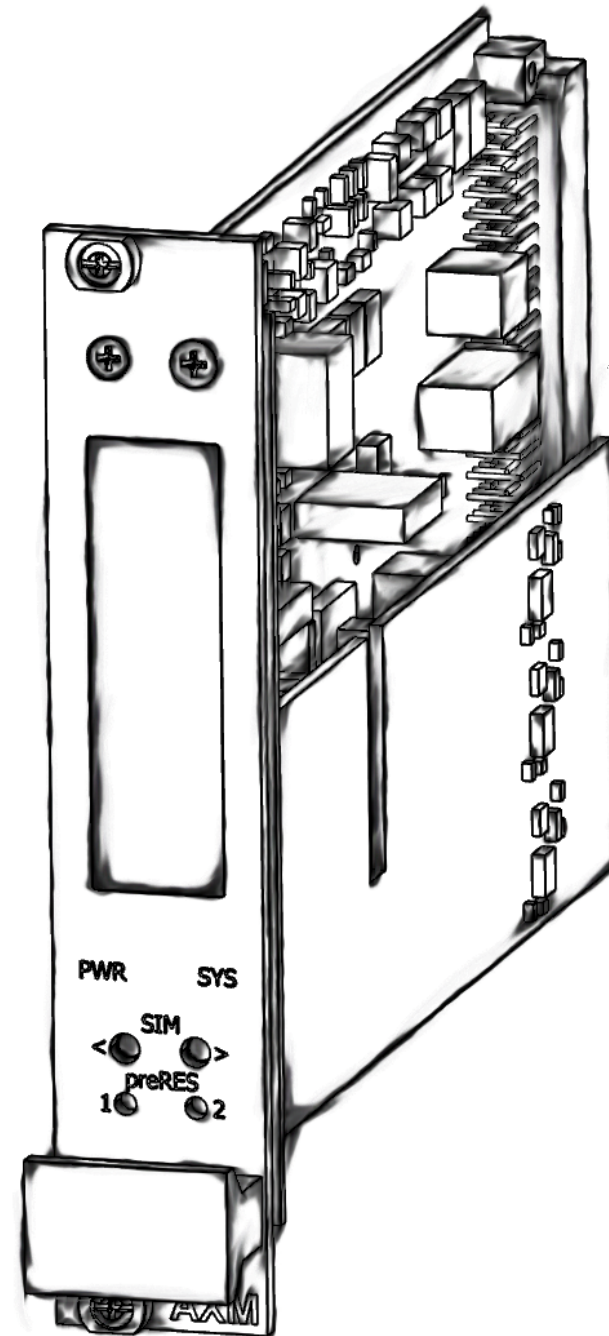
AXM MODULE
THE POWER OF POSSIBILITIES

EVALUATION

AXM supplies the wheel sensor with the proper voltage related to distance and cable quality, evaluates analog signals from the outdoor equipment and converts them into a digital ones. Additionally, every cable fault is detected and an alarm is generated.

COUNTING

AXM provides 4 independent counting units within one module. Each Counting Unit can consist of up to 16 counting points. The amount of counting sections per module allows you to easliy use special functions without the need for additional hard- or software.

COMMUNICATION

AXM is responsible for the vital communication with the subsequent signaling system via Protocol, Optocoupler or Relay. As well the AXM Multipurpose boards handles the internal communication between modules and the communication to distant UniAC[2] installations.

DIAGNOSTIC

AXM provides extended diagnostic functions via its screen and provides them to the Advanced Diagnostic Modules where the data could be accessed in various ways.

Using the Advanced Diagnostic Module (ADM) all analogue wheel sensor currents can be recorded - supporting surveillance of rolling stock compatibility throughout the whole life-cycle.

IMPROVED DETECTION CAPABILITIES

Configurable sensitivity levels and detection thresholds

New coil arrangement for the highest EMC immunity

ENHANCED TEMPERATURE STABILITY

Active temperature compensation built in Wheel Sensor

Compensation of changing behaviour during the lifecycle of electronic components

EASY MOUNTING & MAINTENANCE

Standard mounting clamp without need for drilling

Reduced maintenance cycles

20 mA ANALOG SIGNAL

Enhanced interference and temperature immunity on the connection cable between wheel sensor and indoor equipment

Cable lengths of up to 20 km using twisted pair or star quad cables
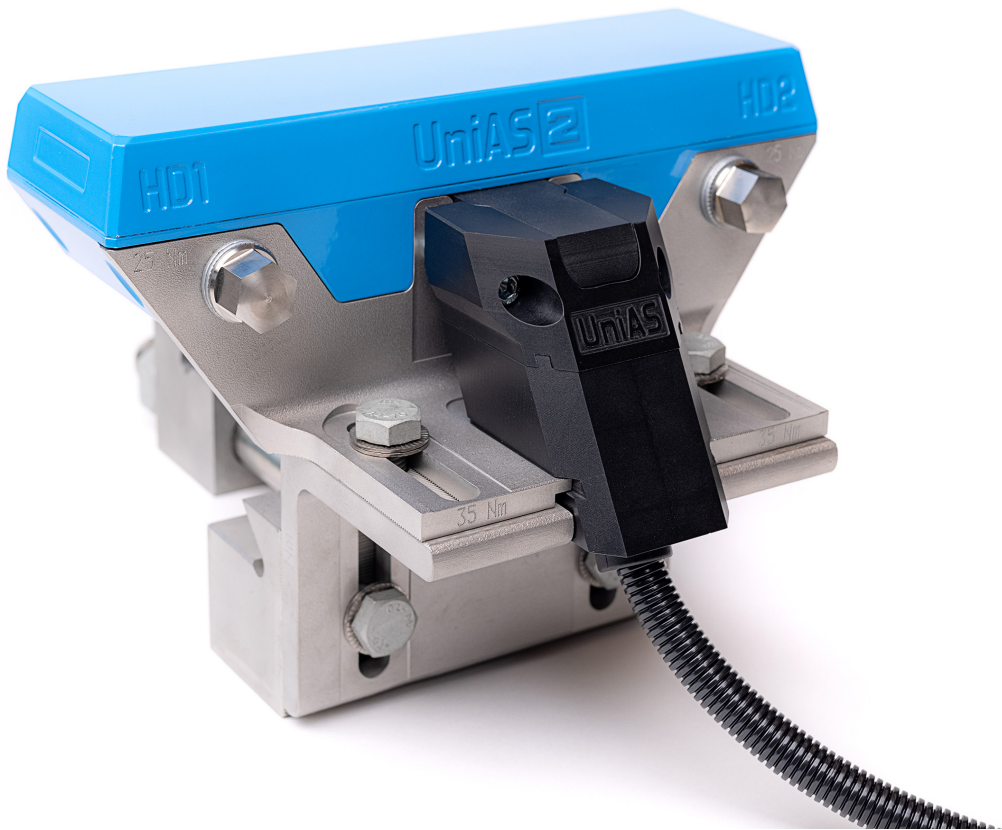
UniAS[2]
WHEEL SENSOR

BEST-IN-CLASS ROLLING STOCK COMPATIBILITY

The SIL4 approved Wheel Sensor UniAS[2], has been developed based on the experience gathered over decades.

It supports the highest availability of the whole UniAC[2] Axle Counting System, while at the same time being easy to install, even using existing Twisted-Pair or Star-Quad Cables already in field.

The sensor is equipped with a IP68 approved plug with a new and flexible fixture method, which can be easily removed for maintenance works.

Analogue wheel sensor currents can be recorded by embedded monitoring subsystem of UNIAC[2] during normal operation

SOFTWARE ECOSYSTEM
SUPPORTING THROUGH THE WHOLE LIFE-CYCLE

The extensive software ecosystem behind the UniAC[2] Axle Counting Systems not only reduces the required time for the design of your specific application.

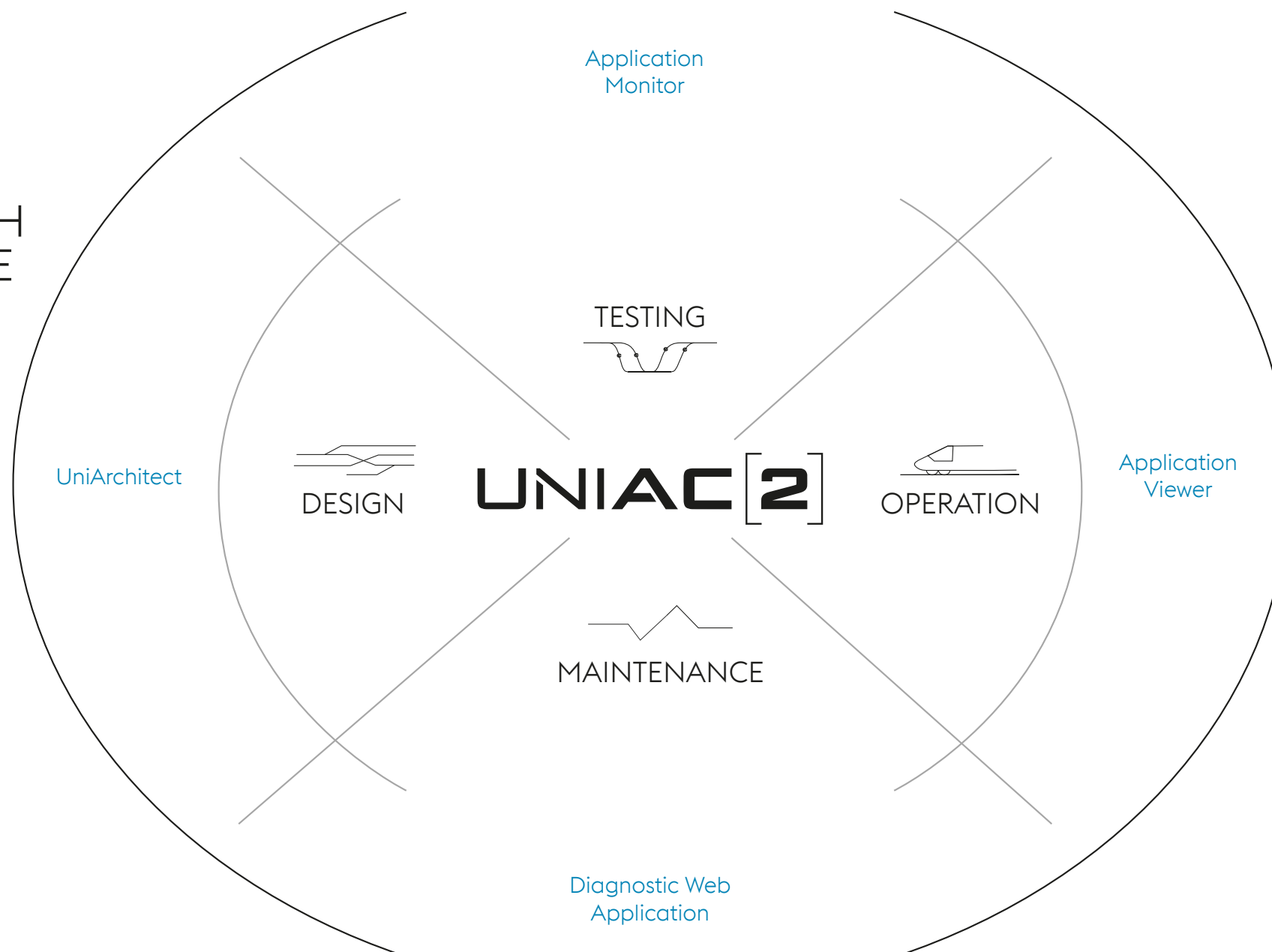Additionally, they built the basis for new functionalities like remote maintenance.

Thanks to the UniAC[2] Web Platform you can remotely update the firmware and application configuration in a safe and secure way. Furthermore, it enables to install cyber security patches for maintaining the requested cyber security level.

VISUALIZATION OF THE SYSTEM CONDITION

The remote monitoring and inspection uses technologies to provide current status of system performance (system "health" status) and support field engineers, independently of the location.

Remote UniAC[2] system condition monitoring is provided via dedicated diagnostic, monitoring and maintenance web application.
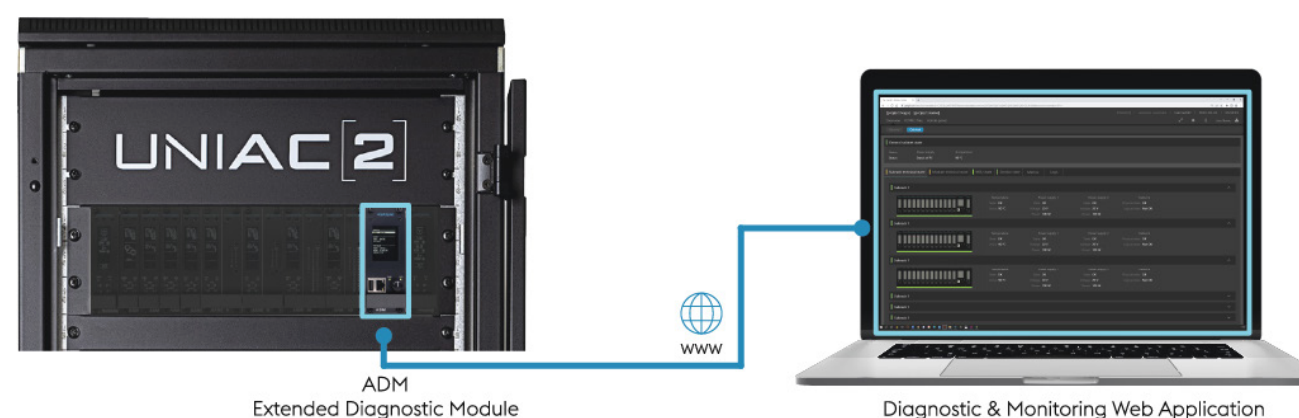
Application Monitor

TESTING

UniArchitect

DESIGN   UNIAC[2]   OPERATION

Application Viewer

MAINTENANCE

Diagnostic Web Application

ROLLING STOCK COMPATIBILITY VERIFICATION

The advantage of UniAC[2] system is that during normal operation the analogue signals of wheels passing over sensors are automatically recorded by embedded monitoring subsystem.

This feature assures outstanding supports in rolling stock compatibility verification either during dedicated field tests or during normal train operation.

DIAGNOSTIC & MAINTENANCE SUPPORT

The diagnostic data are used for root cause analysis to identify the origin of issues and find appropriate solutions to prevent them from happening in the future. It involves checking system events data which are collected by the Advance Diagnostic Module (ADM), part of in-build UniAC[2] diagnostic system.

UNIAC[2]

www

ADM
Extended Diagnostic Module

Diagnostic & Monitoring Web Application

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