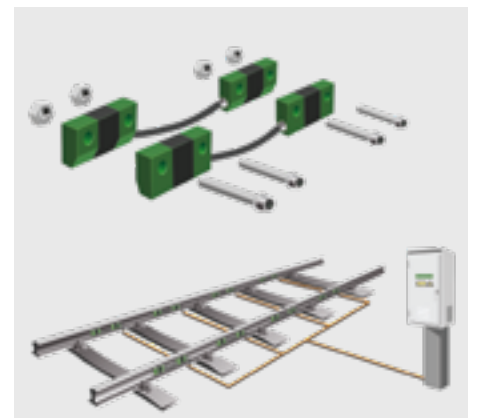




RAILWAY TECHNOLOGY

Measurement systems and sensor solutions for the railway industry



Your expert partner in sensors & controls

althen.de

ALTHEN
SENSORS & CONTROLS

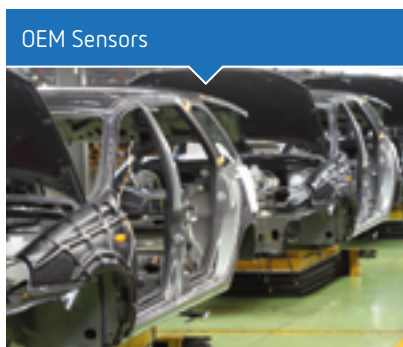
ABOUT ALTHEN SENSORS & CONTROLS

Althen Sensors & Controls stands for pioneering measurement and sensor solutions. Since we are constantly looking to innovate, we accept every measurement challenge. Our engineers are only satisfied when the perfect solution for your measurement task is found. We develop customer-specific solutions in our in-house production facilities. Althen is partner of many recognized universities and leading organizations. We find ourselves in an intensive knowledge transfer, developing future technologies. Althen is one of the first companies in its branch with a certification by the German technical inspection association in Hessen (TÜV PROFICERT) in accordance with DIN EN ISO 9001:2015.

OUR SERVICE FOR YOU

Are you facing a metrological challenge or do you need a suitable spare part for your application? Our specialists will advise you - in detail and professionally. We keep an eye on your costs and develop customer-specific special solutions if required. Benefit from our many years of experience in the field of measurement technology and sensor technology:

-  **High-quality Production**
-  **Measurement and Rental**
-  **Special Custom Calibration**
-  **Training & Consulting**





Innovative sensor solutions for transportation systems of the future



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3D AUTOMATED WHEEL MEASUREMENT SYSTEM

This innovative measurement system is developed for contactless automatic real-time measurement of geometrical parameters of railway wheels (trains, trams, metros). The system is based on a combination of high frequency 2D laser scanners mounted sideways of the rails that after calibration create a common 3D coordinate system.



3D AUTOMATED WHEEL MEASUREMENT SYSTEM

The new automated 3D wheel measurement system is collecting reliable and accurate data to improve railway maintenance activities and to prevent damage on rail infrastructure. By making use of high speed laser scanners, it is possible to measure all wheels even at high speeds.

BENEFITS OF 3D AUTOMATED WHEEL MEASUREMENT SYSTEM

- Getting all important data with one system instead of multiple tools
- Accurate and valuable data within seconds
- Eliminate manual measurement errors
- Integrated software system with all necessary calculations and parameters
- Real time measurement of moving train of tram wheels
- Simple train identification based on vision system
- RFid identification of axles of the train
- Easy installation at any rail infrastructure



TECHNICAL DATA

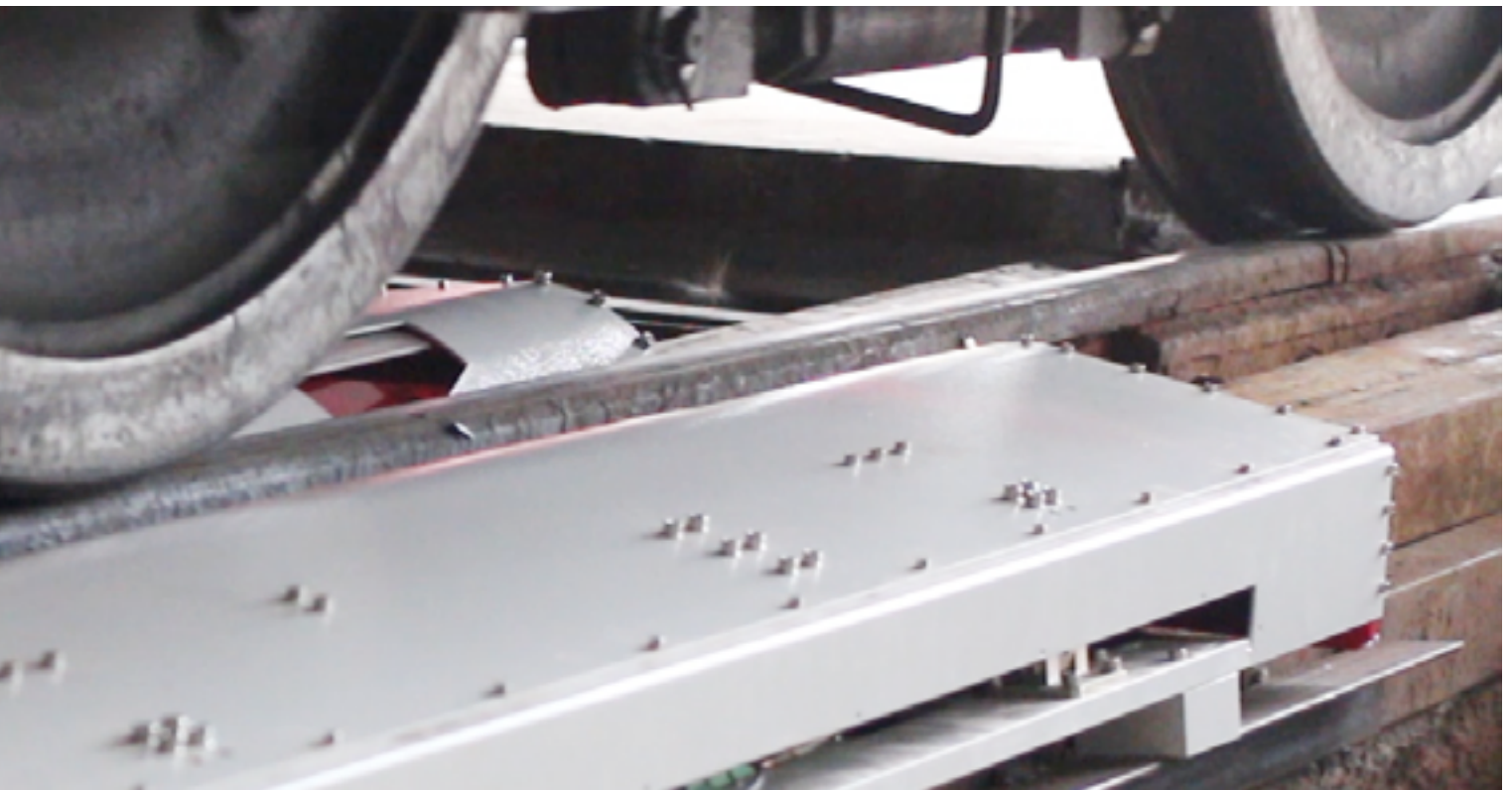
The 3D automated wheel system can be installed in 3 variants:

- 1) Low speed variant for maintenance locations: up to 15 km/hour.
 - 2) Medium speed variant for normal train/metro trajectory: up to 180 km/hour.
 - 3) High speed variant for in high speed trajectory locations: up to 350 km/hour.
- Both variants 2 and 3 will be finished in Q4 2018.

Parameter	Accuracy
Wheel profiles	mm 0,1 ±
Flange height	mm 0,1 ±
Flange width	mm 0,1 ±
Flange angle	mm 0,1 ±
Rim thickness	mm 0,1 ±
Tread width	mm 0,1 ±
Back to back gauge	mm 0,05 ±
Wheel diameter	mm 0,2 ±

SCOPE OF DELIVERY

- Frames with laser scanners
- Inductive sensors of wheel presence
- Industry computer
- Software
- Calibration frame
- Vehicle (carriage) identification system (Video, RFID)



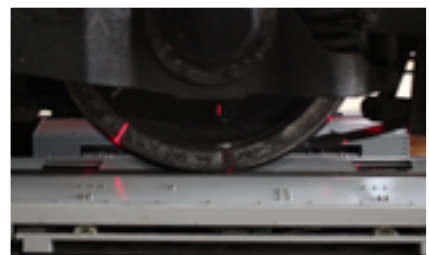
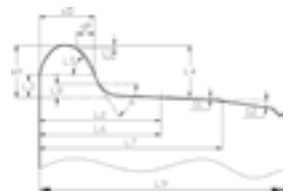
STATE-OF-THE ART SOFTWARE INTEGRATIONS

STAND ALONE SOFTWARE PACKAGE INCLUDING:

- Configuration of the system
- Reference profiles/diameter/back-2-back info configurable
- Data storage of all measurements
- Information overview of which vehicle, wagon, and axles
- Per axle all measurement data easily accessible
- Warning and alarm functionality integrated
- Preparation of file sharing possibility to other systems in fixed format

MEASURED PARAMETERS:

- Diameter of wheels
- Wheel flange height
- Wheel flange thickness
- Wheel flange slope (QR in mm or degrees)
- Wheel hollow wear (in combination with position)
- Specific slopes and angles in profile
- Gap measurement
- Complete profile of wheel as X,Y model
- Back-2-back distance between wheels on same axle



WEIGHING IN MOTION (AWIM) SYSTEM

Measurement system for Weighing in Motion, Wheel Flat Detection and Train Detection

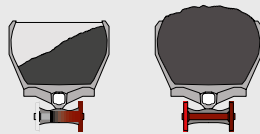
Cost effective accuracy

Market leading cost of investment to accuracy ratio.

0.5%
OIML R106

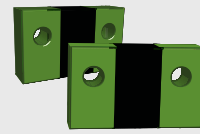
Uneven/overload detection

Increase safety by detecting faulty loading of the cars.



Ruggedized and robust

Quality for harsh environments with a MTBF of 90,000 hours.



WEIGHING IN MOTION (AWIM) SYSTEM

The weighing in motion system is developed to measure the weight of trains or trams when driving by with full speed.

MEASURED PARAMETERS:

- Train detection and speed
- Identification number, locomotive- & wagontype
- Very high accurate load measurements ($< \pm 0,5\%$)
- Weight of single wheel, axles, bogies and complete wagons
- Number of axles
- Very high accurate uneven load detection
- Overload detection
- Broken Bogie Suspension
- Wheel Flat Detection (defects)
- Detection system for derailment risk (!)

EXAMPLES OF OPERATIONAL USE

▪ Weighing single wagons

A mining company need to know that their wagons are not unevenly, under or overloaded.

▪ Weighing complete train sets

A railway operator need to know the number of engines and wagons to charge traffic fee.

▪ Monitoring all train sets

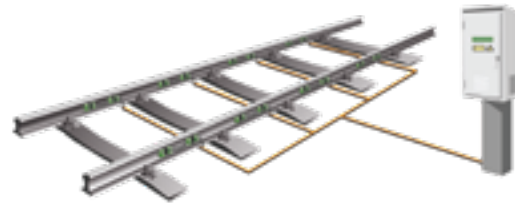
The infrastructure owner need to know how the track system is used.

▪ Detecting derailment risks

The track owner and the train operator wants information on if and when there is a increased risk for derailment.

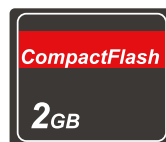
FAST AND EASY INSTALLATION

Our patented bolt-on sensors do not require the track to be closed during installation and maintenance which dramatically reduces traffic interferences. The sensors need to be bolted in place either through holes or using our weldable sockets.



BUILT-IN BACKUP STORAGE

The local CF card ensures that no data will be lost in case of a connection loss.



EMBEDDED USER INTERFACE

Use any modern web browser to access the built-in user interface.



WHEEL MAINTENANCE MEASUREMENT TOOLS

The easiest and fastest way to get reliable and accurate wheel parameters. Our wheel measurement tools are based on laser technology and developed to be used in railway maintenance locations to measure the diameter, scan the profile and measure the back-2-back distance in a modern and innovative way.



DIAMETER GAUGE

PROFILOMETER

- Laser scanning and analysis of wheel profile
- Contactless measurement of wheel profile parameters
- PDA & software for wheel wear database support
- Bluetooth interface for data transfer



LIGHTRAIL PROFILOMETER

- Laser Wheel Profile Gauge model FDKP-short with a shortened handle
- Laser Wheel Profile Gauge model FDKP-Super short version for Ansaldo Breda low floor trams



LIGHTRAIL DIAMETER GAUGE

- High-precision wheel diameter measurement
- Large numeric display
- Bluetooth interface for data transfer (optional)
- Measurement range: 400-750 mm or on request
- Custom design possible
- Lightweight design



DIAMETER GAUGE

- High-precision wheel diameter measurement
- Large numeric display
- Bluetooth interface for data transfer (optional)
- Measurement range: 600-1400 mm or on request
- Custom design possible



BACK-2-BACK GAUGE

- Contactless measurement of back-to-back distance between railway wheels
- Large numeric display
- Bluetooth interface (optional)
- Measurement range: 1340-1610, ±15 mm. 0.2 mm (measurement error)

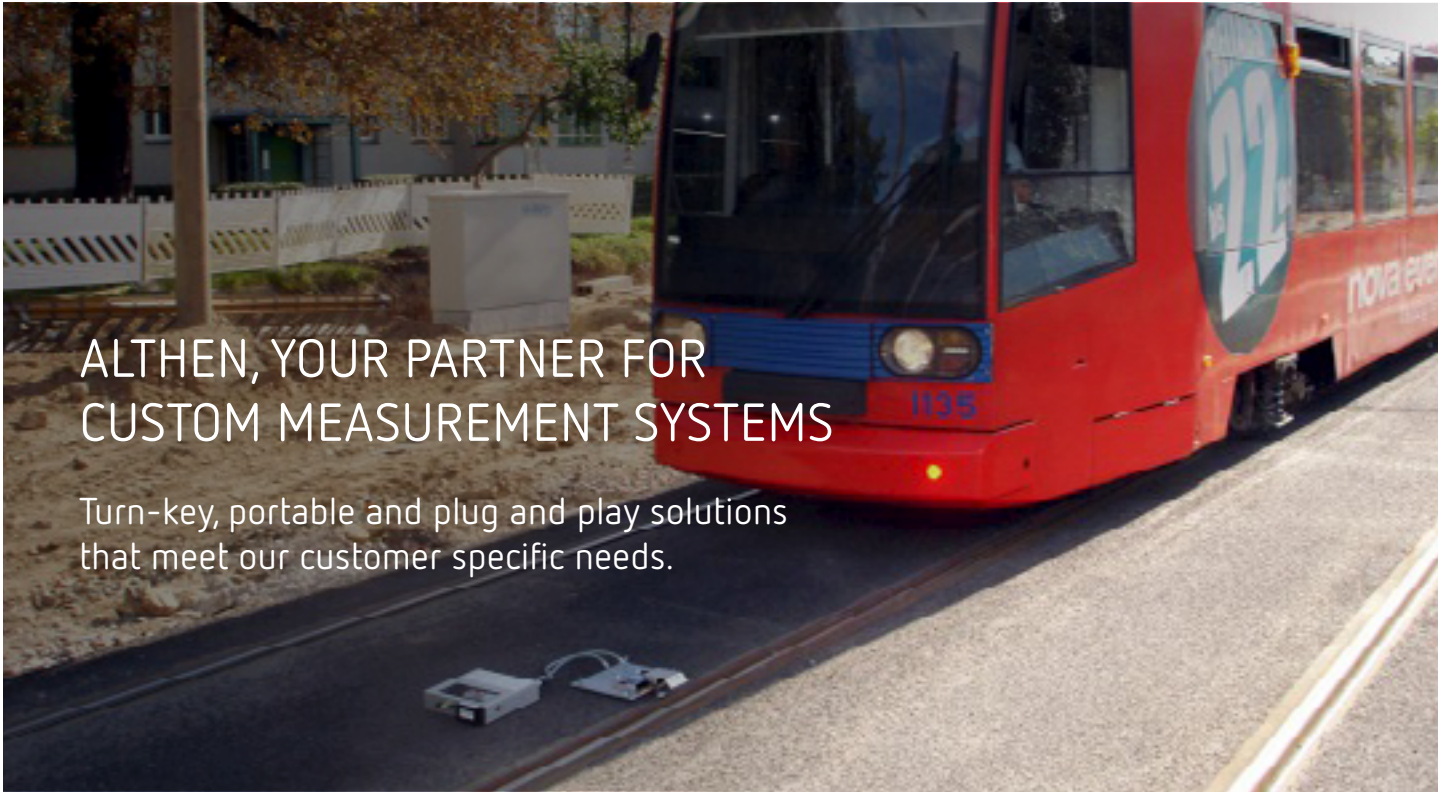


3 TOOLS COMBINED WITH ONE TABLET

All your wheel parameters automatically uploaded to your internal system.

Our user-friendly software collects all the measurements via Bluetooth and visualizes and stores the data into the software. From there all your measurements and wheel parameters can then easily be uploaded into your own system. An accurate, intelligent, fast and easy to handle solution for any railway maintenance location.





ALTHEN, YOUR PARTNER FOR CUSTOM MEASUREMENT SYSTEMS

Turn-key, portable and plug and play solutions that meet our customer specific needs.

RAILWAY DISPLACEMENT MEASUREMENT SYSTEM

This portable measurement system has been developed to measure vibration when a tram is passing by. It is mostly used in urban areas to determine if the rails are still in good condition and don't cause too many vibrations, that could potentially damage surrounding buildings and other infrastructure.

MAIN FUNCTIONALITY

- Measures vibration of rails when tram/train passes by
- Based on FDRF603 laser sensor
- Remote controlled measurement with remote controller
- Integrated amplifier and data logger embedded into industrial housing

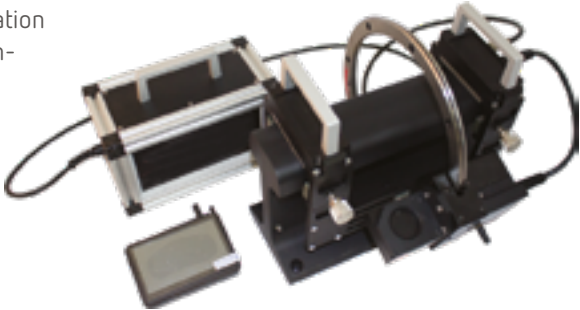


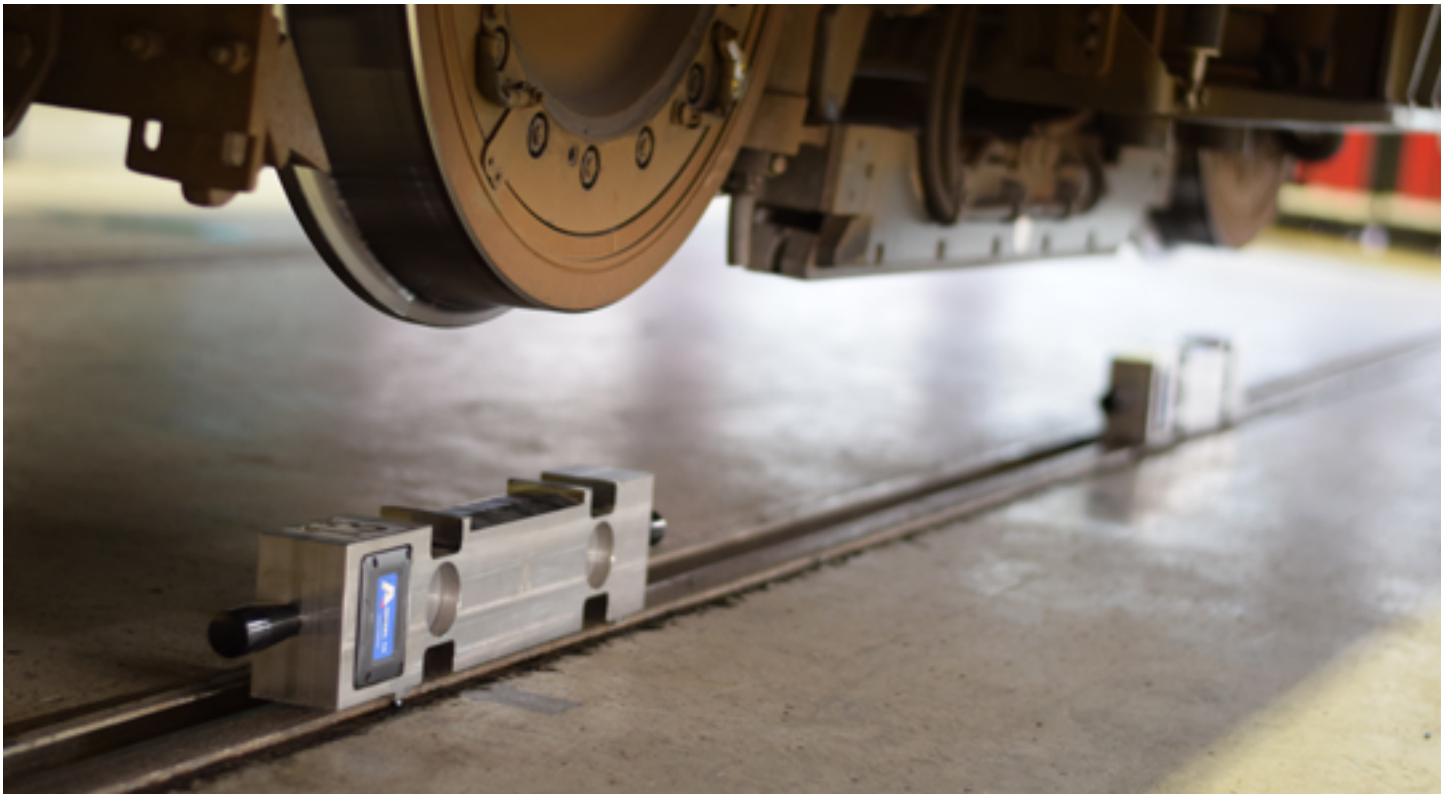
RAILWAY PROFILE MEASUREMENT GAUGE

Portable laser rail profilometer (PRP) is designed for non-contact registration of cross-section of the railhead. The profilometer scans the rail using non-contact laser technology.

MAIN FUNCTIONALITY

- Obtaining the information on the cross-section profile of the working railhead surface
- Full profile scanning and analysis of the railhead
- Combined visualization of measured and reference cross-section





SMART WEIGHING AND BALANCING SYSTEM FOR TRAM/METRO MAINTENANCE

Our wireless weighing system measures the weight of each individual wheel within just a few seconds. All the specially designed load cells are equipped with a wireless communication module to transmit the measured data directly to the software.

You can view the results directly on your dedicated laptop. This includes a visual overview of the balance per axle. The software automatically calculates parameters such as axle load, load per bogie, total load of the tram/metro and can be customized to your requirements.

SYSTEM INCLUDES



- 16 x wireless Rail beam load cells
- Portable case with laptop
- Customized software
- Docking and charging cart (optionally)

MAIN ADVANTAGES

- Accurate data
- Time (labor) saving
- Wireless system
- Easy reporting function
- User friendly visualized software
- Synchronized tare function

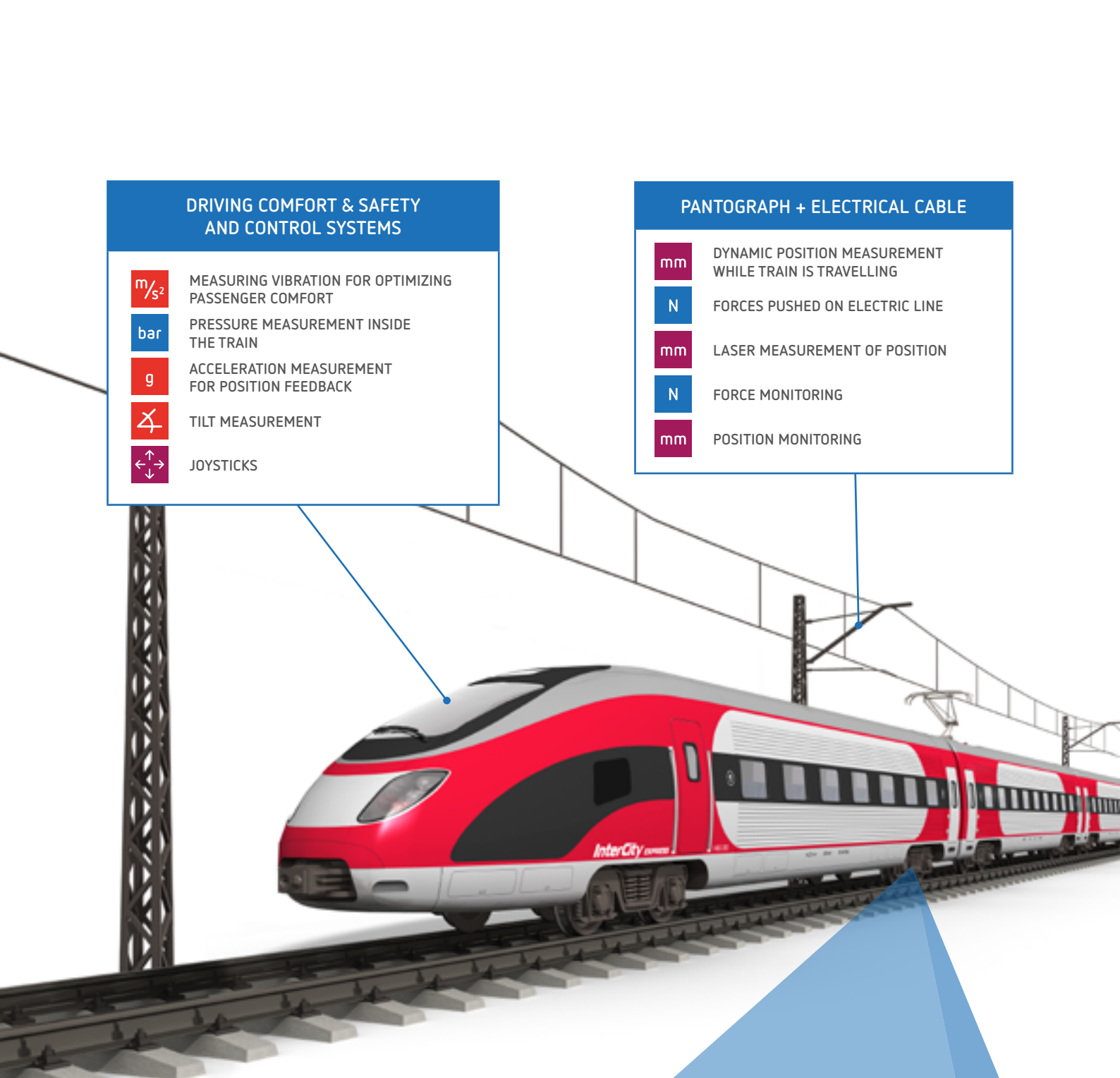


DRIVING COMFORT & SAFETY AND CONTROL SYSTEMS

- m/s^2 MEASURING VIBRATION FOR OPTIMIZING PASSENGER COMFORT
- bar PRESSURE MEASUREMENT INSIDE THE TRAIN
- g ACCELERATION MEASUREMENT FOR POSITION FEEDBACK
-  TILT MEASUREMENT
-  JOYSTICKS

PANTOGRAPH + ELECTRICAL CABLE

- mm DYNAMIC POSITION MEASUREMENT WHILE TRAIN IS TRAVELLING
- N FORCES PUSHED ON ELECTRIC LINE
- mm LASER MEASUREMENT OF POSITION
- N FORCE MONITORING
- mm POSITION MONITORING



BRAKE TESTING

- N FORCE TESTING OF DISK BRAKES
- bar PRESSURE MEASUREMENT OF LIQUID IN THE BRAKES
- m/s^2 VIBRATION MEASUREMENT
- N VARIOUS FORCE SENSORS TO MEASURE ABSORBER LOAD IN ACTION
- Nm LINEAR POSITION SENSOR

BOGIE + WHEELS





THE RIGHT SOLUTION FOR YOUR REQUIREMENTS







Thanks to our long time experience, we at Althen can provide both standard and highly specialized custom sensors as well as complete measurement systems for our customers.

Our product portfolio covers all physical measurements, and we use a wide range of technologies to ensure you always get the best solution for your measurement requirements. Thanks to our vast knowledge, technical expertise, our strong team of engineers from various professional backgrounds, and broad range of products, we can offer the most efficient solution for almost any application in every industry.

Our team will be happy to give you advice!

Call us at **+49 (0)6195 70060** or send an email to **sales@althen.de**.

OUR PRODUCT SCOPE

bar	Pressure	mm	Displacement	g	Acceleration		Amplifier
N	Force	α	Rotation	m/s²	Vibration		Data Logger
Nm	Torque		Joystick	%s	Angular Rate		Automation
ε	Strain		Inclination	°C	Temperature		Measurement Solutions



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