

ATLAS FO

# Precise Diagnosis of Wheel Defects and Vehicle Weights

Reliable Measurement Results through  
Innovative Fibre Optic Technology



# Innovative Solutions for Future Diagnostics

Growing rail traffic worldwide requests higher safety standards and lower maintenance cost at the same time. An essential aspect is a continuous, trustworthy and early detection of wheel defects.

The new generation **ATLAS FO** of voestalpine SIGNALING Siershahn offers unique advantages – also as dynamic rail scales.



## Small Impact with Big Effect – on Operational Safety and Cost

Wheels of rail vehicles are exposed to high wear and tear. This may result in geometric wheel defects as a consequence. Defects of this kind – like out of roundness or flat spots – lead to momentarily very high wheel-rail forces instead of the normally smooth behaviour.

The consequences are:

- High wear and tear of vehicles and infrastructure leading to increased cost for maintenance and support
- Increased noise and vibration emission
- Reduction of travel comfort
- Consequential damages for vehicles and infrastructure
- Higher derailment risk

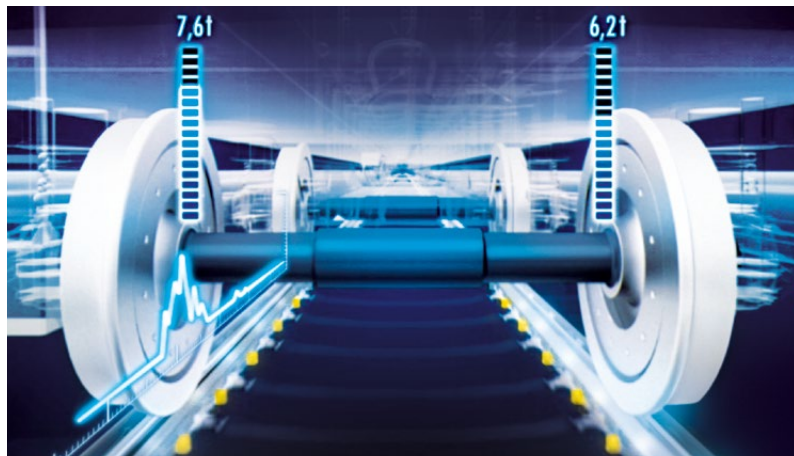
## Detect Deterioration Reliably and Efficiently

The system **ATLAS FO** allows an economic, reliable and continuous supervision of power and trailer wheels of rail vehicles during normal operation up to speed of 500 km/h. Twelve fibre optic sensors clamped to the rail measure forces induced by the wheels into the superstructure. Every defective wheel is identified during a train passage and data reports are generated accordingly. The reports are transmitted via a data line to an operational control centre. Alarms are displayed in real-time and point out a defective wheel together with its exact position within the train and vehicle.

## Monitoring Weight and Load Distribution

Besides detecting wheel defects the system **ATLAS FO** is used as dynamic rail scales at the same time; vehicle weight and load distribution is monitored during the passage. An unbalance or overload can be recognized in time. Also assistance for optimal payload usage can be given.

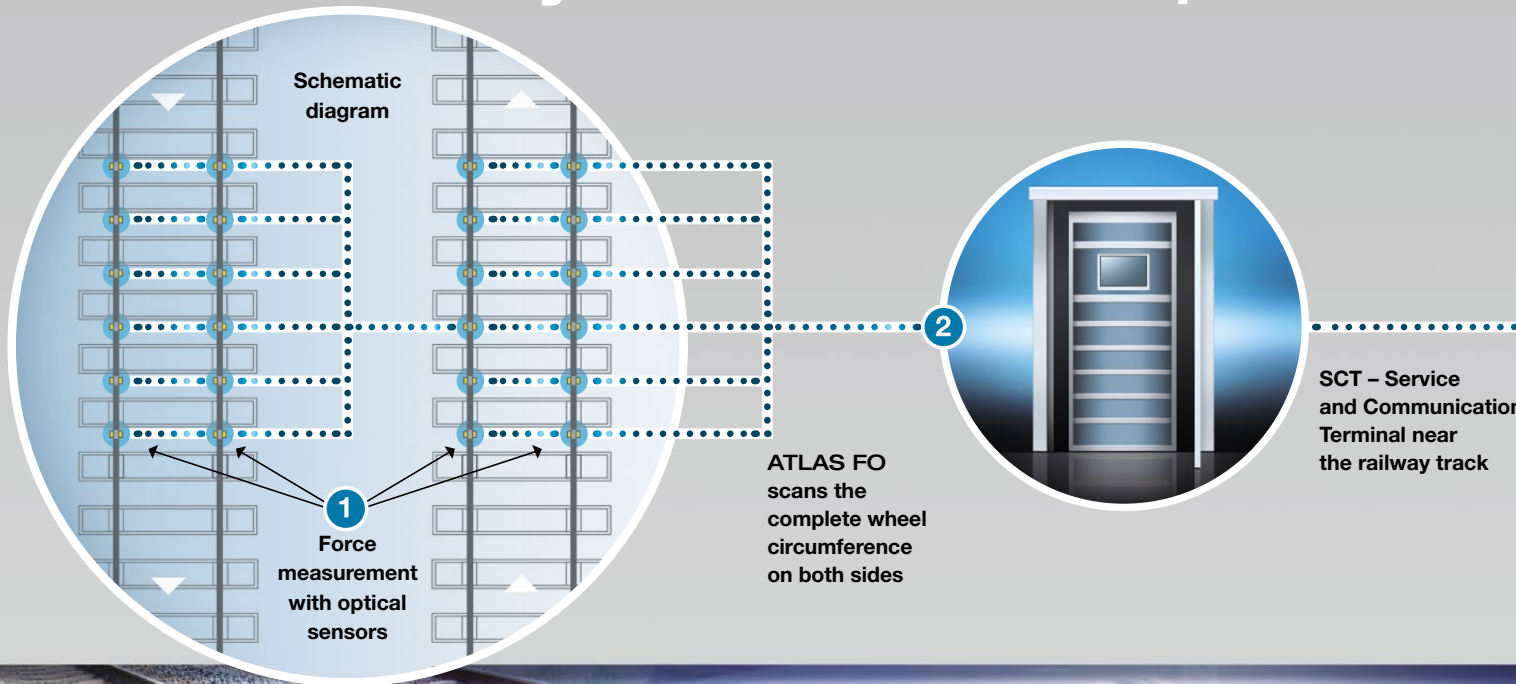
The innovative use of fibre optic technology facilitates a trouble-free and accurately working system. It allows in motion weighing with a maximum deviation of up to  $\pm 3\%$ .



Power and trailer wheels are permanently exposed to severe wear and tear.



# Efficient System Concept



## The System ATLAS FO Consists of Five Functional Units

### 1 Sensor with Fibre Optic Technology

The forces induced by the wheel into the rail are captured by twelve optical sensors per track. At a high scanning rate the deformation of the rail is measured. By covering the complete circumference of the wheel **ATLAS FO** is capable of detecting all kinds of wheel defects.

Applying fibre optic technology in the sensor design guarantees electromagnetic compatibility.

### 2 Service & Communication Terminal (SCT)

The main components are the optical modules and the industrial PC for data acquisition and processing. All services as test functions regarding the connected measuring devices are carried out locally or remotely from the industrial PC. The raw measurement data are processed through a special algorithm to retrieve the weight and geometric wheel defects immediately after the train passage.

Moreover the SCT serves as an interface to the next layer in the network infrastructure (e.g. via TCP/IP) and may be integrated into different IT architectures.



3



**CMS<sup>AT</sup> – Central Control and Processing Unit for the integration of several monitoring points of the railway system**



**Integration into the operational control system of railways is possible**



### 3 Central Control and Processing Unit (CMS<sup>AT</sup>)

To integrate several monitoring points as well as other control systems a central control and processing unit is installed. Integration into different networking topologies resp. networking protocols is also possible. The system is capable of multi-processor operation and features a concept of redundancy and hot standby hardware components.

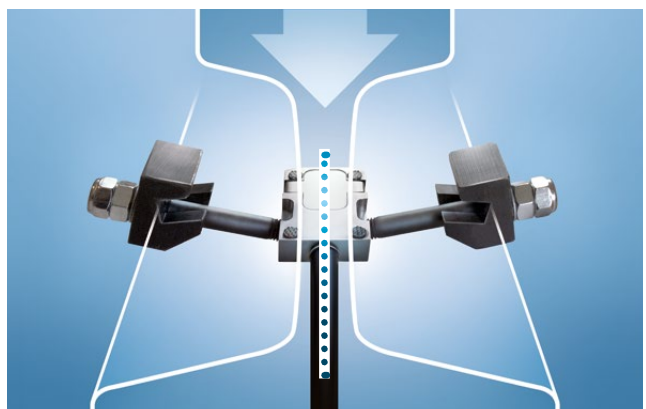
### 4 Remote Service Terminal (RST)

All service and test functions of the **ATLAS FO** system can be executed worldwide by remote maintenance. This leads to significant savings of operating costs.

### 5 Service Solutions

If the customer requests, the systems can be controlled, configured and serviced by voestalpine SIGNALING Siershahn.

### Measuring Technology by voestalpine SIGNALING Siershahn – Reliable under Extreme Conditions



The sensor using fibre optic technology is easily mounted under the rail. It is completely immune against environmental and electromagnetic influences.

# ATLAS FO

## The Advantages of the System at a Glance

- Modern fibre optic technology allows fast installation and easy maintenance
- Tamping of the ballast can be done without dismounting the sensors
- No electromagnetic interference
- Flexible integration into existing networks
- Secured data transmission
- Remote maintenance concept
- Continuous scan of the complete wheel circumference (Wheel Defect Detection)
  - Speed range: 20 - 500 km/h
  - Temperature range: -30°C to +70°C
- Continuous measurement of weight (Weighing in Motion)
  - Speed range: 5 - 500 km/h
  - Temperature range: -30°C to +70°C
  - Accuracy of weighing: up to  $\pm 3\%$
  - Weighing range: up to 40 tons axle load
- Length of measuring area: ca. 7 m – on demand extendable
- Speed of train calculation to  $\pm 1\%$  accurate
- Minimum axle distance: 0.70 m
- Measurement of train length between first and last axle
- Wheels with diameter of 200 - 1600 mm are measured
- Automatic and continuous calibration

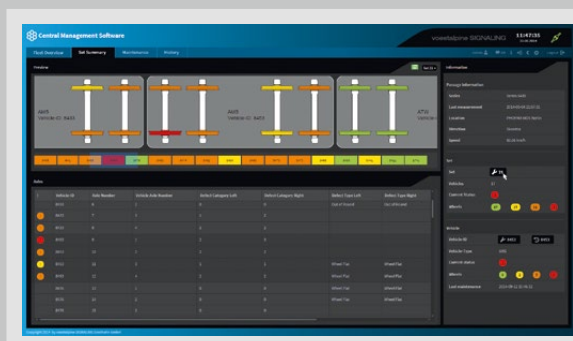
### Scanning the Complete Wheel

All possibly occurring geometric wheel defects can be detected by **ATLAS FO** because the complete wheel circumference is scanned. This applies for high speed trains running at up to 500 km/h as well as for freight trains with substantially lower speed. The graphic shows a schematic drawing.



### Easy Installation and Maintenance

The sensor design as independent modules makes installation and exchange easy and unbeatably fast.



### User Friendly Interface

Conditional based wheelset maintenance planning.

## Central Network

### **CMS<sup>AT</sup>**

Central, modular IT solution to control and monitor different diagnostic systems as well as flexibly integrate railway specific networking components.

## Diagnostic Systems

### **PHOENIX MB**

Hot Box and Hot Wheel Detection Unit with Multi Beam Technology

### **ATLAS FO**

Precise Diagnosis of Wheel Defects and Vehicle Weights

### **MISTRAL**

Precise Wind and Airflow Measurement

### **DED<sup>AT</sup>**

Efficient Detection of Dragging Equipment



Headquarters of voestalpine SIGNALING Siershahn, Germany.

## Service Solutions

### **Maintenance and Repair Services**

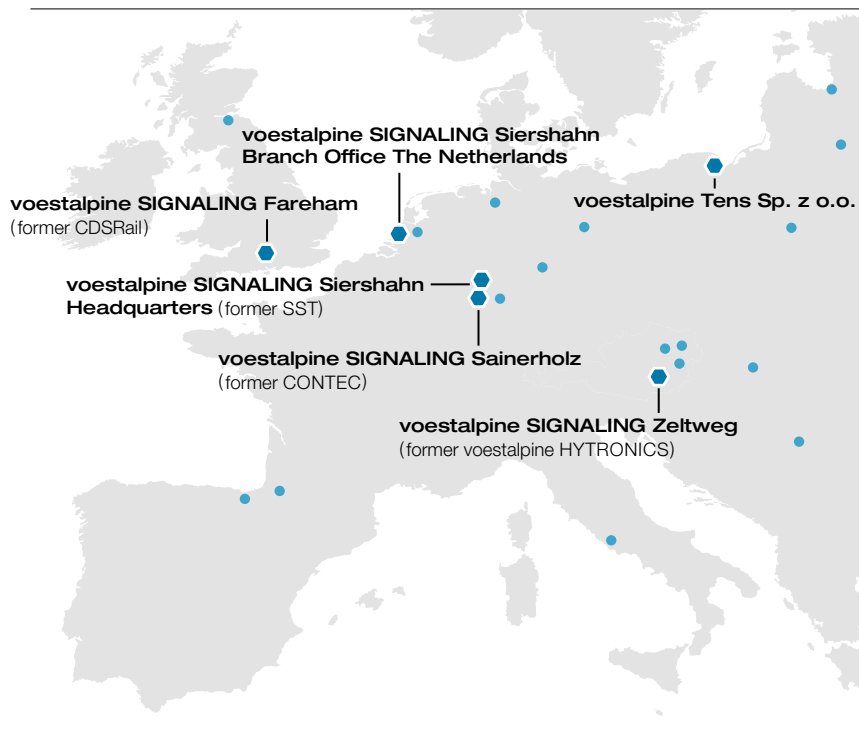
Extensive services and equipment to overhaul the diagnostic systems enable safe operation and guarantee low maintenance costs.



### **Training Courses**

Comprehensive offers for initial and continuing training enable an independent and competent handling of the systems. Preventive maintenance and service done by own employees enhance availability and reduce costs.

## European Locations

## Locations Worldwide



 Companies of voestalpine SIGNALING  
 Companies of the voestalpine group

## **voestalpine SIGNALING Siershahn GmbH**

### Headquarters

Bahnweg 1  
56427 Siershahn  
Germany  
T. +49/2623/6086-0  
F. +49/2623/6086-60  
info.siershahn@voestalpine.com

### Branch Office The Netherlands

Coenecoop 84  
2741 PD Waddinxveen  
The Netherlands  
T. +31/182/6222-70  
F. +31/182/6222-89  
info.nl.siershahn@voestalpine.com

### Branch Office Australia

Unit 14, 160 Hartley Rd.  
Smeaton Grange, NSW 2567  
Australia  
T. +61/246/48-1407  
F. +61/246/48-1407  
info.au.siershahn@voestalpine.com