

PJM Autonomous Measuring System: The Smartphone Among Measuring Systems

March 2021: In our technical life as well as in our everyday life, the requirements of tools like a smartphone are a matter of course: quick, flexible, simple, high-performing and accessible all the times. Based on these premises, PJM had developed a new measuring system meeting the technological demands of the 21st century. The “autonomous measuring system” combines up-to-date and proven standard components and thus creates an entirely new application. The result is a digital measuring system providing three major benefits: The system is easy to install (in just a few steps), it permanently generates required data and then provides the data in real-time on online-platforms. *“The autonomous measuring system is a quick, flexible and stable solution, which can be easily integrated in the existing operating systems of our customers. Due to proven standard components, the system is very stable. By the innovative combination of proven tools, we managed to create numerous additional features”*, says Martin Joch, CEO of PJM. The functionality and reliability of the new system had been proven and well-tried by various international projects.

With the autonomous measuring system PJM has set another milestone in digitalising rail freight cargo. Due to the WaggonTracker system, featuring both monitoring functions and automated processes such as automatic brake test and load monitoring, PJM has strongly pushed innovation in the railway sector. The digital expertise has been extended by the autonomous measuring system. Besides, components of the WaggonTracker system were adopted, e.g. the power supply provided by a hub generator. The autonomous measuring system can be applied in rail freight cargo but also in further railway fields such as infrastructure (e.g. measuring switches). *“We feel confident that the autonomous measuring system will set a new standard. Like a smartphone, our system provides fantastic features, permanent availability and a compact technology. Its assets are the new concept and the concentrated know-how in the inner part of the box”*, summarise the PJM founders and CEO Martin Joch and Günter Petschnig.

Concept and technology

The autonomous measuring system resorts to proven standard components and combines them in a new way. The concept is based on three key points:

- ▶ **Autonomous and high-performance power supply:** The hub generator is the key to sufficient and self-sufficient energy. An additional battery provides the power supply during downtime. The hub generator also generates further data such as wheel speed.
- ▶ **Compact integration:** The autonomous measuring system is installed in a sheet steel container in the size of about 60 x 40 cm. The container box is mounted on the vehicle. It is hardly visible, very robust and designed to sustain railway conditions. The stability even in rough railway operations had been proven in various type tests (according to EN 50155).
- ▶ **Data transfer:** Data is transferred encrypted either via ftp-transfer or by a secure remote access („encrypted secure remote control software“). The communication with the autonomous measuring system is performed by comprehensive mobile networks.

“We have used new conditions such as extensive mobile networks or the proven power supply on freight wagons provided by the WaggonTracker system and then we have built on the innovative measurement technology”, says Martin Joch.

Benefits of the new measurement system

Every new technology provokes the most important question “What’s the advantage?”.

Railway companies, operators, manufacturers and vehicle developers benefit from a wide range of features:

- ▶ The installation of the measurement system is a great deal less than with usual systems. There is no special test vehicle required. The autonomous measuring system is installed only on the test object.
- ▶ The autonomous measuring system is easy to integrate into existing operating processes. For instance, no further vehicles or special train are required.
- ▶ The data analyses get started immediately and the measurement data is provided in real-time. The customer has access to real time data.
- ▶ Due to the remote access, the measurement data can be easily configured or adopted to new assignments (e.g. sampling frequency or sensors).
- ▶ The system enables a new connection to further external data sources (e.g. track system or meteorological data).
- ▶ Thanks to the new local independence, experts can be called in at any time without actually having to be on site.
- ▶ The measuring system is not recognizable at first glance on the control vehicle, which means that ongoing measurements take place in normal operation and under the usual conditions. The data obtained from this reflect the actual operation of the vehicle.

- ▶ The shorter and simpler implementation is a big advantage, particularly in these days, as travel activities had been significantly reduced. This is not only a cost advantage, but also makes it easier to plan business trips and organize on-site assignments. Travel costs and steadily rising personnel costs are

generally a major cost factor in companies. Since the Covid-19 pandemic, mobility and business trips have either been very limited or only feasible with great organisational effort. The autonomous measuring system significantly reduces the on-site personnel costs.

Conclusio: A measuring system meeting today's demands

The autonomous measuring system of PJM takes into account the technical innovations of the past decade and combines standard components such as cellular network and power supply of freight wagons in a compact measuring technology system. After a simple installation of the measuring system in a robust box, the data requested by the users are automatically recorded and transmitted to the server. This makes vehicle measurements much more efficient. The on-site times of measurement technicians and customers are reduced, the organisational effort is significantly lower and the configuration of the required measurement data is much more flexible. The presence of experts and test engineers will continue to be necessary for complex vehicle tests in the future. Yet the autonomous measuring system is an ideal supplement for applications and projects that could previously only be implemented with great effort. *„The autonomous measuring system simplifies many areas and is a further development that conveys flexibility, efficiency and permanent availability to the test measurements of rail vehicles – so as we are used to so many other things these days in 2021“*, summarise Martin Joch and Günter Petschnig.

Further information on the digital overall system WaggonTracker:

<https://pjm.co.at/en/waggontracker/>

PJM at a glance

- ▶ Rail way system solutions & digitalisation systems for rail freight cargo
- ▶ Accredited testing facility for railway vehicles according to ISO IEC 17025
- ▶ Over 70 national and international accreditations
- ▶ Founded 2006 by Martin Joch and Günter Petschnig
- ▶ R&D quota: 14 % PJ Messtechnik GmbH // 21 % PJ Monitoring GmbH
- ▶ Projects implemented in more than 30 countries
- ▶ Export quota: 80 %
- ▶ About 60 employees

Awards WaggonTracker system

- ▶ Austrian Mobility Award 2020, category digitalisation
- ▶ Finalist Houskapreis 2020
- ▶ German Innovation Award 2020 Winner
- ▶ Fast Forward Award 2019

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The hub generator provides a high-performance power supply. This proven WaggonTracker technology was transferred to the autonomous measuring system.

Credit: PJM, free of charge



The entire measurement technology in a box. Thus, the box is easy to install and measurement data is generated automatically.

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