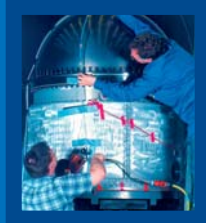
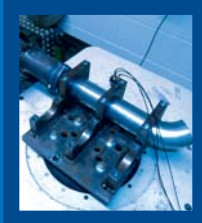
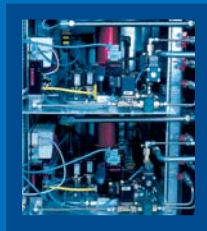




INTERNATIONAL

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Test and Measurement Solutions for the World's Leading Companies





■ m+p international

Today you know m+p international as a worldwide provider of high-quality test and measurement solutions. Founded in 1980 as spin-off of the Institute of Technical Mechanics at Hannover University, Germany, business was first focused on consulting and computational tasks for structural dynamics and applied mechanics. Since then activities have shifted more and more towards test and measurement data applications.

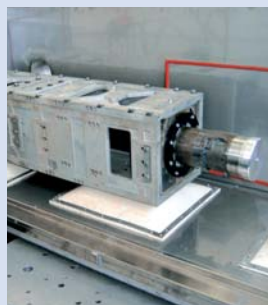
We work closely with our customers and therefore understand applications from an operator's point of view. You can see that in our products. This long, reliable cooperation with our customers combined with the expertise and broad experience of the m+p international engineers have led to numerous pioneering solutions.

Many high-profile companies use m+p international products and engineering services to assure their highest product quality and superior manufacturing process efficiency.

Vibration Control



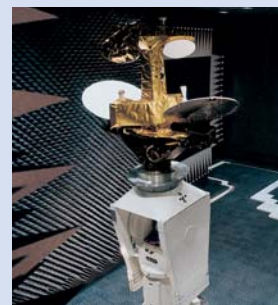
Dynamic Signal Analysis



**Data Acquisition
Process Monitoring**



Test Stand Engineering



Vibration Control

Sophisticated vibration testing procedures are required to simulate even the toughest real operating environments. Product designers and test engineers throughout the world count on m+p international for reliable vibration control and signal analysis ... from entry-level to high-channel count systems.



■ Force limited vibration testing of a spacecraft at NASA Jet Propulsion Laboratory, Pasadena/California

Spacecraft are subjected to a variety of dynamics environments, therefore dynamics testing is a key thing. The NASA Jet Propulsion Laboratory, Pasadena/California, used m+p international's force limiting vibration controller for successful testing of the Cassini Huygens spacecraft which was destined for Saturn. Limiting the shaker force simulates the mechanical impedance of the flight-mounting configuration and minimizes over-testing of the structure.



■ Squeak and rattle testing at Dr. Ing. h.c. F. Porsche AG, Stuttgart/Germany

The VibControl system replicates the high-frequency components of a road load signal which are then applied to the full vehicle fixed on electrodynamic shakers. The vehicle is excited either with signals measured on a test track or with synthetic test signals e.g. sine sweep or frequency spectra. The Porsche test laboratory uses VibControl both for troubleshooting and durability testing.

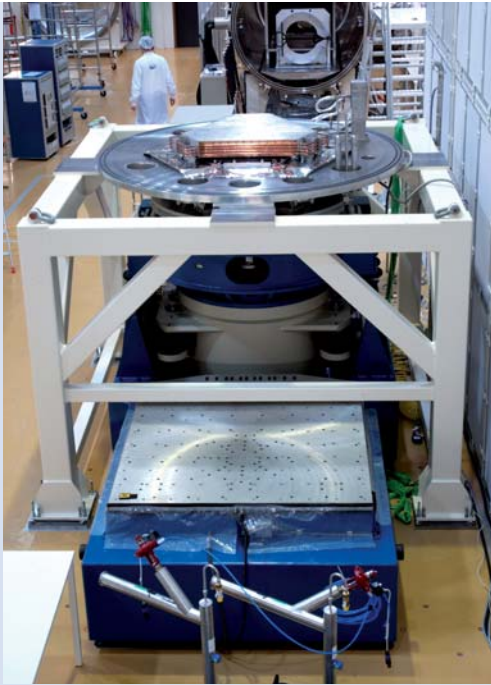


■ Advanced vibration control at TUV Product Services Lab, Titchfield/England

The TUV Product Services Lab in Titchfield, England is often asked to perform the most difficult of test cases. This spectacular example is a 4 m long radar antenna by Litton Marine being rotated full circle while undergoing vibration test. As with all of its vibration testing TUV is using one of a number of our VibControl shaker control systems.

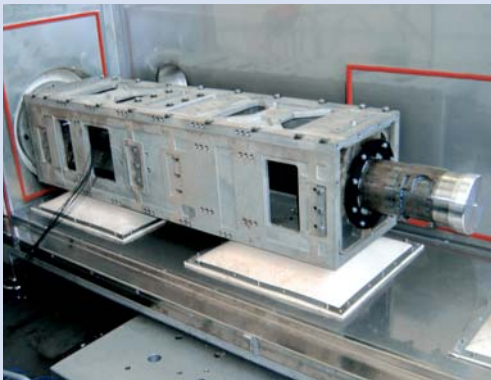
Dynamic Signal Analysis

m+p international provides high-precision dynamic signal analyzers that can be used in a matter of minutes to acquire, analyse and report the most complex of noise and vibration data requirements in the field and in the laboratory.



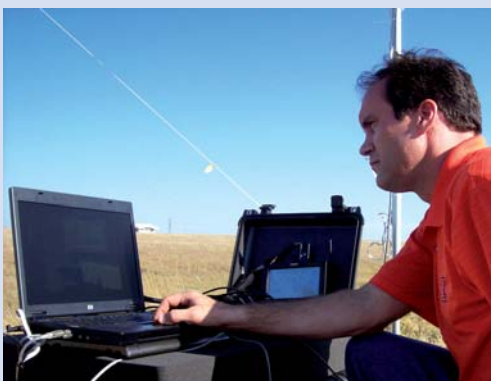
■ Test laboratory of Centre Spatial de Liège, Belgium

The SO Analyzer provides a complete set of tools for multi-channel data acquisition and throughput, advanced modal analysis including hammer impact, rotating machinery testing, acoustic analysis and environmental testing. The Centre Spatial de Liège in Belgium, using an 80-channel VibControl system for their sophisticated vibration tests, chose the SO Analyzer for general data acquisition purposes.



■ Modal testing of a rocket engine at Bayern-Chemie Protac, Aschau/Germany

Modal analysis is an efficient tool for observing, analysing and documenting the vibrational behaviour of machines and mechanical structures. It ranges from simple impact testing using a roving hammer to complex tests with hundreds of accelerometers. When combined with Finite Elements analysis, modal analysis is utilized for structural optimization. Bayern-Chemie Protac, Germany, uses the SO Analyzer modal data acquisition and analysis package to carry out a full modal analysis on a rocket engine.

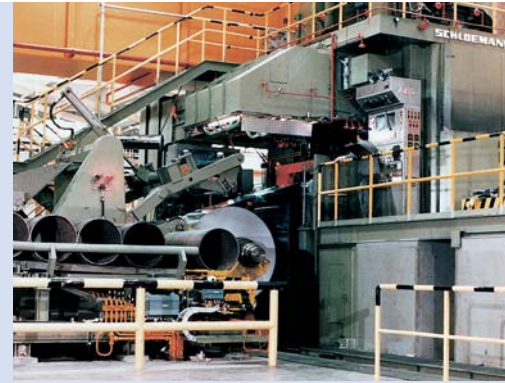
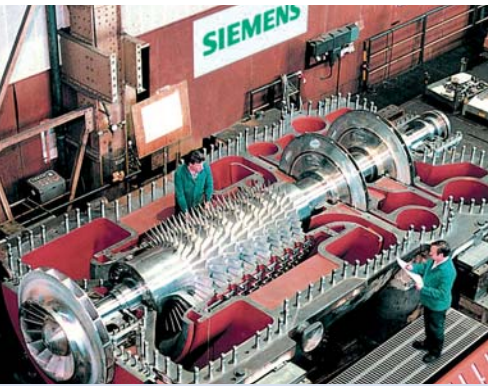


■ Vehicle pass-by-noise testing at Cooper Tire, Pearsall/Texas

The ever-increasing noise emission standards require the automotive industry to do complex vehicle exterior noise tests. m+p international's Pass-by-Noise system efficiently supports the designers when doing their testing job at Cooper Tire. After set-up one man – the driver – can perform the complete pass-by-noise test within the test vehicle, thus saving time and money. The high-quality data is available in car analysis or can be post-processed in the lab.

Data Acquisition Process Monitoring

A specialized engineering team selects, integrates and supports the appropriate data acquisition or process monitoring solution to meet the application requirements. Customized systems utilizing scalable, state-of-the-art hardware and extensive software tools translate to maximum efficiency for special engineering needs.



■ Continuous data acquisition and real-time monitoring at the turbo-compressor test facility of Siemens AG, Duisburg/Germany

Equipped with an intuitive graphical user interface, standardized data interfaces, a real-time kernel with defined response times as well as comprehensive analysis and visualization functions, Coda is used for continuous data acquisition and real-time monitoring. At Siemens in Duisburg/Germany, Coda acquires and verifies the performance data and the thermodynamical parameters of several compressors tested in parallel. In addition, torsional vibrations are acquired and analysed. The final configuration will contain 10 data acquisition units with 168 measurement channels each for temperatures, pressures, flow rates and strains and 48 channels for torsional vibration measurements.

■ Modernization of a 1,000-channel process data acquisition system at E.ON Power Plant, Essenbach/Germany

The E.ON Power Plant Isar 2 in Bavaria is one of the largest European power plants with an output of 1.4 gigawatts. m+p international modernized the 1,000-channel process data acquisition system by installing the Windows-based Coda replacing the Unix computer hardware. This modernization ensures high operation safety and high performance of the continuous data acquisition by the real-time operating system which is installed on a separate data server – irrespective of the interactive user actions. Another advantage for the customer: The existing VXIbus measurement hardware fully meets today's performance and reliability requirements and remains in operation.

■ Real-time process monitoring at Aluminium Norf, Neuss/Germany

Monitoring product quality and process data in continuous production processes: Aluminium Norf, Germany, the largest aluminium rolling and casting facility in the world, rely on m+p international to meet their high quality requirements. Our thickness, profile and flatness measurement system used at six hot and cold mills provides all the tools necessary for data acquisition, visualization, monitoring, long-term data management, comprehensive analysis and documentation.

Test Stand Engineering

m+p international has been supplying custom-made solutions for functional test stands in various industries. Many renowned companies appreciate our broad engineering experience, the reliability and performance of our products as well as the close cooperation.



■ **IDIADA Automotive Technology SA, Tarragona/Spain, utilizes ACON canister preconditioning and test systems**

Carbon canisters prevent evaporative emissions escaping into the environment from the fuel tank. IDIADA Automotive Technology, Spain, uses the ACON canister preconditioning and test systems to develop these vehicle canisters and to automatically precondition (e.g. purge and load) them according to international emissions standards for subsequent hydrocarbon measurements in a SHED chamber.



■ **Antenna measuring range built at EADS Astrium, Ottobrunn/Germany**

The European space company EADS Astrium and its subsidiary Euras-Space delivered the world's largest antenna measuring range to China. The antenna measuring range simulates the geostationary satellites' distance of 36,000 kilometres from earth in a 30-metre-long measuring chamber. EADS Astrium, Ottobrunn/Germany, who built the system, awarded m+p international a contract for the required upgrade of the AAMS Advanced Antenna Measurement System software. The AAMS system comprises monitoring and control functions for the antenna set-ups, data acquisition, processing, analysis as well as creation of graphical reports and test logs.



■ **Light bulb test stand at Volkswagen AG, Wolfsburg/Germany**

m+p international's range of services also includes the operation of test stands onsite. At Volkswagen headquarters in Germany, we are in charge of the light bulb test stand: 100 lamps are checked in parallel for their service life in permanent and in blinking operation. The complete lamp test also includes luminous flux measurements and a 20-hour-vibration test using our VibControl shaker controller. Only if the lamps pass these comprehensive tests and meet the Volkswagen requirements can they be released and installed in the vehicle.

Reference List

This list gives some of the companies that chose m+p international to solve their test and measurement tasks.

■ Automotive & Suppliers

Autoliv, France and Spain
Blaupunkt, Germany
BMW, Germany
Bosch Automotive, Germany, France and Italy
Continental Automotive, Germany, France and Romania
Cooper Tire, USA
Daimler, Germany and USA
Delphi Automotive, France
EMCON Technologies, UK, Germany, France and China
Faurecia, France
Ford Motor Company, UK and USA
Honda Research, UK
Hyundai Motor Company, Korea
Lamborghini, Italy
MCI, Netherlands
Porsche, Germany
Pressan, Turkey
Renault, France
Saab, Sweden
Toyota, UK
Valeo, France and Tunisia
Volkswagen, Germany
Volvo, Sweden

■ Aerospace & Aviation

Airbus, Germany
Alcatel Space, France
Boeing, USA
BUAA, China
CASA, Spain
Centre Spatial de Liège, Belgium
Dassault Aviation, France
DLR, Germany
EADS Astrium, Germany and UK
Goodrich Engine Control Systems, UK
GTRE, India
IABG, Germany
IAI, Israel
Jet Propulsion Laboratory, USA
Lockheed Martin, USA
MTU Aero Engines, Germany
NASA Kennedy Space Center, USA
Nord-Micro, Germany
Saab Ericsson Space, Sweden
Sriharikota Space Center, India

■ Telecommunication/Electrical/Industrial

Amphenol-Tuchel, Germany
BAE Systems, UK
Barco, Netherlands
Bofors, Sweden
Fujitsu, Germany
Hewlett-Packard, USA
Hirschmann, Austria
Johnson Controls, Italy
Kodak, USA
Lear Corporation, Italy
Motorola, Germany
Northrup Grumman, USA
Panasonic Electric Works, Germany
Philipps, Belgium
Premandex, Hongkong
Seagate, Singapore
Stihl, Germany and Brazil
Still, Germany
Swarovski, Austria
Tamam, Israel
Texas Instruments, USA
Thales, France, UK and Netherlands
Thomson Grass Valley, Netherlands
Ultra Electronics, UK

■ Test Houses/R&D

Atlas Elektronik, Germany
Cape Engineering, UK
Car Synergies, Germany
CIOP, Poland
ELTEC, France
Johns Hopkins University APL, USA
KAIST, Korea
Loughborough University, UK
Mecano ID, France
mi Technology, UK
MIRA, UK
PTB, Germany
QinetiQ, UK
RST (Bombardier), Germany
Telus, Germany
TUV, UK
University of Cincinnati, USA
Université St. Etienne, France
ZARM, Germany

■ m+p international

Founded in Hannover/Germany in 1980, m+p international develops and manufactures test and measurement systems for vibration control, dynamic signal analysis, data acquisition, process monitoring and test stand engineering.

Our product reputation and broad experience coupled with valuable user feedback have led to significant market share in numerous key industries worldwide.

The company has its headquarters in Hannover, Germany with sales/marketing subsidiaries in New Jersey/USA, England, France, China and Singapore along with representatives and agents in many countries.

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