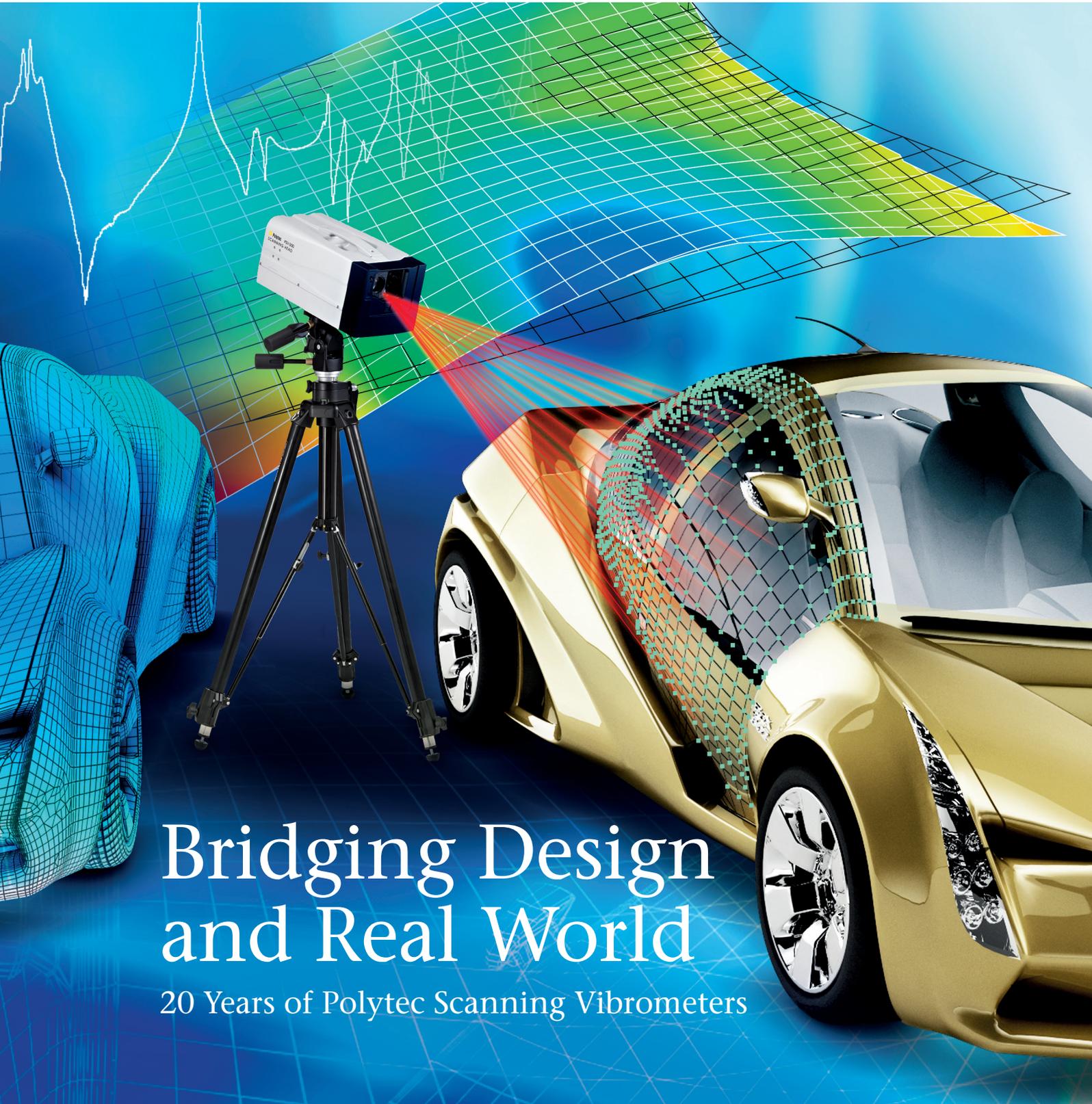


Special Edition 2012



InFocus

Optical Measurement Solutions from Polytec



Bridging Design and Real World

20 Years of Polytec Scanning Vibrometers

SCANNING THE FUTURE

Polytec's Scanning Vibrometer is constantly evolving to remain at the forefront of the best technology for structural dynamic measurements. Expect more to come ...

Dear Reader,

Do you know where the best ideas for our products come from? They come from you! A close relationship with our customers, and the extraordinary commitment and innovation of our employees, are two of the main reasons why we continue to define the worldwide gold standard in optical vibration testing.

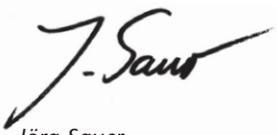
We are proud to look back on 25 years of vibrometer development, including 20 years of scanning vibrometry. Our continued product updates and enhancements have empowered our customers to maintain their own technical leadership.

New 5th generation technology built into the first all-digital Scanning Vibrometer is even faster, more precise, convenient and effective in helping you meet your future needs in structural dynamics, acoustics, and ultrasonics.

This special issue of our InFocus customer magazine will guide you through our history and share a glimpse of the future. I am glad to say "thank you" for your valuable feedback and continued support, and I cordially invite you to celebrate this story of success with us.

Pleasant reading!

With Kind Regards,



Jörg Sauer

Product Manager Vibrometry
Polytec GmbH



Polytec's talented team of engineers, scientists and technicians behind the new Scanning Vibrometer



45 Years
of Polytec

Founded in Germany in 1967 for the distribution of commercial laser technology to industrial and research markets, Polytec's early success led to the development and manufacture of pioneering laser-based test and measurement instruments.

25 Years
of Laser
Vibrometers

In 1987, Polytec sold its first highly innovative fiber-optic laser vibrometers mainly to the data storage industry for testing tiny components of high speed hard drives. Laser vibrometers proved to be extremely fast and precise. The strength of this advancement was honored by the 1988 Photonics Circle of Excellence Award.

20 Years
of Scanning
Vibrometry

In 1992, Polytec's combination of laser vibrometry with scanning technology opened a new range of applications revealing an in-depth view of structural dynamics, acknowledged by the 1994 Photonics Circle of Excellence Award. Polytec Scanning Vibrometers (PSV) have since grown to be an indispensable R&D tool integrating vibration testing into the CAE workflow.

THE STRUCTURAL DYNAMICS & ACOUSTICS OPTIMIZER

The world of product engineering has continuously evolved from simple design-test-fix cycles to highly integrated, model-based engineering processes. Fast and precise component and prototype testing is essential for validating design models and to ensure product performance and quality prior to production. With regard to vibration and acoustic testing, Polytec's Scanning Vibrometer (PSV) is a powerful data acquisition platform that can be seamlessly integrated into engineering workflows.

Troubleshooting First: Acoustics

Scanning Vibrometry, with its high scanning speed and ease-of-use, can clearly reveal vibration hotspots, making it the first choice and an indispensable tool for acoustic troubleshooting of audio components, damping materials, and more.

The Power of Sound: Ultrasonics

Thanks to its non-contact nature and high frequency data acquisition, the PSV supports scientists and developers through characterization and FE model optimization of new ultrasonic devices for medical diagnostics and treatment, Nondestructive evaluation (NDE), industrial and consumer disk drives, as well as ultrasonic welding and cutting tools.

Inherent Properties: Structural Dynamics

Accompanying the evolution of numerical methods, PSVs can be found in all major structural dynamics or NVH labs for vehicles and consumer products. Their ease of use and the technology's constant evolution is important for engineers, making them an essential part of the CAE workflow in the design and verification process.

2012

PSV-500 // the next generation –
the world's first all-digital
Scanning Vibrometer

2009

StrainProcessor // optical stress & strain
measurement for PSV-400-3D

2009

PSV-A-440 Optical Derotator // scanning rotating parts

2008

PSV-400-3D-M // 3-D measurements for ultrasonics applications

2008

RoboVib® Structural Test Station // for automated modal tests
on structures large and small

2004

PSV-400-3D // optimized for experimental modal
analysis with MIMO

2003

PSV-400 // new vibrometer hardware with auto focus,
digital decoding and integrated geometry scanning

2002

PSV-300-3D // the world's first 3-D Scanning
Vibrometer

1999

PSV-300 // integrated hardware design
and ultrasonic version

1996

PSV-200 // breakthrough for commercial applications
such as modal analysis

1992

PSV-100 // Polytec's first Scanning Vibrometer

THE MODEL VALIDATION MACHINE

The new PSV-500 Scanning Vibrometer is the next generation of a product with a proven, highly successful track record. It offers even greater technical excellence in a compact design with innovative hardware features, and powerful software for dynamics measurement, analysis, post-processing, and interfacing.



High-Res Video

The PSV-500 features a full HD 16:9 camera with 4x improved resolution for impressive graphic visualizations, as well as better alignment precision for 3-D and 1-D measurements when using VideoTriangulation®.



Optimized Signal-to-noise Ratio

With the new CoherenceOptimizer*, the sensitivity is now independent of stand-off distance, the signal-to-noise ratio (SNR) is improved, and the velocity range is extended when working with a PSV-500-3D system.



Expanded Scanner Range

The new 40° x 50° scan angle enables more of the object's surface to be acquired in one shot.



Fully Digital Electronics**

The measurement signal is now seamlessly digitized and transferred to the PSV software. Reference channels are linked into a common data stream after A/D conversion, providing the best overall SNR of all PSV systems.

* Option for PSV-500-H and -M, not available for PSV-500-B
** Included with PSV-500-B/-H and 3D-H systems
*** Included with PSV-500-H and 3D-H systems



Smart and Compact Hardware

Almost half the weight and reduced dimensions due to an innovative front-end design, miniaturized interferometer and highly integrated electronics, leading to increased mobility and extended flexibility.



Extended MIMO Functionality^{***}

Principal component analysis, 4 uncorrelated signal generator channels with 2 reference channels per generator channel for driving point and excitation force measurement make the PSV-500 "The Model Validation Machine".

EFFICIENCY

PRECISION

SPEED





ADAPTED TO YOUR NEEDS: PSV-500 MODELS

The needs of our Scanning Vibrometer customers cover an extremely wide spectrum. They include: providing parameters for and the validation of finite element models in the optimization of the design of an automobile; stress and strain analysis of jet engine components for enhancing their performance and reliability; characterization of ultrasonic wave propagation for NDE of critical structures; tuning of medical devices to avoid modal coupling and potentially devastating lawsuits; and analysis of piezoelectrically actuated structures such as the spectrometer funnels on the Mars rover "Curiosity". PSV systems are configured to fulfill these and many other demanding applications as well as to meet the strict productivity, efficiency and accuracy requirements of our customers.

Scanning Vibrometer Model	Bandwidth	Reference Channels
PSV-500-B - Acoustics	50 kHz	1
PSV-500-H - Structural Dynamics	100 kHz	4 (8*)
PSV-500-3D-H - 3-D Structural Dynamics	100 kHz	8
PSV-500-M - Ultrasonics	1 MHz (2 MHz)	3
PSV-500-3D M - 3-D Ultrasonic Vibrations	1 MHz	1

* Optional

Dr. Pablo A. TARAZAGA

ASSISTANT PROFESSOR

“We only know of one sensor that can cover the range from ultra lightweight structures in space to hair cell mimicry.”



When was your first contact with scanning vibrometry?

When I was a graduate student I had the privilege of working with a couple of interesting OFV-040 and OFV-055 scanning units. It was critical for us, as we were testing inflatable satellites that weighed only a few grams and conventional accelerometers would considerably mass load the structure.

Was there a specific project for which you purchased your PSV system?

We work in various peculiar research projects from hair cells only a few microns tall to ultra lightweight gossamer space structures meters long. We only know of one sensor that covers that range and has no effect on the measured structure. It was a pretty simple decision: we cannot afford not to have one (or two).

What has changed in your daily work with the latest generation PSV-400?

Well the changes are significant since the first Polytec model. The overall performance has improved and is very well marked in the system's SNR and its ability to perform measurements on untreated surfaces. The software has also advanced considerably, with numerous improvements from the interface to the physical system in pre-test setup all the way to post-processing and manipulation of data.

What are the major benefits of the technology?

In our line of work the greatest benefits of the system are basically the non-contact feature, numerous data acquisition points and the automation.

What is your experience with Polytec?

Polytec has always provided us with great service. In times of need and urgency they have always worked with us to meet our needs and get us back on track.

Dr. Pablo A. TARAZAGA

Center for Intelligent Material Systems and Structures, Virginia Tech (www.cimss.vt.edu)

Jean-Philippe ROUX

TECHNICAL MANAGER

“We started 10 years ago on automotive projects and have now extended this type of measurement and analysis to most of our clients from the transportation to electronic industries.”

What were your main reasons for purchasing a scanning vibrometer?

In 1999 CEVAA decided to invest in new testing facilities in order to grant automotive partners access to state-of-the-art testing equipment like roller dynos, modal analysis tools and, guess what, a laser scanning system. We finally chose a PSV-300 solution due to the flexibility of the product and the user-friendly interface.

How has this technology changed your daily work?

Operational deflection shape (ODS) and FRF measurements were usually performed with accelerometers despite their known technical limitations (e.g. limited number of measurement points and the errors caused by adding mass). The quality of the vibrometer results now allows us to analyze the modal behavior much faster, and the animations are a good way to highlight results to our customers.

Where do you see the major benefits of scanning vibrometry?

The benefits are obvious - most of our modal analyses are performed with our 3-D system for FRF measurements. The data transfer to our LMS software suite is very easy, and the density of the meshing is really a big advantage compared to conventional methods. Furthermore, our PSV-400 systems are used for characterization of very small and sensitive structures such as PCBs, electronic cards (EC) and components. The exceptional frequency range of the system allows us to respond to our customers' nearly unlimited needs and expectations in the field of EC reliability.

What is your experience with Polytec as a company?

Since 2000 we've been building a strong partnership and technical cooperation between the German and French Polytec teams and CEVAA experts through the organization of several tech days at CEVAA.

Please read more interviews with our customers at:
www.polytec.com/psv.

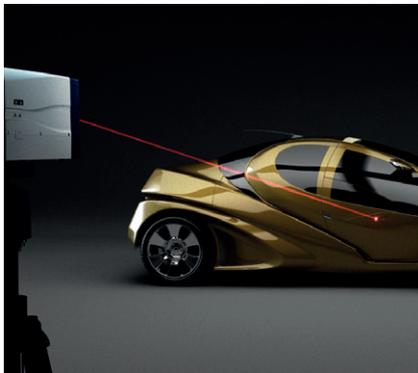
A close-up portrait of Jean-Philippe ROUX, a man with dark hair and a goatee, wearing a dark suit jacket over a light-colored shirt. He is looking directly at the camera with a slight smile.

Jean-Philippe ROUX

CEVAA Automotive and Transport NVH Testing
and Research Center, France (www.cevaa.com)

ENHANCE YOUR PRODUCTIVITY

Polytec's PSV-500 Scanning Vibrometer is the 5th generation of proven technology that will continue to meet our customers' current and future needs in structural dynamics, acoustics, and ultrasonics.



New Video "Bridging Design and Real World"

Advancing Measurements by Light, Polytec is developing excellent test and measurement instruments, helping customers through a focus on innovative, new R&D applications of vibrometer technology. To learn how scanning vibrometry has grown even more precise and convenient, please view our new video at: www.polytec.com/psv.



Polytec's Engineering Services Program

Designed to make advanced non-contact vibration measurements available for every application. For example, the RoboVib® Structural Test Station, equipped with three Scanning Vibrometer sensors, performs complete 3-D modal testing of structures large or small, even on whole vehicles, within extremely short overall test times. More info: www.polytec.com/services



For more technical information and applications of the PSV-500 Scanning Vibrometer please contact your local Polytec sales engineer or visit our website at www.polytec.com/psv.

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