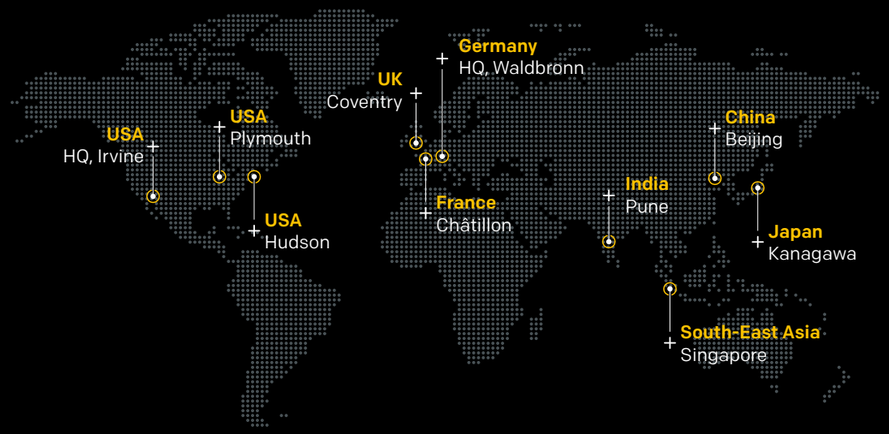


measure what matters. worldwide.

Find your Polytec representative:
www.polytec.com/contact

Polytec GmbH · Germany · Polytec-Platz 1-7 · 76337 Waldbronn
52214/2026/06 - Technical specifications are subject to change without notice.

Polytec

RoboVib® //

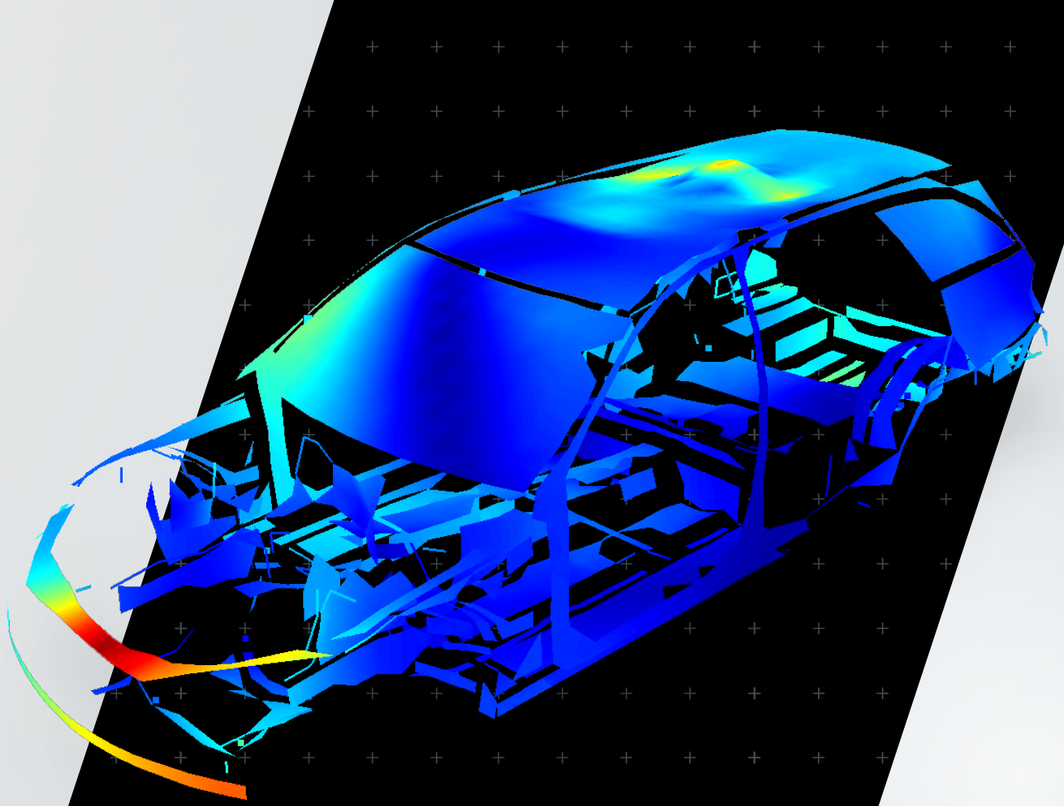
Structural test station
automated experimental
modal testing

polytec.com

01

// Slash testing time and accelerate product development

From weeks to hours – unlock your test lab's full potential



ELIMINATE TRADITIONAL SENSOR LIMITATIONS

Laser-based measurement removes mass loading errors and sensor mounting complexity. You gain unlimited software-defined measurement points at higher spatial density—critical for model validation at elevated frequencies and acoustic simulations.

SEAMLESS CAE INTEGRATION

Measurement points are derived directly from your FE models and delivered in the object's coordinate system. High-fidelity data at nodal points streamlines model updating and eliminates interpolation errors, reducing costly design revisions.

THE ROBOVIB CONCEPT

RoboVib combines a 3D Scanning Laser Vibrometer with an industrial robot to automate experimental modal analysis (EMA). The result: structural tests that previously took weeks are completed in hours—often unattended overnight—freeing your test facilities and prototypes for higher throughput.

Why it matters for your bottom line:

- **Drastic time reduction:** Complete vehicle and complex component testing shifts from days or weeks to just a few hours.
- **Higher asset utilization:** Test labs and prototypes deliver more results per cycle.
- **Faster time-to-market:** Engineering teams get validated data sooner, accelerating design iterations and product launches

KEY PRODUCTIVITY DRIVERS

THE GOAL // 01

Integrate into CAE data workflow

+ Automate recurring tasks
+ Reduce error sources
+ Reuse test setups for similar tasks

ROBOVIB®'S CONTRIBUTION // 02

Supplies interfaces for incorporating FE geometry, external sensor test data, and modal analysis

Robot-driven measurement

+ Eliminates manual sensor mounting and repositioning
+ Eliminates interpolation and errors in point definition (Euler angle determination), cabling, mounting, and calibration
+ Save and replicate setups for similar objects—consistent, repeatable results

Flexible configuration for your test environment scalable to match your throughput needs //

The core system pairs a VibroScan QTec Xtra 3D Scanning Vibrometer with a six-axis industrial robot. Add a linear axis for extended measurement volume or deploy a second robot to double throughput for high-volume testing. Rotary symmetric parts are best probed with an added turntable.

ROBOT'S REACH IS YOUR GAIN

Robot control means you always maintain the optimal stand-off distance and angle of incidence. Unlike tripod-based repositioning around an object the robot's reach makes all parts of your object under test accessible: roof, underbody and even the interior. A calibrated world robot coordinate system eliminates ambiguities regarding sensor position.

QTEC® TECHNOLOGY: SIGNAL QUALITY ON ANY SURFACE

Patented multi-path interferometry ensures high-fidelity data on all surfaces and eliminates the need for surface treatment.

GEOMETRY IS REALITY

VibroScan's integrated LiDAR adds value to the dynamic vibration testing. Each data set returns the true geometry. Model validation can now be based on both: modal parameters such as Eigenfrequencies, mode shapes and damping and a measured x,y,z-coordinate for each nodal point.

The RoboVib® workflow //

STEP // 01	02	03
Preparation and setup: • Import measurement grid from the FE model • Define or load robot program	**Fully automated test cycle:** • Repositioning of laser scanning heads from segment to segment. • Every measurement refers to a FE nodal point. • Data stitching to a common data set in the FE coordinate system	**Analysis and post-processing** • First analysis: animated deflection shapes and the full frequency and phase information • Model validation: curve fitting and MAC analysis • Model updating

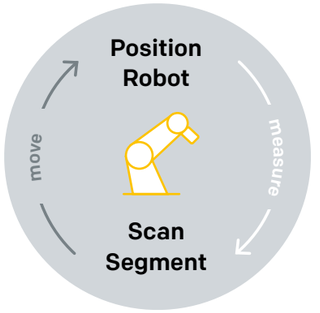
Define measurement grid

Import from FE Model

Use geometry scanner

Teach robot path

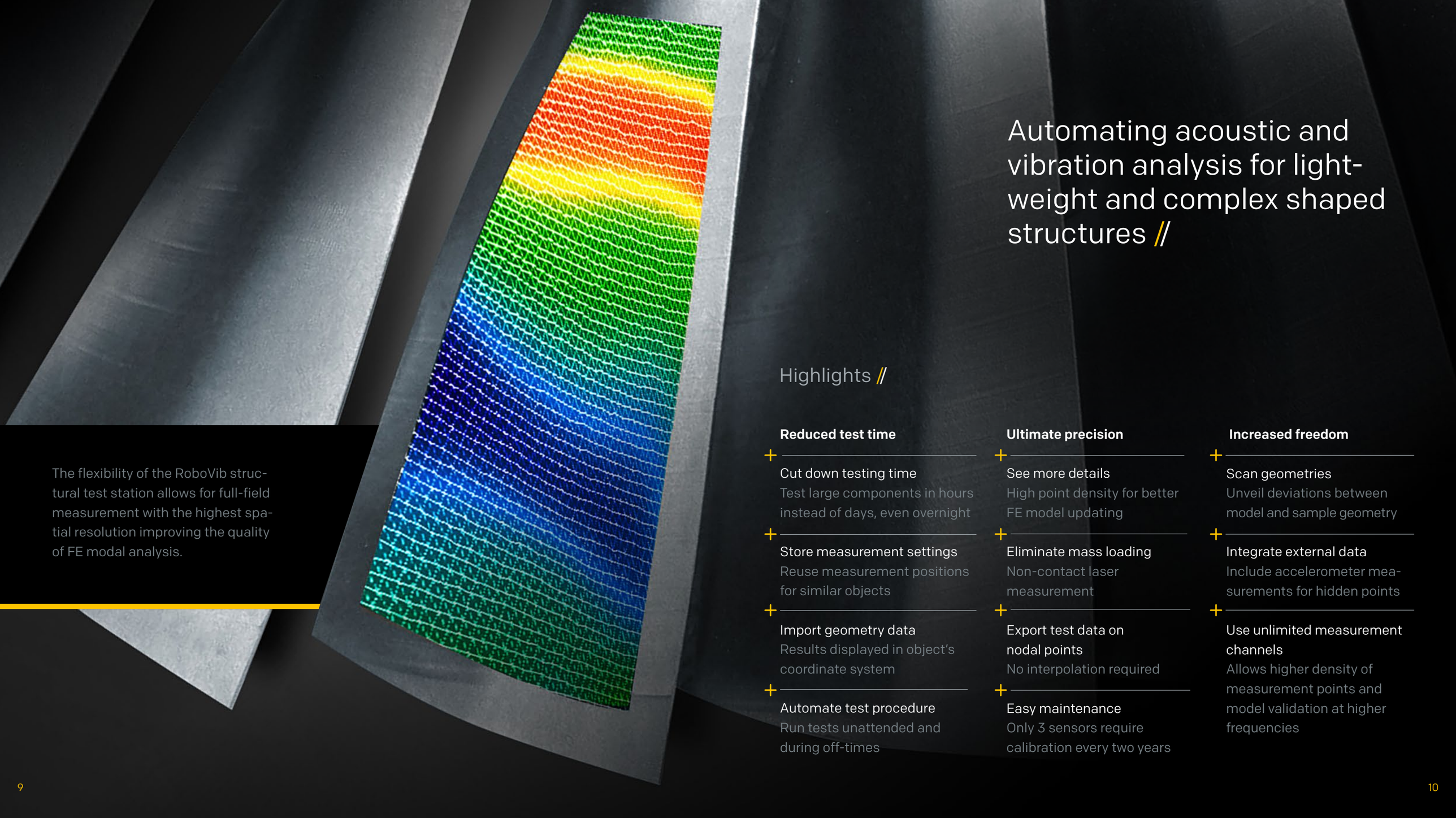
Define segments



Analyze and display data

Export for modal analysis

Update FE Model



The flexibility of the RoboVib structural test station allows for full-field measurement with the highest spatial resolution improving the quality of FE modal analysis.

Automating acoustic and vibration analysis for light-weight and complex shaped structures //

Highlights //

Reduced test time

+ Cut down testing time
  Test large components in hours instead of days, even overnight
+ Store measurement settings
  Reuse measurement positions for similar objects
+ Import geometry data
  Results displayed in object's coordinate system
+ Automate test procedure
  Run tests unattended and during off-times

Ultimate precision

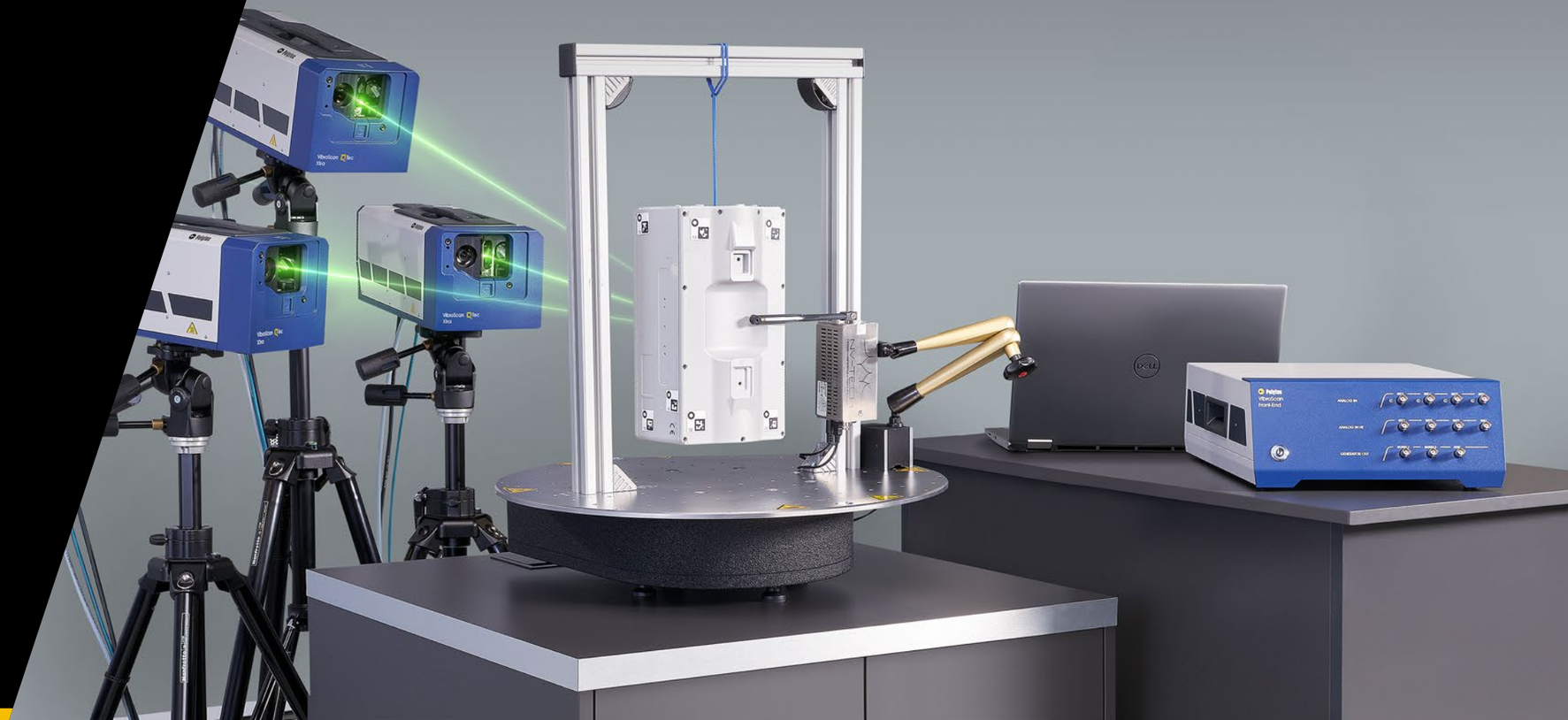
+ See more details
  High point density for better FE model updating
+ Eliminate mass loading
  Non-contact laser measurement
+ Export test data on nodal points
  No interpolation required
+ Easy maintenance
  Only 3 sensors require calibration every two years

Increased freedom

+ Scan geometries
  Unveil deviations between model and sample geometry
+ Integrate external data
  Include accelerometer measurements for hidden points
+ Use unlimited measurement channels
  Allows higher density of measurement points and model validation at higher frequencies

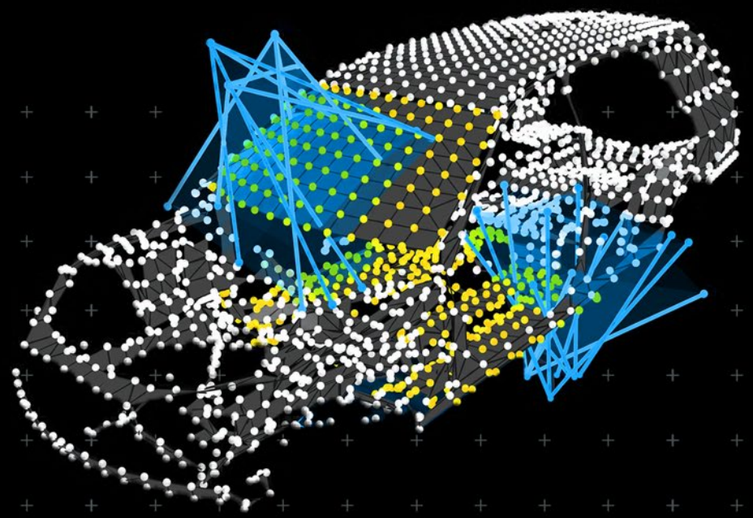
02

RoboVib® Bench automates your experimental modal analysis in the lab for small and mid-sized parts up to 50 kg (110 lb). Combining a 3D scanning laser vibrometer with a motorized turntable, it delivers quick 360° full-body vibration data without manual sensor repositioning. The system integrates seamlessly into your existing CAE workflow, converting each test into a software-defined loop that returns ready-to-use modal datasets and updated geometries.



Software-defined and portable modal test station //

The RoboVib software //



Every RoboVib test station is supplied as a turnkey solution. The unique RoboVib software provides a convenient user interface, integrating PSV analysis and evaluation software with KUKA robot control.

POLYTEC – YOUR PROJECT PARTNER

RoboVib is designed to meet your specific requirements, with options ranging from a single robot to a dual robot with linear stages. Our experienced application team will carry out a smooth on-site installation and training process, using simulations to match your space and safety needs.

Where RoboVib is used //

Field		Modal test	Operational test	Acoustic test	Wave propagation	Durability (stress & strain)
Aerospace	Turbine blade and BLISK	×				×
	UAV	×				
	Aircraft scaled model	×				
	Payload (scientific instruments)	×				
Automotive	Body-in-white	×				
	Trimmed body	×		×		
	Body components	×				
	EV drives	×				
	Combustion engine	×	×			
	Scooter and motor cycle	×	×			
Consumer	Electric motors	×	×			
	Speaker	×				
	Wearables	×				
Bio and geoscience	Rock				×	
	Bones	×				
Material science	Composite materials				×	

Key product features //

COMPONENTS //

- KUKA robot suitable for the required working space
- KUKA linear axis (optional)
- KUKA turntable (optional)
- VibroScan QTec Xtra 3D Scanning Vibrometer
- RoboVib Software

PERFORMANCE //

- Frequency bandwidth: 32 MHz
- Velocity range up to 30 m/s
- Resolution down to 0.005 µm/s/√Hz

DATA HANDLING //

- Target data: frequency response functions in Cartesian coordinates referenced to the test object coordinate system
- MIMO capability (13 reference channels, and 5 uncorrelated signal generator channels), principal component analysis
- Import and export of geometry and vibration data in common file formats including ASAM ODS
- Open data interface: Polytec File Access (enables data access using Python™, Visual Basic®, C++ or MATLAB®)

Start saving test time today //

Make use of the RoboVib benefits in the Polytec test centers in Waldbronn, Germany, and Plymouth, MI, USA

More Info //

Visit **www.polytec.com/robovib** for more information, applications, and demo videos about the RoboVib Structural Test Station and the VibroScan QTec Xtra 3D Scanning Vibrometer.