PolyWave Post-Processing Software Suite

Advancing the analysis of vibration test data

Product brochure

PolyWave - The scalable software package for comprehensive analysis of vibration test data

The seamless post-processing with PolyWave makes your studies with Polytec laser Doppler vibrometers more efficient than ever.

EMA PRO:
Experimental modal analysis

OMA:
Operational modal analysis which adds to EMA PRO

ORDER PRO:
Order analysis

REPORT PRO:
Automated test report generation (enhances all modules)

SIGNAL PROCESSING:
Visualization and pre-processing of raw data

ODS:
Operational deflection shapes in time and frequency domain

RESULT VIEWER:
Comparing simulation and test

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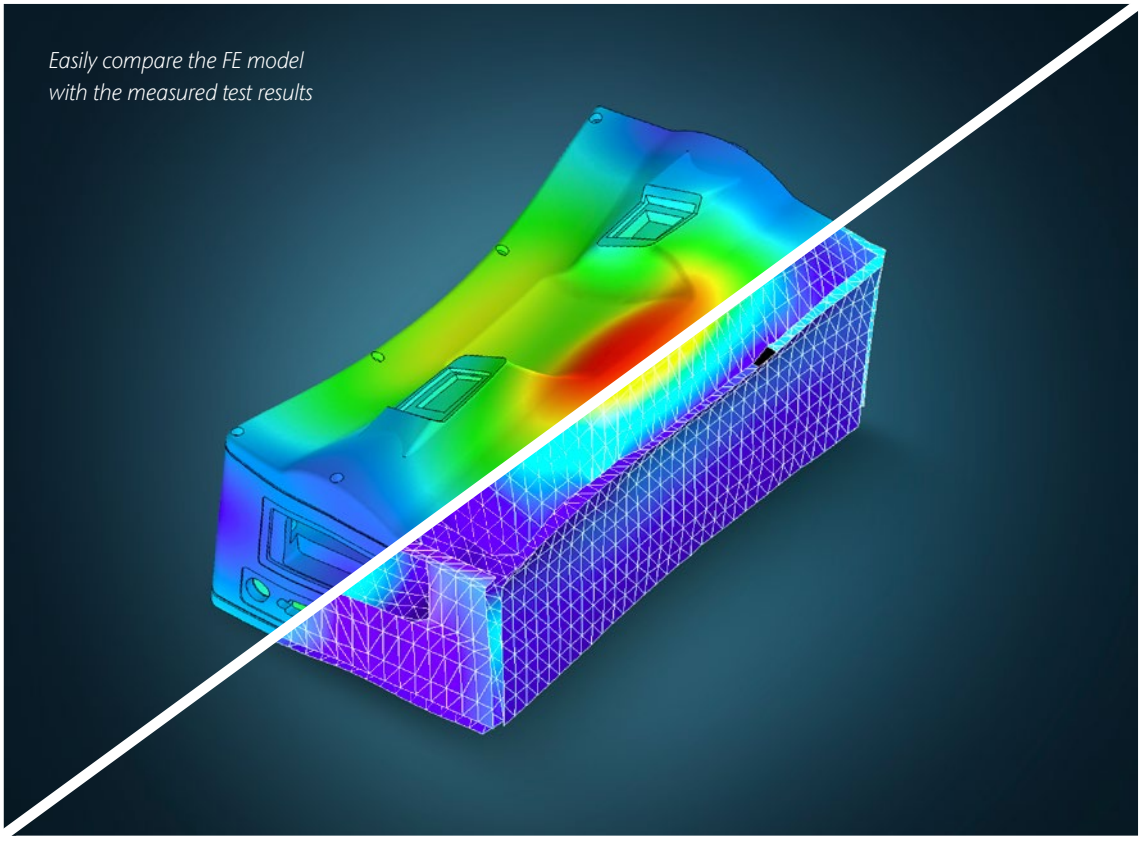
- **Keep track of your raw data with the SIGNAL VIEWER**
- **Meaningful reports with export of graphics and animations**

Concentrate on the essentials

PolyWave has only one focus: your data. Any data set content is already analyzed while loading and PolyWave offers just the matching post-processing modules. This feature alone helps give an inexperienced or first-time user the confidence of an expert and the skills to exclude poor data that can adversely affect subsequent work. It is reassuring that by immediately post-processing data, the user will know that all settings, including excitation values and run-up times, were chosen correctly the first time.

Tuned to maximum performance

PolyWave is optimized for processing the large data sets that make scanning laser vibrometers (PSV, MSA) the superior acquisition system for experimental modal analysis. The software is designed to allow thousands of transfer functions to be analyzed. In addition, PolyWave includes advanced algorithms that are not included in Polytec's basic measurement and analysis software. These powerful algorithms are automatically matched to the content of the test data file when a PolyWave module is started. However, for the expert, all parameters are still accessible for direct optimization.



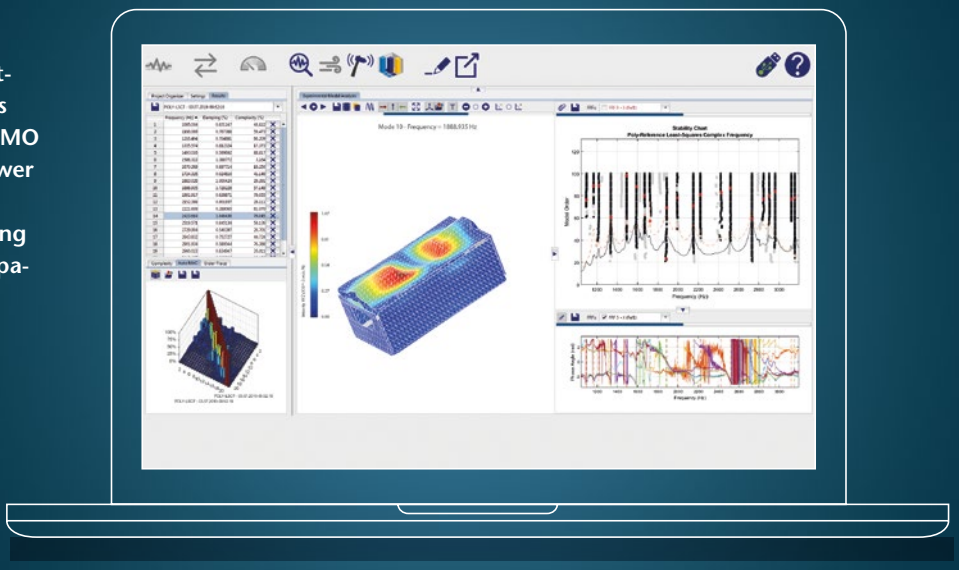
CAE requirements to define your test

If properly processed, the high spatial resolution possible with a scanning vibrometer leads to an accurate and confident validation of the associated FE models. Instead of validating just a few select degrees of freedom, a PSV Scanning Vibrometer can retrieve the measurement point definition directly from the CAE data. As a result, test data are generated at the nodal points and can result in ten thousand or more FRF's. PolyWave is uniquely designed to assure that this demanding post-processing task proceeds smoothly and quickly.

Modules

EMA PRO

EMA PRO is an intelligent software that provides algorithms for SISO, SIMO, MISO and MIMO data. The included Result Viewer bridges the gap to Finite Element Analysis (FEA) by allowing visual and mathematical comparison with calculated modes.



EMA PRO desktop

Highlights

- Automatic module selection based upon file content
- Confidence in the results based on dedicated quality indicators
- Segmental analysis covers high modal density situations

Experimental modal analysis

EMA PRO provides the tools necessary for extracting modal parameters from experimental modal tests. Interfaces and algorithms are optimized for the large data files inherent in using Scanning Vibrometers. Thousands of FRF's can be imported and analyzed without any stability issues.

Consequently, meaningful Eigen vectors, mode shapes and modal damping parameters can be extracted from the operational deflection shapes. Even at high modal density, these parameters can be ascertained by using segmental analysis. The use of multiple quality indicators provides assurance that the results are consistent.

- Auto-MAC
- Complexity plot
- Phase diagram
- Order trace
- Stability chart
- Synthesized FRF

OMA

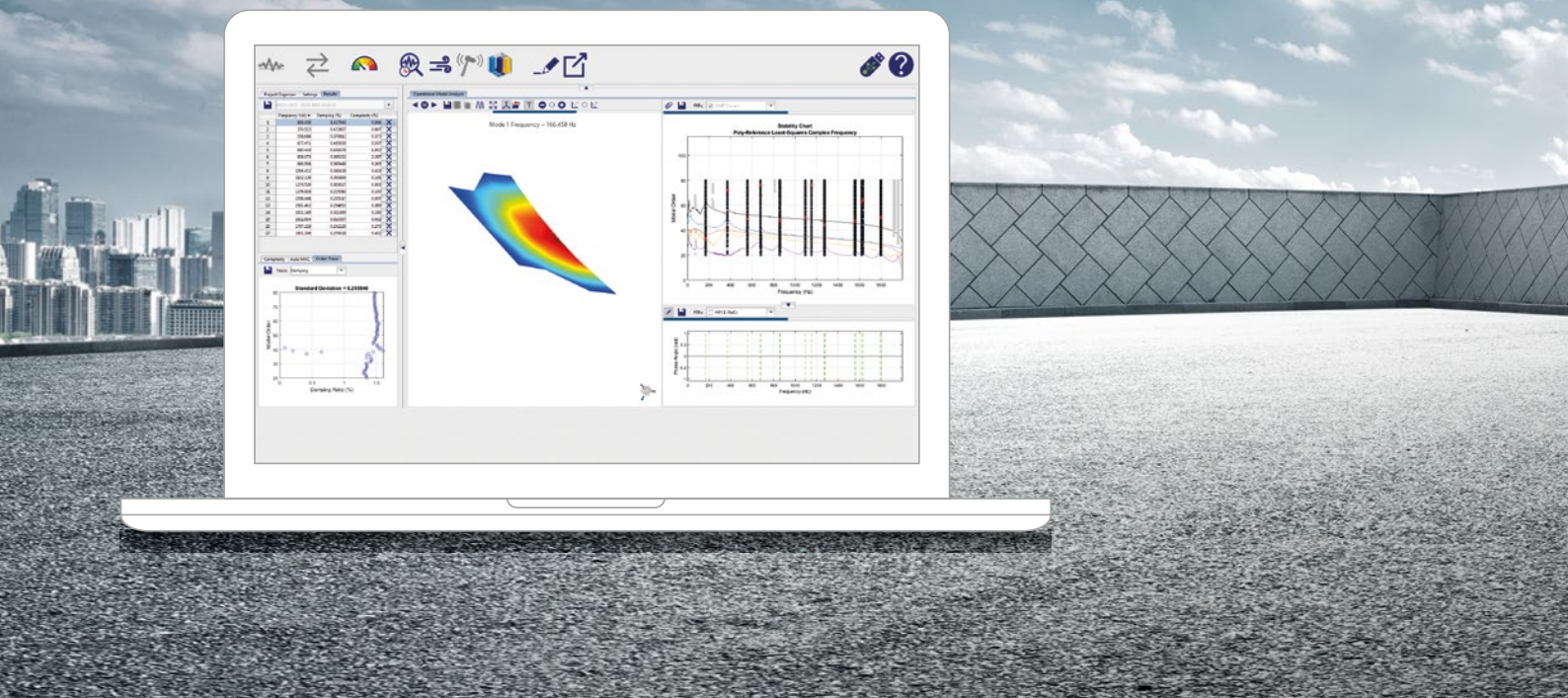
Operational modal analysis

The OMA add-on module provides tools for the analysis of structures exited by ambient vibration where the input force is unknown, e.g. buildings, bridges or other structures under wind excitation, or engines and drives excited through normal operation. PolyWave automatically selects this analysis module when the imported file content is consistent with OMA acquisition. For modal parameter extraction, time based algorithms are integrated. PolyWave automatically offers the best matching algorithm for a specific test file.

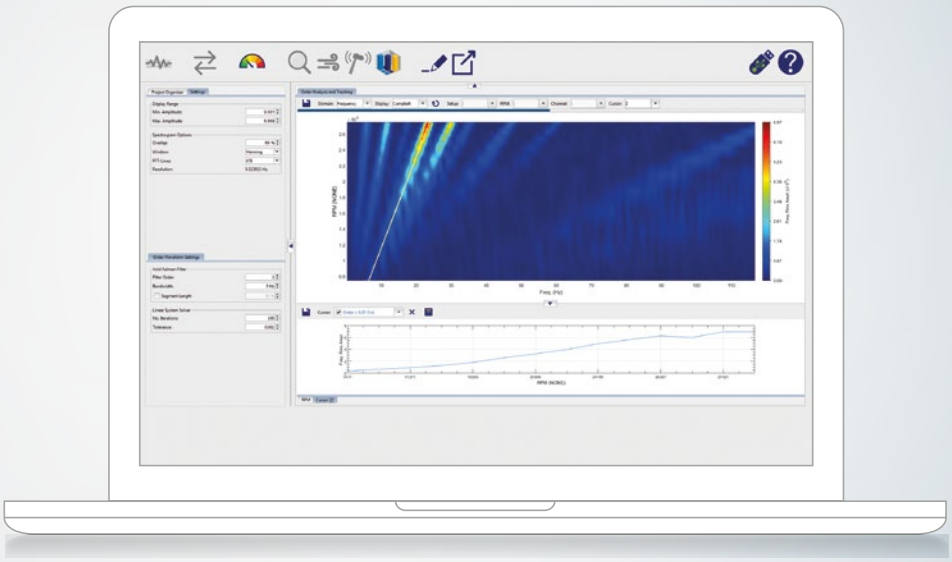
Highlights

- Automatic module selection based upon file content
- Complex mode indicator Functions (CMIF) identify modes during module start-up
- Segmental analysis covers high modal density situations

OMA analysis of vortex induced membrane vibration



ORDER PRO



ORDER PRO module showing Campbell diagram with order cursor

Highlights

- Automatic module selection based upon file content
- Easy-to-handle cursors for resonance identification
- Order spectrum and order waveform tracking
- Extract RPM signal from time traces (requires CONVERT module)

Order analysis

ORDER PRO provides an analysis of structural resonances for tests taken at different rotational speeds. It offers all the necessary tools for a comprehensive analysis and visualization of such data including: Campbell diagrams waterfall diagrams, both in frequency domain and order domain, as well as cursor-specific functions that allow for a quick analysis by positioning the cursor on critical plot elements. Data sets from one or more response channels can be analyzed. TTL pulse signals are easily converted into RPM signals and combined with smoothing functions in the integrated CONVERT module for a maximum flexibility regarding input signals.

RESULT VIEWER

Comparing test data and CAE data

Display and compare results

Comparing modal analysis data from simulation, test data and post-processed data is the core task in model validation. The RESULT VIEWER allows for a direct comparison of results from different sources regarding Eigen frequency, damping, complexity and mode shapes. In addition, it provides a side by side animation of mode shapes and the corresponding modal assurance criterion (MAC).

Highlights

- MAC for EMA and FEA
- Side by side animation of mode shapes
- Comparison of data from various sources

More modules

SIGNAL PROCESSING

Visualization and pre-processing of raw data

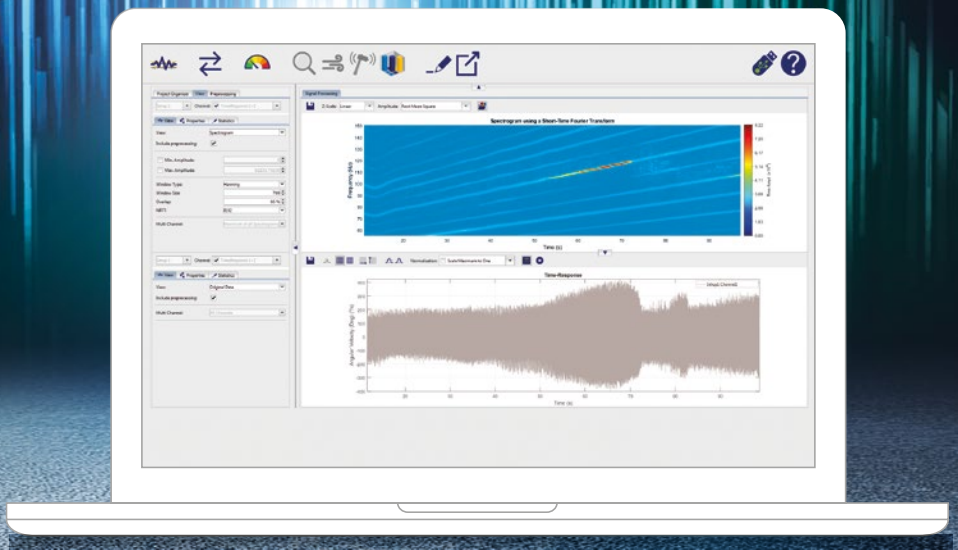
The visualization and pre-processing of data from various sources is the dedicated task of the module SIGNAL PROCESSING. Post-processing is made easier and quicker by applying powerful pre-processing tools such as noise removal to measurement data sets, decimation, time and frequency cut and high / low pass filtering.

NOISE REMOVAL TO MEASUREMENT DATA SETS

DECIMATION

TIME AND FREQUENCY CUT

HIGH PASS AND LOW PASS FILTERING

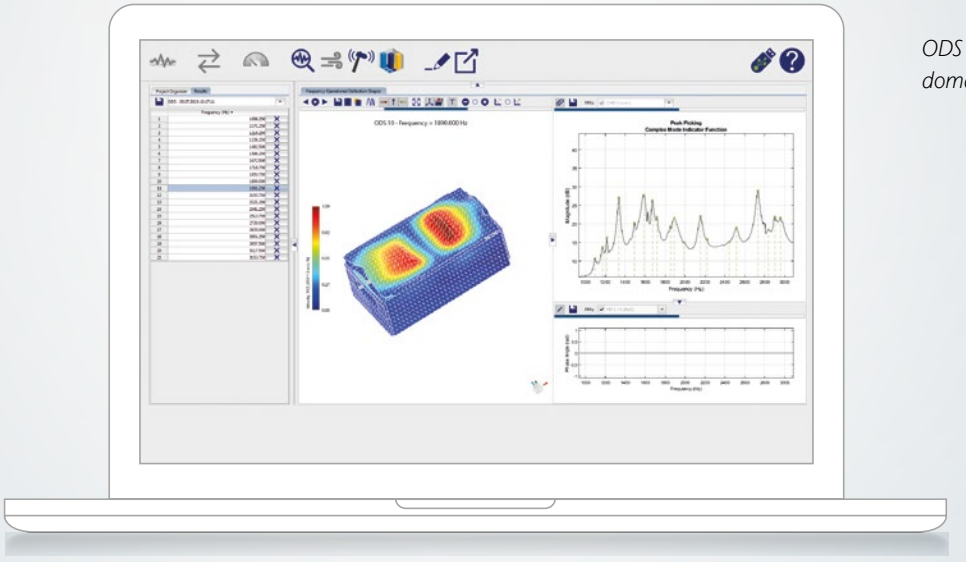


Spectrogram in the PRE-PROCESSING MODULE

Highlights

- Pre-processing of data for easier post-processing
- For spectra and time data
- Spectrogram
- Wavelet transform
- Auto- / cross correlation
- Audio playback of time data

ODS



ODS in frequency domain

ODS - Operational deflection shapes

This optional module is not only replicating functionality of the Polytec PSV and MPV acquistion software. It adds TIME ODS display capabilites including a spectrogram view for a selected channel and the ORDER ODS. If a RPM channel is present, ORDER ODS combines TIME ODS and a Campbell diagram to assess the critical structural resonances.

Highlights

- Visualization of raw data prior to EMA and OMA post-processing
- Basic order analysis with ORDER ODS
- Time domain animations and spectrogram

REPORT PRO

Professional presentation (Microsoft® PowerPoint®) generated by REPORT PRO

Highlights

- Meaningful reports in an instant
- Incorporate custom templates and company logo
- Easily define what's relevant for the audience
- Output in Microsoft® Word®, Microsoft® PowerPoint® (including animated GIF) or PDF

Automated report generation

REPORT PRO is designed to quickly and automatically generate meaningful reports from post-processed test data. Present your post-processing results and convince with animations of the relevant mode shapes in Microsoft® PowerPoint®, Word® and PDF. The reporting option is available for the modules EMA PRO, OMA PRO and ORDER PRO.

System requirements

CPU	Intel® Core™ i7, min. 2.0 GHz min. quad core
RAM	8 GB, 16 GB recommended
HDD	min. 4 GB
Graphics board	minimum OpenGL 2.1 capable GPU (1024 MB DDR3) recommended is NVIDIA card. Onboard graphic chips are not recommended.
Display	1920x1080 (HD) recommended
USB 2.0	at least one port (dongle)
Operating System	Windows® 7 64Bit Pro, 8.1 Pro, 10 Pro
File interface for VIB, UFF and SVD, PVD files	Polytec File Access installed
Using REPORT PRO	Installed Microsoft® Office Package or matching Viewer software (from 2003 version onwards)

PolyWave is designed to provide high performance post-processing also for large test files as generated by Scanning Laser Doppler Vibrometers. A large number of degrees of freedom at high frequency resolutions results in GB of data. Like other numeric CAE tools PolyWave may require a larger RAM in case of large projects.

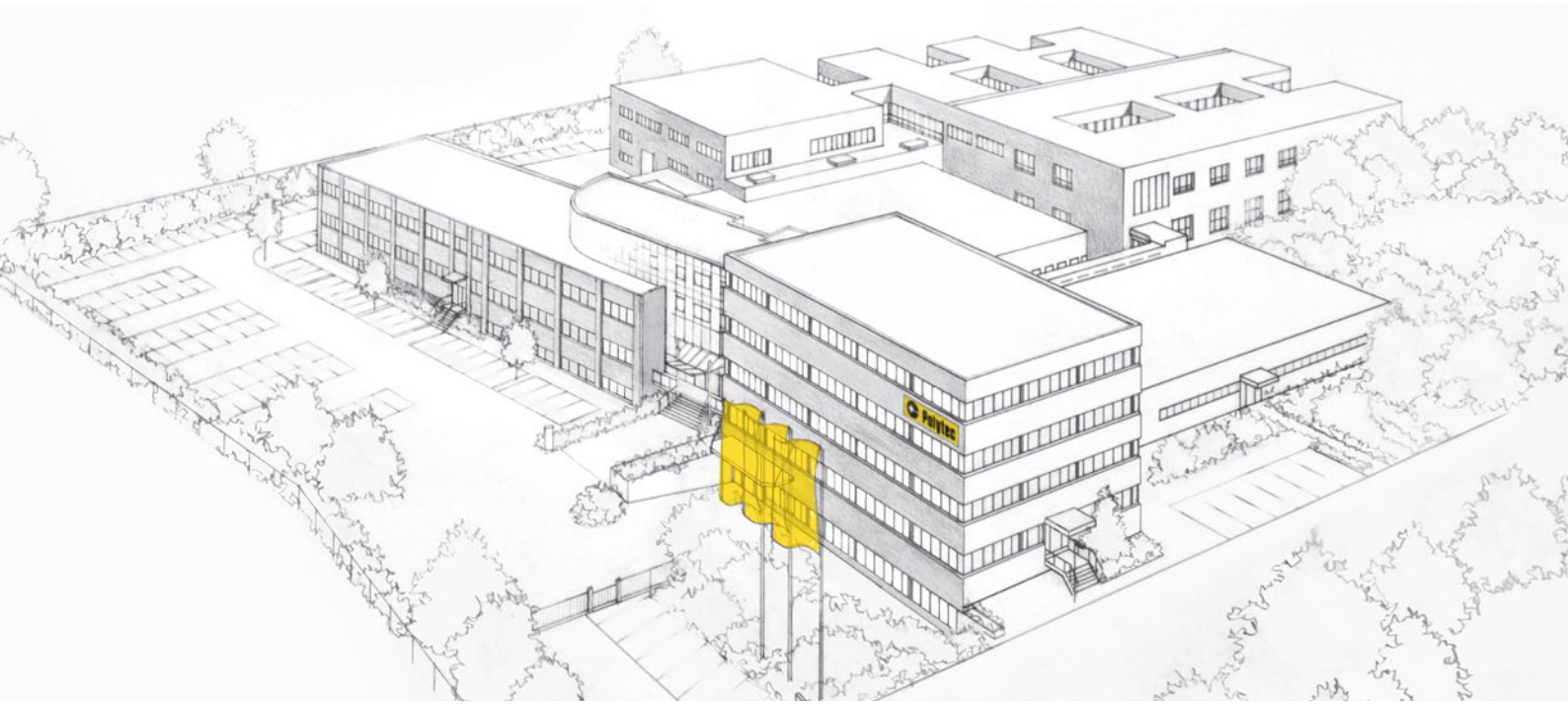
Supported data file formats

Import:

- SVD (Polytec Scanning Vibrometer)
- PDV (Polytec Single Point Vibrometer / VibSoft)
- UNV (Universal File Format)
- VIB (PolyWave Exchange Format)
- WAV (Wave Audio File)
- STL (Geometry)
- OJB (geometry and texture)

Export:

- UNV (Universal File Format)
- VIB (PolyWave Exchange Format)
- CSV (Text file for modal analysis results)
- AVI movies, animated GIF



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