Vibration Analysis with WaveCam

Optical flow based time and frequency ODS

Highspeed cameras Chronos 1.4 and 2.1 with WaveCam software by gfai tech

BENEFITS

- Use any camera to capture vibration data incl. phones
- Save setup-, measurement time and equipment cost
- Quick to learn, intuitive handling, easy configuration
- Intuitive execution and analysis of measurements
- Analyse data in time and frequency domain
- Vibration measurements during operation with sub-pixel-precision measurement resolution
- No preparation of the measured surface necessary
- Export deflection shapes in video
- Improved optical flow and artificial intelligence (AI) algorithms

APPLICATIONS

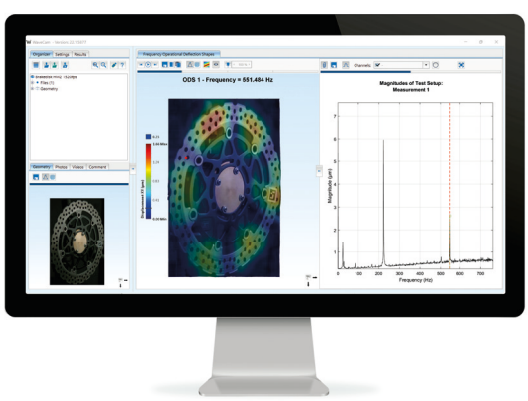
- Operating Deflection Shapes (ODS)
- Natural frequency investigation
- Quality assurance
- Research & development
- Troubleshooting, root-cause analysis
- Predictive maintenance
- Structural vibration
- Transient events

Our vibration analysis solution WaveCam is the perfect tool for non-contact and high-resolution vibration measurement for experts and beginners in the time and frequency domain. To get started, all you need is a camera and our software to process the data. Save the time to set up individual sensors, or measurement locations.

A frequency ODS can be performed with a single excitation in a wide range frequency range. The dispensation of consecutive excitation for different measurement positions saves measurement and test bench time respectively.

Depending on the frame rate of your camera, a minimum frame rate $FPS = 2 \times f_{max}$ is required to capture the highest frequency of interest f_{max}. For maximum flexibility we recommend employing a Chronos highspeed camera exceeding 1000 fps. Vibration displacements < 0.1 µm are captured.

Every single pixel serves as an individual sensor allowing you to measure hundreds of thousands of positions simultaneously. Time waveforms and frequency data can be extracted for individual positions. Results were cross-validated with conventional methods namely laser Doppler vibrometer (LDV), accelerometer as well as acoustic holography. Display deflection shapes of structures during operation, manual, ambient or automated excitation e.g. using the WaveHit^{MAX} as well as transient events. Various options to display the data, facilitate interpretation and export vivid and conclusive results.



Software WaveCam – Frequency ODS module

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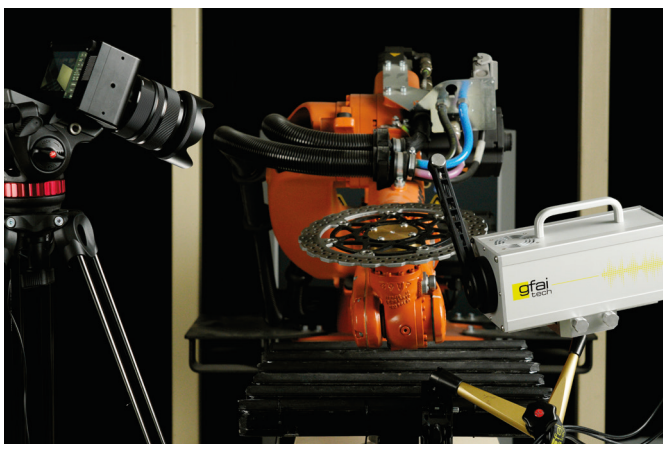
SPECIFICATIONS FOR SOFTWARE:

Vibration measurement data extraction requires uncompresed video files that can be recorded with all available high-speed cameras as well as smartphone cameras. We recommend using a high-speed camera by Chronos.

Supported video file formats for data extraction	
asf	ASF File
asx	ASX File
avi	AVI File
m4v	MPEG-4 Video
mov	QuickTime movie
mp4	MPEG-4
mpg	MPEG-1
wmv	Windows Media Video
dng (folder)	CinemaDNG



Automated excitation of a brake disk with WaveHit^{MAX}

SPECIFICATIONS FOR CHRONOS HIGHSPEED-CAMERA 1.4	
Maximum resolution	1280 x 1024 px
Framerate	1 - 40 kfps (at reduced resolution)
Record time (depending on memory)	4.13 s (8 GB) 8.26 s (16 GB) 16.52 s (32 GB)
Battery run time	1.5 h recording with on-site replaceable EN-EL4a battery
Lens mount	CS/C-mount (recommended)
Display	5“ 800 x 480 capacitive touchscreen
Enclosure	Anodized CNC machined aluminum
Cooling	Active cooling, variable-speed fan (fan-off option supported)
Dimensions	155 mm x 96 mm x 67.3 mm (6.11“ x 3.78“ x 2.65“) without lens
Weight	1,06 kg (2,34 lbs) without lens
BATTERY	
Type	EN-EL4a
Maximum run time	1.5 hours recording
Charge time	2 hours (0 – 80 %) with in-camera charger
INPUT/OUTPUT	
Power input	17 – 20 V 40 W (5.5 / 2.5 mm barrel jack, positive tip)
Network	Gigabit Ethernet
Trigger	Two trigger inputs/frame strobe outputs (BNC and AUX)
Trigger	Electrically isolated trigger input (AUX connector)

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