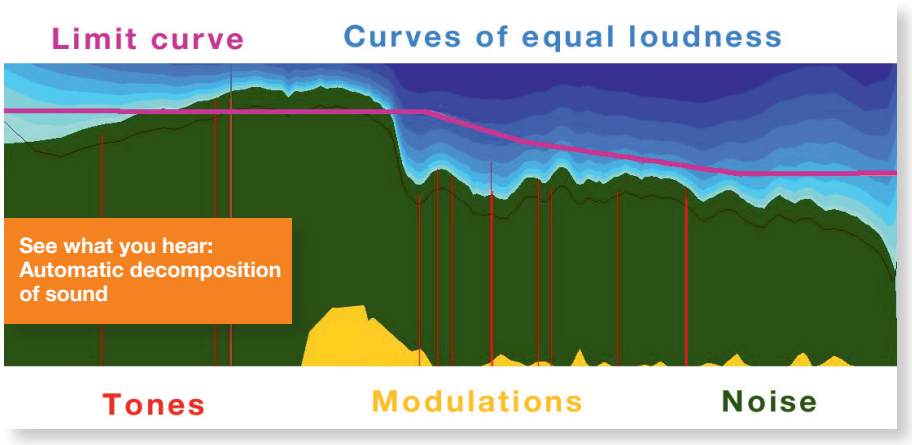
# siVision

## Integrated analysis, filtering and noise rating




**siVision** optically displays all sound components perceived by the human ear and provides filters to reduce, eliminate, or enhance individual sound components. This sound simulation presents the user with specific objectives (in dB / Hz) for optimizing the noise characteristics of a real component, machine, or vehicle.

With the **Testing Mode** extension, **siVision** is the ideal software tool for automated tests in a production environment.

**siVision** on **LivePad** is a compact complete system (measuring instrument, computer hardware and software) with 6 ICP® inputs and a CAN bus interface, which can be operated intuitively via an integrated tablet PC. The system is ideal for mobile work, and can be used directly as a test system for applications involving automatic sound testing.

### What can you visualize with siVision?

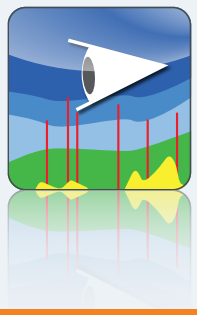
**Tones:**
Narrow-band tonal components (red vertical lines).

**Modulations:**
Rattling, squeaking, or singing components, which can often give the particular sound its unique signature (yellow area).

**Noise/background:**
Stochastic component of the sound over the entire frequency range and lacking any salient features (green background).

**Curves of equal loudness:**
Blue horizons over the sound components which are perceived as equally loud along the course of the individual blue line. With these curves, it is possible to map the different sensitivities of the human ear.

**Limit curves (Testing Mode):**
Target curves to be individually defined by the user, for tones, modulations and noise, and which provide the results 'OK' or 'NOT OK' during automatic acoustic testing in a production environment.



## Applications

- Real time analysis of sound and vibration
- Troubleshooting components and machines
- Sound optimization
- Interactive and intuitive simulation of target sounds
- Objective and subjective rating of sounds and target sounds
- Acoustic source identification on the object
- End of line testing in production environment (**Testing Mode** and **LivePad**)

## Operating Modes

- Software tool for sound analysis and sound optimization tasks
- Extension **Testing Mode** available for comparison and test of acoustic variants with user defined limits for critical sound components
- **siVision** on **LivePad**: Complete system for **siVision** + **Testing Mode** consiting of software, tablet PC and USB frontend (6 channels, ICP® supply, CAN bus interface) - optimal for automatic sound testing



**siVision** on **LivePad**

SOUNDTEC

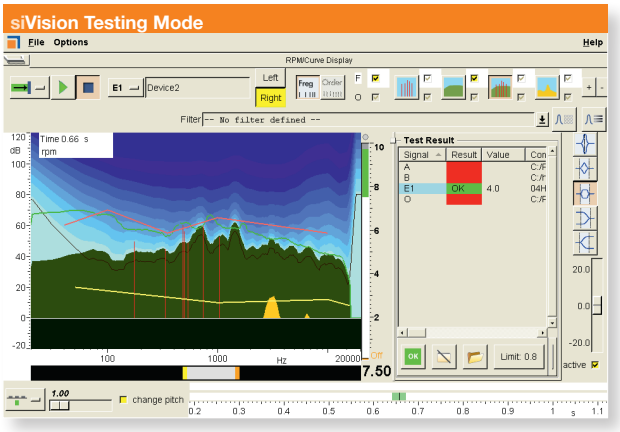
# siVision

## siVision for troubleshooting and sound optimization

Monotonous tones (e.g. persistent beeping) as well as prominent modulations (e.g. rattling) are easily perceptible and irritating to the human ear. Even an otherwise inconspicuous noise can be too loud or too soft (noise can mask other features, for example). In particular, however, these sound characteristics can point to faults or errors in the manufacturing of a machine.

**siVision** visualizes these sound characteristics and can thus plays an important role in the identification of faults.

All the sound components are automatically displayed separately and rated for perceptibility of tones. The perceptibility is visualized by means of equal-loudness curves. The loudness levels shown can be adjusted according to the required quality, and enable a quantitative assessment of the felt disturbance.




**siVision** makes it possible to analyze sound characteristics in real time or in playback in a very simple manner, and allows their individual manipulation with the help of filters. With the modification of the sound it is possible to acoustically generate a target sound, e.g. without tonal and modulating components, which can subsequently be used as the basis for potential constructive adaptations or corrections. Each development status, however, can be compared objectively as well as subjectively.

### Psychoacoustic know-how at the press of a button

With classic methods, analyzing disturbing components and configuring the sound characteristics of a machine is a time-consuming task for experts. **siVision** separates disturbing components without any user interaction or special prior knowledge of psychoacoustics.

### Comparability to standard analyses

The values calculated in **siVision** are computed on an aurally-equivalent frequency scale and normalized according to classic third-octave analysis. The ratio of the tonal component level to the residual noise is given directly in dB. This makes it possible to determine the strength of a disturbing component in a quantitatively meaningful way.

### Filter groups for tones, noise, modulation, and total sound

The sound components can be influenced through separate filter groups; this sound simulation provides the user with specific objectives (in dB) for optimizing sound on a real component. Tonal components and modulations can be analyzed and filtered either as orders via the RPM or in the frequency range. Automatic sound separation makes it possible to filter orders without RPM information for the first time. The direct filtering even of modulations is another unique feature.

### Evaluation of the tonal quality using an objective grading scale

Sound quality is usually graded by experienced listeners. This method is time-consuming and involves a certain degree of uncertainty due to the individual evaluation criteria. **siVision** now provides an objective grading of tonal components in a sound through comparison with curves of equal loudness. Conversely, it is also possible to specify a grade for the desired sound quality in order to achieve an objective through automatic filtering.

## Real-Time Analysis

- Real-Time spectral display and filtering
- Automatic breakdown of sound spectra into acoustically relevant components
- Display of noise parameters such as frequency, noise level, modulation depth, evaluation of tonal components etc.
- Structure-borne sound spectra can also be displayed
- Frequency and order display with RPM from CAN bus or pulse input
- **Testing Mode**: Displayable limit curves for tonal, noise, and modulation sound components

## Filtering

- Separate filter groups for total sound, tonal components, noise components, and modulations
- Filters with different characteristics such as narrow band, bandwidth, high-pass, and low-pass
- **Testing Mode**: Each sound has its own filter set that can also be stored and loaded to other sounds

## Evaluation

- Curves of the equal loudness indicating the percieved loudness of the human ear
- Loudness curves adjustable according to subjective rating scale
- Display of the overall rating for tonal components
- **Testing Mode**: user defined limit curves for tonal, noise, and modulation sound components
- **Testing Mode**: automatic rating of various sounds through comparison with limit curves, display of OK / NOT OK for the tested object

SOUNDTEC

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