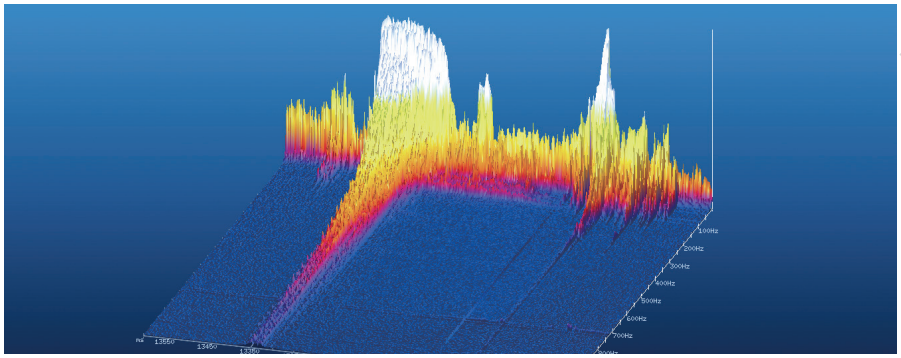
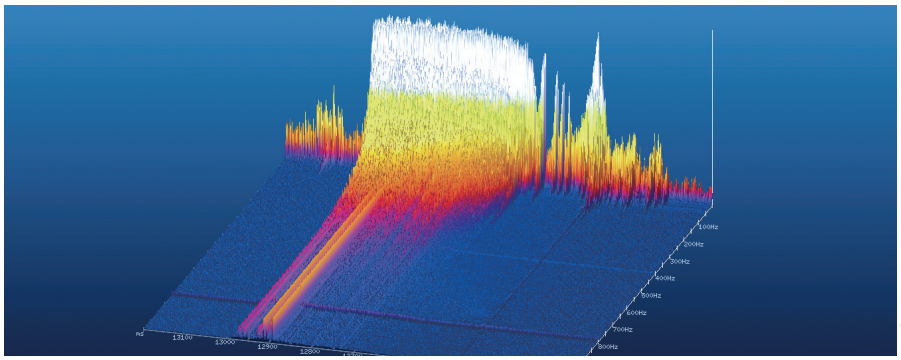
Crack Detection During Cold Forming



This figure shows an extract of High-Frequency-Impulse-Measurement (HFIM) signals of a cold forming process. During this process, steel sheets were formed to produce a vehicle body component. The HFIM-Piezo-Sensors were placed at the forming tool itself. The upper depiction shows a flawless forming process, the extract is limited to emissions which originated in friction between the steel sheet and the forming tool and plastic deformation.



This lower depiction shows signals of the same cold forming process as the upper figure. The difference of the HFIM-Signals are characterized by risen amplitudes in all frequency bands. The reason for the increased amplitudes are cracks inside of the steel sheet which developed because of modified parameters of the cold forming process.

Condition Monitoring

During **cold forming of components and semifinished products**, damages may occur, like cracks, thinning, double draws or wrinkles.

Most production processes do not allow to analyze the product during the process, due to safety, spatial or technological restrictions. Although it is possible to analyze a component to determine whether it's damaged or not, this is only possible after-process.

High-Frequency-Impulse-Measurement (HFIM) is a reasonable alternative to **in-process check systems**. HFIM needs force fit contact of the piezoelectric sensors with the die. **Structure borne noise is emitted by component and machine,** travels through the whole installation and is detected by the sensors.

It's easy to monitor cold forming by HFIM. The **HFIM-signals show significant differences,** if process parameter change and if the mass forming tool crosses thresholds.

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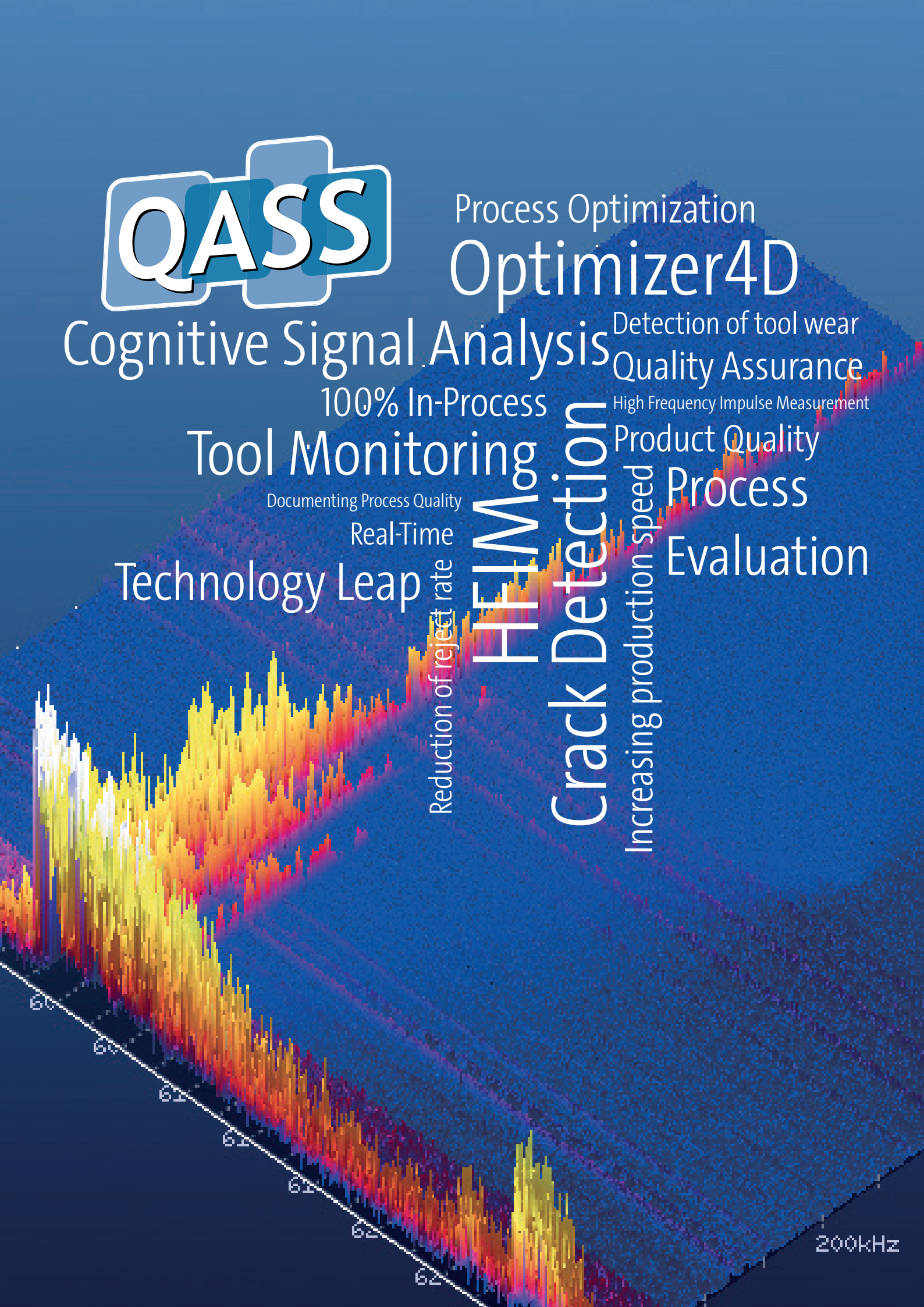
QASS
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Quality Assurance
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High Frequency Impulse Measurement
Tool Monitoring
Product Quality
Process
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Technology Leap
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Reduction of reject rate
Increasing production speed
200kHz