

# CoMoBase3 – new hardware platform for acoustic condition monitoring

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The continuous acquisition of data enables online condition monitoring of infrastructure and comparison with digital twins. Collecting a wide range of data during operation, for example via acoustic condition monitoring, is therefore an important goal.

## CoMoBase3

CoMoBase3, a hardware platform developed at Fraunhofer IKTS, will meet the high demands associated with this task. It is designed for autonomous, long-term monitoring of technical structures and facilities. This includes both active ultrasonic (acousto ultrasonic) and passive methods (acoustic emission analysis) in the frequency range from 1 kHz to 8 MHz.

The multi-channel acoustic measurement system is ready to use for acoustic sensor networks and suitable, for example, for the surveillance of pressure tanks or pipelines in industrial plants, with the option to synchronize the operating data directly with the measurement data. The piezoelectric sensors are applied either to hot spots or on a larger surface. With the help of online and offline analysis, damage indicators are defined and provide information about the condition of the structure. Another application is the monitoring of fatigue tests. Damage progression can be displayed as early as in the test phase.

The system has a modular design and can be equipped with up to 32 synchronous channels at 20 MS/s, depending on the monitoring task, and has a resolution of 16 bits.

## Sensor solutions

The hardware can be combined with a wide range of sensor solutions for various

surveillance tasks. These are available for different frequency ranges, but also for high-temperature applications as well as for measurements in ATEX zones.

## Application areas

Typical areas of application for this measurement technology include fiber composites such as carbon fiber reinforced plastic (CFRP) and glass fiber reinforced plastic (GFRP), for example in pressure tanks, pipelines or rotor blades. But the hardware can also be used for metallic infrastructure components, such as tanks or pipes. The two measuring methods can be used to detect a wide range of corrosion damage, such as cracks, wall erosion or pitting. In addition, the hardware is also suitable for the non-permanent testing of components.

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*CfK rim testing with acoustic emission analysis.*



*Permanent monitoring of pressure tanks with guided waves.*



*Acoustic measurement system with 32 channels.*

