

# Carousel – Exploiting the Hydrostatic Pressure Gradient for the Calibration of Measurement Microphones

*Tuesday, 20 June 2023 10:14 (1 minute)*

Reliable and comparable measurements of physical quantities require traceability to the international system of units (SI). Sound pressure is traditionally quantified using measurement microphones as transfer standards, for which the established primary calibration methods are currently limited to frequencies of 2 Hz and higher. These frequencies do not fully cover the range of interest for the International Monitoring System. For this reason, multiple primary calibration methods for airborne infrasound based on different physical principles are currently in development. The method presented in this talk utilizes the vertical gradient of the ambient air pressure as stimulus. A microphone under test is subjected to an alternating pressure by periodically changing its altitude. This principle has been realized in a calibration setup colloquially called the 'microphone carousel'. In this setup, a rotating disk periodically changes the height of a microphone by about  $\pm 0.30$  m. This subjects the microphone to a sinusoidal alternating pressure which is calculable in amplitude and frequency. With this method, measurement microphones can be calibrated in a frequency range from 0.1 Hz to 5 Hz with a planned extension to 10 Hz. In this presentation, the capabilities and limitations of the microphone carousel for the calibration of measurement microphones are discussed.

## Promotional text

The primary calibration method presented in this talk extends the frequency range for the traceable calibration of microphones to lower frequencies. The objective of this research is to enable traceability and increase reliability for infrasound monitoring stations.

## E-mail

marvin.rust@ptb.de

## Oral preference format

in-person

**Primary author:** RUST, Marvin (Physikalisch-Technische Bundesanstalt (PTB))

**Co-author:** Dr KLING, Christoph (Physikalisch-Technische Bundesanstalt (PTB))

**Presenter:** RUST, Marvin (Physikalisch-Technische Bundesanstalt (PTB))

**Session Classification:** Lightning talks: P1.2-1, P3.1, P3.4, P4.5

**Track Classification:** Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications