



Contribution ID: 20

Type: **not specified**

## Full 3D ultrasound tomography: current status at KIT

*Wednesday, June 12, 2024 11:00 AM (20 minutes)*

Ultrasound tomography (USCT) is an exciting new technology with several active research groups investigating new algorithms, devices and applications worldwide. To fully utilise the 3D interaction of the ultrasound fields with the object to be imaged, we are focusing our research on 3D USCT systems. We have realised a pseudo-randomly sampled hemispherical 3D USCT device (3D USCT III) with 2304 transducers with nearly spherical wave fronts for transmission and reception. Due to the large amount of acquired data and the large 3D space that needs to be reconstructed, image reconstruction is performed using straight and bent ray algorithms, while the more advanced paraxial and full waveform inversion reconstructions are currently under development.

In this summary, the design of the system and initial results with phantoms, volunteers and the ongoing clinical trial are presented. Wire, sphere and gelatin-based phantoms were used to access resolution and contrast of all modalities, and accuracy of speed of sound and attenuation reconstructions. Volunteer images showed plausibility of reconstructions in comparison to MRI and greatly increased field of view, e.g. visibility up to chest muscle in reflection images.

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**Session Classification:** Reconstruction Methods & Modeling

**Track Classification:** oral presentations