

## Towards an enhanced performance of uniform circular arrays at low frequencies - DTU Orbit (09/11/2017)

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Beamforming using uniform circular arrays of microphones can be used, e.g., for localization of environmental noise sources and for conferencing. The performance depends strongly on the characteristics of the array, for instance the number of transducers, the radius and whether the microphones are mounted on a scatterer such as a rigid cylinder or a sphere. The beamforming output improves with increasing frequency, up to a certain frequency where spatial aliasing occurs. At low frequencies the performance is limited by the radius of the array; in other words, given a certain number of microphones, an array with a larger radius will perform better than a smaller array. The aim of this study is to improve the performance of the array at low frequencies without modifying its physical characteristics. This is done by predicting the sound pressure at a virtual and larger concentric array. The propagation of the acoustic information captured by the microphones to the virtual array is based on acoustic holography. The predicted pressure is then used as input of the beamforming procedure. The combination of holography and beamforming for enhancing the beamforming output at low frequencies is examined with computer simulations and experimental results.

### General information

State: Published

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Number of pages: 10

Publication date: 2013

### Host publication information

Title of host publication: Proceedings of INTER-NOISE 2013

Main Research Area: Technical/natural sciences

Conference: INTER-NOISE 2013, Innsbruck, Austria, 15/09/2013 - 15/09/2013

Uniform circular array, Beamforming, Holography

Electronic versions:

Towards an enhanced performance of UCAs at low frequencies.pdf

Source: dtu

Source-ID: u::8792

Publication: Research - peer-review › Article in proceedings – Annual report year: 2013