

## DAGA 2022

21<sup>st</sup> – 24<sup>th</sup> of March 2022

**Place:**

Stuttgart, Germany

**Title:**

Extending Acoustic Vehicle Evaluation in Test Drives with Physiological Measurements

**Authors:**

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**Abstract:**

The HEAD empirical assessment ride (HEAR!) method allows correlation of the driver's perception of the vehicle with acoustic conditions and driving conditions. Using this user-centred-design approach, problematic driving conditions are easily identified. In order to learn more about drivability or the feeling of safety while driving, we extended the method by using physiological measurements. During states of stress or relaxation certain physiological parameters change, such as heart rate or heart rate variability. These changes can be recorded using adequate devices.

During operation of the vehicle, continuous movements of the driver make data acquisition more difficult due to increased number of artifacts. Therefore, this work addresses the issues involved in measuring physiological data in the vehicle. Based on conducted test drives, a method was iteratively derived to eliminate artefacts and achieve good signal quality.

Subsequently, several drives were conducted using this developed methodology. The data collected within the drives offer the possibility to analyze the dimensions driving conditions, acoustic phenomena, perceptive evaluations, and physiological responses in relation to each other. For example, the additional acquisition of vehicle parameters enables a first assignment of the stress responses to specific driving conditions or situations.

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