

## **AVAS - Legislation and technical requirements**

### **Abstract**

In everyday life pedestrians are exposed to traffic sounds in multifarious situations as motor vehicles play an indispensable role for transportation in today's societies. Each vehicle has certain technical features, which communicate different characteristics of vehicle models and types. They include, for example, technically-mechanical processes of different operating states, which influence the emitted sounds. These sounds are audible especially for pedestrians. Thus the perceived sound has an information character: it indicates acceleration, deceleration and speed of the vehicle. Given the increasing use of electric vehicles in road traffic, there is a growing demand for the determination of the perceptibility of vehicle exterior sound by pedestrians, as the electric vehicles move almost silently up to a speed of 20 km/h. This low sound emission results in an increased risk potential, especially for weaker traffic participants. For that reason, car manufacturers are implementing external sound emission systems in electric cars.

In September 2009, the NHTSA (National Highway Traffic Safety Administration) published a technical report on the incidence of accidents involving hybrid and electric vehicles with pedestrians and cyclists. The results show that electric vehicles are involved twice as often as vehicles with internal combustion engines in accidents with pedestrians, especially when the vehicle is moving backwards, decelerates / stops, starts in traffic and in parking situations. The United Nations Economic Commission for Europe (UNECE) also decided that new electric vehicles should emit a warning signal from 2019 onwards. An Acoustic Vehicle Alerting System (AVAS) Regulations are also prepared accordingly, for example, all new electric vehicles in Europe should emit an external sound since 2019. In this talk first "Acoustic Vehicle Alerting System" and then the AVAS regulations will be presented. At the Department of Acoustic and Haptic Engineering of the TU Dresden, both experiments on the response to external noise of vehicles and experiments on the auditory perception and assessment of synthetically generated electric vehicle noises with regard to the detection of operating states were conducted. In the second part of the talk, the results of these experiments and some technical solutions will be presented and a discussion on accessible pleasant smart cities will be held.