ENERGETICS

MUR DM 117/Denso - Analysis and assessment of the acoustic quality at the operator's position on off-road vehicles (tractors, construction site machines, buses, trucks)

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Context of the research activity	The research aims to improve the environmental quality in public and off-road means of transport, and in particular the acoustic quality at the position of the operator who spends many hours in a cabin with stressing environmental conditions. Noise from the HVAC system is currently the most disturbing factor. Progetto finanziato nell'ambito del PNRR - MUR DM 117/2023 - CUP E14D23001950004
Objectives	The research falls within Mission 2 and Mission 3 of the PNRR, i.e., in interventions for mobility and public transport. To evaluate the acoustic conditions, an auralization system will be used to reproduce multi-channel audio tracks in 3rd order ambisonic coding, which is based on the representation of the sound field in its decomposition into 16 spherical harmonics independent of the reproduction system, each associated with a different directionality of sound. In this way, the audio rendering system is characterized by a strong and precise sound directivity that allows the listener to perceive in detail and therefore localize the spatial origin of the sound reproduced around him. The research involves the search for an acoustic comfort index that is related to the psychoacoustic parameters and the subjective perception deriving from a jury. Visual field will be also recreated thanks to a video rendering 360 with Oculus. The ultimate goal is to define an evaluation procedure independent of the subjective response and implementable in the design phase. The research will be carried out in collaboration with DENSO Orsa.
Skills and	

competencies for the development of the activity	The candidate should have acquired fundamentals in acoustics, termodynamics, lighting and air conditioning.