

Acoustic Measurements for Speech Processing Systems with a Rotatable HATS

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Head and Torso Simulators (HATS) have been used for in-vehicle acoustic measurements of hands-free telephones (HFT), Speech Recognition (ASR) and In-Car Communication (ICC) for years. These tests are typically carried out under static conditions, without moving or rotating the HATS. Acoustic measurements were conducted with an experimental rotatable HATS model on the drivers' seat. The transfer characteristics from the artificial mouth to different microphone positions and to a second HATS (listener) at different positions in the car cabin were measured. Turning angles ranging from -90° to $+90^\circ$ deviating from the default position were investigated. The measurements were conducted in a test room without periphery like dashboard, door and windows and in a vehicle cabin for comparison. Discriminating transfer characteristics of the rotation on high-frequency components observed in test rooms decrease with vehicle cabin reflections, vice versa inserting strong comb filter effects. These data are useful to verify the benefit to compensate for any loss by appropriate filtering in the microphone signal processing. Besides applications like HFT, ASR and ICC, such variable head positions are also relevant for robustness tests of Active Noise Canceling (ANC) or transmission characteristics between different acoustic zones in vehicles.