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**Characterization of an acoustic ceramic liner in a subsonic flow by  
mean of Laser Doppler Velocimetry**

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As aircraft traffic constantly increases, serious efforts are made to reduce engine noise. Among them, the design of high performance absorbing materials (liners) placed on the nacelle's internal walls is an exciting challenge. Optimizing these media requires to know the mechanisms of acoustical propagation near them in the conditions encountered in jet engines: high speed hot shear flows. A particular interest is being granted to the influence of the grazing flow in contact with the liners. This is due to its known effects on the liners characteristics: efficiency of absorption and frequency resonance. This influence is remarkable for those configurations based on perforated plates.

Therefore, a testing method based on non-intrusive measurements has been developed at ONERA. This technique consists in measuring acoustic velocities by Laser Doppler Velocimetry to determine acoustic quantities under grazing turbulent high-speed flow, thanks to an Eulerian-Lagrangian description of the perturbations. Experimental activity is performed on a honeycomb material, via the achievement of acoustical pressure and intensity fields, for different Mach numbers. Moreover, these measurements bring into evidence a coupling between acoustical modes and hydrodynamic modes (from Kelvin-Helmholtz instability) which modify the material acoustical behaviour.