

## **ACOUSTICS2008/1075**

### **turbulent flow noise around a zero-incidence airfoil**

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A Large Eddy Simulation (LES) of the flow around a NACA 0012 airfoil at zero incidence, at a chord-based Reynolds number of 500,000 and a Mach number of 0.22, is presented. The aim is to show that high-order numerical schemes can successfully be used to perform direct acoustic computations of compressible transitional flow on curvilinear grids. At a Reynolds number of 500,000, the boundary layers around the airfoil transition from an initially laminar state to a turbulent state before reaching the trailing edge. Results obtained in the LES show a well-placed transition zone, and turbulence levels in the boundary layers in agreement with analytical developments as well as experimental data. Furthermore, the radiated acoustic field is determined directly by the LES, without the use of an acoustic analogy. Third-octave acoustic spectra are compared to experimental data, with deviations of around 3 dB per band exhibited.