ACOUSTICS2008/2589
Benchmark of fan noise propagation tools

Jacky Mardjono
SNECMA Villaroche, 77550 Moissy Cramayel, France

Various propagating codes based on different formulations have been developed over the last years to simulate the fan noise propagation into the nacelle of a turbofan engine and its radiation in the Far field.
The abilities of the ACTRAN softwares (Potential formulation / FEM), SPACE (Linearised EULER equations / DGM) and ICARE (Rays-tracing method) to simulate typical industrial configurations in the frequential domain have been evaluated based on measurements carried out at the RACE acoustic test facility on a fan model at 1/2 scale.
The results of the computations carried out with each of these codes on intake and exhaust configurations (axisymmetric assumption) in hard wall and lined duct will be compared to the measured far field directivities. These comparisons will be discussed depending on the establishment of patterns (sources types, mean flows types, boundaries conditions) considered in the simulations of each of these codes. The impacts of the considered convected mean flow types (Uniform, Euler, NS,..) and the capacities of these codes to predict noise attenuation of the treatments will be investigated in particular.