Acoustics Branch (RTA)

Conducts research directed at aircraft engine noise reduction. Experimental and analytical research focuses on noise reduction technologies for turbofan engines while maintaining acceptable aerodynamic performance. Emphasis is given to fan and jet noise reduction for both subsonic and supersonic applications. Fan/nacelle models are tested in wind tunnels and free-jets to determine the aerodynamic performance and acoustic characteristics of engine components such as inlets, fans, nacelles, nozzles, and portions of the core turbomachinery. System level tests are performed that integrate these components and provide Technology Readiness Level (TRL) assessments of 4/5. Component tests are performed TRL 2/3 research using smaller scale nozzle and fan test rigs. Detailed diagnostic measurements are obtained using Laser Doppler Velocimetry (LDV), Particle Image Velocimetry (PIV), hot wire anemometry, acoustic mode measurements, unsteady pressure measurements, and phased array methods. Active noise control methods are explored for both fan and jet noise reduction. Computer codes are developed that model the unsteady aerodynamics and aeroacoustics of engine components. Engine noise prediction codes are developed and validated using experimental data. Advanced computational algorithms for Computational AeroAcoustics (CAA) are developed that directly compute the noise generation and propagation.