High-Fidelity Simulations of Landing Gear Noise

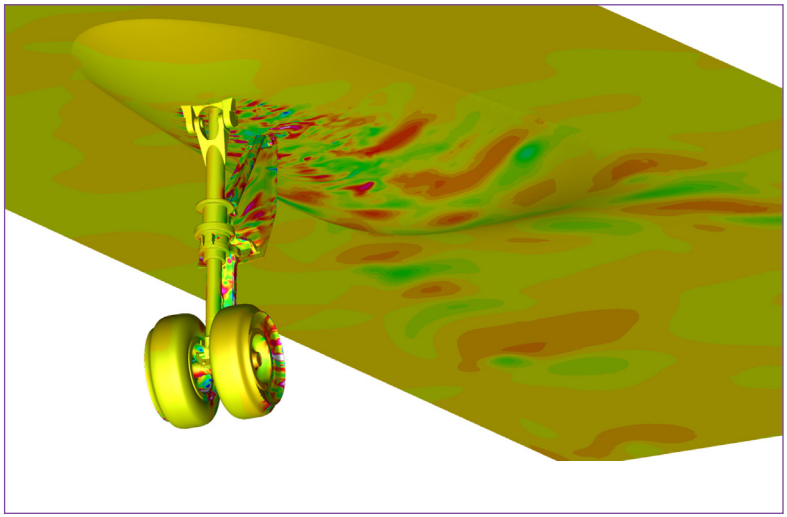
Aeronautics Research Mission Directorate

Mitigation of aircraft noise is a critical goal of NASA's Aeronautics Research Mission Directorate. Airframe noise constitutes a major component of the total aircraft noise generated during approach and landing—with a significant portion attributed to the aircraft undercarriage.

Under a partnership with Gulfstream Aerospace Corporation, NASA Langley's Fully-Unstructured Navier-Stokes Three-Dimensional (FUN3D) computational fluid dynamics (CFD) code is being used to investigate the complex, unsteady flow around the nose landing gear of a G550 aircraft.

The landing gear produces an extremely complex flowfield that is highly interactive and nonlinear in nature. High-fidelity simulations of the unsteady flow around such complex landing gear requires very large calculations that can only be run on supercomputers. The combined capabilities of NASA's Pleiades supercomputer, mass storage, and post-processing expertise enable resolution and visualization of prominent flow features over a broad range of spatial and temporal scales.

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Fluctuating pressure field on nose landing gear and fuselage surfaces. *Airframe Noise Team, NASA/Langley*