Special Issue

Helicopter Aerodynamics

Message from the Guest Editor

Helicopters are multi-purpose flight vehicles due to their ability to perform vertical take-off and landing, hovering, and cruise flight at varying speeds. These capabilities are the basis for conducting a unique range of missions from transport up to search and rescue. The forces required for lift and propulsion are created by a rotor consisting of several blades, the number and design of which depending on performance, operational, and mission requirements. Rotor blade aerodynamics phenomena and problems are, among others, related to dynamic stall, Mach number effects, blade-vortex–interaction, transitional flow, and strong interaction phenomena. Methods of aerodynamic drag reduction often concentrate on fuselage and cowling geometries. Rotor and fuselage wake interactions with the stabilizers may cause problems like tail shake. Consequently, a variety of complex aerodynamic interaction phenomena and problems are associated with helicopters addressing a research field of high relevance.

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