AIAD #10841

Research Opportunity: Both faculty and cadet

ORGANIZATION/PROJECT SPONSOR
Organization: ARL-ARO
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Location of Sponsoring Directorate or Division: Research Triangle Park, NC

PROJECT

Title: Induced Vortex Flow Separation Over A Flat Plate/A NACA 0014 Airfoil

Description: In a hovering or descending helicopter, the tip vortex of one rotor-blade interacts with another blade. The blade-vortex interaction (BVI) phenomenon is one of the main sources of noise and vibration on the helicopter. In fact, BVI is the result of the interactions of the most complex unsteady flow field features associated with the helicopter rotor in forward flight. In an effort to improve current rotorcraft designs, it is necessary to understand the underlying physics of blade-vortex interaction (BVI). Over the past 20 years, ARL/ARO has supported the development of the Vorticity Confinement (VC) method which is particularly applicable to the VBI problem. To date, limited research was done in this field, however, the preliminary results are promising. This summer project is intended to continue the BVI research through the use of VC. The plan calls for the evaluation of the vortex-induced separation and eruption from the boundary layer using VC. This problem will be modeled with a varying degree of fidelity. It can be made simple enough for a summer project for a senior undergraduate or a graduate student. Or, if need be, the problem can also be tailored to a Faculty member. Research will be conducted at the Army Research Office in Research Triangle Park, NC.

ARL/Army Benefit: Improved Rotorcraft and Vertical Lift Aircraft Designs

Backgroud Required: FORTRAN and MATLAB

Security clearance required: None

Capacity: Two

Duration: Eight weeks

Block Preference: Currently, there are no blackout dates