Detached Eddy Simulation Model for the DU-91-W2-250 Airfoil

This paper presents aerodynamic investigations of the DU-91-W2-250 airfoil at Reynolds number of $3 \cdot 10^6$ employing 2D Reynolds-averaged Navier–Stokes (RANS) solver and 3D detached eddy simulation (DES) technique. RANS simulations are performed in the angle of attack range between -20° and +20° whereas DES results are given only for the angle of attack of 7.08°. Measurements have been done at the LM Wind Power Low Speed Wind Tunnel. The lift and drag are obtained from airfoil pressure and wake rake respectively. The obtained numerical results, lift and drag coefficients as well as static pressure distributions are in a good agreement with the experimental results in the linear part of the lift coefficient curve. The Transition SST turbulence model gives much more appropriate results in comparison with the k-ω SST model, especially for the drag at low angles of attack. The DES approach allows to obtain 3D flow characteristics near the S-shaped airfoil tail.