CFD STUDIES OF AIRCRAFT IN GROUND EFFECT FOR SARAS MK II

Shikhar Jaiswal
Senior Scientist
Computational & Theoretical Fluid
Dynamics (CTFD) Division
CSIR-National Aerospace Laboratories
(CSIR-NAL)
Post Box No. 1779, HAL Airport Road
Bangalore-560 017, India

Sharanappa V Sajjan
Senior Principal Scientist
Computational & Theoretical Fluid
Dynamics (CTFD) Division
CSIR-National Aerospace Laboratories
(CSIR-NAL)
Post Box No. 1779, HAL Airport Road
Bangalore-560 017, India
Email : svsajjan@nal.res.in

**K. Madhu Babu, Jyothi Kumar Puttam,
C. Arshad Shameem**
Principal Scientist
Computational & Theoretical Fluid
Dynamics (CTFD) Division
CSIR-National Aerospace Laboratories
(CSIR-NAL)
Post Box No. 1779, HAL Airport Road
Bangalore-560 017, India

T. N. Venkatesh
Chief Scientist
Computational & Theoretical Fluid
Dynamics (CTFD) Division
CSIR-National Aerospace Laboratories
(CSIR-NAL)
Post Box No. 1779, HAL Airport Road
Bangalore-560 017, India
Email : tnv@nal.res.in

Abstract

Aerodynamic performance of an aircraft is affected when it is flying close to the ground, forexample during take-off or landing. In order to estimate this effect, CFD simulations have beencarried out over the SARAS Mk II aircraft configuration using an open source CFD solverwith Spalart Allmaras (SA) turbulence model. The simulations were done for aircraft atdifferent heights above the ground with flaps deployed and at different angles of attack withpropeller power on. The take-off flap deflections of 15° and 20° and landing flap deflectionsof 30° and 35° were considered for the simulations. Power effects were modelled by usingactuator disc model available in SU2. From the simulations, it is observed that, for all flapconfigurations and at all angles of attack studied, flying close to ground increases the lift ofthe aircraft, reduces drag and pitching moment. The factors of increase/reduction are used bythe design group for better estimation of aircraft performance.

Keywords: Ground Effect, SU2 Solver, CFD Simulations