

# VALIDATION OF PARAS3D RANS PRESSURE DATA WITH FLIGHT RESULTS OVER A WING-BODY RLV CONFIGURATION AT SUPERSONIC HIGH ANGLE OF ATTACK CONDITIONS

G. Vidya, K. Manokaran, C. Babu, Dipankar  
Das  
M.M. Patil, V. Ashok  
Aeronautics Entity  
Vikram Sarabhai Space Centre (VSSC)  
Department of Space, ISRO Post  
Thiruvananthapuram-695 022, India  
Email : g\_vidya@vssc.gov.in

Haroon Rasheed  
UR Rao Satellite Centre (URSC)  
Indian Space Research Organisation (ISRO)  
HAL Airport Road, Kodihalli  
Bangalore-560 017, India

## Abstract

Winged Reusable Launch Vehicle - Technology Demonstrator (RLV-TD) was successfully flight tested by Indian Space Research Organisation (ISRO). One of the main objectives of this Hypersonic Experiment (HEX) mission is to validate the aerodynamic design and ground based aerodynamic data generation procedure. In this paper, comparison of flight data and CFD estimated pressure coefficient ( $C_p$ ) over fuselage, wing, vertical tail and rudder are presented at supersonic Mach number and high angle of attack conditions. PARAS3D RANS solver is able to capture the trends as measured in flight. In general, PARAS3D CFD over predicted the compression on windward side and under predicted leeward expansion as compared to flight measurement. In general, CFD predicts  $C_p$  close to flight measured value, except over a port in the vertical tail.

**Keywords:**  $C_p$ , CFD, Flight, High Angle of Attack, PARAS3D, RLV-TD, Supersonic Mach number