FULL SCRAMJET ENGINE FLOW FIELD COMPUTATION AND FLIGHT TEST DATA COMPARISON

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Abstract

Using an in-house developed Computational Fluid Dynamics (CFD) Software, PARAS-3D, full engine simulation of a scramjet engine (along with cone cylinder fore-body) is carried out, burning hydrogen as fuel. This paper describes the results of CFD simulations at two different Mach numbers and equivalence ratios and comparison with the flight measured engine pressure. Pressure rise due to supersonic combustion captured by computational method has very good agreement with flight measured pressure data. This brings good confidence in the usage of CFD tools for scramjet engine performance prediction.

Keywords: Scramjet Engine, CFD, Flow Field, Equivalence Ratio, Flight Pressure Measurements