

EVALUATION OF INTERNAL FLOW PATH OF TWO MODULE SCRAMJET COMBUSTOR THROUGH SECTIONAL MEASUREMENT

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Abstract

The Internal flow path of a scramjet combustor consists a gradual varying cross sectional area along the combustor axis. The performance evaluation and prediction of combustor are based on Computational Fluid Dynamics (CFD) and Structural Analysis simulations which are carried out on a designed 3D CAD model. Due to manufacturing process constraints and assembly process there can be deviation in the hardware from the designed internal flow path of combustor. Thus it is necessary to determine the actual internal flow path of combustor, which in turn can be used for CFD and structural analysis simulations for better performance evaluation and predictions. The paper presents the methodology developed for evaluation of cross-sectional areas along the combustor axis and generation of 3D surface CAD model of actual internal flow path using CNC Coordinate Measuring Machine (CMM) and design CAD software. It also includes the methods adopted for CMM probe compensation while measuring slopes on the combustor surface and for the measurement of inaccessible surfaces by Ultrasonic Thickness Measuring Instrument.