

IAF SPACE PROPULSION SYMPOSIUM (C4)
Hypersonic Air-breathing and Combined Cycle Propulsion, and Hypersonic Vehicle (7)

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CONTROL OF SHOCK WAVE BOUNDARY LAYER INTERACTION BY INTRODUCING WAVY
PATCHES TO THE WALL.

Abstract

The research over shock-wave boundary layer interaction and its control plays a vital role in construction of efficient hypersonic systems. This study is aimed to minimize the separation bubble length caused due to shock-wave boundary layer interaction by modifying the wall which contacts the separation bubble into a wavy shape. To analyze this problem a compression corner with a corner angle of $R = 250$ is selected. The wall shape is controlled by the sine function. By altering the wave parameters such as amplitude (A) and period (l) detailed numerical studies are performed to understand and elucidate the effect of wall shape inside the bubble region. In the numerical investigations, the Navier-stocks equations have been solved with the equations of energy employing Shear Stress Transport (SST) based $K-\omega$ turbulence model using ANSYS Fluent.