International Journal of Mechanical Engineering and Technology (IJMET)
Volume 8, Issue 11, November 2017, pp. 899–909, Article ID: IJMET_08_11_091
Available online at http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=8&IType=11
ISSN Print: 0976-6340 and ISSN Online: 0976-6359

  Scopus Indexed

# EFFECT OF COWL ANGLE IN THE PERFORMANCE OF SCRAMJET AIR INTAKES

**Senthilkumar P, Sharan Chandran M, Sreeja Sadasivan and Govindha rasu N***
School of Mechanical Engineering, VIT, Vellore, India

**K Senthil kumar**
Mechanical and Industrial Engineering, Higher college of Technology, Muscat, Muscat-133, Oman

## ABSTRACT

*A Scramjet engine (Supersonic Combusting Ramjet) entails combustion at supersonic flow by generating high pressure through recompression (oblique) shock train. Shock Boundary Layer Interaction (SBLI) is an undesirable phenomenon that occurs inside the scramjet intake which has a detrimental effect on its performance. Due to adverse pressure gradient created by SBLI, the flow might be decelerated to subsonic speeds via normal shock. This leads to unstarting of the engine including other undesirable phenomena such as high drag and increased localized heating. The effect of cowl angle is studied on the performance of the scramjet engine in this study. A scramjet inlet prototype is designed in Solid Works followed by CFD analysis using ANSYS tool. The effects of cowl angle, static pressure rise, total pressure recovery and Flow Distortion are brought out.*

**Keywords: Scramjet** intake, SBLI, cowl, ramp and stagnation pressure loss.

**Cite this Article:** Senthilkumar P, Sharan Chandran M, Sreeja Sadasivan and Govindha rasu N and K Senthil kumar, Effect of Cowl Angle in the Performance of Scramjet Air Intakes, International Journal of Mechanical Engineering and Technology 8(11), 2017, pp. 899–909.
http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=8&IType=11

## 1. INTRODUCTION

A ramjet engine uses the kinetic energy of air to achieve compression via normal shock wave. But this pressure rise is associated with a huge stagnation pressure loss and reduction to subsonic speeds. Also, the high temperature rise creates additional losses due to dissociation of molecules. A scramjet engine is a variant of a ramjet air breathing jet engine in which combustion takes place in supersonic airflow. The scramjet is composed of three basic components: a converging inlet, where incoming air is compressed; a combustor, where gaseous fuel is burned with atmospheric oxygen to produce heat; and a diverging nozzle, where the heated air is accelerated to produce thrust. Shock wave- boundary layer interaction