World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:11, No:05, 2017

Theoretical Analysis of Self-Starting Busemann Intake Family

Authors : N. Moradian, E. Timofeev, R. Tahir

Abstract : In this work, startability of the Busemann intake family with weak/strong conical shock, as most efficient intakes, via overboard mass spillage method is theoretically analyzed. Masterix and Candifix codes are used to numerically simulate few models of this type of intake and verify the theoretical results. Portions of the intake corresponding to various flow capture angles are considered to have mass spillage in the starting process of this intake. This approach allows for overboard mass spillage via a V-shaped slot with the tip of V coinciding with the focal point of the Busemann flow. The theoretical results, achieved using two different theories, of self-started Busemann takes with weak/strong conical shock show that significant improve in intake startability using overboard spillage technique. The starting phenomena of Busemann intakes with weak conical shock and seven different capture angles are numerically simulated at freestream Mach number of 3 to find the minimum area ratios of self-started intakes. The numerical results confirm the theoretical ones achieved by authors.

Keywords : Busemann intake, conical shock, overboard spillage, startability
Conference Title : ICFME 2017 : International Conference on Fluid Mechanics and Engineering
Conference Location : Montreal, Canada
Conference Dates : May 11-12, 2017