

Abstract Submitted
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Three Dimensional Transient Turbulent Simulations of Scramjet Fuel Injection and Combustion MARWANE BAHBAZ, University of Central Florida — Scramjet is a propulsion system that is more effective for hypersonic flights ($M > 5$). The main objective of the simulation is to understand both the mixing and combustion process of air flow using hydrogen fuel in high speed environment. The understanding of this phenomenon is used to determine the number of fuel injectors required to increase combustion efficiency and energy transfer. Due to the complexity of this simulation, multiple software tools are used to achieve this objective. First, Solid works is used to draw a scramjet combustor with accurate measurements. Second software tool used is Gambit; It is used to make several types of meshes for the scramjet combustor. Finally, Open Foam and CFD++ are software used to process and post process the scramjet combustor. At this stage, the simulation is divided into two categories. The cold flow category is a series of simulations that include subsonic and supersonic turbulent air flow across the combustor channel with fuel interaction from one or more injectors'. The second category is the combustion simulations which involve fluid flow and fuel mixing with ignition. The simulation and modeling of scramjet combustor will assist to investigate and understand the combustion process and energy transfer in hypersonic environment.

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