

Abstract Submitted
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Comparison of Flamelet Models with the Transported Mass Fraction Approach for Supersonic Combustion WENHAI LI, KEN ALABI, TTC Technologies, Inc., Centereach, NY 11720 USA, FOLUSO LADEINDE, Stony Brook University, Stony Brook, NY 11794-2300 USA — In this study, two fully compressible RANS, LES, and combined RANS/LES flow solvers – AEROFLO and VULCAN, both of which were originally developed by the United States Department of Defense but have since been significantly enhanced and commercialized by our organization, are used to investigate the accuracy of flamelet-based approach when employed to model supersonic combustion. The flamelet results from both codes are assessed relative to solutions obtained by solving the transport equations for the mass fractions – which is also supported by one of the codes, and making familiar assumptions about the closure of the reaction rate. The studies are carried out in the flamelet regime, and the numerical procedures are based on high-order schemes, which are also used to solve the level-set and mixture fraction transport equations used to study, respectively, premixed and non-premixed combustion. The effects of supersonic Mach numbers on the results are discussed.

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