Numerical Investigation of the Transonic Base Flow of A Generic Rocket Configuration

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Numerical simulations of a high Reynolds number flow field of wind tunnel models of a generic rocket configuration were performed for transonic freestream conditions to improve the understanding of the highly intricate flow structures. The simulations demonstrate the applicability of the zonal RANS/LES approach for the rocket base flow. The configuration features a cylindrical sting support, thus representing a nozzle and allowing for investigations of a less disturbed wake flow. Since the Ma = 0.7 flow is the most critical regime as far as fluid structure interactions are concerned the paper concentrates on the transonic configuration. This wake flow is characterized by an expanding separated shear layer, the impact of which on the support leads to an increase in pressure, while the enclosed region, which determines the base drag, possesses a pressure minimum.