Journal of Visualization, Vol. 7, No. 1 (2004) 7

Mach Number Distribution and Plume Direction Prediction of a Rocket Thruster Operating at Four Different Combustion Chamber Pressures

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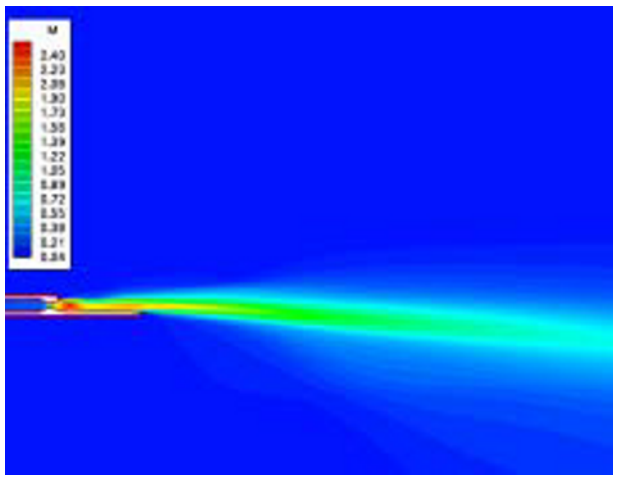
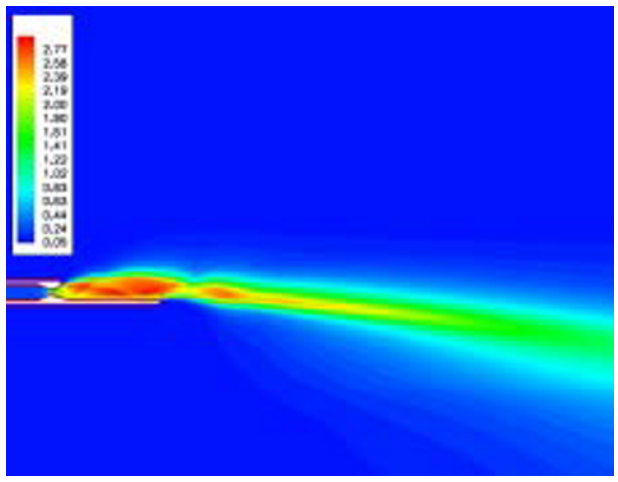
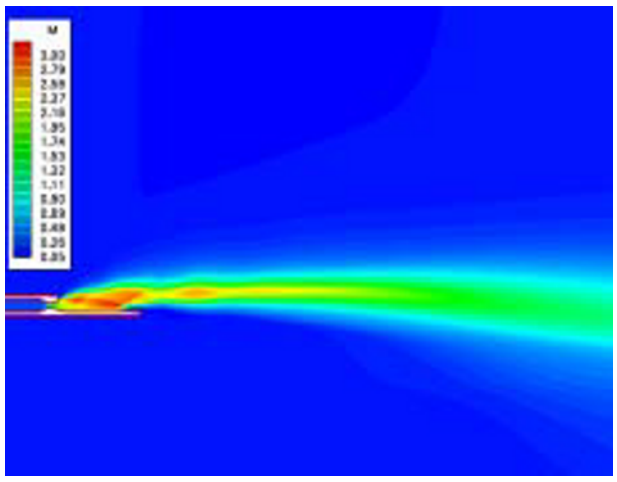


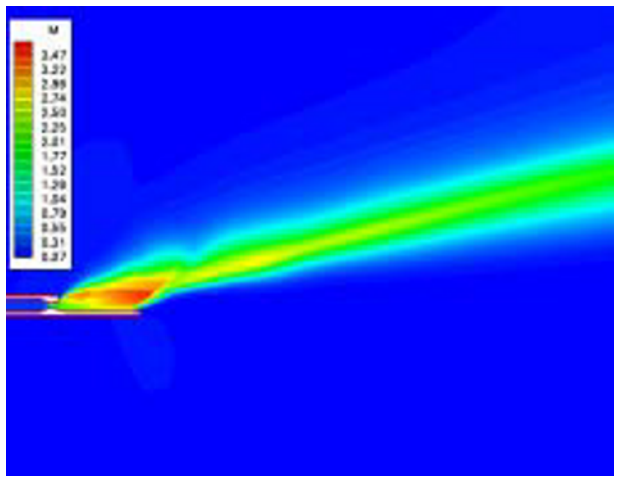
(a) Chamber Pressure = 130 psia



(b) Chamber Pressure = 250 psia



(c) Chamber Pressure = 300 psia



(d) Chamber Pressure = 500 psia

Navier-Stokes numerical simulations showing the supersonic flow field induced by a H2-O2 rocket thruster with an attached panel, under a variety of operating conditions. The plume direction is controlled by the shocks. It moves from a straight and slightly downward direction to an upward direction as the combustion chamber pressure is increased from 130psia to 500psia. The 500psia case exhibits the highest plume angle, where the Mach number remains very high past the initial shock, aft of the inclined ramp, and over the flat panel.