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Three Dimensional Attached and Separated Hypersonic, Turbulent Shock/Boundary Layer Interactions NEIL MURRAY, RICHARD HILLIER, Imperial College — Current understanding of three-dimensional shock/boundary layer interactions in hypersonic flows is limited. Existing two-dimensional experimental results can only be perceived as nominally two-dimensional as end wall effects and other secondary effects introduce parasitic three-dimensionality into an otherwise planar flow. Since any three-dimensional study requires an excellent bench mark two-dimensional flow, we believe that the use of bodies of revolution (2D axisymmetric) is paramount. Here we introduce results from a study into shock boundary layer interactions in a Mach 8.9, turbulent flow. During the study, attached and separated interactions produced by an axisymmetric cowl surrounding an axisymmetric centrebody are investigated using schlieren photography and pressure and heat transfer sampling along the centrebody surface at points 1mm apart. A highly accurate dataset of two-dimensional axisymmetric results, produced when the cowl and centre-body are aligned has been recorded. This is then compared with a three-dimensional dataset produced when the cowl is offset relative to the centrebody giving a controlled insight into the nature of the three-dimensional interaction.

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