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**Experimental Investigation of SBLI to Unravel Inlet Unstart Physics**[1] MORGAN FUNDERBURK, VENKATESWARAN NARAYANASWAMY, North Carolina State Univ — The phenomenon of shock boundary layer interaction (SBLI) driven inlet unstart persists as one of the most significant problems facing supersonic ramjet/scramjet engines. In order to determine how the characteristics of the SBLI units specific to rectangular inlets evolve during an unstart event, an experimental investigation is made using surface streakline methods and pitot/wall pressure measurements in the vicinity of the floor and corner SBLI induced by a compression ramp in a rectangular channel. Mean and unsteady measurements were taken at a variety of shock strengths to simulate the evolution of the combustion-induced back pressure ratio during unstart. The freestream Mach number was also varied. Statistical correlation methods were used to determine the degree of interaction between the floor and corner SBLI with different flowfield locations for the various test conditions. Finally, comparison to a two-dimensional compression ramp SBLI was made to determine any modification caused by the introduction of the corner SBLI. Results indicate that the floor and corner SBLI transition from distinct units to members of a global separated flow with increasing back pressure, and that considerable modification of the floor SBLI by the corner flow occurs.

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