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Structure and Unsteadiness of Shock-foot and Separation Location in a Swept SBLI at Mach 2[1] LEON VANSTONE, MUSTAFA MUSTA, NOEL CLEMENS, The University of Texas at Austin — This study examined the structure and unsteadiness of a 3D shock wave / boundary layer interaction (SBLI) generated by a swept compression ramp in a Mach 2 flow. Fast response PSP was used to examine the behavior of the separation shock foot unsteadiness and high frequency PIV data was used to examine the separation line unsteadiness. Shock-foot unsteadiness was broadband, having significant low- (St¡0.01), mid- (0.01¡ St¡ 0.10), and high-frequency (St¿ 0.10) content. Generally, the shock foot contained lower frequency content in comparison to the separation line. In a low-frequency band the behavior of the shock foot was similar to that of the separation line. The mid- and high-frequency band shock-foot unsteadiness was not characteristically similar to the separation location. Many studies examine SBLI unsteadiness using only a single characterising feature (shock foot, separation line, etc.). Our results showed that the shock and separation lines have different characteristic behavior. Hence, different features within the SBLI give different characteristic impressions of unsteadiness.

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Leon Vanstone
The University of Texas at Austin

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