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Zones of Influence and Low Frequency Shock Motion in a Shock Boundary Layer Interaction LIONEL AGOSTINI, LIONEL LARCHEVEQUE, PIERRE DUPONT, JEAN-FRANCOIS DEBIEVE, JEAN-PAUL DUSSAUGE, IUSTI, UMR 6595 CNRS / University of Provence — Shock-wave / boundary layer interactions usually exhibit unsteadiness with strong low frequency content. The present work aims at analyzing the low frequency shock motion using high resolution data from long-time large-eddy simulations. Three different flow configurations are considered yielding incipient to full separation of the boundary layer in the interaction region. Filtered cross-correlation are used to identify the flow regions being able to influence the shock at low-frequency. It is demonstrated that the information paths deduced from the cross-correlations coincide with the pressure characteristic lines. A theoretical computation of the phase velocity along the shock of perturbations induced by the "breathing" of the interaction region is derived. For all the three flow configurations, two different velocities are found, depending on the location of the sources along the boundary of the decelerated zone. These velocities match quite accurately velocities along the shock computed from the LES data by means of cross-correlations.

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