

Abstract Submitted
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Attachment-Line Heating in a Compressible Flow HELEN REED, WILLIAM SARIC, Texas A&M University — The attachment-line boundary layer on a swept wing can be subject to either an instability or contamination by wing-root turbulence. A model of the attachment-line boundary layer is first developed including compressibility and wall heating in a Falkner-Skan-Cooke class of 3-D boundary layers with Hartree parameter of 1.0. For cases otherwise subcritical to either contamination or instability, the destabilizing effect of leading-edge heating under a variety of sweep angles and flight conditions is demonstrated. The results correlate with the attachment-line Reynolds number. Because the required heating levels are reasonable and achievable to trip the flow over the wing to turbulent, one possible application of this work is in the establishing of a baseline turbulent flow (on demand) for the calibration of a laminar-flow-control health monitoring system. **Portion based on work under Framework Agreement between Airbus Americas and NIA, and opinions, findings, conclusions do not necessarily reflect views of Airbus or NIA. **Support from AFOSR/NASA National Center for Hypersonic Research in Laminar-Turbulent Transition through Grant FA9550-09-1-0341 gratefully acknowledged.

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