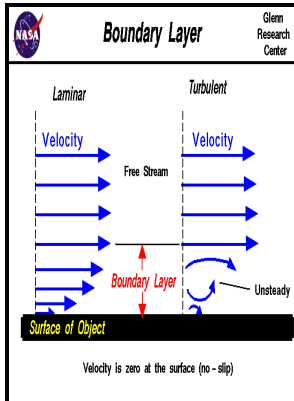


# Use of hot-film technique for boundary layer studies on a 21% thick airfoil

National Aeronautical Establishment - DTIC ADA184412: The Use of Hot



Description: -

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Transonic speed

Hot-film anemometers

Boundary layer flow

Airfoil use of hot-film technique for boundary layer studies on a 21% thick airfoil

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## DTIC ADA184412: The Use of Hot

The boundary layer equations coupled with the Prandtl-Meyer relation for the external flow are used to calculate the flow field. Using proposed UBDO framework, the aforementioned problem has been regularized to achieve the optimal airfoil with a tradeoff of aerodynamic performances under fully turbulent and free transition conditions.

### The use of hot

Additionally, we explore how the boundary layer thickness, local average shear stress distribution, and total drag force on the wrinkled plate vary with the aspect ratio of the riblets as well as the length of the plate. When the skin-friction results of one finite difference solution are used in the thermal analysis of Rubesin and Inouye, improved agreement between the thermal results of the two methods of solution is obtained.

### The use of hot

An experiment was conducted in a water tunnel to replicate separation, with a focus on the reversing flow development near the wall within a laminar boundary layer. Additionally, smoke—wire experiments were performed for the stall region in order to visualize the flow around the airfoil.

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This reveals a breakdown and a subsequent second streamwise zone, where the flow disturbance is predominantly inviscid. A central composite design of experiments method, was used to develop response surfaces for boundary-layer thickness and reversed- flow thickness, with factor variables of inter-ramp spacing, ramp height and chord length, and flow injection ratio.

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