MEMORANDUM

TO: 403/Assistant Chief, High-Speed Aircraft Division
FROM: 359/Head, 8-Foot Tunnels Branch, HSAD
SUBJECT: Some Thoughts on Reducing Skin Friction

The following thoughts are intended to cover only reductions in skin friction drag for subsonic or moderately supersonic aircraft since hypersonic cruise aircraft will probably not be practical within our lifetime.

Laminar flow control with suction slots or through porous surfaces has been studied and restudied. From a construction standpoint it is probably not economically practical. Blowing through a series of slots also probably is not economically practical. While some research on this latter approach might result in some useful information, no major effort should be aimed in this direction. All methods thus far developed have been based on boundary layers defined by the classical Navier-Stokes equation in which air is treated as a continuum. It is very probable that the only practical method for reducing skin friction by a substantial amount with an economically competitive structure will be achieved by a detailed analysis of the inter-reaction of the air molecules with the airplane surface. Such an approach would follow that now being carried out in the study of the low drag of porpoises. However, any method for air would undoubtedly not be an exact duplication of the mechanism of the porpoises skin since air is so much less dense that water. The approach would be based on a physical analysis of the inter-reaction of gases with solid surfaces; a subject which is relatively unexplored and probably a field of important new technological applications.

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