Readers' Forum _____

AIAA 82-4102

Comment on "Streamline Development of the Flow over a Delta Wing"

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WITH regard to Ref. 1, I feel that certain comments are required with respect to the material presented.

The authors employ an equation for circulation, Γ, taken from Ref. 2, and apply it to their separation-induced vortex-flow circulation measurements. However, the equation they used from this report applies only to attached flow and was used by Polhamus only in connection with the attached-flow lift factor. Therefore, the employment of this equation to assess the aggregate value of circulation contained in a separation-induced vortex flow above and along a sharp-edged delta wing is not consistent with the original development. Furthermore, the value attributed to Polhamus on Fig. 3 is not correct. The one shown is about three times higher than can be generated from the Polhamus equation, as it leads to a value of only 0.6117.

References

[1] Sforza, P. M. and Smorto, M. J., "Streamline Development of the Flow over a Delta Wing," *AIAA Journal*, Vol. 19, July 1981, pp. 833-834.

[2] Polhamus, E. C., "A Concept of the Vortex Lift of Sharp-Edge Delta Wings Based on a Leading-Edge Suction Analogy," NASA TN D-3767, 1966.

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Reply by Authors to J. E. Lamar

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THE authors are indebted to Dr. Lamar for pointing out our numerical error in the calculation of the circulation connected with the attached flow, and for presenting the correct value. The intent of showing the value we calculated was to illustrate what we thought to be an unusual result, but was instead a misleading error. Previous experimental studies of the circulation in delta wing flows, e.g., Wentz and McMahon,[1] have shown that the maximum circulation lies between the value for attached flow and the value for the case where the vortex is considered to be concentrated, as in the model of Brown and Michael.[2] The same result was found in our experiments, again indicating that a concentrated vortex model will most likely be incapable of properly representing the actual flowfield. Instead, the circulation distribution we found in the leading edge vortex has strong similarities to that found in trailing vortices, as described by Govindaraju and Saffman.[3] We again thank Dr. Lamar for his comments and apologize to our readers.

References

[1] Wentz, W. H. and McMahon, M. C., "Further Experimental Investigations of Delta and Double-Delta Wing Flow Fields at Low Speeds," NASA CR-714, Feb. 1967.

[2] Brown, C. E. and Michael, W. H., "On Slender Delta Wings with Leading-Edge Separation," NACA TN-3430, April 1955.

[3] Govindaraju, S. P. and Saffman, P. G., "Flow in a Turbulent Trailing Vortex," *Physics of Fluids*, Vol. 14, Oct. 1971, pp. 2074-2080.