DEPARTMENT OF AEROSPACE ENGINEERING
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AEROELASTIC, CFD, AND DYNAMICS COMPUTATION AND
OPTIMIZATION FOR BUFFET AND FLUTTER APPLICATIONS

Principal Investigator: Osama A. Kandil

Final Report
For the period December 1, 1995 through November 30, 1996

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Dr. Robert M. Bennett, Technical Monitor
SD-Aeroelasticity Branch

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AEREOELASTIC, CFD AND DYNAMICS COMPUTATION AND
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GRANT NO. NAG-1-648
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Accomplishments

In the period of December 1, 1995 to November 30, 1996, the Principal Investigator (PI) along with the assistance of three Ph.D. students have achieved the following accomplishments under this grant:

I. Publications

I.1. Kandil, O. A., Massey, S. J. and Sheta, E. F., "Structural Dynamics-CFD Interac-
tion for Computations of Vertical Tail Buffet," Royal Aeronautical Journal, U.K., Au-
gust/September, 1996; pp. 297-303. (a copy is attached).

I.2. Kandil, O. A., "Recent Advances in Multidisciplinary Aeronautical Problems of
Fluid/Structures/Dynamics Interaction," International Seminar Series II Proceedings, In-
stitute of Aeronautics and Applied Mechanics, Warsaw University of Technology, November

with Application to F/A-18 Tail Buffet," High-Angle-of-Attack Technology Conference,
NASA Langley, September 17–19, 1996. (A copy is attached).

I.4. Menzies, M. A. and Kandil, O. A., "Natural Rolling Responses of a Delta Wing in

on Transonic Shock-Induced Vortex-Breakdown Flow of a Delta Wing," Sixth International
Symposium on Computational Fluid Dynamics (ISCFD), Lake Tahoe, NV, September 4–8,


*Professor and Eminent Scholar

II. Abstracts Submitted to Technical Conferences


III. Animation Movies Produced


This simulation movie was first shown at the High-Angle-of-Attack Technology Conference, NASA Langley, September 17–19, 1996. The Virginia State Fair has also requested the permission to show the movie at the VA State Fair on Aerospace Industry, September 30, 1996. The movie has also been shown at The International Seminar Series of The Institute of Aeronautics and Applied Mechanics, Warsaw University of Technology, Warsaw, Poland, November 26, 1996.

The movie exists on the NAS simulation files and the ODU/Aero Web page to be accessed and viewed.


The movie has been shown at the AIAA Atmospheric Flight Mechanics Conference, San Diego, CA, July 29–31, 1996. It was also shown in Warsaw, Poland (same conference listed above), November 26, 1996.
IV. Proposal Submitted For CRAY C-90 Usage

A proposal has been submitted and approved for usage of the National Aerodynamic Simulation Facilities at NASA Ames Research Center, CA, September 1996. The proposal has been funded for 150 hrs. of C-90 CPU time.

A technical summary has also been submitted along with the F/A-18 simulation movie to NAS in December, 1996.

V. Graduate Students

Three Ph.D. students have been assisting the P.I. to carry out the tasks of this research grant and write their Ph.D. Dissertations. Two of these students are supported by the Aerospace Engineering Department and one is supported under this grant. One of the students (Ms. Margaret A. Menzies) wrote her Ph.D. Dissertation and successfully defended it in May 1996. She is currently employed by The Aviation Specialists Company in Charolettsville, VA. Her Ph.D. Dissertation is titled "Unsteady, Transonic Flow Around Delta Wings Undergoing Coupled and Natural Modes Response—A Multidisciplinary Problem." The cover page and a summary are attached. The status of the other two students is given below:

V1. Mr. Steven J. Massey (U.S. Citizen): He has been working on his Ph.D. degree since May 1994. He has been supported under this grant and a fellowship from the AE Dept. Currently, he is a Ph.D. candidate (since Spring 1996). He is expected to finish his Ph.D. degree in August 1997. His Ph.D. dissertation focuses on single and twin tail buffet prediction and control.

V2. Mr. Mark W. Flanagan (U.S. Citizen): He has been working on his Ph.D. degree since January 1994. He has been supported under a fellowship from the AE Dept. and work at Dynamic Engineering Inc. currently, he is a Ph.D. candidate (since Spring 1996) and he is expected to finish his Ph.D. degree in December 1997. His Ph.D. dissertation focuses on simulation and optimization control of tail buffet in supersonic internal vortex breakdown flows in a configured duct.
VI. Conference and Technical Meetings Presentations and Activities


