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***GRADUATE SEMINAR***

## Small Disturbance Boundary Condition Simulating the Interaction Between Upstream Disturbance and an Axial Compressor

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***Date*:** May 30, 2003
***Time*:** 3:00 - 4:00 p.m.
***Place*:** 755 Baldwin Hall

***Refreshments***: 2:45 – 3:00 p.m.

### ABSTRACT

A new small disturbance boundary condition is formulated to model the unsteady interactions of acoustic disturbances with an axial compressor is presented. It is implemented in one-dimensional and axisymmetric turbulent flow models of the inlet/compressor experiment at the University of Cincinnati. Acoustic reflections from the compressor face boundary conditions are compared against the measured experimental reflection characteristics of the axial compressor. The performance of the boundary conditions is also compared against existing boundary conditions such as Paynter small disturbance boundary condition. These comparisons show that the new small disturbance boundary condition provides the best accuracy in terms of the prediction of the reflected disturbance from the interaction of an acoustic disturbance with a compressor.

### BIOGRAPHICAL SKETCH

Maj Jeff McMullan received a B.S. degree in Mechanical Engineering from Clemson University in 1991, a M.S. in Aeronautical Engineering from Air Force Institute of Technology in 1996, and Ph.D. from North Carolina State University in 2002. In 1992, he entered active duty service in the U.S. Air Force. Throughout his military career, Maj McMullan has managed operations of an unique Air Force facility responsible for developing new explosive formulations, led the intelligence community in assessing a new foreign strategic ballistic missile development program, and testified before the House National Security Committee on the Department of Defense assessment of a new missile program. He is currently an Assistant Professor of Aerospace Engineering at the Air Force Institute of Technology, Wright-Patterson AFB, Ohio. Maj McMullan teaching and research efforts are focused in the areas of computational fluid dynamics, hypersonics, and propulsion. He is a member of AIAA, ASME, SAME, and AFA.

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