Investigation of Data Quality for Wind Tunnel Internal Balance Testing
Master of Science Thesis Defense

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Chair of Advisory Committee: Dr. Edward White
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Abstract

Achieving high quality, consistency, and testing efficiency in wind tunnel tests using internal balances is accomplished through the use of new testing methods, analysis of data output, and standardized documentation of test procedures at the Texas A&M Low Speed Wind Tunnel. The wind tunnel is capable of performing internal balance testing on models that experience less than 500 pounds of normal force. Testing has shown less than a 3% mean flow variation with the sting mount installed and a turbulence intensity of less than 0.25%. Documentation of procedures and checklists for installation of internal balance testing equipment and test execution provide higher efficiency and consistency during a test. A step-by-step examination of the data analysis routines and associated uncertainty equations show uncertainty in the force and moment coefficients for the Mark XIII internal balance to be approximately ±0.05 and ±0.02, respectively. Quantifying the uncertainty of the primary output parameters and showing repeatability of the data within the defined uncertainty limits achieved higher quality results.

John Hidore is an M.S. candidate in the Aerospace Engineering Department working under the supervision of Professor White. His research interests are in the areas of dynamics, aerodynamics and wind tunnel testing. He is going to be employed by Lockheed Martin as an Aerospace Engineer in King of Prussia, Pennsylvania.