

DESIGN, FABRICATION, AND CHARACTERIZATION OF A LOW-DISTURBANCE,  
ACTIVELY-CONTROLLED, MACH 5 TO 8 WIND TUNNEL

A Dissertation Proposal

by

JACOB B. VAUGHN

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Chair of Committee, Edward White

Committee Members, Rodney Bowersox

Nathan Tichenor

Je Han

Head of Department, Ivett Leyva

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## ABSTRACT

This is the first numbered page, lower case Roman numeral (ii). Page numbers are outside the prescribed margins, at the bottom of the page and centered; everything else is inside the margins. No bold on this page except the heading ABSTRACT if all major headings are bold. *This L<sup>A</sup>T<sub>E</sub>X template applies to this exception).*

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The next pages are Dedication, Acknowledgments, Contributors and Funding Sources, and Nomenclature. Contributors and Funding Sources is required, the rest are optional.

## DEDICATION

To my mother, father, grandfather, and grandmother. I'm filling in more space so that this extends  
to the next line.

## ACKNOWLEDGMENTS

This section is also optional, and limited to four pages. It must follow the Dedication Page (or Abstract, if there's no Dedication). If listing preliminary pages in Table of Contents, include Acknowledgments. This heading (ACKNOWLEDGMENTS) is bold if major headings are bold. It should be in same type size and style as text. As does the vertical spacing, paragraph style, and margins.

I would like to thank the Texas A&M University Graduate and Professional School to allow me to construct this L<sup>A</sup>T<sub>E</sub>X thesis template.

## CONTRIBUTORS AND FUNDING SOURCES

### **Contributors**

This work was supported by a thesis (or) dissertation committee consisting of Professor John Doe [advisor — also note if co-advisor] and John Doe of the Department of [Home Department] and Professor(s) XXXX of the Department of [Other Department].

The data analyzed for Chapter IV was provided by Professor Thompson. The analyses depicted in Chapter X were conducted in part by Daniel James of the Department of Statistics and were published in (2004) in an article listed in the Journal of Things.

All other work conducted for the thesis (or) dissertation was completed by the student independently.

### **Funding Sources**

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## NOMENCLATURE

ACE	Actively Controlled Expansion
CFD	Computational Fluid Dynamics
FEA	Finite Element Analysis
BCDC	Bush Combat Development Complex
NAL	National Aerothermochemistry and Hypersonics Laboratory
MW	Machine Works Inc.
FEDC	Fischer Engineering Design Center
PLC	Programmable Logic Controller
$L^1$	Space of absolutely Lebesgue integrable functions; i.e., $\int  f  < \infty$ test test test test test test test
$L^2$	Space of square-Lebesgue-integrable functions, i.e., $\int  f ^2 < \infty$
$PC(S)$	Space of piecewise-continuous functions on $S$

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## LIST OF TABLES

TABLE

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## 1. INTRODUCTION

### **1.1 Hypersonics**

Some stuff here about hypersonics

### **1.2 Hypersonic Wind Tunnels**

Wind tunnel stuff

### **1.3 Turbulence**

Turb stuff

## 2. DESIGN AND FABRICATION OF ACE2.0

### 2.1 Motivation

The conventional ACE (Actively Controlled Expansion) Tunnel was designed...

#### 2.1.1 Turbulent Transition

Stuff

##### 2.1.1.1 *ACE Experimental Data*

Stuff and figures



Figure 2.1: A caption about this figure

### *2.1.1.2 Mach Line Tracing*

Stuff and figures



Figure 2.2: Another caption

### *2.1.1.3 Suspect Transition Mechanisms*

Stuff here [1]

1. Throat
2. Stuff
3. Stuff
4. Stuff

### **2.1.2 Active Control Capability**

Stuff here

## **2.2 Design**

Stuff

### **2.2.1 Nozzle Contour Codes**

Stuff and figures

### **2.2.2 CFD**

Stuff and figures

### **2.2.3 Design Requirements**

Stuff and figures

### **2.2.4 20-Ton Linear Actuators Design**

Stuff and figures

#### *2.2.4.1 Nozzle and Settling Chamber*

Stuff and figures

#### *2.2.4.2 Frame and Actuation*

Stuff and figures

#### *2.2.4.3 Final Design*

Stuff and figures

## **2.3 Fabrication**

Stuff and images

## **2.4 Installation and Calibration**

Stuff and figures



Figure 2.3: A caption about penguins

#### **2.4.1 Assembly**

Stuff and figures

#### **2.4.2 Actuation**

Stuff and figures

#### **2.4.3 Actuation Homing and Calibration**

Stuff and figures

#### **2.4.4 First Run**

Stuff and figures

### 3. EXPERIMENTAL SETUP AND MEASUREMENTS

#### 3.1 Nozzle Survey

Stuff

#### 3.2 Mach Sweep Hysterisis

Stuff



## 4. RESULTS AND DISCUSSION

Stuff about experminet results



Figure 4.1: A caption about penguins

More stuff

**4.1 Maybe**

**4.2 Possibly**

## 5. CONCLUSIONS AND RECOMMENDATIONS

Stuff here

**5.1 Maybe**

**5.2 Possibly**

## REFERENCES

- [1] W. S. Saric, “Görtler vortices,” *Annual Review of Fluid Mechanics*, vol. 26, no. 1, pp. 379–409, 1994.

## APPENDIX A

### FIRST APPENDIX

Text for the Appendix follows.



Figure A.1: A caption here

## APPENDIX B

THIS TITLE IS MUCH LONGER THAN THE FIRST AND EXTENDS ALL THE WAY TO  
THE NEXT LINE

Text for the Appendix follows.



Figure B.1: A caption here

### **B.1 Appendix Section**

### **B.2 Second Appendix Section**