CORE PROGRAM

in the

JOINT INSTITUTE FOR ADVANCEMENT OF FLIGHT SCIENCES

at the

NASA LANGLEY RESEARCH CENTER

NCC1-01-020

Final Report

December 1, 2000 – August 31, 2003

School of Engineering and Applied Science
The George Washington University
Washington, DC 20052
The objectives of the "Core Program in the Joint Institute for Advancement of Flight Sciences (JIAFS) at the NASA Langley Research Center" are described in the original proposal awarded November 1980. Funding for this program is given in Appendix A.

Participants and Activities

Participants in the "Core Program" during this period included:
- Professor J. L. Whitesides
- Ms. Jessie Coates
- Ms. Carolyn F. Stough

Professor Whitesides has administered and provided technical direction for the JIAFS.

Research Activities

Following the precedent started several years ago, each of the graduating MS and DSc candidates in JIAFS present a seminar which is advertised throughout the area. Following the formal seminar the attendees are excused and the review committee examines the student as in a standard thesis defense. This allows the students to gain experience in presenting their research and disseminating the Institute's research results to a wider audience. A list of seminars are given in Appendix B.

Some 172 excellent applications for the Graduate Research Scholar Assistantships were received during this period. Forty-nine new GRSA were appointed by Professor Whitesides to JIAFS under the various research grants and contracts.

A list of the publications and presentations by members of JIAFS is given in Appendix C.

During this period there were 54 graduates from the academic programs in JIAFS. A list of these graduates and their initial employer upon graduation from GW is included as Appendix D. A list of the courses offered during the period Fall 2000 through Summer, 2003 is given in Appendix E.
APPENDIX A

Period of Performance

December 1, 2000 through August 31, 2003

Summary

12/01/00 – 11/30/01
New Cooperative Agreement – Funding: 102,446.00
08/09/01 – 11/30/01
Supplement 1 – Augmentation/correct award history – Funding 102,446.00
12/01/01 – 12/31/02
Supplement 2 – Augment award history, add incremental funding and extend period – Funding: 102,446.00
01/01/03 – 08/31/03
Supplement 3 – No Cost Time Extension

Award History
Funding History
Total: 102,446.00
SEMINARS PRESENTED

1. M. A. Benes, "Investigating the Application of a Confidence Interval Methodology to Assessing Neural Network Surrogates."

2. G. C. Harding, "A High-Frequency Supersonic Pulsed Injector with Applications to Supersonic Combustors."


4. R. L. Stephens, "Recursive Attitude and Rate Estimator."


16. J. L. Hanna, “Approaches to Autonomous Aerobraking at Mars.”

17. J. P. Hundley, “A Thermography System for Imaging Reusable Launch Vehicles.”


29. P. P. Zomkowski, “Preliminary Design and Analysis of the GIFTS Instrument Pointing System.”


34. L. Kay-Bunnell, "Orbit Determination Accuracy for Comets on Earth-Impacting Trajectories."

35. B. P. Anderson, "Spacecraft-Ballute Interactions Using Continuum and Rarefied Computational Analysis."


37. A. L. Martin, "Methodology for Reduced Monte Carlo Simulations with Application to Mars Science Laboratory Entry."


40. M. C. Bastow, "A Telescope Tracking and Thermal Imaging System for High-Speed Vehicles."


42. R. M. Lunceford, "Crash Test and Analysis Validation of Aircraft Seat Structures."

APPENDIX C

PUBLICATIONS AND PRESENTATIONS


37. B. P. Anderson, "Computational Continuum and Rarefied Flow Results for Ballute Applications." Presented: AIAA Mid-Atlantic Region 1 Student Conference, College Park, MD, April 11-12, 2003.

## APPENDIX D

### GRADUATES - 2000-2003

#### Concentration

#### Employed by

**Fall 2000**

- **Michael A. Benes**
  - Aero, GRSA
  - Visteon Steering Systems, MI

- **Gregory C. Harding**
  - Aero, GRSA
  - Schweizer Aircraft Corp, NY

- **Timothy M. Mauery**
  - Aero, GRSA
  - Lockheed Martin Aircraft & Logistics, SC

- **Robert L. Stephens**
  - SDyn, GRSA
  - Swales & Assoc @ NASA Langley

- **Javier Velez**
  - Aero, GRSA
  - Raytheon Missile Systems, AZ

**Spring 2001**

- **Michael S. Bonner**
  - Aero, GW
  - Naval Air Warfare Ct, CA

- **Timothy J. Bozung**
  - Astro, GRSA
  - Stryker Instruments, MI

- **Jeffrey S. Parker**
  - Astro, GRSA
  - Allied Signal Technical Services, MD

- **James P. Tomey**
  - SDyn, GRSA
  - Ford Motor Co, MI

- **Kenrick A. Waithe**
  - Aero, GRSA
  - AS&M @ NASA Langley

**Summer 2001**

- **Marcus D. Billings**
  - SDyn, GRSA
  - ATA Engineering, CA

- **Alicia M. Dwyer**
  - Astro, GRSA
  - ICASE @ NASA Langley

- **Louis R. Giersch**
  - Astro, GRSA
  - University of Kentucky, KY

- **Kristopher R. Horne**
  - SDyn, GRSA
  - Lockheed Martin, CA

- **Alan D. Sullins**
  - Astro, GRSA
  - Aerospace Corp, CA

**Fall 2001**

- **Stephen J. Alter**
  - Aero, NASA
  - NASA Langley

- **Brooke M. Anderson**
  - Astro, GW
  - Swales @ NASA Langley

- **Frederico R. Garza**
  - Aero, GW
  - Swales @ NASA Langley

- **Benjamin E. George**
  - Astro, GRSA
  - USAF

- **Govinda B. Haines**
  - Aero, GRSA
  - Unknown

- **Jill L. Hanna**
  - Astro, GRSA
  - ICASE @ NASA Langley

- **Scott A. Hill**
  - S/Dyn, N
  - NASA Langley

- **Jason P. Hundley**
  - Aero, GRSA
  - Northrop-Grumman, CA

- **Craig A. Hunter (DSc)**
  - Aero, GRSA
  - NASA Langley

- **Byron R. Monzon**
  - Aero, GRSA
  - Pratt & Whitney, CT

- **Matthew T. Phillips**
  - Aero, GRSA
  - USAF

- **Michael T. Powers**
  - S/Dyn, GRSA
  - Lockheed Martin Missiles & Space Systems, CA

- **Jason B. Prince**
  - Aero, GRSA
  - Aerotech Research, USA Inc., VA

- **Yelena M. Savranskaya**
  - Astro, GRSA
  - Aerospace Corp, CA
Spring 2002

Troy D. Altus  Aero  GRSA  ATK Tactical Systems Co., MD
Adam C. Olsen  Aero  GRSA  Unknown

Summer 2002

Dustin J. Bouch  Aero  GRSA  Eidetics Corp, CA
Zachary Q. Chavis  Astro  GRSA  Pratt & Whitney, CT
Christopher G. Lang  Astro  GRSA  NASA Langley
Dawn R. Phillips  Aero  GRSA  Lockheed Martin Space Operation
Brendan R. Rogillio  Astro  GRSA  Unknown
Joshua E. VerHage  Astro  GRSA  Unknown
Paul P. Zomkowski  Astro  GRSA  Aerospace Corp, CA

Fall 2002

David W. Fiala  Astro  GRSA  Unknown
Corey D. Hernandez  Astro  GW  Swales & Associates @ NASA LaRC
Micah J. Solter  Astro  GRSA  Lockheed Martin Missiles & Space, CA
Michael P. Strauss  Aero  GRSA  Sikorsky Aircraft Corp, CT
Jeffrey I. Walters  Aero  GRSA  Lockheed Martin Missiles & Space, CA

Spring 2003

Paul E. Escalera  Astro  GRSA  Orbital Sciences Corp, VA
Linda Kay-Bunnell  Astro  GRSA  Analytical Mechanics Assoc @ NASA LaRC
Derek S. Liechty  Aero  NASA  NASA Langley

Summer 2003

Brian P. Anderson  Astro  GRSA  Combustion Research & Flow Technology, PA
Jonathan T. Black  Astro  GRSA  University of Kentucky
Craig P. Hugger  Aero  GW  Unknown
Alex L. Martin  Astro  GRSA  Aerospace Corporation, CA
Kyle G. Moss  Aero  GRSA  Swales Aerospace @ NASA Langley
Michael E. Theriot  Astro  GRSA  George Washington University
David T. Walker  SDyn  GRSA  Thiokol, UT
Martin R. Werner  Astro  GRSA  Spectrum Astro, AZ
APPENDIX E

ACADEMIC PROGRAM

FALL 2000

ApSc 212    Analytical Methods in Engineering II
ApSc 213    Analytical Methods in Engineering III
MAE 207    Theory of Elasticity
MAE 221    Fluid Mechanics
MAE 224    Viscous Flow
MAE 248    Aircraft Design II
MAE 253    Aircraft Structures
MAE 274    Spacecraft Dynamics
MAE 275    Stability and Control of Aircraft
MAE 276    Space Flight Mechanics
MAE 286    Numerical Solution Techniques in MAE
MAE 292    Special Topics in Aerospace Engineering
MAE 298    Research (arr.)

SPRING 2001

ApSc 214    Analytical Methods in Engineering IV
ECE 202    Linear Systems Theory
MAE 225    Computational Fluid Dynamics
MAE 228    Compressible Flow
MAE 234    Composite Materials
MAE 247    Aircraft Design I
MAE 250    Launch Vehicle Design
MAE 257    Theory of Vibrations
MAE 277    Spacecraft Attitude Control
MAE 286    Numerical Solution Techniques in MAE
MAE 292    Special Topics in Aerospace Engineering (Astro Project)
MAE 298    Research (arr.)
ACADEMIC PROGRAM (continued)

FALL 2001

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