# GEORGE F. SWITZER

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## EXPERIENCE

### High Performance Computing Facilitator

Available after 3/14/2025
NASA Langley Research Center, Hampton, VA
03/2021 – present

NASA Team Lead for the Research Directorate

A new position promoting efficient and effective use of high-performance computing (HPC) resources to impact research goals with three concentrations: consulting, training, and future capability awareness. NASA Hackathon and bootcamp training events co-coordinator in 2021 and coordinator in 2023.

1) Worked with the NASA Langley unsteady pressure sensitive paint project to install and test operations on the Langley HPC system K Cluster.

2) Developed valuable relationship with NASA Langley training office leveraging budget support for $100K HPC related training in FY ’22 and $24K in FY ‘23. Coordinated and facilitated training events at Langley and across the agency to develop workforce HPC skills improvement.

3) Identified topics and arranged speakers for the monthly HPC meeting benefiting research staff at NASA Langley and across the agency. Presenters ranged from local NASA researchers to industry experts bringing awareness about new technologies and how to use existing HPC resources. The HPC meeting has no budget support.

10/2023 Reassignment to Computational Aerosciences Branch D302

Member of the Sustainable Flight Demonstration Team for Low-Speed Computational Fluid Dynamic (CFD) analysis of the X-66 Boeing transonic truss braced wing (TTBW) design

1) Conducted several CFD simulations to generate Cp, force and moment, and skin friction surface plots for several angles of attack.

2) Created Python scripts utilizing PyTecplot to automate post-processing FUN3D CFD results for presentation to Boeing.
3) Responsible to transfer data to/from Boeing and NASA as holder of Boeing laptop and badged as Boeing employee.

Member of the coordination team for the Google AI/ML training Aug 2024
1) Awarded the Silver Group Achievement award as part of the Summer of AI Team

Organized several HPC related training events:
1) Pointwise onsite two-day training (Cadence - Sep 2024)
2) PyTecplot training (Tecplot - Sep 2024)
3) Ennova Mesh Generation presentation (Ennova - Oct 2024)
4) Quantum Readiness presentation (BosonQ Psi - Nov 2024)

Create a prototype Python method to accelerate CERES satellite data analysis.
1) Acceleration demonstrated scales to 97% efficiency of available CPU.
2) Minimal modification to Fortran source
3) Portability to other projects with embarrassingly parallel workflows

**RADAR ENGINEER**
Analytical Mechanics Associates, Hampton, VA
01/2016 – 03/2021

NASA Contractor member of the High Ice Water Content (HIWC) research team within the Electromagnetic Sensors Branch at NASA Langley.

1) Applied and modified the Terminal Area Simulation System (TASS) Large Eddy Simulation (LES) Fortran model to investigate HIWC related phenomena and its ability to be detected by airborne radar. Having over two decades of experience as a research engineer applying TASS as a state-of-the-art numerical LES model for simulating various types of atmospheric phenomena, this current application of TASS involved using flight recorded data to reconstruct an environment representative of the observed conditions flown during the NASA HIWC research flight campaigns of 2015 and 2018 as well as other international flight campaigns. Operation of TASS requires high performance computing (HPC) resources along with the Message Passing Interface (MPI) library to enable TASS to simulate extremely large domains using the smallest possible grid resolutions.

- served as Principal Investigator for the National Advanced Supercomputing (NAS) center project, “LES Modeling for High Ice Water Content.”
- participated in the RTCA Special Committee 230 Working Group 10, “Airborne Weather Detection Systems.”

- Engineered significant modifications to the TASS MPI logic to reduce global memory required as well as improve computational efficiency. The modifications enabled TASS operations with over 7000 processors on a domain with 800,000,000 grid points.
- Applied Python scripting language to analyze and visualize the vast amount of data produced by the TASS simulations.
- Derived an improved microphysical model relationships within TASS by applying Python to analyze flight recorded ice water concentration profile data.
- Created, documented, and delivered TASS based data sets to industry partners supporting development of sensor technology.

2) Updated and improved simulation capability of radar systems by enhancing the Airborne Doppler Weather Radar Simulation (ADWRS) written in Fortran and the Airborne Weather Radar Simulator (AWRS) written in C++. Both programs simulate radar performance against TASS based data sets.

3) Investigated how to transfer SVHS and DVCAM tapes of NASA flight research data to digital format. The complicating factor of the research was the requirement to capture time code (TC) from the original tapes to the digital format, which resulted in a one of a kind capability to capture and preserve TC of the video sources. This led to the discovery and purchase of a commercially available solution to convert analog signal to Serial Digital Interface (SDI) which is necessary to digitize the media. The resulting workflow solved a perplexing enigma that was over a decade old.

### COMPUTER SCIENTIST, SENIOR

SAIC, Hampton, VA
11/2015 – 12/2015

NASA Contractor member of the Pair-wise Trajectory Management (PTM) research team within the Crew Systems & Aviation Operations Branch at NASA Langley after contract transferred to SAIC from SGT.

1) Analyzed flight data to determine performance metrics for evaluation of aircraft signal reception of Automatic Dependent Surveillance-Contract (ADS-B) in oceanic airspace.
2) Modified Fortran program Traffic Manager (TMX) for simulation of aircraft operations evaluating the PTM concept, which involves acquiring FAA ground station data and generating flight scenarios representative of real-world operations for use as input to the TMX program.

### SENIOR SCIENTIST

Analytical Services & Materials, Inc., Hampton, VA
10/2008 – 10/2015

Subcontractor to SGT from 04/2013 as member of the Pair-wise Trajectory Management (PTM) research team within the Crew Systems & Aviation Operations Branch at NASA Langley Responsibilities from 04/2013:

1) Analyzed flight data to determine performance metrics for evaluation of aircraft signal reception of Automatic Dependent Surveillance-Contract (ADS-B) in oceanic airspace.
2) Modified Fortran program Traffic Manager (TMX) for simulation of aircraft operations evaluating the PTM concept, which involves acquiring FAA ground station data and generating flight scenarios representative of real-world operations for use as input to the TMX program.

Subcontractor to Raytheon from 10/2008 through 08/2010 followed by SGT though the NASA LITES contract from 09/2010 to 03/2013 in support of the wake vortex research team within the Crew Systems & Aviation Operations Branch at NASA Langley
Responsibilities from 10/2008 through 03/2013:

1) Served as research engineer to apply TASS LES model to evaluate the effects of atmospheric phenomenon on aircraft wake vortices thereby developing models and relationships necessary for performing analysis of flight systems and operations.
2) Mentored a Governor's Fellow student during the summer of 2011. Mentoring involved delivering TASS and related post-processing software to high school student (Kevin Kabaria) as well as instructing him how to compile and run the programs. His research topic was to evaluate the feasibility of using TASS in cloud computing, and his research conclusively showed cloud computing to be inferior to regular computing methods. Mentoring Kevin involved guidance and suggestions to successfully complete his research assignment.
3) Designed, implemented and verified NASA's suite of wake vortex prediction models, which is a collection of empirical models containing state-of-the-art theorems derived from TASS model simulations, observational data, and international collaboration. Gave recommendations based on knowledge of software modernizations strategies for reduced logic complexity and improved maintainability that motivated NASA to initiate this project, which saved NASA significant time and labor resources.
4) Lead a specialized group of programmers to generate high-fidelity, high-frequency data sets of a sub-region of the TASS LES model domain necessary for industry partners to test and verify sensor technology performance against detection and quantification of wake vortex systems.
5) Created a number of TASS LES data sets and generated reports documenting the background information, contents, and truth values for verification by sensor simulation systems.
6) Trained team members in the operation of TASS post processing software and implemented modifications and improvements in response to identified findings. Served as subject matter expert (SME) resource on the operation and capabilities of this

software by providing technical advice related to proposed modifications and their impact on the research objectives. Served as the sole person responsible for maintaining, improving and verifying all TASS LES post processing software.
7) Applied novel automation strategies to the operation of TASS and related post processing software to reduce required time-on-task thereby allowing investigation of more variables to better quantify large 3-D TASS data set results to parametric relationships for wake vortex decay.
8) Conducted an experimental study to better understand TASS turbulence generation methodologies and provide guidance for improving turbulence generation efficiency, isotropic qualities, and understanding of domain aspect ratio limitations.
9) Directed and planned necessary research assessing TASS model performance on new supercomputer systems to insure continuity of research with the TASS LES model as computer systems improve over time. The result of this research minimizes potential disruption of the research progress dependent upon TASS model results.

**SENIOR SCIENTIST**
Analytical Services & Materials, Inc., Hampton, VA
10/2007 – 10/2008

NASA Contractor with a team of research engineers to evaluate the performance of abort scenarios for NASA's Project Orion Crew Exploration Vehicle, which supported the research milestones of the Configuration Aerodynamics Branch at NASA Langley Research Center. This required numerous simulations using the USM3D model to assess the performance of abort motors and abort control motors across a range of angles of attack, Mach numbers, vehicle configurations, and thrust conditions. The work required constant re-processing of USM3D model data to answer research questions.

1) Lead the post-processing of results for flow field contour and vehicle surface plots.
2) Developed novel techniques using the Perl scripting language to generate hundreds of plots in a matter of hours that would have otherwise required a week or more to complete.
3) Responded promptly to NASA requests for additional analysis plots.
4) Trained team members to use software tools to greatly improve productivity. The tools introduced resulted in significant savings in network bandwidth between NASA Ames supercomputers and local desktop machines, because these tools enabled researchers to perform analysis remotely on Ames computer systems.
5) Trained team members in the operation and modification of Perl scripts to insure a smooth transition as contract assignment concluded.

**SUPPORT SCIENTIST**
Northwest Research Associates, Inc., Redmond, WA
08/2005 - 10/2008

NASA Contractor member of the wake vortex research team within the Crew Systems & Aviation Operations Branch at NASA Langley Research Center, responsibilities involved conceiving and formulating research ideas to mitigate software limitations to meet NASA milestones, leading software development teams to introduce new capabilities in software systems, formulating analytical relationships for vortex behavior due to varying atmospheric phenomenon, utilizing TASS LES model results to create large 3-D data sets for government and industry, and developing post processing software to analyze large 3-D data sets.

1) Coordinated with NASA contractors to remove software deficiencies and improve the performance of TASS.
2) Directed the search for and implementation of a freely available Fast Fourier Transform (FFT) enabling TASS to create 3-dimensional turbulence domains, which restored the ability to investigate environmental affects upon wake vortex behavior.
3) Tested, maintained and improved the TASS model code and related post processing software programs.
4) Performed numerous 2-D TASS LES wake vortex simulations and analyzed crosswind shear effects upon wake vortex behavior.
5) Created tools and methods to study and generate empirical model relationships for aircraft vortex behavior as related to turbulence intensity and thermal stratification.
6) Reported on results from TASS LES wake vortex studies.
7) Designed and implemented post processing software solutions for TASS LES model results.
8) Trained team members and provided technical direction to operate TASS post processing software.
9) Identified, created and implemented automation strategies to post process TASS LES model results that achieved greater than 10 times reduction in the required time. The time saved allowed for the research and optimization of two key parameters critical to the analysis of these large 3-D data sets. This automation also enabled the timely completion of the contract obligations otherwise not possible.
10) Documented and delivered 3-D wake vortex results from TASS to NASA partner companies to meet NASA objectives.
11) Initiated, designed, and developed a MatLab software tool to plot post processed results from TASS 3-D wake vortex simulations compared to empirical model predictions. This tool enabled the NASA wake vortex team to quickly generate presentation figures, analyze many different groupings of wake vortex results, and develop relationship improvements for the empirical model performance.

### RESEARCH AEROSPACE ENGINEER

RTI International, Hampton, VA
03/1993 - 04/2005

Participated on teams with representatives from industry, university, and government to develop advanced concepts for improving aircraft operations in the National Airspace System. The research focused on the application of 3-D TASS model results to improve the efficiency and safety of the national airspace system. The work performed in this position as a contractor supported research objectives of the NASA Langley Research Center in Hampton, VA.

1) Lead projects for over 10 years to interpret TASS model results.
2) Project lead to improve/enhance the Airborne Doppler Weather Radar Simulator (ADWRS).
3) Coordinated TASS model development across many different organizations.
4) Created and maintained Fortran software to analyze and interpret TASS model results.
5) Conducted research to improve understanding of atmospheric phenomena.
6) Communicated research results in oral presentations and written reports.

Worked on three distinct projects to solve important problems related to national airspace safety and efficiency as explained below.

1) Turbulence Prediction and Warning System (TPAWS) 2000 – 2005
- Project manager for NASA contracts to develop software tools to certify turbulence detection systems for researching and evaluating flight systems performance.
- Created, evaluated, and documented 3-D high and medium fidelity data sets.
- Participated with definition and evaluation of turbulence classification techniques.
- Worked within TPAWS team to evaluate and improve turbulence prediction models.
- Applied TASS 3-D model to research novel means to generate isotropic turbulence fields necessary for sensor certification studies.

2) Aircraft Vortex Spacing System (AVOSS) 1995 – 2004
- Enhanced TASS to simulate wake vortex systems in turbulent, stratified domains.
- Analyzed TASS results to develop greater understanding of wake vortex behavior.
- Co-derived a unique analytical prediction model for vortex transport and decay.
- Identified a new relationship for the onset of rapid decay of vortex systems.

3) Windshear 1993 – 1996
- Created the FAA windshear database for airborne systems certification.
- Evaluated the performance of NASA's onboard windshear radar.
- Programmed software to create and analyze the FAA windshear database.

The following two short duration, high pressure projects were the result of requests by NASA to apply the TASS model to support the National Transportation and Safety Board (NTSB) in specific aircraft crash investigations:

1) AA587 – 2002: Flight AA 587 crashed in New York, NY on November 12, 2001. Assisted NASA to re-create a wake vortex system to analyze its potential contribution to the accident.
2) US AIR 1016 - 1994: US Air flight 1016 crashed at Charlotte, NC, on July 2, 1994. Assisted NASA with the re-creation of the meteorological environment at the time of the accident.

## EDUCATION

Master's Degree / Aerospace Engineering
Virginia Polytechnic Institute & State University Blacksburg, VA
04/1987
Thesis: Patch Grid Solutions of the 2-D Thin-Layer Navier Stokes Equations

Bachelor's Degree / Aeronautical Engineering
California Polytechnic State University San Luis Obispo, CA
05/1985
Honors: Cum Laude

## JOB RELATED TRAINING

Proficient in Fortran, Message Passing Interface (MPI), and shell scripting strategies necessary for utilizing large processor based super computing resources.
Proficient in MatLab application environment, TecPlot 360, MS Word, Excel, and PowerPoint.
Proficient with Python language as well as application of the Pandas data analysis library.
Proficient with high performance computing systems, Linux operating system, and MS Windows operating systems.
Knowledgeable about analog video technology and the requirements to transfer to digital format.

Invited attendee two-week training “Argonne Training for Program for Extreme Scale Computing” (2022)
Three-day training “Team Leadership” (2022)
Two-day training “Communicating with Impact” (2022)
Five-day training “Python for Scientists & Engineers” (2022)
Two-day training “Deep Reinforced Machine Learning” (2018)
Two-day training “Python High Performance Computing Using Anaconda” (2017)
Two-day training “Large Scale Visualization with ParaView” (2017)
Two-day training for Julia Language (2017)
Personal Software Process for Engineers (2003) Guide to Project Management (2001)

## AFFILIATIONS

American Institute of Aeronautics and Astronautics (AIAA) - Senior Member
Tau Beta Pi - Lifetime member

## PROFESSIONAL PUBLICATIONS


1) Strickland, J. K., P. J. Hunt, Harrah, S.D., and G. F. Switzer, “A Method for Correlating Forward-Looking Remote Sensor Measurements with In-Situ Measurements on Flying Platforms,” NASA TM 2020-5002898.
2) Proctor, F. H., S. D. Harrah, G. F. Switzer, J. K. Strickland, and P. J. Hunt, “High Ice Water Content in Tropical Cyclones during NASA/FAA Radar Flight Campaigns with Comparison to Numerical Simulations,” AIAA Aviation 2019 Forum, Dallas, TX, Paper No. AIAA 2019-3304, doi: 10.2514/6.2019-3304.
3) Harrah, S.D., J. K. Strickland, P. J. Hunt, F. H. Proctor, G. F. Switzer, T. P. Ratvasky, J. W.Strapp, L. Lilie, C. Dumont, “Radar Detection of High Concentrations of Ice Particles – Methodology and Preliminary Flight Test Results,” SAE Intl. Conf. on Icing of Aircraft, Engines, and Structures, Minneapolis, MN., Paper No. 2019-01-2028, doi: 10.4271/2019-01-2028.
4) Proctor, F. H., S. D. Harrah, G. F. Switzer, J. K. Strickland, and P. J. Hunt, “High Ice Water Concentrations in the 19 August 2015 Coastal Mesoconvective System,” 9th AIAA Atm. and Space Env. Conf., Denver, CO., Paper No. AIAA 2017-4370, doi: 10.2514/6.2017-4370.
5) Proctor, F. H., and G. F. Switzer, “Numerical Simulation of HIWC Conditions with the Terminal Area Simulation System,” AIAA Aviation 2016, Washington, D.C., Paper No. AIAA 2016-4203, doi: 10.2514/6.2016-4203.
6) Switzer, G. F., and F. H. Proctor, “Terminal Area Simulation System User's Guide - Version 10.0,” NASA/TM-2014-218150, Jan 2014.
7) Switzer, G. F., F. H. Proctor, N. N. Ahmad, and F. M. Duparcmeur, "An Improved Wake Vortex Tracking Algorithm for Multiple Aircraft," AIAA ASE Conference, Toronto, Canada, Paper No. AIAA-2010-7993, August 2010, doi: 10.2514/6.2010-7993.
8) Proctor, F. H., N. N. Ahmad, G. F. Switzer and F. M. Duparcmeur, "Three-Phased Wake Vortex Decay," AIAA ASE Conference, Toronto, Canada, Paper No. AIAA-2010-7991, August 2010, doi: 10.2514/6.2010-7991.
9) Proctor, F. H., D. W. Hamilton, and G. F. Switzer, “TASS Driven Algorithms for Wake Prediction,” 44th Aerospace Sciences Meeting & Exhibit, Reno, NV, Paper No. AIAA-2006-1073, January 2006, doi: 10.2514/6.2006-1073.
10) Proctor, F. H., D. W. Hamilton, D. K. Rutishauser, and G. F. Switzer, “Meteorology and Wake Vortex Influence on American Airlines FL-587 Accident,” NASA/TM-2004-213018, April 2004.

11) D. P. Delisi, R. E. Robins, G. F Switzer, D. Y. Lai, and F. Y. Wang, “Comparison of Numerical Model Simulations and SFO Wake Vortex Windline Measurements,” 21st AIAA Applied Aerodynamics Conference, Orlando, FL, AIAA Paper No. 2003-3810, June 2003, doi: 10.2514/6.2003-3810.
12) Switzer, G. F., and F. H. Proctor, "Wake Vortex Prediction Models for Decay and Transport within Stratified Environments," 40th Aerospace Sciences Meeting & Exhibit, Reno, NV, AIAA Paper No. 2002-0945, January 2002, doi: 10.2514/6.2002-945.
13) Proctor, F. H., and G. F. Switzer, "Numerical Simulation of Aircraft Trailing Vortices, "Preprints of the 9th Conference on Aviation, Range and Aerospace Meteorology, Orlando, FL, paper 7.12, September 2000, pp 511-516, NTRS-NASA.
14) Switzer, G. F., and F. H. Proctor, "Numerical Study of Wake Vortex Behavior in Turbulent Domains with Ambient Stratification," 38th Aerospace Sciences Meeting & Exhibit, Reno, NV, AIAA Paper No. 2000-0755, January 2000, doi: 10.2514/6.2000-755.
15) Switzer, G. F., "Two-dimensional Simulations of Wake Vortex Interaction from Multiple Aircraft, "Proceedings of the NASA First Wake Vortex Dynamic Spacing Workshop. NASA CP 97-206235, November 1997, pp. 212-222.
16) Schowalter, D. G., D. S. DeCroix, G. F. Switzer, Y.-L. Lin, and S. P. Arya, "Toward Three dimensional Modelling of a Wake Vortex Pair in the Turbulent Planetary Boundary Layer," 35th Aerospace Sciences Meeting & Exhibit, January 1997, Reno, NV, AIAA Paper No. 97-0058, doi: 10.2514/6.1997-58.
17) Switzer, G. F., "Validation Tests of TASS for Application to 3-D Vortex Simulations," NASA CR-4756, October 1996.
18) Switzer, G. F. and C. L. Britt, "Performance of the NASA Airborne Radar with the Windshear Database for Forward-Looking Systems," NASA CR-201607, September 1996.
19) Proctor, F. H., E. M. Bracalente, S. D. Harrah, G. F. Switzer, and C. L. Britt, "Simulation of the 1994 Charlotte Microburst with Look-ahead Windshear Radar," Preprints, 27th Conference on Radar Meteorology, Vail, CO, Amer. Meteor. Soc., Paper: 10B.7, 1995, pp. 530-532, NTRS-NASA.
20) Switzer, G. F., F. H. Proctor, and D. A. Hinton, "Windshear Certification Database for Forward-look Detection Systems," Airborne Windshear Detection and Warning Systems, Fifth and Final Combined Manufacturers' and Technologists' Conference, Hampton, VA, NASA CP 10139, Part II, Hampton, VA, 1994, pp. 447-462.
21) Switzer, G. F., F. H. Proctor, D. A. Hinton and J. V. Aanstoos, "Windshear Database for Forward-looking Systems Certification," NASA TM-109012, 1993.
22) Richardson, P. F., E. B. Parlette, J. H. Morrison, G. F. Switzer, A. D. Dilley, and W. M.Eppard, "Comparison Between Experimental and Numerical Results for a Research Hypersonic Aircraft,” Journal of Aircraft, April 1990, doi: 10.2514/3.25272.
23) Richardson, P. F., A. D. Dilley, K. W. Edwards, J. H. Morrison, G. F. Switzer, J. A. White, and E. B. Parlette, "Status Report on Calculations for the Test Technique Demonstrator," Presented at the 7th NASP Technology Symposium, NASA Lewis Research Center, October 1989.
24) Richardson, P. F., C. R. McClinton, R. D. Bittner, A. D. Dilley, K. W. Edwards, W. M. Eppard, J. H. Morrison, D. R. Riggins, G. F. Switzer, and E. B. Parlette, "Hypersonic CFD

Applications for the National Aero-Space Plane," SAE Aerotech 89 Conference, Anaheim, California, September 1989, doi: 10.4271/892310.
25) Richardson, P. F., E. B. Parlette, J. H. Morrison, G. F. Switzer, A. D. Dilley, and W. M. Eppard, "Heat Transfer and Pressure Comparisons Between Computation and Wind Tunnel for a Research Hypersonic Aircraft," AIAA 27th Aerospace Sciences Meeting. AIAA Paper No. 89 0029, Reno, Nevada, January 1989, doi: 10.2514/6.1989-29.
26) Richardson, P. F., E. B. Parlette, A. D. Dilley, W. M. Eppard, J. H. Morrison, and G. F. Switzer, "Effect of Grid Refinement on Heat Transfer Calculations for the McDonnell Douglas Generic Option #2 Blended Wing Body" Presented at the 5th National Aerospace Plane Technology Symposium, NASA Langley Research Center, October 1988.
27) Walters, R.W., J.L. Thomas, and G.F. Switzer, "Aspects and Applications of Patch Grid Calculations," AIAA paper # 86-1063, AIAA/ASME 4th Joint Fluid Mechanics, Plasma Dynamics & Lasers Conference, Atlanta, Georgia, May 1986, doi: 10.2514/6.1986-1063.

## HONORS AND AWARDS

2024 NASA Silver Group Achievement Award as member of Summer of AI Team
2019 NASA Group Achievement Award as a member of the High Ice Water Concentration Radar Evaluation Team
2009 NASA Group Achievement Award as a member of the CEV Aeroscience Project Team
2009 AS&M Special Achievement Award for Outstanding Contributions to the CEV Aeroscience Project Team
2004 NASA Certificate of Appreciation for exceptional contributions developing technologies that have significant potential for reducing turbulence-induced injuries aboard commercial transports.
2004 NASA Group Achievement Award entitled, “NASA Langley Research Center American Airlines Flight 587 Accident Investigation Team.”
2003 NASA Turning Goals into Reality Award for outstanding contributions to Aviation Safety Turbulence Prediction and Warning Systems (TPAWS) Team.
2002 NASA Group Achievement Award entitled, “NASA Langley Research Center American Airlines Flight 587 Accident Investigation Team."
2001 NASA Turning Goals into Reality Award for outstanding contributions to Aircraft Vortex Spacing System (AVOSS) and exceptional progress toward revolutionizing aviation by increasing capacity while maintaining a high degree of safety.
2000 NASA Group Achievement Award for outstanding accomplishments in pioneering the development and field testing of a prototype wake vortex spacing system at the Dallas/Fort Worth International Airport.
1988 Honorary Superior Accomplishment Award for timely computational support to the test module review activities of the National Aerospace Plane Program.
1988 Certificate of Appreciation for contribution as a Langley Integrator Team Member for the National Aerospace Plane Program Aircraft Concept Review (June-September 1987).

## REFERENCES

Available upon request