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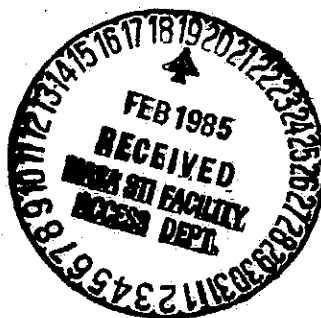
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Scientific and Technical Information Output of the Langley Research Center for Calendar Year 1984

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NASA Technical Memorandum 86336

**Scientific and Technical Information
Output of the Langley Research Center
for Calendar Year 1984**

Compiled by

Research Information and Applications Division

Langley Research Center

Hampton, Virginia

NASA

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

FOREWORD

This report contains a listing of Langley Research Center's scientific and technical research output for calendar year 1984.

The intent of this report is to provide a greater awareness of the broad scope of results and the importance of the research and development work conducted by scientists and engineers at Langley. This current awareness is mandated by the National Aeronautics and Space Act of 1958, which provides for the widest practical dissemination of NASA research.

During the calendar year 1984, Langley's contributions to NASA and non-NASA literature included 150 NASA Formal Reports, 144 Quick-Release Technical Memorandums, 277 Contractor Reports, 241 Journal Articles and Other Publications, 497 Meeting Presentations, 168 Technical Talks, 30 Computer Programs, 120 Tech Briefs, and 26 Patents. In addition, during the year 18 conferences, symposia, and workshops were sponsored or cosponsored by Langley and held locally.

Comments or suggestions concerning this publication should be addressed to the Research Information and Applications Division, Mail Stop 180A, NASA Langley Research Center, Hampton, Virginia 23665.



Andrew J. Hansbrough
Assistant Chief, Research Information
and Applications Division

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CONFERENCES SPONSORED OR COSPONSORED BY LANGLEY AND HELD LOCALLY IN 1984

Title of conference	Date	Langley contacts	Langley		Non-Langley	
			Speakers	Attendees	Speakers	Attendees
1. Workshop on Technology Needs for Filament Wound Composite Structures	Mar. 6-8	B. A. Stein	1	15	17	57
2. Opportunity Through Technology Workshop	Mar. 27	J. Samos and L. J. Rose	2	22	8	100
3. NASA 5th NTA Region II Technical Student Symposium	Mar. 30-31	C. M. Darden G. A. Haynes	0	33	23	372
4. A New Direction in Structural Analysis	Apr. 11-12	W. J. Stroud	1	30	7	7
5. NASA Recent Experiences in Multi-Disciplinary Analysis and Optimization Symposium	Apr. 24-26	J. E. Gardner	11	48	52	130
6. Integrated Digital/Electric Aircraft (IDEA) Systems Studies Contracts Final Oral Reviews	May 1-2	C. R. Spitzer	2	8	15	100
7. 107th Meeting of the Acoustical Society of America	May 6-10	H. H. Hubbard	9	40	440	730
8. Workshop on Wind Shear/Turbulence Inputs to Flight Simulation and Systems Certification	May 30-June 1	R. L. Bowles	2	5	8	52
9. High Temperature Polymers Conference	June 19-21	T. L. St. Clair	1	20	20	110
10. Joint NASA/AIAA Meeting on General Aviation Technology	July 10-12	L. J. Williams	8	60	0	53
11. Space Station Software Development Environment Workshop	Aug. 20-21	S. J. Voigt	0	1	2	19
12. Computational Structural Mechanics Workshop	Sept. 5-7	W. J. Stroud	0	26	11	55
13. Workshop on Theoretical Approaches to Turbulence	Oct. 10-12	D. L. Dwyer	2	15	18	34
14. AIAA/NASA 9th Aeroacoustics Conference	Oct. 15-17	D. G. Stephens J. C. Yu	19	40	100	160
15. Spectroscopic Parameters Workshop	Oct. 17-19	M. A. H. Smith	1	3	19	23
16. SAE/NASA 2nd Aircraft Interior Noise Meeting	Oct. 18-19	J. S. Mixson	2	17	31	68
17. Second Symposium on Welding, Bonding, and Fastening	Oct. 23-25	J. D. Buckley B. A. Stein	16	41	24	69
18. Large Space Antenna Systems Technology-1984 Conference	Dec. 4-6	C. A. Lightner	20	110	40	175
Total			97	534	835	2314

INTRODUCTION

The NASA Langley Research Center is one of the Nation's leading laboratories for research and development in the sciences of aeronautics and space technology. Langley conducts basic and applied research in fluid and flight mechanics, structures and materials, acoustics and noise reduction, measurement and instrumentation systems, numerical methods and techniques, data systems, electronics, physics, chemistry, and Earth and space sciences.

This publication is a compilation of Langley's scientific and technical research output for 1984 which is processed through the Center's Research Information and Applications Division, an integral part of NASA's Agency-wide Scientific and Technical Information (STI) system. This document is intended as a reference summary for researchers and as a current awareness publication for the scientific, research, and academic community.

The results of Langley's research are disseminated in a variety of NASA and non-NASA scientific and technical media and information systems. Details of the availability of the research references in this document are found in the section, "Availability," on page vii.

The citations are grouped first by Langley Directorates, then by the Langley Office or Division to which the senior author or innovator belongs. Citations are listed alphabetically by author or innovator under the following headings: Formal Reports (Technical Papers, Technical Memorandums, Conference Publications, Reference Publications, and Special Publications). Quick-Release Technical Memorandums, Contractor Reports, Journal Articles, and Other Publications, Meeting Presentations, Technical Talks, Computer Programs, Tech Briefs, and Patents. If a citation has more than one author, it is listed only once under the first author's name. The subject category number used to index the citation and the Research Technology Objectives and Plans (RTOP) number are noted below citations when appropriate.

Computer Programs listed are those which were submitted by Langley to COSMIC in 1984.

The NASA Tech Briefs cited have either been published¹ or submitted in 1984 for publication in "NASA Tech Briefs," a quarterly journal for United States industry, entrepreneurs, and academia. Free Subscriptions to this journal are available through the publisher, NASA Tech Briefs, 41 East 42nd Street, Suite 921, New York, New York 10017 or the NASA Technology Utilization Program by writing to the Technology Utilization Office, NASA Scientific and Technical Information Facility, P. O. Box 8757, Baltimore/Washington International Airport, Maryland 21240.

Patents listed, which are owned in whole or in part by Langley Research Center personnel, have been published in issues of "Scientific and Technical Aerospace Reports" (STAR), a NASA announcement journal for report literature. A subscription to STAR is available from the U.S. Government Printing Office (GPO) or to qualified recipients from the NASA Scientific and Technical Information Facility (STIF).

¹Those submitted in 1983 (and therefore listed in the 1983 issue of this document) but published in 1984 have not been listed.

Publication of some journal articles was not known at press time for the 1983 issue of this document. These articles are therefore listed in the 1984 issue.

AVAILABILITY

<u>Category</u>	<u>Source</u>
Formal Reports Quick-Release Technical Memorandums Contractor Reports	National Technical Information Service (NTIS) 5285 Port Royal Road Springfield, VA 22161 NASA Scientific and Technical Information Facility (STIF) P. O. Box 8757 Baltimore/Washington International Airport, MD 21240 NASA Industrial Applications Centers (IAC) (See Appendix for addresses of IAC's)
Computer Programs	Computer Software Management and Information Center (COSMIC) 112 Barrow Hall University of Georgia Athens, GA 30602
Langley Tech Briefs	Office of Technology Utilization and Applications Mail Stop 139A NASA Langley Research Center Hampton, VA 23665
Patents:	
Patent Application Specifications	National Technical Information Service (NTIS)
Printed Copies	Commissioner of Patents and Trademarks U.S. Patent and Trademark Office Washington, DC 20231

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NASA LANGLEY RESEARCH CENTER
Hampton, Virginia

CALENDAR YEAR 1984

PUBLICATIONS FOR OFFICE OF THE DIRECTOR

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

1. Anon.: Langley Aeronautics and Space Test Highlights - 1983. NASA TM-85806, June 1984, 79 p.
(Avail: NTIS Subject Category 99)
2. Anon.: Research and Technology - 1984 Annual Report of the Langley Research Center. NASA TM-86321, November 1984, 109 p.
(Avail: NTIS Subject Category 99)

Contractor Reports

3. Adams, L. M.; and Crockett, T. W.: Modelling Algorithm Execution Time on Processor Arrays. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering; and NAS1-16000 Kentron International, Inc.) NASA CR-172289, January 1984, 25 p.
(Avail: NTIS Subject Category 61 RTOP 505-31-83)
4. Anon.: Semiannual Report - April 1, 1983 Through September 30, 1983. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172304, February 1984, 51 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)
5. Anon.: Cumulative Reports and Publications Through December 31, 1983. (NAS1-17070, NAS1-17130, NAS1-15810, NAS1-16394, NAS1-14101, and NAS1-14472 Institute for Computer Applications in Science and Engineering.) NASA CR-172326, March 1984, 31 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)
6. Anon.: Semiannual Report - October 1, 1983 Through March 31, 1984. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172421, August 1984, 42 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)
7. Anon.: Semi-Annual Report - April 1, 1984 Through September 30, 1984. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172505, December 1984, 58 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)

8. Banks, H. T.; and Murphy, K. A.: Estimation of Coefficients and Boundary Parameters in Hyperbolic Systems. (NAS1-16394 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172389, June 1984, 53 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
9. Banks, H. T.; and Rosen, I. G.: Approximation Techniques for Parameter Estimation and Feedback Control for Distributed Models of Large Flexible Structures. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172411, June 1984, 21 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
10. Bayliss, A.; Goldstein, C. I.; and Turkel, E.: On Accuracy Conditions for the Numerical Computation of Waves. (NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172433, August 1984, 18 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
11. Bayliss, A.; Goldstein, C. I.; and Turkel, E.: The Numerical Solution of the Helmholtz Equation for Wave Propagation Problems in Underwater Acoustics. (NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172454, September 1984, 30 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
12. Bokhari, S. H.: Shuffle-Exchanges on Augmented Meshes. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172476, October 1984, 13 p.
(Avail: NTIS Subject Category 62 RTOP 505-31-83)
13. Bokhari, S. H.; and Raza, A. D.: Augmenting Computer Networks. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172399, July 1984, 24 p.
(Avail: NTIS Subject Category 62 RTOP 505-31-83)
14. Burns, J. A.; Ito, K.; and Powers, R. K.: Chandrasekhar Equations for Distributed Parameter Systems. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172467, September 1984, 24 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)
15. Canuto, C.: Boundary Conditions in Chebyshev and Legendre Methods. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172469, October 1984, 39 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
16. Canuto, C.; Hariharan, S. I.; and Lustman, L.: Spectral Methods for Exterior Elliptic Problems. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172380, June 1984, 34 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

17. Davis, S. F.: TVD Finite Difference Schemes and Artificial Viscosity. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172373, June 1984, 37 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
18. Elcrat, A. R.; and Trefethen, L. N.: Classical Free-Streamline Flow Over a Polygonal Obstacle. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172448, September 1984, 23 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)
19. Gannon, D.; and Van Rosendale, J.: On the Impact of Communication Complexity in the Design of Parallel Numerical Algorithms. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172436, August 1984, 37 p.
(Avail: NTIS Subject Category 60 RTOP 505-31-83)
20. Gatski, T. B.; and Grosch, C. E.: A Numerical Study of the Two- and Three-Dimensional Unsteady Navier-Stokes Equations in Velocity-Vorticity Variables Using Compact Difference Schemes. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172353, May 1984, 20 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
21. Goodman, J. B.; and LeVeque, R. J.: A Geometric Approach to High Resolution TVD Schemes. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172484, October 1984, 36 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
22. Gottlieb, D.: Spectral Methods for Compressible Flow Problems. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172395, June 1984, 21 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
23. Gozani, J.; Nachshon, A.; and Turkel, E.: Conjugate Gradient Coupled With Multigrid for an Indefinite Problem. (NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172379, June 1984, 13 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
24. Graif, E.; and Kunisch, K.: Parameter Estimation for the Euler-Bernoulli-Beam. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172417, June 1984, 44 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
25. Hafez, M. M.; and Phillips, T. N.: A Modified Least Squares Formulation for a System of First Order Equations. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172372, May 1984, 21 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
26. Hall, P.: The Görtler Vortex Instability Mechanism in Three-Dimensional Boundary Layers. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172370, June 1984, 39 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)

27. Hall, P.; and Malik, M. R.: On the Stability of a Three-Dimensional Attachment Line Boundary Layer: Weakly Nonlinear Theory and a Numerical Approach. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172504, December 1984, 66 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)

28. Hall, P.; Malik, M. R.; and Poll, D. I. A.: On the Stability of an Infinite Swept Attachment Line Boundary Layer. (NAS1-17070 Institute for Computer Applications in Science and Engineering, NAS1-16916 High Technology Corporation, and NAS1-14605 George Washington University.) NASA CR-172300, February 1984, 45 p.
(Avail: NTIS Subject Category 02 RTOP 505-31-83)

29. Hariharan, S. I.: Numerical Solutions of Acoustic Wave Propagation Problems Using Euler Computations. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172434, August 1984, 30 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

30. Hussaini, M. Y.; Kopriva, D. A.; Salas, M. D.; and Zang, T. A.: Spectral Methods for the Euler Equations: Chebyshev Methods and Shock-Fitting. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172295, January 1984, 35 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

31. Hussaini, M. Y.; Kopriva, D. A.; Salas, M. D.; and Zang, T. A.: Spectral Methods for the Euler Equations: Fourier Methods and Shock-Capturing. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172294, January 1984, 33 p.
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32. Hussaini, M. Y.; and Lakin, W. D.: Existence and Non-Uniqueness of Similarity Solutions of a Boundary Layer Problem. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172503, December 1984, 18 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)

33. Ipsen, I. C. F.: Singular Value Decomposition With Systolic Arrays. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172396, July 1984, 24 p.
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34. Ito, K.: An Iterative Method for Indefinite Systems of Linear Equations. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172345, April 1984, 21 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

35. Ito, K.: Legendre-Tau Approximation for Functional Differential Equations, Part III: Eigenvalue Approximations and Uniform Stability. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172447, August 1984, 35 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

36. Ito, K.; and Teglas, R.: Legendre-Tau Approximation for Functional Differential Equations, Part II - The Linear Quadratic Optimal Control Problem. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172397, July 1984, 66 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
37. Krause, E.: Review of Some Vortex Relations. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172452, September 1984, 9 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)
38. Lamm, P. D.: Estimation of Discontinuous Coefficients in Parabolic Systems: Applications to Reservoir Simulation. (NAS1-15810 and NAS1-16394 Institute for Computer Applications in Science and Engineering.) NASA CR-172301, February 1984, 55 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
39. Leuze, M. R.: Parallel Triangulation of Substructured Finite Element Problems. (NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172466, September 1984, 19 p.
(Avail: NTIS Subject Category 61 RTOP 505-31-83)
40. Lustman, L.: The Time Evolution of Spectral Discretizations of Hyperbolic Systems. (NAS1-17070 and NAS1-17261 Institute for Computer Applications in Science and Engineering.) NASA CR-172432, August 1984, 13 p.
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41. Lustman, L.: A Review of Spectral Methods. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172502, December 1984, 27 p.
(Avail: NTIS Subject Category 34 RTOP 505-31-83)
42. Malik, M. R.; Zang, T. A.; and Hussaini, M. Y.: A Spectral Collocation Method for the Navier-Stokes Equations. (NAS1-15810, NAS1-16394, NAS1-16916, NAS1-17070, and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172365, June 1984, 50 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
43. Osher, S.: Convergence of Generalized MUSCL Schemes. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172306, February 1984, 36 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
44. Phillips, T. N.; and Rose, M. E.: A Finite Difference Scheme for the Equilibrium Equations of Elastic Bodies. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172293, January 1984, 32 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
45. Reed, D. A.; and Patrick, M. L.: A Model of Asynchronous Iterative Algorithms for Solving Large, Sparse, Linear Systems. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172418, July 1984, 28 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

46. Reed, D. A.; and Patrick, M. L.: Parallel, Iterative Solution of Sparse Linear Systems: Models and Architectures. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172457, August 1984, 46 p.
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47. Roe, P. L.: Generalized Formulation of TVD Lax-Wendroff Schemes. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172478, October 1984, 15 p.
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48. Rose, M. E.: A Compact Finite Element Method for Elastic Bodies. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172487, November 1984, 39 p.
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49. Rosen, I. G.: Approximation Methods for Inverse Problems Involving the Vibration of Beams With Tip Bodies. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172468, September 1984, 11 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
50. Rosen, I. G.: A Numerical Scheme for the Identification of Hybrid Systems Describing the Vibration of Flexible Beams With Tip Bodies. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172388, June 1984, 37 p.
(Avail: NTIS Subject Category 66 RTOP 505-31-83)
51. Salas, M. D.; Abarbanel, S.; and Gottlieb, D.: Multiple Steady States for Characteristic Initial Value Problems. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172486, November 1984, 44 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
52. Spencer, J. H. (Compiler): Hampton Institute/American Society for Engineering Education/NASA Summer Faculty Fellowship Program 1984. (NGT 47-020-800 Hampton Institute.) NASA CR-172409, September 1984, 141 p.
(Avail: NTIS Subject Category 80)
53. Sritharan, S. S.: Delta Wings With Shock-Free Cross Flow. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172297, February 1984, 26 p.
(Avail: NTIS Subject Category 02 RTOP 505-31-83)
54. Sritharan, S. S.; and Smith, P. W.: On the Grid Generation Methods by Harmonic Mapping on Plane and Curved Surfaces. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172331, March 1984, 23 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)

55. Tadmor, E.: The Exponential Accuracy of Fourier and Tchebyshev Differencing Methods. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172435, August 1984, 25 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
56. Tadmor, E.: The Well-Posedness of the Kuramoto-Sivashinsky Equation. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172431, August 1984, 23 p.
(Avail: NTIS Subject Category 59 RTOP 505-31-83)
57. Tal-Ezer, H.: A Pseudospectral Legendre Method for Hyperbolic Equations With an Improved Stability Condition. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172475, September 1984, 48 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
58. Tal-Ezer, H.: Spectral Methods in Time for Hyperbolic Equations. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172302, February 1984, 34 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
59. Trefethen, L. N.: Stability of Finite Difference Models Containing Two Boundaries or Interfaces. (NAS1-17070 Institute for Computer Applications in Science and Engineering.) NASA CR-172319, March 1984, 49 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
60. Turkel, E.: Fast Solutions to the Steady State Compressible and Incompressible Fluid Dynamic Equations. (NAS1-17070 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172416, June 1984, 9 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
61. Turkel, E.: Acceleration to a Steady State for the Euler Equation. (NAS1-16394 and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172398, July 1984, 46 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
62. Turkel, E.; and Van Leer, B.: Flux Vector Splitting and Runge-Kutta Methods for the Euler Equations. (NAS1-16394, NAS1-17070, and NAS1-17130 Institute for Computer Applications in Science and Engineering.) NASA CR-172415, June 1984, 11 p.
(Avail: NTIS Subject Category 64 RTOP 505-31-83)
63. Vardi, A.: A New Minmax Problem. (NAS1-15810 Institute for Computer Applications in Science and Engineering.) NASA CR-172382, June 1984, 37 p.
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Meeting Presentations

No meeting presentations.

Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR OFFICE OF DIRECTOR FOR PROJECTS

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

No quick-release technical memorandums.

Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

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Tech Briefs

No tech briefs.

Patents

No patents.

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77. Spearman, M. L.: Some Aerodynamic Discoveries and Related NACA/NASA Research Programs Following World War II. NASA TM-86258, June 1984, 27 p.
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78. Spearman, M. L.: An Overview of Some Monoplanar Missile Programs. NASA TM-86330, December 1984, 32 p.
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79. Spearman, M. L.: Aerodynamic Characteristics of Some Lifting Reentry Concepts Applicable to Transatmospheric Vehicle Design Studies. NASA TM-86331, December 1984, 30 p.
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Quick-Release Technical Memorandums

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Contractor Reports

No contractor reports.

Journal Articles and Other Publications

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Meeting Presentations

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Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR LONG DURATION EXPOSURE FACILITY PROJECT OFFICE

Formal Reports

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(Editors): The Long Duration Exposure Facility (LDEF) - Mission 1
Experiments. NASA SP-473, February 1984, 197 p.
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Quick-Release Technical Memorandums

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Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

No meeting presentations.

Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

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Formal Reports

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119. Jackson, A. C.; Sandifer, J.; Sandorff, P.; and Van Cleave, R.: Advanced Manufacturing Development of a Composite Empennage Component for L-1011 Aircraft, Phase III - Final Report, Production Readiness Verification Testing. (NAS1-14000 Lockheed-California Company.) NASA CR-172383, August 1984, 107 p.
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121. Klotzsche, M. (Compiler): ACEE Composite Structures Technology. (NAS1-14869, NAS1-16857, and NAS1-17701 McDonnell Douglas Corporation.) NASA CR-172359, August 1984, 132 p.
(Avail: IAC Subject Category 24 RTOP 534-06-03)
122. Lineberger, L. B., et al.: Development of Laminar Flow Control Wing Surface Composite Structures. (NAS1-17487 Lockheed-Georgia Company.) NASA CR-172330, May 1984, 145 p.
(Avail: IAC Subject Category 01 RTOP 505-45-63)
123. McCarty, J. E.; and Roeseler, W. G.: Durability and Damage Tolerance of Large Composite Primary Aircraft Structure (LCPAS). (NAS1-16863 Boeing Commercial Airplane Company.) NASA CR-3767, January 1984, 22 p.
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132. Middleton, D. B.; Bartlett, D. W.; and Hood, R. V.: Energy Efficient Transport Technology in Hand. Aerospace America, Volume 22, May 1984, p. 74-78.
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133. Wagner, R. D.; and Fischer, M. C.: Fresh Attack on Laminar Flow. Aerospace America, Volume 22, No. 3, March 1984, p. 72-76.
(Subject Category 01 RTOP 505-45-63)

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Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

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Patents

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(Subject Category 37)

PUBLICATIONS FOR OFFICE OF DIRECTOR FOR ELECTRONICS

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

No quick-release technical memorandums.

Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

No meeting presentations.

Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR ANALYSIS AND COMPUTATION DIVISION

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(Avail: NTIS Subject Category 61 RTOP 505-37-23)
149. Sutherland, D.: Formal Verification of Mathematical Software. (NAS1-17579 Odyssey Research Associates, Inc.) NASA CR-172407, May 1984, 154 p.
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Tech Briefs

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Patents

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(Avail: NTIS Subject Category 72 RTOP 505-31-53)
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(Avail: NTIS Subject Category 61 RTOP 505-31-53)
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Technical Talks

863. Bell, V. L.: Research on High Performance Polyimides at NASA's Langley Research Center. Presented at the Central Research Institute, Mitsui Toatsu Chemical Company, April 3, 1984, Yokohama, Japan.
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865. Deaton, J. W.: Residual Strength of Repaired Graphite/Epoxy Laminates After One Year of Outdoor Exposure. Presented at the Materials and Flight Dynamics Laboratories of the Wright Aeronautical Laboratories, Air Force Composites Repair Technology Conference, October 30 - November 1, 1984, Dayton, Ohio.
(Subject Category 24 RTOP 505-33-33)
866. Dexter, H. B.: Composite Applications to Aircraft. Presented at the Mississippi State University Short Course on 2nd Applied Composite Structure Design and Fabrication, June 10-15, 1984, Mississippi State, Mississippi.
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869. Elber, W.: Fracture Toughness Testing for Interlaminar and Transverse Fracture in Resin-Matrix Composites. Presented at the Defense Advanced Research Projects Agency Workshop on Fracture Toughness of Advanced Fibrous Composites, July 19-20, 1984, La Jolla, California.
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874. Freeman, W. T., Jr.: The Potential of Filament Winding. Presented at the NASA Workshop on Technology Needs for Filament Wound Composite Structures, March 6-8, 1984, Hampton, Virginia. (Subject Category 24 RTOP 505-33-33)
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No patents.

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1418. Benner, D. C.; and Rinsland, C. P.: Identification and Intensities of the 'Forbidden' $03^3_0 \leftarrow 00^0_0$ Band of $^{12}C^{16}O_2$. Presented at the Ohio State University 39th Annual Symposium on Molecular Spectroscopy, June 11-15, 1984, Columbus, Ohio. Abstract in Proceedings, p. 53. (Subject Category 45 RTOP 147-44-02)
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1420. Browell, E. V.: Remote Sensing From Space Platforms. Presented at the NASA Workshop on Tunable Solid State Lasers for Remote Sensing, October 1-3, 1984, Stanford, California. Proceedings pending. (Subject Category 47 RTOP 618-32-33)
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1437. Grose, W. L.: Some Recent Advances in Understanding Stratospheric Dynamics and the Application of Satellite Data to Their Interpretation. Presented at the COSPAR 25th Plenary Meeting and Associated Activities, June 25 - July 7, 1984, Graz, Austria. Paper No. 5.2.1. Publication of proceedings in COSPAR journal "Advances in Space Research" pending.
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1438. Grose, W. L.; and Russell, J. M., III: Application of LIMS Temperature, Ozone, and Nitric Acid Data to Studies of Wave Breaking and Transport in the Middle Stratosphere. Presented at the COSPAR 25th Plenary Meeting and Associated Activities, June 25 - July 7, 1984, Graz, Austria. Paper No. A.1.5.2. Publication of proceedings in COSPAR journal "Advances in Space Research" pending.
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1445. Megie, G.; Flamant, P.; Bourdet, M.; Browell, E. V.; and Hall, W. M.: An ER-2 Airborne Lidar as Part of the Development Program of a Spaceborne System: A Potential NASA-CNES Cooperative Project. Presented at the ESA Workshop on Space Laser Applications and Technology, March 26-30, 1984, Les Diablerets, Switzerland. Published in ESA SP 202, May 1984, p. 189-195.
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1446. Minnis, P.; and Fishman, J.: Identification of Biomass Burning and In Situ Photochemical Ozone Generation in the Amazon Basin From Satellite Imagery. Presented at the 1984 Fall Meeting of the American Geophysical Union, December 3-7, 1984, San Francisco, California. Abstract published in EOS, Volume 65, No. 45, November 6, 1984, p. 836.
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1447. Natarajan, M.; Callis, L. B.; Russell, J. M., III; and Boughner, R. E.: A Study of the Ozone Photochemistry in the Upper Stratosphere Using LIMS Data. Presented at the IAMAP International Ozone Commission 1984 Quadrennial Ozone Symposium, September 3-7, 1984, Kassandra-Halkidiki, Greece. Abstract published in Programs and Abstracts, p. 1.8. Proceedings of extended abstracts pending.
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1448. Rinsland, C. P.; Goldman, A.; Devi, V. M.; Fridovich, B.; Murcay, F. J.; Murcay, D. G.; Coffey, M. T.; and Mankin, W. G.: Tunable Diode Laser Measurements of Intensities and Air-broadened halfwidths of the ν_2 band of HDO: Results and Their Application to the Analysis of Stratospheric Solar Absorption Spectra. Presented at the Ohio State University 39th Annual Symposium on Molecular Spectroscopy, June 11-15, 1984, Columbus, Ohio. Abstract in Proceedings, p. 52.
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1449. Russell, J. M., III: Results From the Limb Infrared Monitor of the Stratosphere (LIMS) Experiment. Presented at the COSPAR 25th Plenary Meeting and Associated Activities, June 25 - July 7, 1984, Graz, Austria. Paper No. 5.4.1. Publication of proceedings in COSPAR journal "Advances in Space Research" pending.
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1450. Russell, J. M., III; Remsberg, E. E.; Gordley, L. L.; and Gille, J. C.: The Climatology of Upper Atmosphere Nitrogen Dioxide Revealed by LIMS Observations. Presented at the IAMAP International Ozone Commission 1984 Quadrennial Ozone Symposium, September 3-7, 1984, Kassandra-Halkidiki, Greece. Abstract published in Programs and Abstracts, p. 3.18. Proceedings of extended abstracts pending.
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1451. Russell, P. B.; and McCormick, M. P.: Satellite Stratospheric Aerosol Measurement Validation. Presented at the COSPAR 25th Plenary Meeting and Associated Activities, June 25 - July 7, 1984, Graz, Austria. Publication of proceedings in COSPAR journal "Advances in Space Research" pending.
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1452. Shipham, M. C.; Shipley, S. T.; and Trepte, C.: A Real-Time Global Weather Analysis System for Atmospheric Experiment Support and Guidance. Presented at the NASA/NOAA, et al., Third Conference on Interactive Meteorological Processing, October 23-25, 1984, Greenbelt, Maryland. Abstract published in proceedings, p. 31.
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1453. Smith, G. L.; Avis, L. M.; Green, R. N.; and Wielicki, B. A.: Methods for Estimating Errors for Radiation Budgets Based on a Scanning Radiometer. Presented at the AMS Conference on Satellite Meteorology/Remote Sensing and Applications, June 25-29, 1984, Clearwater Beach, Florida. In Proceedings, p. 288-293.
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1454. Smith, M. A. H.; Harvey, G. A.; Richardson, D. J.; Thompson, R. E.; and Sutton, C. H.: Measurements of Pressure Broadening by Polar Gases. Presented at the Ohio State University 39th Annual Symposium on Molecular Spectroscopy, June 11-15, 1984, Columbus, Ohio. Abstract in Proceedings, p. 49.
(Subject Category 72 RTOP 678-12-03)
1455. Whitlock, C. H.; Suttles, J. T.; Sebacher, D. I.; Fuller, W. H.; and LeCroy, S. R.: Interpretation of Spectral Radiation Experiments Using Finite-Difference Radiative Transfer Theory. Presented at the IAMAP International Radiation Symposium 1984, August 21-29, 1984, Perugia, Italy. Abstract published in Programme and Abstracts, p. 715.
(Subject Category 47 RTOP 672-40-04)
1456. Vukovich, F.; Fishman, J.; and Browell, E. V.: The Reservoir of Ozone in the Boundary Layer of the Eastern United States and its Potential Impact on the Global Tropospheric Ozone Budget. Presented at the 1984 Fall Meeting of the American Geophysical Union, December 3-7, 1984, San Francisco, California. Abstract published in EOS, Volume 65, No. 45, November 6, 1984, p. 836.
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Technical Talks

1457. Browell, E. V.: Laser Remote Sensing of Atmospheric Gases and Aerosols. Presented at the SOQE/AIAA 1984 International Conference on Lasers, November 26-30, 1984, San Francisco, California.
(Subject Category 47 RTOP 176-40-04)
1458. Costen, R. C.: A Twisted Ring-Vortex Model of a Blocking High. Presented at the Los Alamos National Laboratory Vortex Dynamics Workshop, February 21-23, 1984, Los Alamos, New Mexico.
(Subject Category 47 RTOP 672-22-04)

1459. Fishman, J.: Global Budget of Tropospheric Ozone: Interpretation of Measurements From Long-Range Transport Experiment. Presented at the World Meteorological Organization and United Nation Enviromental Commission Advisory Meeting on the Eastern Mediterranean Transport Experiment, November 6, 1984, Madrid, Spain.
(Subject Category 46 RTOP 176-10-05)
1460. Grose, W. L.; Turner, R. E.; and Nealy, J. E.: Transport Processes in the Stratosphere: Model Simulations and Comparisons With Satellite Observations. Presented at the SCOSTEP/URSI, etc., International MAP Symposium, November 26-30, 1984, Kyoto, Japan.
(Subject Category 47 RTOP 673-64-02)
1461. Hypes, W. D.; and Casas, J. C.: Flying a Scientific Experiment Aboard the Space Shuttle - A Perspective From the Viewpoint of the Experimenter. Presented at the AIAA 22nd Aerospace Sciences Meeting, January 9-14, 1984, Reno, Nevada.
(Subject Category 45 RTOP 618-22-31)
1462. Lee, R. B., III; Luther, M. R.; and Barkstrom, B. R.: An Overview: Earth Radiation Budget Experiment (ERBE) Solar Monitor. Presented at the 56th Annual Convention of the National Technical Association, July 25-28, 1984, Cleveland, Ohio.
(Subject Category 92 RTOP 619-12-20)
1463. Levine, J. S.: Global Changes in Tropospheric Composition: Chemical and Climate Implications. Presented at the 17th Annual Meeting, Technical Advisory Committee, State Air Pollution Control Board, October 2, 1984, Virginia Beach, Virginia.
(Subject Category 46 RTOP 176-20-02)
1464. Levine, J. S.: Earth's Early Atmosphere: A New View. Presented at the 1984 Annual Meeting of the Geological Society of America, November 5-8, 1984, Reno, Nevada.
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1465. McCormick, M. P.: Transport Processes as Manifested in Satellite and Lidar Aerosol Measurements. Presented at the SCOSTEP/URSI/etc., International MAP Symposium, November 26-30, 1984, Kyoto, Japan.
(Subject Category 46 RTOP 665-10-40)
1466. Reichle, H. G., Jr.: Scientific and Technical Results of the Measurement of Air Pollution from Satellites (MAPS) Experiment. Presented at the AIAA 22nd Aerospace Sciences Meeting, January 9-12, 1984, Reno, Nevada.
(Subject Category 45 RTOP 618-22-31)
1467. Sebacher, D. I.; Harriss, R. C.; and Bartlett, K. B.: Atmospheric Methane Sources: Alaskan Tundra and Northern Bogs. Presented at the 1984 Fall Meeting of the American Geophysical Union, December 3-7, 1984, San Francisco, California. Abstract published in EOS, Volume 65, No. 45, November 6, 1984, p. 834.
(Subject Category 45 RTOP 199-30-26)

1468. Smith, G. L.: Deconvolution of Wide Field of View Radiometer Measurements. Theory and Results. Presented at the Goddard Space Flight Center Climate and Radiation Seminar, February 15, 1984, Greenbelt, Maryland.
(Subject Category 47 RTOP 672-40-06)
1469. Smith, M. A. H.: Continuing Spectroscopy Activities at Langley Research Center. Presented at the NASA Spectroscopic Parameters Workshop, October 17-19, 1984, Hampton, Virginia.
(Subject Category 72 RTOP 147-23-11)

Computer Programs

No computer programs.

Tech Briefs

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PUBLICATIONS FOR OFFICE OF DIRECTOR FOR SYSTEMS ENGINEERING AND OPERATIONS

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

No quick-release technical memorandums.

Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

No meeting presentations.

Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR SYSTEMS SAFETY, QUALITY AND RELIABILITY OFFICE

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

No quick-release technical memorandums.

Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

No meeting presentations.

Technical Talks

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Tech Briefs

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Patents

No patents.

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Formal Reports

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Contractor Reports

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Computer Programs

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Patents

No patents.

PUBLICATIONS FOR FACILITIES ENGINEERING DIVISION

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

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Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

No meeting presentations.

Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR OPERATIONS SUPPORT DIVISION

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

No quick-release technical memorandums.

Contractor Reports

No contractor reports.

Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

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Computer Programs

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Quick-Release Technical Memorandums

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Computer Programs

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Tech Briefs

No tech briefs.

Patents

No patents.

PUBLICATIONS FOR ARMY STRUCTURES LABORATORY (AVSCOM)

Formal Reports

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Computer Programs

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Tech Briefs

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Patents

No patents.

APPENDIX

INDUSTRIAL APPLICATIONS CENTERS

Aerospace Research Applications Center
Indianapolis Center for Advanced Research
611 N. Capital Avenue
Indianapolis, IN 46204
(317) 264-4644

Kerr Industrial Applications Center
Southeastern Oklahoma State University
Station A, Box 2584
Durant, OK 74701
(405) 924-6822

NASA Industrial Applications Center
710 LIS Building
University of Pittsburgh
Pittsburgh, PA 15260
(412) 624-5211

NASA Industrial Applications Center
University of Southern California
Research Annex, Room 200
3716 South Hope Street
Los Angeles, CA 90007
(213) 743-6132

New England Research Applications Center
Mansfield Professional Park
Storrs, CT 06268
(203) 486-4533

North Carolina Science and Technology Research Center
Post Office Box 12235
Research Triangle Park, NC 27709
(919) 549-0671

Technology Applications Center
University of New Mexico
Albuquerque, NM 87131
(505) 277-3622

NASA/Florida State Technology Applications Center
State University System of Florida
307 Weil Hall
Gainesville, FL 32611
(904) 392-6626

NASA/UK Technology Applications Program
University of Kentucky
109 Kinkead Hall
Lexington, KY 40506-0057
(606) 257-6322

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