NASA Technical Memorandum 89065

Scientific and Technical Information
Output of the Langley Research Center
for Calendar Year 1986

Compiled by
Research Information and Applications Division
Langley Research Center
Hampton, Virginia

NASA
National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23665-5225
FOREWORD

This report contains a listing of the NASA Langley Research Center's scientific and technical research output for calendar year 1986.

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 calendar year 1986, Langley's contributions to NASA and non-NASA literature included 152 NASA Formal Reports, 129 Quick-Release Technical Memorandums, 234 Contractor Reports, 283 Journal Articles and Other Publications, 574 Meeting Presentations, 233 Technical Talks, 15 Computer Programs, 77 Tech Briefs, 24 Patents, and 12 Special Documents. In addition, during the year, 11 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 23665-5225.

Andrew J. Hansbrough
Chief, Research Information and Applications Division
### CONFERENCES SPONSORED OR COSPONSORED BY/LANGLEY AND HELD LOCALLY IN 1986

<table>
<thead>
<tr>
<th>Title of conference</th>
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<th>Langley contacts</th>
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<th>Non-Langley</th>
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<td>1. Workshop on Turbulence Relative to Aviation, Missile, and Space Programs</td>
<td>Apr. 2-4</td>
<td>H. N. Murrow</td>
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<td>2. Workshop on Aircraft Tire Testing Requirements</td>
<td>May 7</td>
<td>T. J. Yager</td>
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<td>3. Sixth Conference on Atmospheric Radiation</td>
<td>May 12-16</td>
<td>B. A. Wielicki</td>
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<td>4. &quot;SIMP&quot; Code Users Workshop</td>
<td>May 21-22</td>
<td>N. A. Talcott</td>
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<td>5. Workshop on Conceptual Aircraft Design</td>
<td>May 28-29</td>
<td>C. E. K. Morris</td>
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<td>14</td>
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<tr>
<td>7. Eighth International Conference on Spectral Line Shapes</td>
<td>June 9-13</td>
<td>R. J. Exton</td>
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<tr>
<td>9. Space Construction Conference</td>
<td>Aug. 6-7</td>
<td>J. A. Hagaman</td>
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<td>10. Symposium on Sensitivity Analysis in Engineering</td>
<td>Sept. 25-26</td>
<td>H. M. Adelman</td>
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<td>11. First NASA/DOD CSI Technology Conference</td>
<td>Nov. 18-21</td>
<td>R. L. Wright</td>
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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 1986 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. Citations for Special Documents are listed under the appropriate Office or Division where applicable. 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 1986.

The NASA Tech Briefs cited have either been published or submitted in 1986 for publication in "NASA Tech Briefs," a 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 10017-5391 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

\(^1\) Those submitted in 1985 (and therefore listed in the 1985 issue of this document) but published in 1986 have not been listed.
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).

Publication of some journal articles was not known at press time for the 1985 issue of this document. These articles are therefore listed in the 1986 issue.
### AVAILABILITY

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<td><strong>Quick-Release Technical Memorandums</strong></td>
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<td><strong>Contractor Reports</strong></td>
<td>Springfield, VA 22161</td>
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<td><strong>Computer Programs</strong></td>
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<td><strong>Langley Tech Briefs</strong></td>
<td>P. O. Box 8757</td>
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<td><strong>Patents:</strong></td>
<td>Baltimore/Washington International Airport, MD 21240</td>
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<td><strong>Software Information Services</strong></td>
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<td><strong>University of Georgia</strong></td>
<td>Athens, GA 30602</td>
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<td><strong>Office of Technology Utilization and Applications</strong></td>
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<td><strong>Mail Stop 139A</strong></td>
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Quick-Release Technical Memorandums

   (Avail: NTIS Subject Category 99)

Contractor Reports

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   (Avail: NTIS Subject Category 64 RTOP 505-90-21)

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(Avail: NTIS Subject Category 61 RTOP 505-90-21)

(Avail: NTIS Subject Category 66 RTOP 505-31-83)


Journal Articles and Other Publications

89. Petersen, R. H.: The Status of the AST. Air World, Volume 37, No. 2, 1985, p. 19-23. (Subject Category 02 RTOP 505-69-61)

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 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.
Formal Reports


Quick-Release Technical Memorandums


Contractor Reports


Journal Articles and Other Publications


Meeting Presentations


110. Smith, R. E.; and Eriksson, L-E.: Algebraic Grid Generation. Presented at the International Association for Computational Mechanics First World Congress on Computational Mechanics, September 22-26, 1986, Austin, Texas. Abstract in proceedings, Volume 1. (Subject Category 59 RTOP 505-31-83)
Technical Talks

111. Cleveland, J. I., II; and Crawford, D. J.: Upgrading of the Time Critical Flight Simulation Facility. Presented at the VIM-45 Conference, October 20-23, 1986, Minneapolis, Minnesota. (Subject Category 09 RTOP 999-16-01)


Computer Programs


Tech Briefs


Patents

No patents.
PUBLICATIONS FOR INSTRUMENT RESEARCH DIVISION

Formal Reports


121. Snow, W. L.; Burner, A. W.; and Goad, W. K.: Improvement in the Quality of Flow Visualization in the Langley 0.3-Meter Transonic Cryogenic Tunnel. NASA TM-87730, August 1986, 22 p. (Avail: NTIS Subject Category 35 RTOP 505-61-01)

Quick-Release Technical Memorandums


Contractor Reports


Journal Articles and Other Publications


Meeting Presentations


Technical Talks

171. Batten, C. E.: Analysis of Trace Organic Compounds in a Class-100 Clean Room. Presented at the Institute of Environmental Sciences 32nd Annual Technical Meeting and Equipment Exposition, May 5-9, 1986, Dallas, Texas. (Subject Category 45 RTOP 678-12-04)


173. Kern, F. A.: Transferring Measurement Accuracy From the Laboratory to the Wind Tunnel. Presented at the Region 4 Meeting of National Conference of Standards Laboratories, November 18, 1986, Kennedy Space Center, Florida. (Subject Category 35 RTOP 992-19-00)


Computer Programs


Tech Briefs


189. Singh, J. J. (Langley Research Center); Mall, G. H. (Computer Sciences Corporation); and Hoshang, C. (Old Dominion University): Measurement of Viscosity of Gaseous Mixtures at Atmospheric Pressure. NASA Tech Brief LAR-13591.


Patents


PUBLICATIONS FOR FLIGHT ELECTRONICS DIVISION

Formal Reports

No formal reports.

Quick-Release Technical Memorandums


Contractor Reports


### Journal Articles and Other Publications

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<th>Volume, Issue, Pages</th>
<th>Year</th>
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Meeting Presentations


Technical Talks


Computer Programs

No computer programs.


Patents

No patents.
PUBLICATIONS FOR CONTROL OF FLEXIBLE STRUCTURES PROJECT OFFICE

Formal Reports

(Avail: NTIS Subject Category 18 RTOP 542-06-11)

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

(Subject Category 18 RTOP 542-06-11)

(Subject Category 18 RTOP 542-06-11)

(Subject Category 18 RTOP 542-06-31)

(Subject Category 18 RTOP 542-06-21)

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

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


Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs


No patents.
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

Computer Programs
No computer programs.

Tech Briefs
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Patents
No patents.
Formal Reports


Quick-Release Technical Memorandums


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Meeting Presentations

   (Subject Category 39 RTOP 506-53-43)

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   (Subject Category 39 RTOP 506-43-51)


305. Daugherty, R. H.; and Stubbs, S. M.: Flow Rate and Trajectory of Water Spray Produced by an Aircraft Tire. Presented at the SAE 1986 Aerospace Technology Conference and Exposition, October 13-16, 1986, Long Beach, California. SAE Paper No. 86-1626. (Subject Category 05 RTOP 505-63-41)


*Aerostructures Directorate, USAARTA (AVSCOM)


Technical Talks


339. Card, M. F.: Construction and Control of Large Space Structures. Presented at the Israel Society of Aviation and Astronautics 28th Israel Annual Conference on Aviation and Astronautics, February 19-20, 1986, Tel Aviv, Israel. (Subject Category 18 RTOP 506-43-41)


342. Juang, J-N.: Studies of Parameter Identification and Control of Large Flexible Structures. Presented at the Metropolitan Science and Technology University, June 4, 1986, Tokyo, Japan. (Subject Category 39 RTOP 506-43-51)
343. Juang, J-N.; and Taylor, L. W., Jr.: Control Experiment Progress of Large Space Structures. Presented at the IEEE/American Automatic Control Conference Fourth IFAC Symposium on Control of Distributed Parameter Systems, June 30 - July 2, 1986, Los Angeles, California. (Subject Category 39 RTOP 506-43-51)


354. Yager, T. J.; and Daiutolo, H.: Recent Winter Runway Friction Test Findings From Joint FAA/NASA Program. Presented at the Northeast Chapter of the American Association of Airport Executives Twentieth Annual International Aviation Snow Symposium, April 28 - May 1, 1986, Allentown, Pennsylvania. (Subject Category 05 RTOP 505-45-14)


Computer Programs


Tech Briefs


Patents


Formal Reports


Quick-Release Technical Memorandums


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*Aerostructures Directorate, USAARTA (AVSCOM)


Contractor Reports


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403. Camarda, C. J.; and Haftka, R. T.: Evaluation of Modal Methods for Dynamic
Response. Presented at the International Association for Computational
Mechanics First World Congress on Computational Mechanics, September 22-26,
(Subject Category 34 RTOP 506-43-31)

404. Cazier, F. W., Jr.; and Kehoe, M. W.: Flight Test of a Decoupler Pylon for
Wing/Store Flutter Suppression. Presented at the AIAA 3rd Flight Testing
Conference and Technical Display, April 2-4, 1986, Las Vegas, Nevada. AIAA
Paper No. 86-9730.
(Subject Category 05 RTOP 505-33-43)

Flutter Suppression. Presented at the Joint Technical Coordinating Group
for Munitions Development 1986 Aircraft/Stores Compatibility Symposium,
(Subject Category 05 RTOP 505-33-43)

Presented at the AIAA 24th Aerospace Sciences Meeting, January 6-9, 1986,
(Subject Category 39 RTOP 505-33-43)

407. Eckstrom, C. V.: Prediction of Wing Aeroelastic Effects on Aircraft Lift and
Pitching Moment Characteristics. Presented at the 63rd Meeting of the
AGARD Structures and Materials Panel Specialists' Meeting on Static
Aeroelastic Effects on High-Performance Aircraft, September 28 - October 3,
(Subject Category 08 RTOP 505-63-21)

408. Edwards, J. W.: Application of Potential Theory Computations to Transonic
Aeroelasticity. Presented at the 15th Congress of the International
Council of the Aeronautical Sciences (ICAS), September 7-12, 1986, London,
(Subject Category 02 RTOP 505-63-33)

Flutter Boundary Tracking Procedure. Presented at the AIAA/ASME, et al.,
27th Structures, Structural Dynamics and Materials Conference, May 19-21,
(Subject Category 05 RTOP 505-33-43)

410. Gibbons, M. D.; Whitlow, W., Jr.; and Williams, M. M.: Nonisentropic
Unsteady Three-Dimensional Small Disturbance Theory. Presented at the
No. 86-0863-CP.
(Subject Category 02 RTOP 505-33-43)

Control Law Design. Presented at the NASA Langley/VPI&SU Symposium on
Sensitivity Analysis in Engineering, September 25-26, 1986, Hampton,
Virginia. NASA CP pending.
(Subject Category 05 RTOP 505-63-21)


Computer Programs

No computer programs.

Tech Briefs


Patents

No patents.
PUBLICATIONS FOR INTERDISCIPLINARY RESEARCH OFFICE

Formal Reports

(Avail: NTIS Subject Category 39 RTOP 506-53-53)

Quick-Release Technical Memorandums

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Journal Articles and Other Publications

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*Aerostructures Directorate, USAARTA (AVSCOM)


Meeting Presentations


*Aerostructures Directorate, USAARTA (AVSCOM)*

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Technical Talks


Computer Programs


Tech Briefs

No tech briefs.

Patents

No patents.
Formal Reports

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(Avail: STIF Subject Category 24 RTOP 505-43-81)

(Avail: NTIS Subject Category 24 RTOP 505-63-01)

(Avail: NTIS Subject Category 26 RTOP 506-43-81)

Quick-Release Technical Memorandums

(Avail: NTIS Subject Category 24 RTOP 505-63-11)

*Aerostructures Directorate, USAARTA (AVSCOM)


* Aerostructures Directorate, USAARTA (AVSCOM)
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   (Avail: NTIS Subject Category 39 RTOP 505-63-01)

   (Avail: NTIS Subject Category 39 RTOP 505-63-01)

   (Avail: IAC Subject Category 24 RTOP 534-06-23)


Journal Articles and Other Publications


*Aerostructures Directorate, USAARTA (AVSCOM)


527. Mangalgiri, P. D.; and Johnson, W. S.: Preliminary Design of Cracked-Lap Shear Specimen Thickness for Determination of Interlaminar Fracture Toughness. Journal of Composites Technology & Research, Volume 8, No. 2, Summer 1986, p. 58-60. (Subject Category 39 RTOP 505-33-33)


*Aerostructures Directorate, USAARTA (AVSCOM)


Meeting Presentations


*Aerostructures Directorate, USAARTA (AVSCOM)

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*Aerostructures Directorate, USAARTA (AVSCOM)


*Aerostructures Directorate, USAARTA (AVSCOM)


Technical Talks


*Aerostructures Directorate, USAARTA (AVSCOM)


603. Dexter, H. B.: Composite Applications to Aircraft. Presented at the Raspet Flight Research Laboratory Fourth Applied Composite Structure Design and Fabrication Short Course, March 17-21, 1986, Mississippi State, Mississippi. (Subject Category 24 RTOP 505-63-01)


*Aerostructures Directorate, USAARTA (AVSCOM)

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   (Subject Category 24 RTOP 506-43-21)

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   (Subject Category 23 RTOP 506-43-11)

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Patents

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Contractor Reports


Journal Articles and Other Publications


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   (Subject Category 71 RTOP 505-31-33)

   (Subject Category 71 RTOP 505-31-33)

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Meeting Presentations

   (Subject Category 71 RTOP 535-03-11)

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*Aerostructures Directorate, USAARTA (AVSCOM)
(Super Category 71 RTOP 505-61-51)

(Super Category 03 RTOP 505-35-13)

(Super Category 71 RTOP 535-03-11)

(Super Category 71 RTOP 535-03-11)

(Super Category 71 RTOP 505-61-51)

(Super Category 71 RTOP 505-63-11)

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Technical Talks


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Computer Programs

No computer programs.

Tech Briefs


Patents

No patents.
PUBLICATIONS FOR OFFICE OF DIRECTOR FOR AERONAUTICS

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


Technical Talks


Computer Programs

No computer programs.

Tech Briefs

No tech briefs.
Patents

No patents.
PUBLICATIONS FOR AER0-SPACE PLANE 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


Technical Talks

No technical talks.

Computer Programs

No computer programs.
Tech Briefs

No tech briefs.

Patents

No patents.

Special Documents

PUBLICATIONS FOR ADVANCED VEHICLES DIVISION

Formal Reports

No formal reports.

Quick-Release Technical Memorandums


Contractor Reports


Journal Articles and Other Publications


Meeting Presentations


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827. Salas, M. D.; and Gumbert, C. R.: Breakdown of the Conservative Potential
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in V/STOL and High Lift Testing – A Selected, Annotated Bibliography. NASA
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(Avail: NTIS Subject Category 02 RTOP 505-62-91)

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(Avail: NTIS Subject Category 34 RTOP 505-60-21)

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Computer Programs


Tech Briefs


Patents

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Special Documents

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Formal Reports


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(Avail: NTIS Subject Category 02 RTOP 505-43-23)

(Avail: NTIS Subject Category 02 RTOP 505-45-43)

(Avail: NTIS Subject Category 02 RTOP 505-61-41)

(Avail: NTIS Subject Category 02 RTOP 505-43-13)

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(Avail: NTIS Subject Category 03 RTOP 505-45-13)

Quick-Release Technical Memorandums

(Avail: NTIS Subject Category 02 RTOP 505-61-41)

(Avail: NTIS Subject Category 05 RTOP 505-60-31)

*Aerostructures Directorate, USAARTA (AVSCOM)
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Journal Articles and Other Publications


971. Liu, C-H.; Tavantzis, J.; and Ting, L.: Numerical Studies of Motion and Decay of Vortex Filaments. AIAA Journal, Volume 24, No. 8, August 1986, p. 1290-1297. (Subject Category 02 RTOP 505-31-03)
(Subject Category 02 RTOP 505-31-23)

(Subject Category 02 RTOP 505-31-03)

Meeting Presentations

(Subject Category 02 RTOP 505-31-03)

(Subject Category 05 RTOP 505-61-51)

(Subject Category 02 RTOP 505-43-13)

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(Subject Category 02 RTOP 505-61-71)

*Aerostructures Directorate, USAARTA (AVSCOM)*


983. Dunham, R. E., Jr.: Potential Influences of Heavy Rain on General Aviation Airplane Performance. Presented at the AIAA General Aviation Technology Conference, September 29 - October 1, 1986, Anaheim, California. AIAA Paper No. 86-2606 (Subject Category 01 RTOP 505-68-01)


Technical Talks


1018. Holmes, B. J.: Applied Viscous Flow Control. Presented at the University of Kansas Aerospace Short Course on Applied Viscous Flow Control, August 4-7, 1986, Lawrence, Kansas. (Subject Category 02 RTOP 505-61-41)

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Computer Programs

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Tech Briefs


Patents


PUBLICATIONS FOR HIGH-SPEED AERODYNAMICS DIVISION

Formal Reports


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   (Avail: NTIS Subject Category 64 RTOP 505-68-91)

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(Avail: STIF Subject Category 07 RTOP 505-68-91)

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(Avail: NTIS Subject Category 34 RTOP 505-31-13)

(Avail: IAC Subject Category 02 RTOP 505-61-71)


(Avail: NTIS Subject Category 34 RTOP 505-60-31)
Journal Articles and Other Publications

(Subject Category 02 RTOP 505-31-03)

(Subject Category 02 RTOP 505-61-71)

(Subject Category 07 RTOP 505-43-83)

(Subject Category 34 RTOP 505-31-13)

(Subject Category 02 RTOP 505-31-03)

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(Subject Category 02  RTOP 505-31-03)

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(Subject Category 02  RTOP 505-43-23)


Meeting Presentations


   (Subject Category 02 RTOP 505-31-03)

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Technical Talks


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Gatski, T. B.: Two and Three Dimensional Numerical Studies of Unsteady Fluid Flow Phenomena. Presented at the Mechanical Engineer Seminar, September 26, 1986, Bethlehem, Pennsylvania. (Subject Category 34 RTOP 505-60-31)

McClinton, C. R.: The National Aero-Space Plane Program. Presented at the Experimental Aircraft Association Annual Convention, July 31 - August 8, 1986, Oshkosh, Wisconsin. (Subject Category 07 RTOP 505-62-81)

Newsome, R. W.; and Thomas, J. L.: Navier-Stokes Solutions for Vortical Flow About Wings and Bodies. Presented at the SIAM 1986 National Meeting, July 21-25, 1986, Boston, Massachusetts. (Subject Category 02 RTOP 505-60-01)


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Computer Programs


Tech Briefs


Patents

No patents.
Special Documents

PUBLICATIONS FOR OFFICE OF DIRECTOR FOR SPACE

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 SPACE STATION OFFICE

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

(Avail: NTIS Subject Category 18 RTOP 483-31-03)

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Contractor Reports

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Journal Articles and Other Publications

No journal articles and other publications.

Meeting Presentations

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Technical Talks

(Subject Category 51 RTOP 480-51-06)
Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.
PUBLICATIONS FOR ATMOSPHERIC SCIENCES DIVISION

Formal Reports


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No quick-release technical memorandums.

Contractor Reports


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1346. Callis, L. B.: Possible Climatic Effects Due to Odd Nitrogen Variations Associated With the 11-Year Solar Cycle. Presented at the Australian National Committee for the World Climatic Program/IAMAP Conference on Mechanisms of Interannual and Longer Term Climatic Variations, December 8-12, 1986, Melbourne, Australia. (Subject Category 46 RTOP 673-62-70)


1351. Flaud, J-M.; Camy-Peyret, C.; Devi, V. M.; Rinsland, C. P.; and Smith, M. A. H.: The \(^{3}\text{P}_{1}\) and \(^{3}\text{P}_{3}\) Bands of \(^{18}\text{O}_{2}\) and \(^{18}\text{O}_{3}\). Presented at the Ohio State University 41st Symposium on Molecular Spectroscopy, June 16-20, 1986, Columbus, Ohio. (Subject Category 72 RTOP 147-23-11)

1352. Grose, W. L.: Dynamics and Transport Processes in the Stratosphere: Comparison of Three-Dimensional Simulations With Satellite Data. Presented at the IAMAP/DMG Meeting on Verification of Theories in Atmospheric Large/Medium Scale Dynamics, June 24-26, 1986, Burghausen, Germany. (Subject Category 47 RTOP 673-64-02)


1357. Keating, G. M.; Pitts, M. C.; Brasseur, G.; and De Rudder, A.: Middle Atmosphere Response to Solar Short-Term UV Variability. Presented at the XXVI COSPAR Plenary Meeting and Associated Activities, June 30 - July 12, 1986, Toulouse, France. (Subject Category 46 RTOP 673-41-07)

1358. Keating, G. M.; and Young, D. F.: Ozone Reference Models for CIRA. Presented at the XXVI COSPAR Plenary Meeting and Associated Activities, June 30 - July 12, 1986, Toulouse, France. (Subject Category 46 RTOP 673-41-07)


1368. Smith, G. L.; Barkstrom, B. R.; and Harrison, E. F.: The Earth Radiation Budget Experiment: Early Validation Results. Presented at the XXVI COSPAR Plenary Meeting and Associated Activities, June 30 - July 12 1986, Toulouse, France. (Subject Category 47 RTOP 619-12-30)

1369. Smith, M. A. H.; Devi, V. M.; Rinsland, C. P.; and Benner, D. C.: Intensities and Self-Broadening of Ozone Near 5 μm. Presented at the Ohio State University 41st Symposium on Molecular Spectroscopy, June 16-20, 1986, Columbus, Ohio. (Subject Category 72 RTOP 147-23-70)

1370. Smith, M. A. H.; Thakur, K. B.; Rinsland, C. P.; Devi, V. M.; and Benner, D. C.: Diode Laser Measurements in the ν₁ Band of 16O₃. Presented at the Ohio State University 41st Symposium on Molecular Spectroscopy, June 16-20, 1986, Columbus, Ohio. (Subject Category 72 RTOP 147-23-11)


1372. Thakur, K. B.; Devi, V. M.; Rinsland, C. P.; and Smith, M. A. H.: Tunable Diode Laser Measurements of Absolute Intensities and Linewidths in the ν₆ Band of 12CH₃D Near 8.6 μm. Presented at the Ohio State University 41st Symposium on Molecular Spectroscopy, June 16-20, 1986, Columbus, Ohio. (Subject Category 72 RTOP 147-23-11)

1373. Thakur, K. B.; Friedl, R. R.; Rinsland, C. P.; Devi, V. M.; and Rao, K. N.: The High Resolution Spectrum and Rotational Analysis of the ν₆ Band of Carbonyl Fluoride. Presented at the Ohio State University 41st Symposium on Molecular Spectroscopy, June 16-20, 1986, Columbus, Ohio. (Subject Category 72 RTOP 147-23-11)


Computer Programs

No computer programs.

Tech Briefs


Patents

Formal Reports


Quick-Release Technical Memorandums


Townsend, L. W.; and Wilson, J. W.: An Assessment of Transport Coefficient Approximations Used in Galactic Heavy Ion Shielding Calculations. NASA TM-89054, December 1986, 16 p. (Avail: NTIS Subject Category 73 RTOP 199-22-76)


1412. Deutchman, P. A.; Norbury, J. W.; and Townsend, L. W.: Total and Differential Cross Sections for Pion Production Via Coherent Isobar and Giant Resonance Formation in Heavy-Ion Collisions. Canadian Journal of Physics, Volume 63, No. 9, September 1985, p. 1242-1248. (Subject Category 73 RTOP 199-20-76)


   (Subject Category 34 RTOP 506-51-13)

   (Subject Category 34 RTOP 506-40-11)

   (Subject Category 73 RTOP 199-22-76)

   (Subject Category 73 RTOP 199-22-76)

   (Subject Category 01 RTOP 506-51-13)

   (Subject Category 34 RTOP 506-40-11)

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   (Subject Category 34 RTOP 506-40-11)


Meeting Presentations


1463. Miller, C. G.; and Smith, F. M.: Langley Hypersonic Facilities Complex - Description and Application. Presented at the AIAA 14th Aerodynamic Testing Conference, March 5-7, 1986, West Palm Beach, Florida. AIAA Paper No. 86-0741-CP. (Subject Category 09 RTOP 506-40-11)


1477. Walker, G. H.; and Heinbockel, J. H.: Photovoltaic Conversion of Laser Power to Electrical Power. Presented at the 8th Space Photovoltaic Research and Technology Conference, October 7-9, 1986, Cleveland, Ohio. NASA CP pending. (Subject Category 44 RTOP 506-41-41)


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POSMI Based on an Inverse-Pinch and Magnetic Interruption. Presented at
the Defense Nuclear Agency Advanced Pulsed Power Review and SDIO Update,
(SUBJECT CATEGORY 75 RTOP 506-41-41)

1488. Lee, J. H.; and Conway, E. J.: A Novel Closing and Opening Plasma Switch
POSMI. Presented at the Space High Power Inverter Technology Workshop,
September 9-10, 1986, Wright-Patterson, AFb, Ohio.
(SUBJECT CATEGORY 75 RTOP 506-41-41)

1489. Miller, C. G., III; Wells, W. L.; and Ashby, G. C., Jr.: Presented at the
First National Areso-Space Plane Technology Symposium, May 20-22, 1986,
Hampton, Virginia.
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1490. Schuster, G. L.; and Robertson, S.: The Brush Cathode Discharge as a Source
of Cold Ions. Presented at the American Physics Society 28th Annual
Meeting, Division of Plasma Physics, November 3-7, 1986, Baltimore,
Maryland.
(SUBJECT CATEGORY 01 RTOP 506-41-41)

1491. Talay, T. A.: Shuttle II. Presented at the SAE 1986 Aerospace Technology
Conference and Exposition, October 13-16, 1986, Long Beach, California.
(SUBJECT CATEGORY 16 RTOP 506-49-11)

1492. Wong, M.; Murphy, D.; Schimmerling, W.; Howard, J.; Townsend, L. W.; and
Wilson, J. W.: Measurement of the Fragmentation of Iron Nuclei in
Spacecraft Shielding Material. Presented at the 34th Annual Meeting of
Radiation Research Society, April 12-17, 1986, Las Vegas, Nevada.
(SUBJECT CATEGORY 73 RTOP 199-22-76)

Requirement. Presented at the AIAA 14th Aerodynamic Testing Conference,
March 5-7, 1986, West Palm Beach, Florida.
(SUBJECT CATEGORY 05 RTOP 551-12-30)

Computer Programs

No computer programs.

Tech Briefs

1494. Ashby, G. C., Jr.; Coombs, D. S.; Eves, J. W.; Price, H. E.; and
Vasquez, P.: Miniature Flow-Direction/Pilot-Static Pressure Survey
Probes. NASA Tech Brief LAR-13643.


Supplied Silver Surfaces. NASA Tech Brief LAR-13652.
Issued June 10, 1986.
(Subject Category 36)
PUBLICATIONS FOR OFFICE OF DIRECTOR FOR FLIGHT SYSTEMS

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


Technical Talks

No technical talks.

Computer Programs

No computer programs.

Tech Briefs

No tech briefs.

Patents

No patents.

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PUBLICATIONS FOR ADVANCED TRANSPORT OPERATING SYSTEMS PROGRAM OFFICE

Formal Reports

No formal reports.

Quick-Release Technical Memorandums

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(Avail: NTIS Subject Category 09 RTOP 505-66-41)

Contractor Reports

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Technical Talks

No technical talks.
Computer Programs

No computer programs.

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No tech briefs.

Patents

No patents.
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(Avail: NTIS Subject Category 64 RTOP 506-45-21)

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(Avail: NTIS Subject Category 54 RTOP 506-45-21)

(Avail: NTIS Subject Category 62 RTOP 505-58-13)

(Avail: NTIS Subject Category 35 RTOP 542-03-11)

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(Avail: NTIS Subject Category 18 RTOP 506-46-11)

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   (Subject Category 63 RTOP 506-57-13)

   (Subject Category 63 RTOP 506-57-13)

   (Subject Category 13 RTOP 506-57-13)
Meeting Presentations


1630. Campbell, T. G.; Bailey, M. C.; and Belvin, W. K.: The Development of the 15-Meter Hoop Column Deployable Antenna System With Final Structural and Electromagnetic Performance Results. Presented at the 37th IAF Congress on Space: New Opportunities for All People, October 4-11, 1986, Innsbruck, Austria. IAF Paper No. 86-199. Proceedings pending. (Subject Category 33 RTOP 506-43-51)


Technical Talks


1656. Murphy, P. C.: Supermaneuverability Control System Design Metrics. Presented at the West Coast Industry Tour of the 1986 LaRC Dynamics Integration Progress Reviews, August 21-29, 1986. (Subject Category 08 RTOP 505-66-01)


No patents.
PUBLICATIONS FOR FLIGHT MANAGEMENT DIVISION

Formal Reports

(Avail: NTIS Subject Category 53 RTOP 505-35-13)

(Avail: NTIS Subject Category 06 RTOP 534-04-13)

(Avail: NTIS Subject Category 06 RTOP 505-45-33)

(Avail: NTIS Subject Category 03 RTOP 505-67-01)

Quick-Release Technical Memorandums

No quick-release technical memorandum.

Contractor Reports

(Avail: NTIS Subject Category 04 RTOP 505-45-33)

Journal Articles and Other Publications

(Subject Category 06 RTOP 505-66-11)

Meeting Presentations

(Subject Category 53 RTOP 505-67-01)


Technical Talks


Computer Programs


Tech Briefs


Patents

(Subject Category 06)
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 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


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 FABRICATION DIVISION

Formal Reports

(Avail: STIF Subject Category 24 RTOP 505-63-01)

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

(Subject Category 24 RTOP 505-63-01)

(Subject Category 24 RTOP 506-51-13)

(Subject Category 24 RTOP 307-06-01)

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Technical Talks


Computer Programs

No computer programs.

Tech Briefs


Patents

PUBLICATIONS FOR SYSTEMS ENGINEERING DIVISION

Formal Reports

0 formal reports.

Quick-Release Technical Memorandums

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Journal Articles and Other Publications

No journal articles and other publications.

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   (Subject Category 18 RTOP 927-11-01)


Technical Talks

No technical talks.

Computer Programs

No computer programs.

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PUBLICATIONS FOR FACILITIES ENGINEERING DIVISION

Formal Reports

No formal reports.

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No journal articles and other publications.

Meeting Presentations

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(Subject Category 39 RTOP 323-53-71)

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
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Journal Articles and Other Publications
No journal articles and other publications.

Meeting Presentations
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Technical Talks
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Computer Programs
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PUBLICATIONS FOR OFFICE OF DIRECTOR FOR MANAGEMENT OPERATIONS

Formal Reports
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Quick-Release Technical Memorandums


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Journal Articles and Other Publications


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Computer Programs


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Patents

No patents.
PUBLICATIONS FOR AEROSTRUCTURES DIRECTORATE, USAARTA (AVSCOM)

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


Computer Programs
No computer programs.

Tech Briefs
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
University of Pittsburgh
823 William Pitt Union
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
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Washington, DC 20546-0001

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