

## Chronological Index

**A89-001 Prediction of Three-Dimensional Hypersonic Flows Using a Parabolized Navier-Stokes Scheme.** Bilal A. Bhutta and Clark H. Lewis, *VRA, Inc.* (26, 1, p. 4) Article based on AIAA Paper 85-1604

**A89-002 Aeroelastic Analysis of Launch Vehicles in Transonic Flight.** João Luiz F. Azevedo, *Stanford University* (26, 1, p. 14) Article based on AIAA Paper 87-0708 CP872

**A89-003 Supersonic, Transverse Jet from a Rotating Ogive Cylinder in a Hypersonic Flow.** D. L. McMaster and J. S. Shang, *U. S. Air Force Aeronautical Laboratories, Wright-Patterson AFB*; and W. C. Golbitz, *Defense Nuclear Agency* (26, 1, p. 24) Article based on AIAA Paper 87-1441

**A89-004 Interactive Approach to Surface Fitting Complex Geometries for Flowfield Applications.** F. McNeil Cheatwood and Fred R. DeJarnette, *North Carolina State University*; and H. Harris Hamilton II, *NASA Langley Research Center* (26, 1, p. 31) Article based on AIAA Paper 87-1476

**A89-005 Dynamic Display of Electronic Crew Procedures for Space Station.** Gordon L. Johns, *The MITRE Corporation* (26, 1, p. 39) Article based on AIAA Paper 88-0442

**A89-006 Interferometric Measurements of Re-Entry Vehicle Base Radius.** R. L. Henry, *U. S. Air Force Systems Command, Wright-Patterson AFB* (26, 1, p. 47) Article

**A89-007 Method of Atmospheric Density Measurements During Shuttle Entry Using Ultraviolet-Laser Rayleigh Scattering.** Robert L. McKenzie, *NASA Ames Research Center* (26, 1, p. 56) Article

**A89-008 Outer Atmospheric Research Using Tethered Systems.** John L. Anderson, *NASA Headquarters* (26, 2, p. 66) Article based on AIAA Paper 88-0686

**A89-009 Tether Satellite Potential for Rarefied Gas Aerodynamic Research.** F. C. Hurlbut, *University of California, Berkeley* (26, 2, p. 72) Article based on AIAA Paper 88-0687

**A89-010 Engineering Tethered Payloads for Magnetic and Plasma Observations in Low Orbit.** William J. Webster Jr., *NASA Goddard Space Flight Center* (26, 2, p. 80) Article based on AIAA Paper 88-0689

**A89-011 Aerodynamic Characteristics of Configurations Having Bodies with Square, Rectangular, and Circular Cross Sections.** Asher Sigal and Ehud Lapidot, *Technion-Israel Institute of Technology* (26, 2, p. 85) Article based on AIAA Paper 87-2429 CP876

**A89-012 Collision Matrix for Low Earth Orbit Satellites.** Darren McKnight and Gary Lorenzen, *U. S. Air Force Academy* (26, 2, p. 90) Article based on AIAA Paper 88-4240 CP8811

**A89-013 Closed-Form Approach to Rocket-Vehicles Aeroelastic Divergence.** Dov Elyada, *Israel Armament Development Authority* (26, 2, p. 95) Article

**A89-014 Particle Adhesion to Surfaces Under Vacuum.** Jack B. Barengoltz, *Jet Propulsion Laboratory, California Institute of Technology* (26, 2, p. 103) Article based on AIAA Paper 88-2725

**A89-015 Spacecraft and Mission Design for the SP-100 Flight Experiment.** William D. Deininger, *Jet Propulsion Laboratory, California Institute of Technology*; and Robert J. Vondra, *W. J. Schafer and Associates* (26, 2, p. 109) Article based on AIAA Paper 87-2026

**A89-016 Data System with Distributed Processing for a Next Generation Satellite.** Clifton M. Tsai and Manorama Raghavender, *TRW Space & Technology Group* (26, 2, p. 116) Article based on AIAA Paper 87-2819 CP8710

**A89-017 Simple Relations for Analysis of Airbreathing Launch Vehicles.** G. E. Dorrington, *University of Cambridge, England, UK* (26, 2, p. 124) Engineering Note

**A89-018 Large Solar Flare Radiation Shielding Requirements for Manned Interplanetary Missions.** Lawrence W. Townsend, John E. Nealy and John W. Wilson, *NASA Langley Research Center*; and William Atwell, *Rockwell International* (26, 2, p. 126) Engineering Note

**A89-019 Quasistatic Shape Adjustment of a 15-Meter-Diameter Space Antenna.** W. Keith Belvin, *NASA Langley Research Center*; Harold H. Edighoffer, *Edighoffer, Inc.*; and Catherine L. Herstrom, *NASA Langley Research Center* (26, 3, p. 129) Article based on AIAA Paper 87-0869 CP872

**A89-020 Influence of Temperature on Structural Joints with Designed-In Damping.** Jacky C. Prucz, *West Virginia University*; Philip Smith and Lawrence W. Rehfield, *Georgia Institute of Technology*; and Ambur D. Reddy, *Lockheed-Georgia Company* (26, 3, p. 137) Article

**A89-021 Spacecraft Interactions as Influenced by Thermochemical Considerations.** Edmond Murad, *U. S. Air Force Geophysics Laboratory, Hanscom AFB* (26, 3, p. 145) Article

**A89-022 Supersonic Noncircular Missile Computations.** F. J. Priolo and A. B. Wardlaw Jr., *U. S. Naval Surface Warfare Center* (26, 3, p. 151) Article based on AIAA Paper 88-0278

**A89-023 Three-Dimensional Hypersonic Nonequilibrium Flows at Large Angles of Attack.** Bilal A. Bhutta and Clark H. Lewis, *VRA, Inc.* (26, 3, p. 158) Article based on AIAA Paper 88-2568 CP886

**A89-024 Bubble Behaviors in a Slowly Rotating Helium Dewar in a Gravity Probe-B Spacecraft Experiment.** R. J. Hung, Y. D. Tsao and B. B. Hong, *University of Alabama in Huntsville* (26, 3, p. 167) Article

**A89-025 Shuttle High Resolution Accelerometer Package Experiment Results: Atmospheric Density Measurements Between 60 and 160 km.** R. C. Blanchard, *NASA Langley Research Center*; E. W. Hinson, *ST Systems Corporation*; and J. Y. Nicholson, *Vigyan Research Associates, Inc.* (26, 3, p. 173) Article based on AIAA Paper 88-0492

**A89-026 Analytical and Experimental Investigations for Satellite Antenna Deployment Mechanisms.** Masayoshi Misawa and Tetsuo Yasaka, *NTT Radio Communication Systems Laboratories, Japan*; and Shojiro Miyake, *NTT Applied Electronics Laboratories, Japan* (26, 3, p. 181) Article based on AIAA Paper 88-2225 CP882

**A89-027 Validated Spherical Pendulum Model for Rotary Liquid Slosh.** Daniel D. Kana, *Southwest Research Institute* (26, 3, p. 188) Article

**A89-028 Rocket Nozzle Expansion Ratio Analysis for Dual-Fuel Earth-to-Orbit Vehicles.** James A. Martin, *NASA Langley Research Center* (26, 3, p. 196) Engineering Note

**A89-029 Shock Wave Asymmetry of Sphere Cones at Angles of Attack.** S. L. Gai, *University College, Australian Defence Force Academy* (26, 2, p. 198) Engineering Note

**A89-030 Flow-Thermal-Structural Study of Aerodynamically Heated Leading Edges.** Pramote Dechaumphai, *NASA Langley Research Center*; Earl A. Thornton, *Old Dominion University*; and Allan R. Wieting, *NASA Langley Research Center* (26, 4, p. 201) Article based on AIAA Paper 88-2245 CP882

**A89-031 Wing Vertical Position Effects on Lift for Supersonic Delta Wing Missiles.** A. A. Jenn, *McDonnell Douglas Astronautics Company*; and H. F. Nelson, *University of Missouri--Rolla* (26, 4, p. 210) Article based on AIAA Paper 88-4381 CP8810

**A89-032 Aerodynamic Side Force Induced by Nozzle Entrance Flow Asymmetry.** R. L. Varwig, J. S. Whittier, D. A. Durran, R. X. Meyer and E. K. Ruth, *Aerospace Corporation* (26, 4, p. 217) Article

**A89-033 Delamination-Based Approach Toward Fracture Control of Composite Spacecraft Structures.** C. K. H. Dharan, *University of California, Berkeley* (26, 4, p. 229) Article

**A89-034 Review of Electrodynamic Tethers for Space Plasma Science.** Peter M. Banks, *Stanford University* (26, 4, p. 234) Article based on AIAA Paper 89-0675

**A89-035 Size and Economics of Big Space Freighters.** Harald Arend and H. Hermann Koelle, *Technical University of Berlin, FRG* (26, 4, p. 240) Article

**A89-036 Space-Based Test-Bed Concept.** Charles F. Gartrell, *General Research Corporation*; and Cyrus L. Butner, *General Research Corporation* (26, 4, p. 245) Article

**A89-037 Reusable, Flyback Liquid Rocket Booster for the Space Shuttle.** Mark G. Benton, *University of Maryland* (26, 4, p. 252) Article

**A89-038 Impact of Water Integration on Space Station Freedom Propellant Availability.** George R. Schmidt, *Booz, Allen & Hamilton, Inc.* (26, 4, p. 259) Article based on AIAA Paper 87-1864

**A89-039 Test-Analysis Correlation of the Space Shuttle Solid Rocket Motor Center Segment.** Daniel C. Kammer, *SDRC, Inc.*; Brent M. Jensen and Donald R. Mason, *Morton Thiokol, Inc.* (26, 4, p. 266) Article based on AIAA Paper 88-2398 CP882

**A89-040 Effects of Multiple Scattering on Rocket Exhaust Plume Smoke Visibility.** A. C. Victor, *U. S. Naval Weapons Center* (26, 4, p. 274) Article

**A89-041 Rocket Motor Service Life Calculations Based on the First-Passage Method.** Hazim S. Zibdeh and Robert A. Heller, *Virginia Polytechnic Institute and State University* (26, 4, p. 279) Article based on AIAA Paper 86-1416

**A89-042 Nozzle-Lip Effects on Argon Expansions Into the Plume Backflow.** David H. Campbell, *University of Dayton Research Institute* (26, 4, p. 285) Article

**A89-043 Moments Applied in the Rotation of Massive Objects in Shuttle Extravehicular Activity.** D. Cousins and D. L. Akin, *Massachusetts Institute of Technology* (26, 4, p. 293) Engineering Note

**A89-044 Mars Tethered Sample Return.** S. Alan Stern, *University of Colorado* (26, 4, p. 294) Engineering Note

**A89-045 Thermal Control of Space X-Ray Experiment.** R. L. Akau and D. W. Larson, *Sandia National Laboratories* (26, 5, p. 297) Article based on AIAA Paper 87-1572

**A89-046 Optimum Heat Rejection Temperatures for Spacecraft Heat Pumps.** D. K. Edwards and R. F. Richards, *University of California, Irvine* (26, 5, p. 303) Article

**A89-047 Drag Correlation and Predictions of Surface Groove Drag for Kinetic Energy Projectiles.** Ameer G. Mikhail, *U. S. Army Ballistic Research Laboratory* (26, 5, p. 308) Article based on AIAA Paper 88-2541 CP886

**A89-048 Prediction of Tubular Projectile Aerodynamics Using the ZEUS Euler Code.** J. Evans, *Defence Research Establishment Valcartier, Canada*; and A. B. Wardlaw, *Naval Surface Warfare Center* (26, 5, p. 314) Article based on AIAA Paper 89-0334

**A89-049 Wing-Body Interference Lift for Supersonic Missiles with Elliptical Cross-Section Fuselages.** H. F. Nelson, *University of Missouri--Rolla* (26, 5, p. 322) Article

**A89-050 Atmospheric Environment During Maneuvering Descent from Martian Orbit.** Michael E. Tauber and Jeffrey V. Bowles, *NASA Ames Research Center*; and Lily Yang, *Sterling Software* (26, 5, p. 330) Article based on AIAA Paper 88-2671

**A89-051 Electromagnetically Launched Microspacecraft for Space Science Missions.** Ross M. Jones, *Jet Propulsion Laboratory, California Institute of Technology* (26, 5, p. 338) Article based on AIAA Paper 88-0068

**A89-052 Consort 1 Sounding Rocket Flight.** Francis C. Wessling, *University of Alabama in Huntsville*; and George W. Maybee, *McDonnell Douglas Space Systems Company* (26, 5, p. 343) Article

**A89-053 Electric Propulsion for Constellation Deployment and Spacecraft Maneuvering.** W. D. Deininger and R. J. Vondra, *Jet Propulsion Laboratory, California Institute of Technology* (26, 5, p. 352) Article based on AIAA Paper 88-2833

**A89-054 Photochemical Spacecraft Self-Contamination: Laboratory Results and Systems Impacts.** Thomas B. Stewart, Graham S. Arnold, David F. Hall, Dean C. Marvin, Warren C. Hwang, Rolaine C. Young Owl and H. Daniel Marten, *Aerospace Corporation* (26, 5, p. 358) Article based on AIAA Paper 88-2728

**A89-055 Analysis of a Low-Vapor-Pressure Cryogenic Propellant Tankage System.** Chris N. Torre and Jim A. Witham, *General Dynamic Space Systems Division*; Elizabeth A. Dennison, Richard C. McCool and Michael W. Rinker, *General Dynamics Space Systems Division* (26, 5, p. 368) Article based on AIAA Paper 87-2068

**A89-056 Swept Frequency Type of Ultrasonic Inspection Method for Liner-Propellant Separations of the H-I Upper-Stage Motors.** Morio Shimizu, Katsuya Itoh and Tsutomu Fujiwara, *National Aerospace Laboratory, Japan*; Yukio Fukushima and Michio Takahashi, *National Space Development Agency of Japan*; and Takao Maniwa, *Nissan Motor Company, Japan* (26, 5, p. 379) Article based on AIAA Paper 88-3356

**A89-057 Modeling of the Space Shuttle Solid Rocket Motor Nozzle Boot Cavity Pressurization Process.** J. Louie Clayton, *United Technologies, USBI* (26, 5, p. 385) Article

**A89-058 Integrated Launch and Emergency Entry Vehicle Concept.** James A. Martin, *NASA Langley Research Center* (26, 5, p. 391) Engineering Note

**A89-059 Solar Activity Cycle: History and Predictions.** George L. Withbroe, *Harvard-Smithsonian Center for Astrophysics* (26, 6, p. 394) Article

**A89-060 Solar Proton Events During the Past Three Solar Cycles.** D. F. Smart and M. A. Shea, *Air Force Geophysics Laboratory, Hanscom AFB* (26, 6, p. 403) Article

**A89-061 Solar Cycle Effects on Trapped Energetic Particles.** A. L. Vampola, *Aerospace Corporation* (26, 6, p. 416) Article

**A89-062 Solar Cycle Effects on Near-Earth Plasmas and Space Systems.** D. J. Gorney, *Aerospace Corporation* (26, 6, p. 428) Article

**A89-063 Solar Cycle Effects on the Upper Atmosphere: Implications for Satellite Drag.** R. L. Walterscheid, *Aerospace Corporation* (26, 6, p. 439) Article

**A89-064 Aerodynamic Effects of a Turbulent Flowfield on a Vertically Launched Missile.** Richard M. Howard, *Naval Postgraduate School*; M. Peter Rabang and Donald P. Roane Jr., *U. S. Navy* (26, 6, p. 445) Article based on AIAA Paper 89-0329

**A89-065 Electrodynamics of the Getaway Tether Experiment.** Michael Greene, *Auburn University*; Douglas Wheelock, *SCI Systems*; and Michael Baginski, *Auburn University* (26, 6, p. 452) Article

**A89-066 Determining Characteristic Mass for Low-Earth-Orbiting Debris Objects.** Michael R. Dickey and Robert D. Culp, *University of Colorado* (26, 6, p. 460) Article

**A89-067 Predicting Redesigned Solid Rocket Motor Joint Volume Pressurization, Temperature Transients, and Ablation.** Michael O'Malley, *Morton Thiokol, Inc.* (26, 6, p. 465) Article based on AIAA Paper 88-3332

**A89-068 Heat Loads Due to the Space Particle Environment.** A. L. Vampola, R. D. Jimenez and J. E. Cox, *Aerospace Corporation* (26, 6, p. 474) Engineering Note

**A89-069 Effects of Crucible Wetting During Solidification of Immiscible Pb-Zn Alloys.** Henry C. de Groh III and Hubert B. Probst, *NASA Lewis Research Center* (26, 6, p. 476) Engineering Note based on AIAA Paper 89-0304

U.S. Postal Service <b>STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION</b> <small>Required by 39 U.S.C. 3685</small>									
1A. Title of Publication  Journal of Spacecraft and Rockets		1B. PUBLICATION NO. <table border="1" style="width: 100%; text-align: center;"> <tr> <td>2</td><td>8</td><td>2</td><td>9</td><td>4</td><td>0</td> </tr> </table>	2	8	2	9	4	0	2. Date of Filing  9/28/89
2	8	2	9	4	0				
3. Frequency of Issue  Bi-monthly		3A. No. of Issues Published Annually  6	3B. Annual Subscription Price  \$25.00						
4. Complete Mailing Address of Known Office of Publication (Street, City, County, State and ZIP+4 Code) (Not printers)  370 L'Enfant Promenade S.W., Washington, D.C. 20024									
5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher (Not printer)  Same as above.									
6. Full Names and Complete Mailing Address of Publisher, Editor, and Managing Editor (This item <b>MUST NOT</b> be blank)									
Publisher (Name and Complete Mailing Address)  American Institute of Aeronautics and Astronautics, Inc. Same as above.									
Editor (Name and Complete Mailing Address)  Frank J. Redd -- Same as above									
Managing Editor (Name and Complete Mailing Address)  William O'Connor -- Same as above.									
7. Owner (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given. If the publication is published by a nonprofit organization, its name and address must be stated.) (Item must be completed.)									
Full Name		Complete Mailing Address							
American Institute of Aeronautics and Astronautics, Inc.		Same as above.							
8. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities (If there are none, so state)									
Full Name		Complete Mailing Address							
None.									
9. For Completion by Nonprofit Organizations Authorized to Mail at Special Rates (DMM Section 423.12 only) The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes (Check one)									
(1) <input checked="" type="checkbox"/> Has Not Changed During Preceding 12 Months		(2) <input type="checkbox"/> Has Changed During Preceding 12 Months <small>(If changed, publisher must submit explanation of change with this statement.)</small>							
10. Extent and Nature of Circulation <small>(See instructions on reverse side)</small>	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date							
A. Total No. Copies (Net Press Run)	3,667	3,600							
B. Paid and/or Requested Circulation 1. Sales through dealers and carriers, street vendors and counter sales	-----	-----							
2. Mail Subscription (Paid and/or requested)	3,252	3,207							
C. Total Paid and/or Requested Circulation (Sum of 10B1 and 10B2)	3,252	3,207							
D. Free Distribution by Mail, Carrier or Other Means Samples, Complimentary, and Other Free Copies	132	133							
E. Total Distribution (Sum of C and D)	3,384	3,340							
F. Copies Not Distributed 1. Office use, left over, unaccounted, spoiled after printing	283	260							
2. Return from News Agents	-----	-----							
G. TOTAL (Sum of E, F1 and 2--should equal net press run shown in A)	3,667	3,600							
11. I certify that the statements made by me above are correct and complete		Signature and Title of Editor, Publisher, Business Manager, or Owner David Quackenbush, Controller 							