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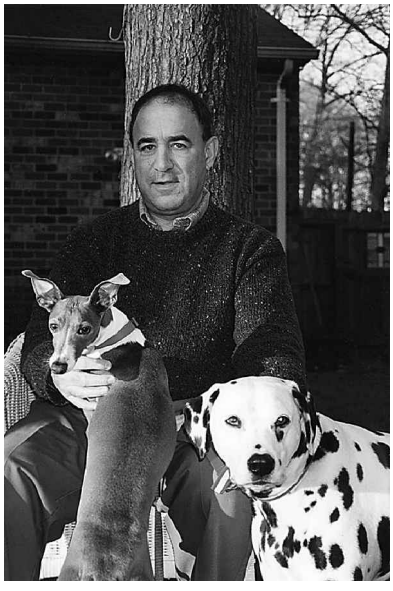
Journal Support

AS Editor-in-Chief, I would like to acknowledge all of the important contributors to this journal and thank them. The contributors are all of the authors, reviewers, Associate Editors, AIAA editorial staff, and TechBooks staff who have been associated with the *Journal of Spacecraft and Rockets* (*JSR*). The *JSR* has a diverse scope with application-orientedarticles, and I hope that the technical community continues to find papers of interest. I need to thank the authors who have chosen the *JSR* as the means to disseminate their research to the technical aerospace community. I hope that they felt that the peer review process was professional and constructive. The peer review process and the high quality of the AIAA journals would not exist if it were not for the reviewers who voluntarily give of their time and provide in-depth reviews. Although it is only a small token of appreciation, their names are listed in this issue. Hopefully we have successfully included all of them. I do, however, thank all who gave their time. The Associate Editors provide the cornerstone of this peer review process. They have the responsibility for the technical evaluation of the proposed papers and for maintaining the high quality in the published version. Their biographies are also included in this issue. We are fortunate to have new commitments from Craig McLaughlin, Nikolaos Gatsonis, Timothy Collins, and Andrew Ketsdever to serve as Associate Editors. I want to thank three retiring *JSR* Associate Editors, Jeff Taylor, Mike Nemeth, and David Cooke. If anyone has ever had the responsibility of an Associate Editor position, a simple thank you probably seems insufficient. It is very difficult trying to balance your real job with one where you are attempting to contribute to your profession. Finally, we arrive at the AIAA editorial staff and the TechBooks staff. I want to thank Ms. Norma Brennan for her terrific help over all of the past years. Her ongoing dedication is invaluable. I truly appreciate Luke McCabe, who always seems willing to make this job a little easier. Also, I want to thank Ms. Carol Neff and her TechBooks staff for their patience and outstanding effort in publishing the special issues and sections.

E. Vincent Zoby
Editor-in-Chief



E. VINCENT ZOBY is employed by NASA and has been at the Langley Research Center since 1962. He received a B.S.M.E. from Virginia Polytechnic Institute and State University and an M.S. in Thermal Engineering from Old Dominion University. Mr. Zoby has been responsible for developing and demonstrating the applicability of approximate codes that define the aerothermal environment about spacecraft at both Earth and planetary entry conditions. This work encompassed preliminary design and/or postflight heating calculations for the RAM C, Re-Entry F, Shuttle, and Venusian and Galileo vehicles. (At this point, it is usually noted that his dogs, Banks and Hokie, have not done a lick of work in their lives! Sad to say, Hokie—the Dalmatian—has passed away, but Hokie will always be his buddy.) Mr. Zoby has over 90 publications in the area of hypersonic aerothermodynamics to his credit, including studies for computing the equilibrium high-temperature properties of gas mixtures and for the heat shield performance of entry probes. He recently served as Langley's Technical Team Leader for the aerothermodynamics tasks in a cooperative effort with Boeing on the X-37 program. Another current assignment is involved with aerothermodynamic studies for the outer planets. Mr. Zoby served on the AIAA Thermophysics Technical Committee and is a Fellow of the AIAA.

Associate Editors

IAIN D. BOYD received a B.S. in Mathematics (1985) and a Ph.D. in Aeronautics and Astronautics (1988) from the University of Southampton in England. He worked for four years as a contractor at NASA Ames Research Center in the area of rarefied gas dynamics. Dr. Boyd was a faculty member in Mechanical and Aerospace Engineering at Cornell University for six years and recently joined the Department of Aerospace Engineering at the University of Michigan. His research interests involve development of physical models and numerical algorithms using particle methods with applications to a variety of nonequilibrium gas and plasma dynamic systems. He has authored over 60 journal papers. He is the recipient of the 1998 AIAA Lawrence Sperry Award and the 1997 AIAA Electric Propulsion Best Paper Award.

TIM COLLINS is a structures research engineer at NASA Langley Research Center. He has a Bachelor's Degree in Physics and a Master of Science Degree in Mechanical and Aerospace Engineering. His primary areas of research have included the structural analysis and design of both aircraft and spacecraft structures. During the early part of his career, he worked on the development of structures for micron-precision segmented reflector applications. Later, he performed nonlinear analysis studies of composite fuselage concepts under NASA's High Speed Civil Transport Program. He has served on special assignment to NASA's X-33 composite fuel tank failure investigation team and has performed analyses to support the development of the current Space Shuttle superlightweight liquid oxygen tank. In addition, he has participated in numerous studies related to the design, packaging, and assembly of truss structures for in-space applications. He is currently involved with the analysis and testing of lightweight inflatable–rigidizable columns and is participating in studies to develop human/robotic cooperative roles for in-space assembly and servicing. He is also leading a research effort to develop high-temperature composite materials and adhesives for application to planetary missions that utilize aerocapture technology. In his spare time, Tim enjoys the beach, hiking, golf, pocket billiards, and spending time with his dogs Casey and Jamie.

RUSSELL M. CUMMINGS graduated from California Polytechnic State University with a B.S. and M.S. in Aeronautical Engineering in 1977 and 1985, respectively, before receiving his Ph.D. in Aerospace Engineering from the University of Southern California in 1988. Before joining the Aeronautical Engineering Department at Cal Poly in 1986, he worked for Hughes Aircraft Company in the Missile Systems Group as a missile aerodynamicist from 1979 through 1986. He completed a National Research Council postdoctoral research fellowship at NASA Ames Research Center in 1990, working on the computation of high-angle-of-attack flowfields in the Applied Computational Fluids Branch. He was named an AIAA Associate Fellow in 1990, received the AIAA National Faculty Advisor Award in 1995, and has served on the AIAA Student Activities Committee since 1990. Dr. Cummings served as the Chairman of the Aeronautical Engineering Department at Cal Poly from 1991 through 1995 and is currently a Professor in that department.

DAVID L. EDWARDS received a Bachelors of Science degree, in Physics, from the University of North Alabama in 1986. In 1989, he received a Masters of Science degree, in Physics, from Auburn University. His research focused on ion beam analysis of the oxide growth on thin silver films. NASA's Marshall Space Flight Center (MSFC) hired Dr. Edwards on 1 May 1989, and he has worked in the discipline of Space Environmental Effects on materials for 13 years. Dr. Edwards was accepted into the Materials Engineering Ph.D. program at Auburn University in 1991 and completed this program in August 1999. He is the Space Environments Team Lead in the Environmental Effects Group of MSFC's Engineering Directorate. He coordinates the activities of engineers, scientists, and technicians conducting basic research as well as program-related testing of space environmental effects on materials and systems. Research interests include quantifying the effects of material exposure to the space environment, ion beam analysis of materials, and investigating the interaction physics associated with advanced propulsion systems. Dr. Edwards is an active member of the committee to generate an International Standard titled "Simulation for Radiation Tests of Materials." This International Standard, when approved, will govern the procedure for performing radiation exposures of materials. Dr. Edwards and his wife, Sandy, live in Huntsville, Alabama, with their two children, Megan and Ashley.

NIKOLAOS A. GATSONIS received his undergraduate degree in Physics at the Aristotelian University of Thessaloniki, Greece (1983), an M.S. in Atmospheric Science at the University of Michigan (1996), and an M.S. (1987) and a Ph.D. (1991) in the Aeronautics and Astronautics Department of the Massachusetts Institute of Technology. From 1991 to 1993 he was a Postdoctoral Fellow at the Space Department of the Johns Hopkins University, Applied Physics Laboratory, where he worked on various aspects of spacecraft–space environment interactions in support of space experiments and missions. In 1994 he joined the Mechanical Engineering faculty at Worcester Polytechnic Institute, where he is currently an Associate Professor and Director of the Aerospace Program. His research areas include spacecraft–space environment interactions, spacecraft propulsion and micropropulsion, gasdynamics, and plasmadynamics. He has been pursuing his research interests with modeling, simulations, experiments, and participation in space experiments. A significant component of his research involves the development of fluid, particle, and hybrid numerical simulation methods for nonequilibrium, multicomponent, multiscale, gaseous, and plasma flows. He has authored or coauthored over sixty journal and conference proceedings papers. He is a member of the AIAA Electric Propulsion Technical Committee and served on the AIAA Space Science Technical Committee (1992–1996).

BASIL HASSAN is the Manager of the Aerosciences and Compressible Fluid Mechanics Department at Sandia National Laboratories, Albuquerque, New Mexico. Dr. Hassan received his B.S. (1988), M.S. (1990), and Ph.D. (1993) in Aerospace Engineering from North Carolina State University. While at Sandia, he has primarily worked in research and development in the areas of nonequilibrium computational fluid dynamics and ablation with application to aerodynamics and aerothermodynamics of high-speed flight vehicles. Dr. Hassan has been a member of the AIAA Thermophysics Technical Committee (1994–2003), including serving as its Chair (2000–2002). He was the Technical Program Chair of the 7th AIAA/ASME Joint Thermophysics and Heat Transfer Conference (1998) and will be the General Chair of the AIAA Summer Collocated Conferences (Thermophysics, Fluid Dynamics, Plasmadynamics and Lasers, Aerodynamics Measurement Technology and Ground Testing) in 2004. Dr. Hassan is the Deputy Director for Fluid Sciences in AIAA's Aerospace Sciences Group. Dr. Hassan was named an Associate Fellow of the AIAA in 2000 and is a member of the American Society of Mechanical Engineers. He has been a manuscript reviewer for *AIAA Journal*, the *Journal of Thermophysics and Heat Transfer*, the *Journal of Spacecraft and Rockets*, and the *Journal of Thermal Spray Technology* and has authored or coauthored over 25 journal articles and conference papers.

ANDREW D. KETSDEVER is currently a Group Leader and Senior Research Engineer at the U.S. Air Force Research Laboratory's (AFRL) Propulsion Directorate at Edwards Air Force Base, California. He has worked in the areas of nonequilibrium flows, rarefied gas dynamics, microfluidics, spacecraft-thruster interactions, and microspacecraft propulsion since starting at AFRL in 1992. Dr. Ketsdever received a Ph.D. in Aerospace Engineering from the University of Southern California (USC) in 1995, where he is currently a Research Professor in the Department of Aerospace and Mechanical Engineering. He regularly teaches graduate and undergraduate courses in rarefied gas dynamics, planetary atmospheres, microspacecraft design, and spacecraft–environment interactions and is the Director of the USC Student Microsatellite Program. He has been a member of the AIAA Thermophysics Technical Committee, has been involved with the AIAA Fluid Dynamics Technical Committee's Working Group in Microfluidics, has authored or coauthored over 50 technical papers, and has coedited an AIAA Progress in Astronautics and Aeronautics series book entitled *Micropropulsion for Small Spacecraft.*

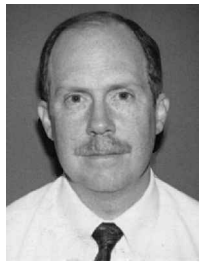
CRAIG A. KLUEVER received his B.S. in Aerospace Engineering from Iowa State University in 1986. He worked at Rockwell International from 1986 to 1989 in the Space Shuttle Guidance, Navigation, and Control Group. He returned to Iowa State and completed his M.S. and Ph.D. degrees in Aerospace Engineering in 1990 and 1993, respectively. Since 1993, he has been with the University of Missouri–Columbia and is currently an Associate Professor in the Mechanical and Aerospace Engineering Department. His research interests include mission design and analysis, trajectory optimization, guidance and control of aerospace vehicles, reentry flight mechanics, and orbital mechanics. He is an Associate Fellow of the AIAA, has served on its Astrodynamics Technical Committee, and is currently a member of the AIAA Atmospheric Flight Mechanics Technical Committee.

MARK S. LAKE is the Director of Technology Programs for Composite Technology Development, Inc., Lafayette, Colorado. He received his B.S. in 1984 from the University of Illinois, his M.S. in 1989 from Old Dominion University, and his Ph.D. in 1992 from North Carolina State University. From 1981 to 2001, he was a Research Engineer with NASA Langley Research Center. From 1999 to 2001, he was a Visiting Researcher at the Jet Propulsion Laboratory. Dr. Lake is an internationally recognized expert in the field of deployable spacecraft structures and an authority on nonlinear mechanics of composite and mechanically jointed structures. He is the author or coauthor of over 40 research publications in the field of spacecraft structures and a reviewer for the *Journal of Shock and Vibration.* He is an Associate Fellow of the AIAA and an Adjunct Member of the Graduate Faculty of the Department of Aerospace Engineering Sciences at the University of Colorado.

TONY C. LIN received his B.S. degree (1964) from National Taiwan University in Civil Engineering and his Ph.D. degree (1969) from Polytechnic Institute of Brooklyn in Aerospace Engineering. Over the years, he has worked at NASA Marshall Space Flight Center, Avco, and The Aerospace Corp. Since 1979, he has been with TRW/SSD and is currently a Department Manager. His primary fields of interest are aerothermodynamics, flight mechanics, computational fluid dynamics, and electromagnetic wave propagation.

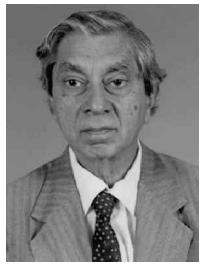
JAMES A. MARTIN holds a B.S. degree from West Virginia University, M.S. and Engineer degrees from the Massachusetts Institute of Technology, and a D.Sc. Degree from George Washington University. He has worked at the NASA Langley Research Center, the University of Alabama, and Boeing. His work has mostly involved the design and evaluation of reusable launch vehicles and space transfer concepts. Several of his papers deal with tripropellant rocket propulsion options. He was leader of the Orbit-on-Demand Study at NASA. Some recent work has been on the NASA and Boeing Solar Power Satellite Program, crew escape for the Shuttle, and the use of tethers for launch and orbit transfer.

CRAIG A. MCLAUGHLIN is an Assistant Professor in the Space Studies Department at the University of North Dakota (UND). His research interests are in spacecraft engineering, particularly in astrodynamics. He currently focuses his research on spacecraft formation flying, orbit determination and prediction, and mission planning for remote sensing. In addition, he is actively involved in the American Astronautical Society's Space Flight Mechanics Committee and the AIAA's Astrodynamics Technical Committee. He is also a member of the American Society for Engineering Education and the Planetary Society. Dr. McLaughlin came to UND from the Space Vehicles Directorate of the U.S. Air Force Research Laboratory. There he served as Principal Investigator for formation flying for the TechSat 21 mission and as Team Lead for the Guidance, Navigation, and Control Team. Before that he provided mission planning design and support for the MightySat II.1 technology demonstration satellite, which captured the first hyperspectral images taken from space. Dr. McLaughlin received his M.S. and Ph.D. in Aerospace Engineering Sciences at the University of Colorado at Boulder in 1994 and 1998, respectively. He received a B.S. in Aeronautical Engineering from Wichita State University in 1992. As an undergraduate he spent time working for Lockheed Engineering and Sciences Company in Houston, where he worked on the Space Shuttle program and several Space Shuttle payloads.



MARK S. MILLER received his B.S. and M.S. degrees in Aerospace Engineering from Auburn University and is an Associate Fellow of the AIAA. His areas of technical expertise include missile aerodynamic design, wind-tunnel testing, and performance analysis. He is currently Manager of the Missile Systems Department at Dynetics, Inc., where he directs a group of engineers supporting a variety of missile-related projects for the Department of Defense. He has also been the Principal Investigator on several Small Business Innovative Research Contracts evaluating advanced aerodynamic control technologies for a variety of atmospheric vehicles. Mr. Miller has been a member of both the AIAA Atmospheric Flight Mechanics and the Applied Aerodynamics Technical Committees, was the Technical Chair of the 1996 AIAA Applied Aerodynamics Conference, and has served as a coinstructor for the AIAA Short Course on Launch Vehicle and Missile Aerodynamics first taught in 2000.

DAVID B. SPENCER is an Assistant Professor of Aerospace Engineering at Pennsylvania State University. He teaches undergraduate and graduate courses in spacecraft dynamics and controls. Additionally, he conducts research in the areas of space debris dynamics, trajectory optimization, guidance, navigation, control, and theoretical and applied astrodynamics. Formerly, he was a member of the Technical Staff at The Aerospace Corporation in Los Angeles and held various technical and management positions at the U.S. Air Force Research Laboratory's Space Vehicles Directorate in Albuquerque, New Mexico. He has a B.S. in Mechanical Engineering from the University of Kentucky, an M.S. in Aeronautics and Astronautics from Purdue University, and a Ph.D. in Aerospace Engineering Sciences from the University of Colorado at Boulder. He was named an AIAA Associate Fellow in 1998, is the author of several technical publications, and serves on both the AIAA Astrodynamics Technical committee and the AAS Space Flight Mechanics Technical Committee.



IRWIN E. VAS has been employed by The Boeing Company since 1987. He received his B.M.E. and B.A.E. from the Catholic University of America, his M.S.E. from Princeton University, and his Ph.D. in Aeronautics and Astronautics from New York University. He worked in supersonic and hypersonic experimental gas dynamics at Princeton University for 25 years. The high-Reynolds-number supersonic flows dealt primarily with two- and three-dimensional shock wave/boundary-layer interactions. The hypersonic flows created in helium and heated nitrogen facilities dealt with two-dimensional and axially symmetric phenomena of sharp and blunted shapes, including incidence effects. On leaving Princeton University, he joined the Solar Energy Research Institute (currently the National Renewable Energy Laboratory) as Program Manager for Wind Energy. He later joined Flow Industries/Flowind Corporation in Seattle, Washington, a company that designed and manufactured vertical-axis wind turbines. He is currently working on advanced space transportation technologies and systems for the Defense and Space Group of The Boeing Company. He has published approximately 100 technical papers in the area of gas dynamics, wind energy, and space technologies. He is an Associate Fellow of the AIAA.

PAUL WEINACHT has been a Senior Researcher at the U.S. Army Research Laboratory (ARL) and the former U.S. Army Ballistics Research Laboratory since 1982. His interests include computational fluid dynamics modeling of aerodynamic flows for projectiles and missiles, flight mechanics, and heat transfer. Dr. Weinacht received a B.S. in Aerospace Engineering from the University of Notre Dame (1978), an M.S. in Naval Architecture and Marine Engineering from the Massachusetts Institute of Technology (1980), a Diploma from the von Kármán Institute for Fluid Dynamics (1981), and a Ph.D. in Mechanical Engineering from the University of Delaware (1996). In 1995, Dr. Weinacht received the Louis and Edith Zernow Award for the Most Significant Recent Advancement in Fundamental Ballistics, presented at the 15th International Symposium on Ballistics, Jerusalem, Israel. During the 1999–2000 academic year, Dr. Weinacht served as the ARL Visiting Scientist at the U.S. Military Academy, West Point, New York. He is an Associate Fellow of the AIAA and has served on the AIAA Atmospheric Flight Mechanics Technical Committee. He also served as a Technical Program Chair for the 36th AIAA Aerospace Sciences Meeting.

WALT WILLIAMSON is Professor and Chair of the Department of Engineering at Texas Christian University. He received his B.S. in Mechanical Engineering from Stanford University and his M.S. and Ph.D. in Aerospace Engineering from the University of Texas at Austin. He taught for four years at the University of Texas at Austin. He worked for 25 years at Scandia Laboratories in an Advanced and Exploratory Aerospace Systems Department. During that time, he was involved in flight tests of reentry vehicle technologies. He is on the Astrodynamics Technical Committee.

Reviewers for 1 October 2001–30 September 2002

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Editorial Policy Statement on Numerical Accuracy and Experimental Uncertainty

The purpose of this statement is to reiterate the desire to have high-quality investigations with properly documented results published in the AIAA journals, and to clarify acceptable standards for presentation of numerical and experimental results. Recently there has been considerable concern with the quality of published numerical solutions. Also the practice of including error bars on experimental results is often lacking. In response to these problems, a succinct policy statement on these items is as follows:

> *The AIAA journals will not accept for publication any paper reporting (1) numerical solutions of an engineering problem that fails adequately to address accuracy of the computed results or (2) experimental results unless the accuracy of the data is adequately presented.*

The implementation of this policy will be at the discretion of the Editors and Associate Editors of the journals.

The accuracy of the computed results is concerned with how well the specified governing equations in the paper have been solved numerically. The appropriateness of the governing equations for modeling the physical phenomena and comparison with experimental data is not part of this evaluation. Accuracy of the numerical results can be judged from grid refinement studies, variation of numerical parameters that influence the results, comparison with exact solutions, and any other technique the author selects. The validity of the accuracy estimation will be judged by the reviewers of the paper. An estimate of accuracy of the numerical results must be presented when comparisons with other numerical and experimental results are given, and when new results of the author will likely become data for future comparisons. Since accuracy of various computed results obtained from a numerical solution can vary significantly, the accuracy of the result being used must be stated. Accuracy of results from a validated code must still be established to show that proper input parameters have been used with the code.

Estimates of experimental uncertainty are required for all plotted or tabulated data obtained by authors. If data from other workers are used, they require no uncertainty. Unless otherwise stated and properly referenced, it is assumed that the uncertainty of authors' output data is estimated by the small-sample method[1] with assumed odds 20:1. All reported data must show uncertainty estimates if used in text or tables; for example, $T = 642 \pm 8$ K. All figures reporting new data should contain uncertainty estimates either on the figure with error bars in both coordinate directions or in the caption; for example, uncertainty in $T = \pm 8$ K at 20:1 odds. Investigations with limited data should present tabulated results in the paper while extensive data should be available elsewhere in tabulated form for use by other workers.

Finally, the accepted documentation procedures for a technical investigation must be used. For computational papers, the author must provide an adequate description of the numerical solution procedure, if not documented elsewhere. In addition, the complete governing equations must be specified with sufficient detail along with the input parameters to the code so that a reader could reproduce the results of the paper. For papers concerned with experimental test, thorough documentation of the experimental conditions, instrumentation, and data reduction techniques is required.

[1] Kline, S. J., and McClintock, F. A., "Describing Uncertainties in Simple-Sample Experiments," *Mechanical Engineering*, Jan. 1953, pp. 3–8.