JOURNAL OF SPACECRAFT AND ROCKETS
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A Message from the Editor-in-Chief

AS Editor-in-Chief, I enjoy this issue since it provides me with an opportunity to publicly thank the contributors to the journal. The contributors are the authors, reviewers, associate editors, and AIAA staff personnel who were associated in 1996 with the *Journal of Spacecraft and Rockets* (*JSR*). The *JSR* has a diverse scope with application-oriented articles, and I hope that the technical community continues to find articles of interest to their tasks.

I thank the authors who have chosen the *JSR* to disseminate their research to the technical aerospace community. I hope that the peer review process was professional and constructive for their proposed papers. The outstanding quality of the AIAA journal articles is due to the reviewers who voluntarily give their time and provide in-depth reviews in the review process. The names of the reviewers are listed in this issue, and I hope we have successfully included all of them. I do, however, thank all who did contribute. The Associate Editors are the key to the peer review process. They are responsible for the technical evaluation of the submitted papers and for maintaining high quality in the accepted version. One of the editors, John Adams, has decided that he doesn't want to send status reports to me anymore. I want to thank John for a job well done! We have added Bilal Bhutta, Ramesh Malla, Alan Tribble, and James Maus since the year began. The biographies of all of the Associate Editors are included in this issue. I finally want to thank the AIAA editorial staff, and in particular, Saturia Lake, for their continuing patience and help.

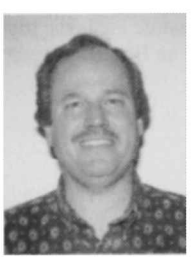
E. Vincent Zoby
Editor-in-Chief

E. VINCENT ZOBY is employed by NASA and has been at the Langley Research Center since 1962. He received his 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 post-flight heating calculations for the RAM C. Re-Entry F Shuttle, and Venusian and Galileo vehicles. He has over 70 publications in the area of hypersonic acrothermodynamics 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 is currently involved in studies of a Reusable Launch Vehicle System and in Shuttle studies. Mr. Zoby served on the AIAA Thermophysics Technical Committee and is an Associate Fellow of the AIAA.

Associate Editors

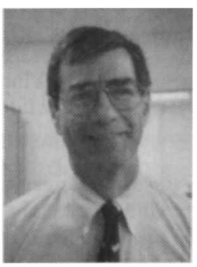
BILAL A. BHUTTA received his B.S.E. (1979) from Orta Dogu Teknik Universitesi, Ankara, Turkey, his M.S.E. (1982) from Purdue University, and his Ph.D. (1985) in Aerospace Engineering from Virginia Polytechnic Institute and State University. He is currently the President of AeroTechnologies, Inc., of Yorktown, Virginia. Previously he has been the Vice President and Chief Scientist at VRA, Inc. His research areas include high-temperature gas dynamics, reactive and ablative re-entry aerothermodynamics, and computational fluid dynamics with emphasis on full/parabolized Navier–Stokes and viscous shock-layer techniques. He has more than 75 publications on these subjects, most of which are available in the open literature. He has also been a major participant in several projects for the U.S. Air Force, U.S. Army, U.S. Department of Energy, NASA, McDonnell Douglas, Textron Defense Systems, General Dynamics Corp., General Electric Co., and Lockheed Martin Co. He is a Senior Member of AIAA and has also been a member of the AIAA Thermophysics Technical Committee.

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. In particular, he participated in the development of nonequilibrium collision models and efficient numerical algorithms for computing low-density flows using Monte Carlo methods. Dr. Boyd is an Associate Professor in Mechanical and Aerospace Engineering at Cornell University, where he teaches aerodynamics and physical gas dynamics. His current research interests include hypersonics, electric propulsion, and materials processing. He has authored, or coauthored, over 40 technical papers.



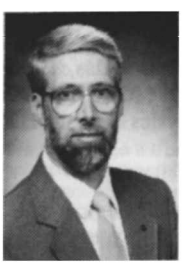
RUSSELL M. CUMMINGS graduated from California Polytechnic State University with a B.S. and an M.S. in Aeronautical Engineering in 1977 and 1985, respectively, before receiving his Ph.D. in Aerospace Engineering from the University of Southern California in 1988. Before joining the Aeronautical Engineering 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 and received the AIAA National Faculty Advisor Award in 1995. Dr. Cummings is currently a Professor in the Aeronautical Engineering Department at Cal Poly.

TONY C. LIN received his B.S. (1962) from National Taiwan University in Mechanical Engineering and his Ph.D. (1969) from Polytechnic Institute of Brooklyn in Aerospace Engineering. He has been employed since 1979 by TRW/SSD and is currently a department manager. His primary fields of interest have been aerothermodynamics, flight dynamics, computational fluid dynamics, and electromagnetic wave propagation. He has published over 40 technical articles in these areas.



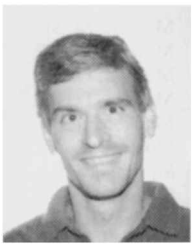
FREDERICK H. LUTZE received a B.S. in Mechanical Engineering with an Aeronautical option from Worcester Polytechnic Institute in 1959. After working a year in the area of inertial guidance systems with Bendix Corporation in Teterboro, New Jersey, he returned to school to get his M.S. and Ph.D. in Aerospace Engineering at the University of Arizona in 1967. He has been teaching and doing research at Virginia Polytechnic Institute and State University for the past 30 years. During this time he has taught courses at both the graduate and undergraduate level in the areas of aircraft performance, aircraft stability and control, vibrations aerodynamics, optimization techniques, spacecraft dynamics, astrodynamics, and control, and has participated in a wide range of research projects sponsored by NASA, the Navy, and the Air Force. These include trajectory optimization in both atmospheric and space environments, evasive maneuvering in both atmospheric and space environments, vehicle guidance and control, and experimental wind tunnel tests. While at Virginia Tech, he has served as consultant for several companies in the areas of space mechanics, atmospheric flight mechanics, dynamics, and trajectory optimization. He is a member of the American Astronautical Society, a past member of the AIAA Atmospheric Flight Mechanics Technical Committee, currently Vice President of Sigma Gamma Tau, and an Associate Fellow of the AIAA.

RAMESH B. MALLA is an Associate Professor at the University of Connecticut and received his B.S. in Civil Engineering (1979) from the Indian Institute of Technology, his M.S. in Civil Engineering (1981) from the University of Delaware, and his Ph.D. in Structural Mechanics (1986) from the University of Massachusetts. His teaching and research expertise is in the areas of structural mechanics with special concentration on dynamics and vibrations of structures. His main research encompasses dynamic and thermal response of orbital structures, response of lunar structures, passive damping of structures, and dynamic effects of member failure in truss-type structures. Professor Malla played a key role in the founding of the Connecticut Space Grant College Consortium and has been serving as the University of Connecticut Director since its inception in 1991. He also has more than 40 technical publications, has served on several Technical and Planning Committees, and is a member of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the AAM, and the AIAA.



JAMES A. MARTIN graduated from West Virginia University in 1966 with a B.S. in Aerospace Engineering. He completed his M.S. in Aeronautics and Astronautics in 1967 at the Massachusetts Institute of Technology and returned for the Engineer of Aeronautics and Astronautics professional degree in 1969. He completed his D.Sc. in Flight Sciences from George Washington University in January 1982. His work at NASA Langley Research Center has been on advanced Earth-to-orbit transportation, including trajectory analysis, vehicle sizing, rocket and air-breathing propulsion, and cost estimation. Dr. Martin became an Associate Professor of Aerospace Engineering at the University of Alabama in 1991, where he teaches design and propulsion.

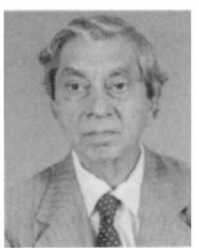
JAMES R. MAUS received B.S (1959), M.S. (1962), and Ph.D. degrees in Mechanical Engineering from North Carolina State University. In 1966 he joined the faculty of the University of Tennessee Space Institute, where he spent the next 15 years teaching graduate courses in fluid mechanics and mathematics while carrying out research in high-speed flow and acoustics. In 1981 Dr. Maus joined the computational mechanics staff in the von Kármán Facility at Arnold Engineering Development Center (AEDC). At AEDC, he has been involved in hypersonic aerodynamic analysis, high enthalpy flow modeling, and high enthalpy facility development. He is currently an Engineering Specialist in the Applied Technology Department of Sverdrup Technology, Inc.



FRANK S. MILOS, Research Scientist at NASA Ames Research Center, received his B.S. and M.S. in Chemical Engineering from the Illinois Institute of Technology in 1978 and 1980, respectively, and his Ph.D. in Chemical Engineering from Stanford University in 1986. Before joining NASA in 1989, he worked at Aerotherm Corporation, primarily in the areas of hypersonic boundary layer chemistry and thermal protection system (TPS) materials, response, and sizing. At NASA Ames he has worked in the Aerothermodynamics, Arc Jet Research, and Thermal Protection Branches. His recent research has been on heat shield response of the Galileo probe, technology development for TPS sizing, a theory for multicomponent ablation, and modeling the properties of rigid fibrous insulations. He has authored or coauthored over 30 technical papers.

EARL A. THORNTON became Professor of Aerospace Engineering at the University of Virginia in the fall of 1989. Prior to that time, he was a visiting scholar at the Texas Institute of Computational Mechanics at the University of Texas at Austin. From 1969 to 1987 he was a member of the faculty of the Mechanical Engineering and Mechanics Department at Old Dominion University. He received a B.S. in Engineering Mechanics from Virginia Polytechnic Institute and State University (VPI&SU) in 1959, an M.S. from the University of Illinois in Theoretical and Applied Mechanics in 1961, and a Ph.D. in Engineering Mechanics from VPI&SU in 1968. For most of his career he has been involved in interdisciplinary research on flow, thermal, and structural behavior of space structures and high-speed flight vehicles. Professor Thornton is a past member of the Thermophysics and Structures Technical Committees and currently a member of the History Technical Committee. The author of over 100 engineering publications, he is coauthor of the text *The Finite Element Method for Engineers*. He is the editor of two volumes in the AIAA Progress in Astronautics and Aeronautics series, and he is the author of a new book, *Thermal Structures for Aerospace Applications*, in the AIAA Education Series.

ALAN C. TRIBBLE received a B.S. in Physics from the University of Arkansas in 1983. He completed an M.S. and a Ph.D. in Space Physics from the University of Iowa in 1986 and 1988, respectively. He then joined Rockwell International's Space Systems Division as a Space Environment Effects specialist. In addition to providing specialty engineering support to over two dozen satellite programs, he has been an active researcher in various Space Environment Effects subfields. He is a Principal Investigator for the NASA Space Environment Effects program, is the instructor for the AIAA Professional Study Course on Space Environment Effects, and is also a member of the U.S. delegation to the International Standards Organization's working group on space environments. He is the author of two books, including *The Space Environment—Implications for Spacecraft Design*, and over two dozen technical publications and has also been a regular lecturer at the University of Southern California's Department of Aerospace Engineering. He recently accepted a new position with the Collins Avionics and Communications Division within Rockwell International.



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 National Renewable Energy Laboratory) as Program Manager for Wind Energy. He later joined Flow Industries/Flowind Corporation in Seattle, 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.

Reviewers for the *Journal of Spacecraft and Rockets*–1996*

Abate, G.
Abusali, P. A. M.
Accorsi, M.
Agajanian, A.
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Allen, J. M.
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Ardema, M. D.
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August, H.
Austin, R. F.
Axelrad, P.

Baker, R.
Baker, R. D.
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Barlog, S. J.
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Braun, R. D.
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Buckland, R.W.
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Burns, K.
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Byers, D. C.

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Candler, G. V.
Carroll, J.
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Cassell, L.
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Cheng, H. K.
Childs, D.
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Cicci, D. A.
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Colwell, G. T.
Comparetto, G.
Connolly, J. F.
Cooke, D.
Coppola, V. T.
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Cramer, E. J.
Culp, R. D.
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Curry, E. B.
Cutchins, M. A.

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Degani, D.
de Groh, K. K.
DeJarnette, F. R.
DeLaHunt, P.
Demetriades, A.
Denig, W. F.
Dickinson, R. M.
Dirling, R.
DiTolla, R.
Dix, R. E.
Dolling, D.
Dolling, D. S.
Douglas, O. S.
Drolen, B. L.
Dunham, D. W.
Dunteman, R.
Dutton, J. C.
Dye, J. O., III

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Elangovan, R.
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Farquhar, R.
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Fu, H.
Funk, J.

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Gaynor, T.
Gerald, W.
Geros, J. M.
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Glickman, R.
Goebel, J.
Gorski, J.
Green, B. D.
Greenwald, E. C.
Griffin, T.
Grossman, B.
Gulino, D. A.
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Gyetvay, M. J.

Hablani, H.
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Hallman, W. P.
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Harrison, J. V.
Hassan, H. A.
Hathaway, W.
Herold, R.
Hill, S.
Hill, S. M.
Hillard, G. B.
Hochstein, J.
Hoffmann, K.
Hornung, H.
Housh, C.
Howell, K. C.
Hsieh, T.
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Hunt, J. W., Jr.
Hunton, D. E.
Hurlbut, F. L.

Ibarra, T. H.
Ingham, M.

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Johnson, D. P.
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Joseph, R. G.
Joyner, C. R.

Kahl, R.
Kamotani, Y.
Karasopoulos, H. A.
Kattamis, T. Z.
Ken, W. B.
Kennedy, K. D.
Kessler, D. J.
Kiessling, E. H., III
Kinnison, J.
Kittel, P.
Kluever, C. A.
Koppenwallner, G.
Kumar, G. N.
Kuntz, D. W.

Lach, C. L.
Lamb, J.
Lambert, J. V.
Lambertson, M. D.
Laub, B.
Lee, H.
Lee, R. S.
Lee, T. A.
Levin, G. M.
Levy, P.
Lewis, M. J.
Lightsey, E. G.
Lin, C. S.
Lin, S.-C.
Lin, T. C.
Loewenthal, S.
Logsdon, T.
Lorenzini, E.
Lu, P.
Lukins, R.
Lumpkin, F. E.
Lutze, F. H.
Lyell, M. J.
Lyon, J. M.

Malla, R. B.
Mankins, J. C.
Marshall, J. A.
Martin, M.
Maryniak, G. E.
Marzwell, N.
Masciarel, J. P., III
Maus, J. R.
McCarthy, D.
McClinton, C.
McDonnell, J. A. M.
McFarlan, D. M.
McGregor, W. K.
McMillen, L.
McNulty, P. J.
McSpadden, J.
Melfi, L. T., Jr.
Mendenhall, M. R.
Menon, P. K.
Merkle, C. L.
Messick, B.
Mikhail, A. G.
Mikulas, M. M.
Miller, C. G., III
Mingori, D. L.
Molvik, G.
Mook, M. E.
Moore, J. E.
Morrison, P. H.
Moss, J. N.
Muller, D.
Murdock, J. W.
Murphy, C. H.
Murray, A.
Murtha-Smith, E.
Murthy, S. N. B.

Naumann, R. J.
Nelson, E.
Nelson, H. F.
Nelson, R. A.
Nestler, D.
Nichols, R. H.
Nietubicz, C.
Norris, R. B.

Oberkampf, W. L.
Olynick, D. R.
Ota, D.

Pai, D.
Palazotto, A. N.
Pappay, M.
Pate, S. R.
Paul, W.
Paul, W. S.
Pelfrey, P.
Penley, N. J.
Pfitzer, T.
Pippin, G.
Potter, J. L.
Potts, R.
Powell, R. W.
Power, G.
Presson, K. H.
Price, L. L.

Raisch, J. W.
Ramashandran, N.
Rasmussen, M. L.
Rausch, A. H.
Reeves, B.
Rizk, M. H.
Robert, J. N.
Roberts, P. W.
Robey, J.
Rossi, R.
Rousu, D.
Rupp, C. C.

Sack, W.
Sackhein, R. L.
Sahu, J.
Salzman, J. A.
Saparstein, J.
Satter, C. M.
Scheeres, D.
Schreiber, J.
Scialdone, J. J.
Seaford, C. M.
Sexton, F. W.
Shang, J. S.
Shapiro, A. H.
Shen, J. Y.

*This list represents names received through October 1996. We regret any inadvertent omissions.

Sherman, M.
Shyy, W.
Sinha, N.
Smith, Y. H.
Snyder, D.
Spearman, M. L.
Spencer, D. B.
Stalling, D. A.
Stanley, D.
Stansbery, E. G.
Stewart, A.
Stuckey, W. K.
Sutton, K.

Talay, T. A.
Tegart, J.
Than, P.
Thompson, C.
Thompson, W. S.
Tinker, M. L.
Tong, H.
Torres, M.
Tracy, J.
Tribble, A.
Trimmer, L.
Tsai, T.

Uy, M.

Vadali, S. R.
Vanyo, J. P.
Vaughn, E.
Venator, T. J.
Verlot, F. O.

Waldburg, G. D.
Waldman, G.
Weinacht, P.
Whitfield, D. L.
Wilbur, P. J.
Wilhite, A. W.
Williams, S.
Wilmoth, R.
Wise, P.
Wolf, C.
Woodcock, G.
Woodcock, G. R.
Woollam, J.
Wu, K. C.
Wu, S.-C.

Xerikos, J.

Ying, S.

Zabrensky, E.
Zeiler, T. A.
Zhu, K.
Zoby, E. V.
Zolensky, M.

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, $T = 642 + 8$ 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.

Ethical Standards for Publication of Aeronautics and Astronautics Research

Preface

The American Institute of Aeronautics and Astronautics (AIAA) serves the engineering and scientific aerospace communities and society at large in several ways, including the publication of journals that present the results of scientific and engineering research. The Editor-in-Chief of a journal of the AIAA has the responsibility to maintain the AIAA ethical standards for reviewing and accepting papers submitted to that journal. In the main, these ethical standards derive from the AIAA definition of the scope of the journal and from the community perception of standards of quality for scientific and engineering work and its presentation. The following ethical standards reflect the conviction that the observance of high ethical standards is so vital to the whole engineering and scientific enterprise that a definition of those standards should be brought to the attention of all concerned.

Ethical Standards

A. Obligations of Editors-in-Chief and Associate Editors*

1. The Editor-in-Chief has complete responsibility and authority to accept a submitted paper for publication or to reject it. The Editor-in-Chief may delegate this responsibility to Associate Editors, who may confer with reviewers for an evaluation to use in making this decision.

2. The Editor will give unbiased and impartial consideration to all manuscripts offered for publication, judging each on its scientific and engineering merits without regard to race, gender, religious belief, ethnic origin, citizenship, or political philosophy of the author(s).

3. The Editor should process manuscripts promptly.

4. The Editor and the editorial staff will not disclose any information about a manuscript under consideration or its disposition to anyone other than those from whom professional advice is sought. The names of reviewers will not be released without the reviewers' permission.

5. The Editor will respect the intellectual independence of authors.

6. Editorial responsibility and authority for any manuscript authored by an Editor-in-Chief and submitted to the journal must be delegated to some other qualified person, such as an Associate Editor of that journal. When it is an Associate Editor participating in the debate, the Editor-in-Chief should either assume the responsibility or delegate it to another Associate Editor. Editors should avoid situations of real or perceived conflicts of interest. If an Editor chooses to participate in an ongoing scientific debate within the journal, the Editor should arrange for some other qualified person to take editorial responsibility.

7. Unpublished information, arguments, or interpretations disclosed in a submitted manuscript must not be used in the research of an Editor-in-Chief, Associate Editor, or reviewer except with the consent of the author.

8. If an Editor is presented with convincing evidence that the main substance or conclusions of a paper published in the journal are erroneous, the Editor must facilitate publication of an appropriate paper or technical comment pointing out the error and, if possible, correcting it.

B. Obligations of Authors

1. An author's central obligation is to present a concise, accurate account of the research performed as well as an objective discussion of its significance.

2. A paper should contain sufficient detail and reference to public sources of information such that the author's peers could repeat the work.

3. An author should cite those publications that have been influential in determining the nature of the reported work and that will guide the reader quickly to the earlier work that is essential for understanding the present investigation. Information obtained privately, as in conversation, correspondence, or discussion with third parties, should not be used or reported in the author's work without explicit permission from the investigator with whom the information originated. Information obtained in the course of confidential services, such as refereeing manuscripts or grant applications, should be treated similarly.

4. Fragmentation of research papers should be avoided. A scientist who has done extensive work on a system or group of related systems should organize publication so that each paper gives a complete account of a particular aspect of the general study.

5. It is inappropriate for an author to submit manuscripts describing essentially the same research to more than one journal of primary publication.

6. An accurate, nontrivial criticism of the content of a published paper is justified; however, in no case is personal criticism considered to be appropriate.

7. To protect the integrity of authorship, only persons who have significantly contributed to the research and paper preparation should be listed as authors. The corresponding author attests to the fact that any others named as authors have seen the final version of the paper and have agreed to its submission for publication. Deceased persons who meet the criterion for co-authorship should be included, with a footnote reporting date of death. No fictitious name should be listed as an author or co-author. The author who submits a manuscript for publication accepts the responsibility of having included as co-authors all persons appropriate and none inappropriate.

8. It is inappropriate to submit manuscripts with an obvious marketing orientation.

C. Obligations of Reviewers of Manuscripts

1. In as much as the reviewing of manuscripts is an essential step in the publication process, every publishing engineer and scientist has an obligation to do a fair share of reviewing. On the average, an author should expect to review twice as many papers as an author writes.

2. A chosen reviewer who feels inadequately qualified or lacks the time to judge the research reported in a manuscript should return it *promptly* to the Editor.

3. A reviewer of a manuscript should judge the quality of the manuscript objectively and respect the intellectual independence of the authors. In no case is personal criticism appropriate.

4. A reviewer should be sensitive even to the appearance of a conflict of interest. If in doubt, the reviewer should return the manuscript promptly without review, advising the Editor of the conflict of interest or bias.

5. A reviewer should not evaluate a manuscript authored or co-authored by a person with whom the reviewer has a personal or professional connection if the relationship would bias judgment of the manuscript.

6. A reviewer should treat a manuscript sent for review as a confidential document. Its contents, as well as the reviewers' recommendations, should neither be shown to nor discussed with others except, in special cases, to persons from whom specific advice may be sought; in that event, the identities of those consulted should be disclosed to the Editor.

7. A reviewer should explain and support judgments adequately so that Editors and authors may understand the basis of the comments. Any statement that an observation, derivation, or argument had been previously reported should be accompanied by the relevant citation.

8. A reviewer should be alert to failure of authors to cite relevant work by other scientists. A reviewer should call to the Editor's attention any substantial similarity between the manuscript under consideration and any published paper or any manuscript submitted concurrently to another journal.

9. A reviewer should not use or disclose unpublished information, arguments, or interpretations contained in a manuscript under consideration, except with the consent of the author.

D. Obligations of Engineers and Scientists Making Statements to Society at Large

1. A scientist or engineer publishing in the popular literature has the same basic obligation to be accurate in reporting observations and to be unbiased in interpreting them as when publishing in a technical journal.

2. A scientist or engineer should strive to keep public writing, remarks, and interviews as accurate as possible.

3. A scientist or engineer should not proclaim a discovery to the public unless the support for it is of strength sufficient to warrant publication in the technical literature. An account of the work and results that support a public pronouncement should be submitted as quickly as possible for publication in a technical journal.

Acknowledgments

The ethical standards embodied in this document were adopted by the Publications Committee of AIAA on August 16, 1989, and are endorsed by the Editors-in-Chief. With minor changes, these standards are adapted from those published by the American Geophysical Union and are used with their permission.

*Throughout this document, the term "Editor," when used alone, applies to *both* Editor-in-Chief and Associate Editor. When one or the other bears the specific responsibility the full title is used.

AIAA Manuscript Review Process

This description of AIAA manuscript review procedures is given so that authors, reviewers, and readers will better understand the paper selection and publication process. The first step in manuscript evaluation is an examination by the Editor-in-Chief of papers submitted to the journal. The Editor-in-Chief first tests the manuscript for the several criteria of subject scope, archival editorial style, apparent technical validity, topical importance, timeliness, relationship to prior publication, conciseness, appropriate references, and length. Precise requirements are given on the inside back cover of each journal issue.

Formal Review

If it passes these first tests, the paper is sent to that journal's Associate Editor with the most direct knowledge of the subject matter and of expert reviewers in the field. The Associate Editor then evaluates the paper according to the same criteria and, in most cases, has the paper sent to two or more reviewers in the field for confidential review. The review report form, reproduced here, is designed both to encourage the reviewer's objectivity and to ensure the thoroughness of his or her evaluation.

Considerable significance is attached to the review reports. Each reviewer is asked to judge the technical validity of the manuscript and the extent of its advance beyond work previously published. The reviewer is asked also for advice as to whether the paper merits publication in an archive journal. However, the decision to publish, to require major revision before publication, or to reject for reasons cited lies first with the Associate Editor and ultimately with the Editor-in-Chief.

It takes a minimum of several months (at least three) after receipt of the manuscript to accomplish the evaluation and review steps discussed above.

Revision or Rebuttal

The next step is up to the author. If the paper has been rejected or if extensive revisions have been requested which the author believes are incorrect or unwarranted, he or she is entitled to submit a point-by-point rebuttal to the Editor's statement of reasons and the reviewers' comments. The rebuttal then is analyzed by the Editors, and a final decision is made, although there may be a need for an additional review cycle. Authors who revise their papers must make an effort to do so within the stated time period.

A reviewer who feels strongly that a particular paper should not be published may choose to write his or her criticism as a Technical Comment. The author then will be allowed to write a closing response for publication in the same issue as the Comment.

Formal acceptance will not occur until the author has complied with all of the revision requests (if any) made by the Associate Editor and has prepared the paper in AIAA archival style. (Or the Associate Editor may accept the author's rebuttal, as described above.)

Acceptance and Publication

When a paper is formally accepted, it will be scheduled for publication in a forthcoming issue, and the author will be so informed. Depending upon the number of papers awaiting publication and projected size of issues, this may require that papers be scheduled several issues ahead. When feasible, papers will be published in the order of their original receipt.

Galley proofs will be sent to authors for correction and release approximately two months prior to publication. At that time, authors will be told for which issue their papers are tentatively scheduled. In order to allow for late or nonreturn of galleys by authors and to provide the flexibility to meet issue-length and topic-mix constraints, issues will be over-scheduled by about 25%. Thus, there will always be a certain number of papers held over for the next issue. All authors and co-authors receive a complimentary copy of the issue in which their papers appear.

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Confidential Review Report
AIAA Journals

Guidelines for Review Comments

Length
Note on reverse if reduction in length is required. Concise presentation is important in any case. Please indicate what material can be deleted, shortened, or covered by a readily available reference.

Title
Precise and informative. Twelve words or fewer (preferably six to eight); no acronyms or abbreviations.

Authors
Listed authors should be limited to those who have made significant contributions to the paper (six maximum).

Abstract
Proper and specific summary of objectives, contents, major results, and conclusions; 100 to 200 words.

Nomenclature
List of characters or symbols used throughout the paper, and their definitions. Acronyms should not be included in this list, and nomenclature definitions should not be repeated in the text.

Introduction
Adequate discussion of need and purpose of the work and its relation to prior work.

Content
Adequate justification and definition of assumptions, inputs, references, test conditions, etc., so that information presented is useful.

Figures
Readily understandable and useful as data or for design. Please point out unnecessary figures, especially photographs, that can be deleted, as well as any errors or deficiencies. When color illustrations are provided, determine if the use of color is essential to the interpretation of the data.

References
Adequate (see *Introduction* and *Content)* and accurate; must be obtainable by the reader.

Journal Scopes

AIAA Journal: Aerodynamics, the aerospace environment, lasers and plasmas, fluid mechanics and reacting flows, and structural mechanics and materials.

Journal of Aircraft: Applied aircraft systems, design, operations, flight mechanics, flight and ground test, flight safety, computer applications, systems integration, aerodynamics, structures, and structural dynamics.

Journal of Guidance, Control, and Dynamics: Dynamics, stability, guidance, control, navigation, optimization, *electronics, and information processing, including applications* of recent research to practical engineering problems.

Journal of Propulsion and Power: Airbreathing, electric, and advanced propulsion, solid and liquid rockets, combustion, fuels and propellants, power generation and conversion for aerospace vehicles, and terrestrial energy devices and systems.

Journal of Spacecraft and Rockets: Spacecraft and tactical and strategic missile systems, including subsystem design and application, mission design and analysis, developments in space sciences, and applications of space technology to other fields.

Journal of Thermophysics and Heat Transfer: Properties and mechanisms involved in thermal energy transfer and storage in gases, liquids, and solids, including conductive, convective, and radiative modes alone or in combination.

Numerical Accuracy and Experimental Uncertainty
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.

Confidential Report Policy

Do not sign the Report, since it is the policy of the Institute to maintain the anonymity of the reviewer unless there is a specific reason for making the reviewer known to the author.

Please return the original Review Report, signed letter, and manuscript to the Associate Editor (large manuscript envelope enclosed).
Send a copy of the Review Report and letter to the Editor-in-Chief (envelope enclosed).

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