

Editorial

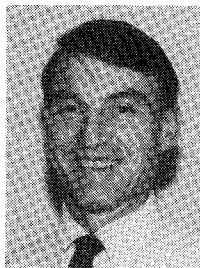
YOU received this issue late, as well as the previous two issues. This delay resulted from a change in operations at the AIAA. To cut costs the AIAA decided to contract for the manuscript preparation rather than doing it in house. Unfortunately, the first contractor did not do a good job and a change in contractors was necessary. This change caused the delay in the publication of the last several issues. TechBooks of Fairfax, VA, is the new contractor and they are doing a good job. We should be almost back on schedule with the next issue and back on schedule by the May-June issue. The good news is that with the cost reduction we will be able to publish more pages and reduce the backlog, which brings me to my next topic; time to publish a paper. Last year I stated my goal was to reduce the time from submission to publication to less than 12 months. Over the past year we have had some modest reduction in this time, but not enough. However, we are making some headway. With the reduction in the AIAA costs we should be able to substantially reduce the backlog, and cut the time from acceptance to publication to six months. In order to reduce the workload on the Associate Editors, and hopefully reduce the review time, I am adding two more Associate Editors. I am very pleased with the team and they are presented below. Of course, the time to review a paper is dependent on you the reviewers. Many of you do an excellent job and last year's reviewers are listed below. One of our major problems continues to be the people who do nothing with a paper they have been sent to review. By nothing I mean it is not reviewed, nor is it sent back or forwarded to some one else. The result is that the Associate Editor has to start the review process over again after three or four months. I will make my plea again, if you cannot review a paper please return it promptly to the Associate Editor or sent it to some one else to review.

As the aerospace business continues to decline the number of papers is holding constant. As I stated above I have increased by two the number of Associate Editors to handle the increased load and

to try and reduce the evaluation time. Our new Associate Editors are Brij Agrawal of the Naval Postgraduate School who will be responsible for papers in satellite attitude dynamics and control; S. N. Balakrishnan of the University of Missouri—Rolla, who will be responsible for papers in estimation and optimization; Arun Banerjee of Lockheed Palo Alto Research Laboratory, who will have responsibility for papers in satellite attitude dynamics and control and tether satellites; Christopher Hall of the Air Force Institute of Technology, who will also be responsible for papers in satellite attitude dynamics and control; Felix Hoots of General Research Corporate, Colorado Springs, who will have responsibility for papers in astrodynamics; Vivekanand Mukhopadhy of NASA Langley Research Center, who will have responsibility for papers in control theory; and Steven Rock of Stanford University, who will be responsible for papers in robotics and control theory. I welcome them to the team and look forward to working with them. The entire team is presented in the following pages. The editors retiring this year are Carl Hubert of Martin Marietta Astrospace, Suresh Joshi of NASA Langley Research Center, Donald Mackinson of Mackinson and Associates, Kenneth Mease of the University of California-Irvine, and Srinivas Vadali of Texas A&M University. I want to thank them for their dedicated service to the *Journal of Guidance, Control, and Dynamics* and the AIAA. The entire team is presented in the following pages.

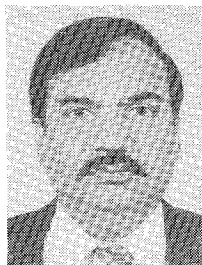
Finally, it is my pleasure to thank another group of individuals who make this journal possible, the reviewers. Following the Editorial Team is a list of the reviewers for the period 1 October 1993 through 30 September 1994. Your efforts and prompt response in reviewing papers are appreciated. I apologize to any reviewers whose names have been inadvertently omitted.

Kyle T. Alfrend
Editor-in-Chief



KYLE T. ALFRIEND received his B.S. degree from Virginia Polytechnic Institute and State University in 1962, his M.S. from Stanford University in 1964 and his Ph.D. from VPI&SU in 1967. All degrees were in Engineering Mechanics. He has been with General Research Corporation since 1985 but is currently a visiting professor at the Naval Postgraduate School as the Navy TENCAP Space Chair. He has worked previously at the Naval Research Laboratory, as an Assistant Professor in the Theoretical and Applied Mechanics Dept. at Cornell University and at Lockheed Missiles and Space Co. His primary technical interests are spacecraft attitude dynamics and control, orbital mechanics and orbital debris. He is a Fellow of the AIAA and AAS and has been Editor-in-Chief of the JGCD since 1992. He was previously Editor-in-Chief of the Journal of the Astronautical Sciences and Chairman of the AIAA Astrodynamics Technical Committee.

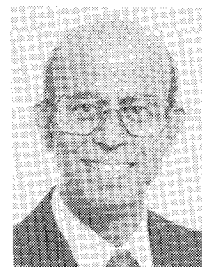
Associate Editors



BRIJ AGRAWAL is a Professor in the Department of Aeronautics and Astronautics at the Naval Postgraduate School, Monterey, CA. Before joining the Naval Postgraduate School in 1989, he worked for 10 years at COMSAT Laboratories and 10 years at INTELSAT in spacecraft research and development. He received his Ph.D. from Syracuse University in 1970. He has written a textbook on spacecraft design. His current areas of interest are spacecraft system design, attitude control of flexible spacecraft, smart structures, and space robotics.



S. N. BALAKRISHNAN is currently an Associate Professor of Aerospace Engineering in the Department of Mechanical and Aerospace Engineering and Engineering Mechanics at the University of Missouri—Rolla (UMR). He received his bachelor's degree in Aeronautics at Madras Institute of Technology, India. He received his M.S. and Ph.D. degrees in Aerospace Engineering at the University of Texas at Austin. Dr. Balakrishnan's professional experience includes Lead Engineer, Lockheed Electronics Company, Houston, Texas, where he worked in the space shuttle program; Scientist and Fellow, Center for Space Research, University of Texas at Austin, where he worked on Autonomous Navigation of Multiple Satellites and Multiple Target Estimation; Faculty Research Fellow, Wright Laboratory (Eglin Air Force Base, Florida), where he was involved in Integrated Missile Guidance/Autopilot Design and Automatic Target Recognition, and Indian Space Program, where he worked on Flight Mechanics-related topics. He teaches stability and control and advanced control courses at UMR. His research activities focus on neural networks in trajectory optimization, control and design, control of time-varying systems, missile guidance and self-repairing control and multiple target-multiple sensor problems and estimation. He has authored/co-authored about 35 journal and referred conference papers in these areas. Dr. Balakrishnan is a member of AIAA Guidance, Navigation, and Control Technical Committee and an Associate Fellow of the AIAA.



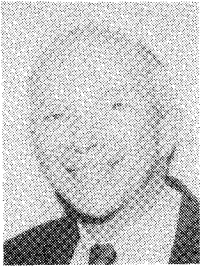
ARUN K. BANERJEE is a Senior Staff Engineer in the Dynamics and Control Department at the Lockheed Palo Alto Research Laboratory. At Lockheed since 1982, his principal work has been in multibody elastodynamics. For his work on motion-induced stiffness of articulated structures, he received the Engineer of the Year award in 1990 from AIAA, San Francisco Chapter, and was invited by the European Space Agency to give a Survey Lecture in 1992. Previously, he worked for Martin-Marietta on tethered satellite dynamics and control, and for Northrop on the atmospheric descent of parachuted shuttle boosters. He received a B.S. in Mechanical Engineering in 1962 from Bengal Engineering College, India, and taught through 1964–69 at the Indian Institute of Technology, Kharagpur, where he also received a Ph.D. in Mechanical Engineering in 1969, following it with a Ph.D. in Engineering Mechanics from the University of Florida in 1972, and a Master's in Controls from Stanford in 1986. His research interests include computational dynamics, slewing and vibration control, and nonlinear control. Dr. Banerjee is an Associate Fellow of the AIAA.



HAIM BARUH is an Associate Professor in the Department of Mechanical and Aerospace Engineering at Rutgers University. He received his B.S. degree in Mechanical Engineering in 1976 from Bogaziçi University in Istanbul, Turkey, and his M.S. and Ph.D. degrees in Engineering Mechanics in 1978 and 1981, respectively, from Virginia Polytechnic Institute and State University. Prior to joining Rutgers in 1983, he worked as a Visiting Assistant Professor at Virginia Polytechnic Institute and State University. His research interests include modeling of control of flexible spacecraft and robots, parameter identification, reliability issues in structural control, detection of structural damage, and aircraft structural analysis. He is a member of AIAA and Sigma Xi and he currently serves as Education Officer in the AIAA Princeton Section.



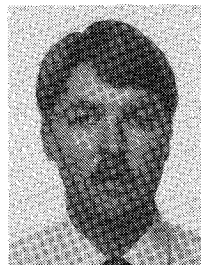
EUGENE M. CLIFF was awarded the B.S. degree by Clarkson University in 1965 and the Ph.D. by the University of Arizona in 1970. He served on the faculty at Arizona for two years and moved to Virginia Polytechnic Institute and State University in 1971. Currently, he is the Reynolds Metals Professor in the Aerospace and Ocean Engineering Department. His research interests center on optimal control and optimization with applications to trajectory shaping, optimal design, and control of distributed parameter systems. He is an Associate Fellow of the AIAA.



DALLAS G. DENERY received his B.S.E. degrees from the University of Michigan in Aeronautics and Astronautics (1962) and Mathematics (1963). He received an M.S.E. degree from the University of Washington (1965) and a Ph.D. in Applied Mechanics from Stanford University (1971). Dr. Denery worked at the Boeing Company on the SST from 1962 to 1966. He joined Ames in 1966 where he has been involved in research related to state estimation; parameter identification; aircraft guidance, navigation, and control; and air traffic control. He has been a visiting lecturer at Stanford for a course in Radio and Inertial Navigation. He is Chief of the Air Traffic Management Branch. Dr. Denery received the National Space Club Dryden Memorial Fellowship in 1979. He has been a member of the AIAA Technical Committees on Digital Avionics and Guidance, Navigation, and Control. He is an Associate Fellow of the AIAA.



SANJAY GARG received the Bachelor of Technology degree in Aeronautical Engineering from the Indian Institute of Technology, Kanpur, India, in 1980, the M.Sc. degree in Aerospace Engineering from the University of Minnesota in 1982, and the Ph.D. degree in Aeronautics and Astronautics from Purdue University in 1988. Dr. Garg has worked at NASA Lewis Research Center, Cleveland, Ohio, since 1988, first as a controls engineer with Sverdrup Technology Inc. and then as a NASA employee since 1991. He led the program to develop an advanced Integrated Flight/Propulsion Control (IFPC) design methodology and demonstrated the methodology by application to Short Take-Off and Vertical Landing (STOVL) aircraft. He is the group leader for integrated controls activities at the Advanced Controls Technology Branch and is responsible for technical management of a multicenter NASA program to flight validate advanced integrated control design methodologies. His research interests include all aspects of application from modern multivariable robust control design techniques to aerospace vehicles. Dr. Garg is a senior member of IEEE, Associate Fellow of AIAA, and a past member of the AIAA technical committee on Guidance, Navigation, and Control. He served as the technical program chairman for the 1993 AIAA Guidance, Navigation, and Control Conference.



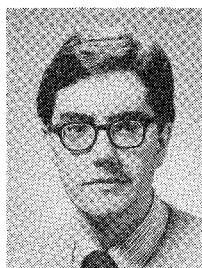
CHRISTOPHER D. HALL is an Assistant Professor of Aerospace and Systems Engineering at the Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio. In 1978, he enlisted in the U.S. Air Force and served as a telecommunications technician at Royal Air Force Mildenhall, United Kingdom, until 1981. He then received an Air Force scholarship to attend Auburn University, Auburn, Alabama, where he received the B.S. degree in Aerospace Engineering in 1984. After attending Officer Training School, he worked as a satellite systems engineer at Onizuka Air Force Base, Sunnyvale, California, until 1987. He then entered graduate school, earning an M.S. in Systems Engineering at the Air Force Institute of Technology (1988), and a Ph.D. in Theoretical and Applied Mechanics from Cornell University, Ithaca, New York (1992). Dr. Hall has held his current position since January 1992, teaching graduate courses in control theory, mechanics, spacecraft dynamics and control, and nonlinear differential equations, for which he received the Tau Beta Pi Outstanding Professor Award in 1993. His research interests include spacecraft attitude dynamics and control, and nonlinear oscillations, and he has published several papers in these areas. He is the Institute's representative on the Executive Committee of the Ohio Space Grant Consortium, a Senior Member of the AIAA and the AAS, and is currently serving on the AIAA Astrodynamics Technical Committee, as well as its subcommittee on Education.



FELIX R. HOOTS received his B.S. in Physics (1969) and his M.S. in Mathematics (1971) from Tennessee Technological University and his Ph.D. in Mathematics (1976) from Auburn University. He began his professional career in Civil Service as a Mathematician for the 14th Aerospace Force headquartered in Colorado Springs, Colorado. His research there involved development of analytical models for: satellite orbit prediction with atmospheric drag, ground site visibility, and satellite close approach prediction. In 1986 he joined General Research Corporation and now serves as the Director of the Astrodynamics and Operations Support Center. Dr. Hoots has published papers in the leading technical journals, has reviewed numerous papers for these journals, and has taught both short courses and full semester courses in Astrodynamics, Engineering Mathematics, and Partial Differential Equations for the University of Colorado. He is an Associate Fellow of AIAA, has served on its Astrodynamics Technical Committee, and has served as General Chairman for the annual Astrodynamics Conference. He is a member of the American Astronautical Society (and currently serves on its Space Flight Mechanics Technical Committee), Kappa Mu Epsilon (Mathematics Honor Society), and Phi Kappa Phi (Scholastic Honor Society).



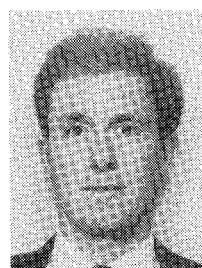
DAVID C. HYLAND received the B.S., M.S., and Sc.D. degrees in aeronautics from the Massachusetts Institute of Technology, Cambridge, Massachusetts, in 1969, 1971, and 1973, respectively. After serving as a vibration specialist in a Cambridge-based acoustics consulting firm, in 1974 he joined the staff at Lincoln Laboratory, Massachusetts Institute of Technology, Cambridge, Massachusetts. His work at Lincoln Laboratory included reentry vehicle dynamics, multibody spacecraft dynamics simulation, and spacecraft attitude control. In 1983 he joined the Harris Corporation, Melbourne, Florida, where he is presently a Senior Scientist in the Government Aerospace Systems Division. His current interests include control system robustness analysis and design synthesis with application to vibration suppression in aerospace structures, vibration control sensing, and actuation hardware developments and application of artificial neural networks for autonomous vehicle control.



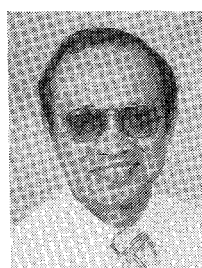
ROBERT G. MELTON received his B.S. in physics from Wake Forest University in 1976 and his M.S. in physics (1979) and Ph.D. in engineering physics (1982) from the University of Virginia. He joined the Aerospace Engineering Department of the Pennsylvania State University as Assistant Professor in 1981, and became Associate Professor in 1987. His research has involved attitude control of multibody spacecraft, optimal detumbling of space stations, dynamics of gyro-controlled spacecraft via conjugate momentum methods, control of flexible space structures using embedded fiber optic sensors, error analysis for finite burn ascent trajectories, perturbation analysis of low-thrust orbital transfers, and the dynamics and control of large articulated spacecraft in low Earth orbit. Over the past nine years, he has also served as a consultant in several of these areas. An Associate Fellow of the AIAA, he has served on its Astrodynamics Technical Committee and on the *Journal of Guidance, Control, and Dynamics* Applications Advisory Board. Dr. Melton has published papers in the leading technical journals, and has reviewed numerous papers for these journals as well. He is a member of the American Astronautical Society (and currently serves on its Space Flight Mechanics Technical Committee), Sigma Xi (Scientific Research Society), and Sigma Pi Sigma (Physics Honor Society).



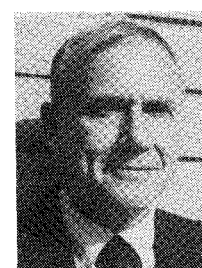
VINOD J. MODI received a bachelor's degree in mechanical and electrical engineering from Bombay University in 1953. Recipient of several fellowships, he obtained his M.S. at the University of Washington (1956) and Ph.D. from Purdue University (1959), both in aerospace engineering. He is currently a professor at the University of British Columbia, Canada. Dr. Modi's versatility is reflected through research in areas as diverse as the human heart to the space station-based mobile robotic manipulators. Dr. Modi has served as consultant to a number of industrial and government agencies including the United Nations. His contributions are recognized by a number of international awards including the CANCAM Award (1985); B.C. Science Council's Gold Medal (1986); University of British Columbia's 75th Anniversary Commemorative Medal (1991); Dirk Brouwer Award (1991); and the McCurdy Award (1993). He is a member of the Spaceflight Mechanics Committee (AAS, 1981–present) and the Astrodynamics Committee of the International Astronautical Federation (1984–present, chairman since 1991). He is a Fellow of the AIAA, AAS, and ASME, as well as the Canadian Aeronautics and Space Institute and the Royal Society of Canada.



D. JOSEPH MOOK is Associate Professor of Mechanical and Aerospace Engineering at the State University of New York at Buffalo. A native of Blacksburg, Virginia, Mook received the B.S. degree in Engineering Science and Mechanics from the Virginia Polytechnic Institute (VPI) in 1979. He then worked as an Analytical Engineer in the Combustor Durability group at Pratt and Whitney Aircraft Company in East Hartford, Connecticut. In 1981 he returned to graduate school at VPI, receiving the M.S. and Ph.D. in Engineering Mechanics in 1982 and 1986, respectively. He has been on the faculty at Buffalo since January 1986. Dr. Mook is the author or co-author of over sixty papers spanning numerous topics in estimation theory, system identification, and control of both aircraft and spacecraft. His work has been supported by a number of government agencies and private companies. He has also served as a Councilmember (1991–1993) and Chairman (1992–1993) of the Niagara Frontier Section of the AIAA. He is a member of the American Academy of Mechanics, American Society of Engineering Educators, American Society of Mechanical Engineers, Society of Automotive Engineers, and Society of Engineering Science, and is the winner of several education awards including the 1989 SAE Ralph Teetor Outstanding Educator Award.



VIVEK MUKHOPADHYAY received his S.M. and Sc.D. in Aeronautics and Astronautics from the Massachusetts Institute of Technology in 1972. He is presently a senior research engineer in Aeronautical Systems Analysis Division at NASA Langley Research Center and is also an Adjunct Associate Professor at George Washington University. He has 25 years of research and teaching experience in the areas of aircraft and spacecraft structural dynamics, aeroelasticity, stability and control, active flutter suppression and gust load alleviation. He was a contributing author to the Academic Press series "Advances in Controls and Dynamics." His research interests include practical application of optimal control and optimization techniques in active control of aeroelastic effects; feasibility study of blended wing-body (BWB) very large subsonic transport (VLST) concepts with static margin augmentation, ride quality control and gust load alleviation.



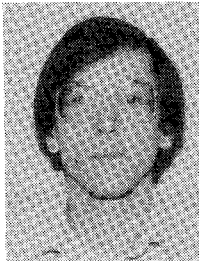
STEPHEN OSDER is currently a McDonnell Douglas Corporate Fellow at McDonnell Douglas Helicopter Company. He has a B.E.E. degree from City College of New York and an M.S. in electrical engineering from Johns Hopkins University. He joined McDonnell Douglas in 1985 as Chief Scientist for Avionics and Controls, and has been responsible for advanced development in rotorcraft flight control, fire control, navigation, and related Avionics Systems. He spent many years at Sperry Flight Systems, where he was Director of Research and Development. His contributions have been in the area of guidance and control systems for transports, fighters, bombers, helicopters, missiles, reentry vehicles, and spacecraft. He has published many papers on fly-by-wire systems, fault tolerant computer technology, avionics architectures, guidance, and navigation, and holds 16 patents in related areas. He is an Associate Fellow of the AIAA, Member of the IEEE and AHS, and has been Associate Editor of the *Journal of Guidance, Control, and Dynamics* since the journal's inception.



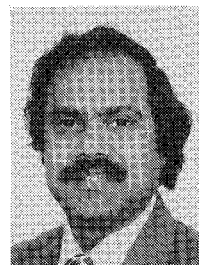
STEPHEN M. ROCK is an Associate Professor in the Department of Aeronautics and Astronautics at Stanford University. He received his S.B. and S.M. degrees in Mechanical Engineering from M.I.T. in 1972 and his Ph.D. degree in Applied Mechanics from Stanford University in 1978. At Stanford, Dr. Rock teaches courses in dynamics and control and pursues research in two main areas. The first is the application of advanced control techniques for robotics. Areas of emphasis include precision end-point control in the presence of flexibility and uncertainty; object oriented control; and cooperative control of multiple manipulators. Dr. Rock's second research area is vehicle control. This includes underwater remotely operated vehicle control and integrated flight/propulsion control for both fixed and rotary wing aircraft. Prior to joining the Stanford faculty, Dr. Rock worked for Systems Control Technology (1977 through 1988). There he performed and led research in four main areas: integrated control; fault detection, isolation and accommodation; turbine engine modelling and control; and parameter identification.



GARY L. SLATER is currently Professor and Department Head in the Department of Aerospace Engineering and Engineering Mechanics at the University of Cincinnati. Dr. Slater received his B.S. and Ph.D. degrees in Aerospace Engineering from the University of Cincinnati in 1963 and 1971, respectively, and a master's degree in Aeronautics and Astronautics from M.I.T. in 1964. Prior to joining the faculty at Cincinnati in 1972, he held research positions at M.I.T. in the Experimental Astronomy Laboratory and in the Department of Earth and Planetary Sciences. Dr. Slater's primary research efforts have been in the area of trajectory guidance algorithms with Air Traffic Control applications, and in optimization and control of flexible structures. Related topics of current interest are in the area of health monitoring and control of "smart structures," control-structure optimization, and on-line identification of flexible, controlled structures. He is an Associate Fellow of the AIAA.



KENNETH M. SOBEL received the Ph.D. in 1980 from Rensselaer Polytechnic Institute with a dissertation in adaptive control. During the period 1980–1987 Dr. Sobel was a research engineer at the Lockheed California Company where he developed novel modern control laws for advanced technology flight vehicles. Since 1987 Dr. Sobel has been with The City College of New York where he is currently Professor of Electrical Engineering. His research focuses on robust eigenstructure assignment and its application to flight control design. Dr. Sobel has published over 70 papers in the areas of eigenstructure assignment, robust control, adaptive control, and the application of modern control theory to flight control design. He is coauthor of a book entitled *Direct Adaptive Control Algorithms Theory and Applications*. Dr. Sobel has been awarded summer faculty fellowships at NASA Langley Research Center and at the U. S. Air Force Wright Laboratory. He is listed in *Who's Who in the World*, *Who's Who in the East*, *Who's Who in Science and Engineering*, and *Who's Who in American Education*. Dr. Sobel is an Associate Fellow of AIAA.



R. K. YEDAVALLI received his Bachelor's and Master's degrees from the Indian Institute of Science, Bangalore, India, and the Ph.D. degree from the School of Aeronautics and Astronautics of Purdue University in the dynamics and control area in 1981. He was an Assistant Professor at the Stevens Institute of Technology from 1981 to 1985 and an Associate Professor at the University of Toledo from 1985 to 1987. In September 1987, he joined the Department of Aeronautical and Astronautical Engineering at The Ohio State University, Columbus, Ohio, where he is currently Professor. Dr. Yedavalli's research interests include robustness and sensitivity issues in linear uncertain dynamical systems, model reduction, dynamics and control of flexible structures with applications to aircraft, spacecraft, and robotics control. He published, to date, over thirty Journal and book chapter articles and various conference papers on these topics. Dr. Yedavalli is an Associate Fellow of AIAA and a senior member of IEEE. He served as a coeditor for an IEEE press book on "Recent Advances in Robust Control." In addition to *JGCD*, he also serves as an Associate Editor for the *International Journal of Systems Science*. He served as the Chairman of the Technical Program Committees for the 1991 AIAA Guidance, Navigation, and Control Conference held in New Orleans, Louisiana. He was a member of the team of instructors that taught an AIAA Professional Short Course on "Robust Multivariable Control; Theory and Practice," held in August 1992. He was on the technical program committees for 1992 ACC and CCA, and serves as a society review chairman for AIAA for the 1993 ACC.