JOURNAL OF GUIDANCE, CONTROL, AND DYNAMICS
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Annual Business

THE past year was very good for the *JGCD*. The online version was placed in operation and its use increased. Three special sections on the Benchmark Active Control Technology Project were published under the editorship of Vivek Mukhopadhyay, NASA Langley Research Center. Our Associate Editors continued to do a great job in getting reviews back to authors. In fact, in July, August, and September there were only about three papers (of 150 or so, submitted in the previous six months) that had not been returned to the authors. This is truly a dedicated effort by our Associate Editors, and I want to thank them.

Also with this issue, I am announcing the following changes to our Editorial staff.

Renewed for three-year terms are Associate Editors:

Alain Carrier, Lockheed Martin Advanced Technology Center (second three-year term)

Richard Colgren, Lockheed Martin Skunk Works (second three-year term)

Hari Hablani, The Boeing Company (second three-year term)

Ping Lu, Iowa State University (third three-year term)

Steve Osder, Osder Associates (ninth three-year term)

Bala Subrahmanyam, Lockheed Martin Advanced Technology Center (third three-year term)

Panagiotis Tsiotras, Georgia Institute of Technology (second three-year term) Renewed as Book Editor:

I. Michael Ross, Naval Postgraduate School (third three-year term)

I would like to welcome the following new Associate Editors, who will start three-year terms:

Kurt Anderson, Rensselaer Polytechnic Institute

Andrew Kurdila, University of Florida

Michael McFarland, Raytheon Electronic Systems

I want to express my thanks to our retiring Associate Editors for their distinguished service:

Arun Banergee, Lockheed Martin Advanced Technology Center (seven years)

James Cloutier, USAF Research Laboratory (two years)

Krishna Krishnakumar, Ames Research Center (six years)

The complete list of current Associate Editors is presented in the following pages.

I must also express my gratitude to all of our anonymous reviewers, who perform the peer reviews that are necessary to maintain the quality of the *JGCD*. The list of reviewers contributing between 1 October 2000 and 30 September 2001 follows the list of Associate Editors. I apologize to any reviewers whose names have been inadvertently omitted from the list.

I would like to acknowledge our International Advisors, who help us in soliciting high-quality papers that represent technical efforts in their countries. They also assist authors who have questions about the review process. I would like to thank our retired International Advisor: Vladimir Peshekhonov, Central Scientific Research Institute-Elecktropribor, St. Petersburg, Russia. I welcome a new International Advisor: Konstantin Veremeenko, Moscow State Aviation Institute, Russia.

I also wish to acknowledge individuals serving as liaisons between the *JGCD* and AIAA Technical Committees (TCs): Ping Lu, Iowa State University, and Mark Balas, University of Colorado, with the Guidance, Navigation, and Control TC; and Lester Sackett, The Charles Stark Draper Laboratory, with the Astrodynamics TC.

Finally, my thanks to the editorial staff at AIAA headquarters and to the production staff at TechBooks. These dedicated individuals work at the highest standard in producing the *JGCD*. I also thank Lisa Gorman and Loretta Mitrano, The Charles Stark Draper Laboratory, for making the Editor-in-Chief's office operate smoothly and efficiently all year long, and The Charles Stark Draper Laboratory for its support of the *JGCD*.

Looking ahead to the AIAA 2003 Centennial of Flight celebration, the Editors-in-Chief of the six AIAA archival journals plan to publish a series of special papers throughout the year 2003. Historical papers addressing technologies within the scope of each journal are sought to cover all aspects of aerospace technology. For each journal, these topics are listed under Scope inside the front cover. Several authors are in the process of writing contributions, and potential authors are invited to contact me as soon as possible to discuss contributions of interest to our readers. Dick Battin's paper in this issue is a wonderful example of a contribution to the archival literature.

In past editorials, I have written about the progress made during the year toward meeting the goals that I have as Editor-in-Chief. The goals are 1) maintain the quality of the *JGCD*, 2) increase the number of engineering applications-oriented papers, 3) minimize the time from submission to publication, 4) increase the international involvement in the *JGCD*, and 5) listen to and respond to everyone's concerns. Let me briefly discuss each item.

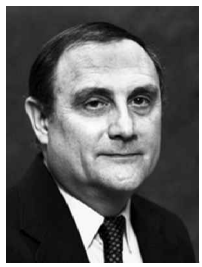
In terms of quality, the *JGCD* continues to do well in the indices compiled by Scientific Citation Index, particularly in the categories "Total Citations" and "Impact Factor." We continue to attract high-quality papers submitted on a worldwide basis. However, the number of applications-oriented papers submitted needs to increase, and I repeat the call to our community to respond with more relevant papers that can help engineers practice their profession.

The Associate Editors have worked hard to shorten the time from submission of a paper to when the review comments are returned to the author. I am pleased that their efforts have substantially decreased the review time. Our goal is to return every paper within three months of receipt, with an upper limit of six months. Then it will be up to the authors to make revisions as quickly as possible to speed their papers toward publication.

International participation in the *JGCD* continues to increase. Approximately 50% of new paper submittals are from outside the U.S., and the acceptance rate for those papers is about the same as for U.S. papers. Publication tends to be a bit slower, however, as more of these papers need extensive editorial work and revisions of figures. Our International Advisors have been very helpful in soliciting papers. The fact that the *JGCD* is online should aid our international authors and increase our subscription base.

Finally, I continue to encourage communication between our readers and any member of the Editorial Board. I also believe we did a good job last year in covering the span of interests of our readers and in responding quickly to communication. We can do better and we are willing to listen; please contact me directly. My contact information is:

Dr. George T. Schmidt
Editor-in-Chief, JGCD
MS57
The Charles Stark Draper Laboratory, Inc.
555 Technology Square
Cambridge, MA 02139
E-mail: gschmidt@Draper.com
Tel: 617/258-3841, Fax: 617/258-2333



GEORGE T. SCHMIDT received his S.B. and S.M. degrees in Aeronautics and Astronautics from the Massachusetts Institute of Technology (MIT) in 1965 and his Sc.D. in instrumentation from MIT in 1971. Since 1965 he has worked at the Charles Stark Draper Laboratory, Cambridge, Massachusetts, where he is currently Director, Education. He was formerly leader of the Guidance and Navigation Division. His major technical activities have been in GN&C system design for missiles, aircraft, and manned spacecraft; Kalman filtering applications; and integration techniques for high-resolution synthetic aperture radars, global positioning systems (GPS), and inertial sensors. Since 1968 he has served the NATO Research and Technology Agency (formerly AGARD) in many positions, including as a U.S. member of the Guidance and Control Panel. He has also participated in several high-level U.S. Department of Defense committees. He is a Lecturer in Aeronautics and Astronautics at MIT. He is an Associate Fellow of the AIAA, a Senior Member of the Institute of Electrical and Electronics Engineers, a member of the Institute of Navigation, and he is an elected member of the Russian Federation, Academy of Navigation and Motion Control. He received the AIAA International Cooperation Award in 2001. He is on the editorial board of the Draper Technology Digest. He is author or contributing author of more than 60 technical papers and reports, encyclopedia articles, and textbooks. He has been Editor-in-Chief of the AIAA *Journal of Guidance, Control, and Dynamics* since 1996.

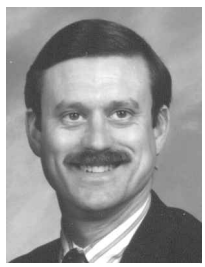
Associate Editors

KURT S. ANDERSON, Associate Professor of the Department of Mechanical, Aerospace, and Nuclear Engineering at Rensselaer Polytechnic Institute, received his Ph.D. degree in Applied and Computational Mechanics from Stanford University in 1990. After that time he worked in the areas of dynamics, structural dynamics, and controls for TRW Space and Technology in Redondo Beach, California. Dr. Anderson subsequently accepted a two-year appointment as a visiting scholar, lecturer, and research fellow at the Darmstadt Technical University of Darmstadt in Germany. He then spent a short period in the Department of Aeronautical Engineering, Applied Mechanics, and Aviation at the Ohio State University in Columbus. Since earning his Ph.D., Dr. Anderson has continued to work in the areas of computational multibody dynamics, with particular attention given to development of advanced algorithms including, but not limited to: low computational order algorithms for dynamic systems simulation and control, design sensitivity analysis of dynamic systems, parallel computing applications, characterization of translating dynamic media, and numerical integration schemes. Dr. Anderson enjoys wood carving, gourmet cooking, bike riding, hiking, horseback riding, and flyfishing.

S. N. BALAKRISHNAN is currently a 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 Ph.D. degree in Aerospace Engineering at the University of Texas at Austin. Dr. Balakrishnan's professional roles include 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, and Faculty Research Fellow, Wright Laboratory (Eglin Air Force Base, Florida). He teaches stability and control and advanced control courses at UMR. His research activities focus on neural networks in trajectory optimization, and control, missile guidance, and multiple target-multiple sensor problems and estimation. He has authored/co-authored about 55 journal and refereed conference papers in these areas. Dr. Balakrishnan is a Member of the AIAA Guidance, Navigation, and Control Technical Committee, an Associate Fellow of AIAA, and Director, American Automatic Control Council.

KARL D. BILIMORIA is an Aerospace Engineer at the NASA Ames Research Center, where he leads a research group on future air traffic control concepts for NASA's Advanced Air Transportation Technologies (AATT) project. Previously, he worked on advanced guidance and control concepts for supersonic civil transport aircraft under NASA's High Speed Research (HSR) program. He received his B.Tech. degree from the Indian Institute of Technology, Kanpur, graduating at the top of the aeronautical engineering class in 1982; he also received his M.S. and Ph.D. degrees in Aerospace Engineering from Virginia Polytechnic Institute and State University in 1984 and 1986, respectively. From 1987 to 1994, Dr. Bilimoria was on the aerospace engineering faculty at Arizona State University, where he held the positions of Assistant Professor and Research Scientist. At ASU, he taught courses on optimal control, flight dynamics/control, aircraft performance, and aircraft conceptual design. He also conducted research on aircraft trajectory optimization, optimal control of spacecraft, and flight dynamics of elastic hypersonic vehicles. He is an Associate Fellow of the AIAA, a Member of the AIAA Guidance, Navigation, and Control Technical Committee, a past Member of the AIAA Atmospheric Flight Mechanics Technical Committee, a Member of the IFAC Technical Committee on Air Traffic Control Automation, and a Member of Sigma Gamma Tau (national aerospace honor society).

ALAIN CARRIER received his Ph.D. in Aeronautics and Astronautics from Stanford University in 1990. Since then he has been working for the Lockheed Martin Advanced Technology Center, leading applied research and optical-precision instrumentation design, modeling, and control. He lead the development of several actively controlled electromechanical systems from concept to hardware demonstration, including actively controlled segmented optics, secondary and fast steering mirrors for astronomical telescopes, zero-G slew suspensions for space structures, active and passive vibration isolators, smart actuators, and a latch mechanism actuated by Shape Memory Alloy springs for which he owns a patent. He is the author of *Principal Gain Tracking*, a novel testing and system identification technique for high-modal-density lightly-damped structures. He currently leads the development of the pointing control system for HIRDLS (an earth observing radiometer) and the development and experimental demonstration of adaptive control techniques for vibration isolation. His research interests are in isolation, control, and passive damping of broadband and periodic mechanical vibrations for optical instruments; subarcsecond optical pointing and beam control for earth observing, laser communication, and astronomical instruments; actuators and sensors for structural control; dynamics modeling of space structures and instruments; and attitude control, stationkeeping, slews, and orbital maneuvers of spacecraft and "sciencecraft."



RICHARD COLGREN, Senior Staff Engineer at the Lockheed Martin Aeronautics Company in Palmdale, California, is Lead Engineer for C4ISR and UAV programs for Air Vehicle Sciences and Systems. He earned his B.S.A.A. at the University of Washington and his M.S.E.E. at the University of Southern California. He completed his Ph.D. in Electrical Engineering Systems at the University of Southern California. Previously he was Flight Control Systems Lead for RECEE and Advanced Programs, and before that IPT Lead for Specialist Support on the DarkStar UAV (Tier III-). He was also IPT Lead for the Vehicle Management System on the Uninhabited Combat Air Vehicle (UCAV), and was Lead Flight Controls Engineer on the U-2S. Dr. Colgren was also the Lead Flight Controls Engineer on the Air Force MCT (Multivariable Control Theory) project. He has served as Project Engineer/Principal Investigator on independent research and development projects including Technologies for Reliable Autonomous Control (TRAC), development of the Lockheed flight controls workstation, and on the state reduction of structural dynamic models for control systems design. Previous work includes feasibility studies and preliminary/advanced design for flight control system concepts such as the CRV and HL-20 mini-shuttles, A-X proposal, F-22, F-117A, U-2/TR-1/ER-2, SR-71, B-2, F-20, and other programs. Work on UAV (Uninhabited Air Vehicle) projects includes Tier II$^+$, Tier III-, and Tier III, X-33, UCAV, micro-UAVs, the Wraith RPV (Remotely Piloted Vehicle) and other projects. Dr. Colgren is a past Chairman of the Integrated Controls Subcommittee of the Lockheed Corporate Task Force. Dr. Colgren is an ABET/EAC (Accreditation Board for Engineering and Technology, Inc.) aeronautical engineering evaluator. He is an Associate Fellow of the AIAA, and is a Member and past Secretary for the National Technical Committee on Guidance, Navigation, and Control.

VICTORIA L. COVERSTONE is an Associate Professor of Aeronautical and Astronautical Engineering at the University of Illinois at Urbana-Champaign (UIUC). Previous experience includes employment at TRW as a member of the technical staff and the NASA Jet Propulsion Laboratory as a summer faculty fellow. She earned her B.S., M.S., and Ph.D. degrees from UIUC in 1985, 1986, and 1992. Her research interests include space mission analysis and design, optimal control theory applications, and computational methods. She is a Member of the Phi Kappa Phi and Tau Beta Pi Honorary Societies and the recipient of several teaching awards. She is a Senior Member of AIAA and has served on the AIAA Astrodynamics Technical Committee, as well as it awards subcommittee.

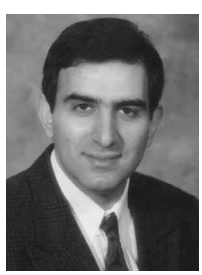
DALE F. ENNS is a Senior Research Fellow in the Dynamics and Control Technology Section at Honeywell's Technology Center where he has worked for 21 years. He has served as the Technical Lead for several research and development projects that have involved modeling, design, and analysis of guidance and control systems for a variety of aerospace applications including business and commuter fixed and rotary wing aircraft, X-38 lifting body, X-35 ASTOVL fighter, F-18 High Angle-of-Attack Research Vehicle, X-30 National Aerospace Plane, X-29 Forward Swept Wing Aircraft, F-8 Oblique Wing Research Aircraft, MD-11 Autoland, AH-64 Apache Helicopter, APGM and CGSP guided artillery shells, large elastic space structures and ring laser gyro navigation, and automated highways studies. Dr. Enns is also an Associate Professor in the Aerospace Engineering and Mechanics department at the University of Minnesota where he has been teaching for 17 years. He teaches senior level required and elective courses on aircraft modeling, dynamics, control, flight mechanics, and random vibrations, as well as graduate level control courses. He also advises graduate students. He received his B.S. (1979) in Aerospace Engineering and Mechanics from the University of Minnesota, his M.S. (1980) in Aeronautics and Astronautics from Stanford University, and his Ph.D. (1984) in Aeronautics and Astronautics from Stanford University. He is a Senior Member of the AIAA.

HARI B. HABLANI received his B.S. (Mechanical Engineering) in 1972 from Government College of Engineering and Technology, Raipur, Madhya Pradesh, and his M.S. in 1974 and Ph.D. in 1978 (both in Aeronautical Engineering) from the Indian Institute of Science, Bangalore, India. He passed his M.S. with distinction and his Ph.D. with the P.S. Narayan Gold Medal. From 1978–1980, he was a Postdoctoral Fellow in the Department of Aeronautical and Astronautical Engineering, Purdue University, West Lafayette, Indiana. For the following two years, he was a NASA National Research Council Resident Associate at Johnson Space Center, Houston, Texas. Since 1982, he has been with The Boeing Company (formerly Rockwell International), Human Space Flight & Exploration, Huntington Beach, California, where currently, he is a Technical Fellow in the Flight Systems Design & Analysis Group. In the past 19 years, he has been responsible for detailed design and simulation of Spacecraft and interceptor dynamics, control, determination, guidance, and navigation. Dr. Hablani has received numerous awards for his contributions, including the Leonardo da Vinci (the Spirit of the Renaissance) Engineer of the Year 1991 award and patent and innovation awards. He has numerous publications, both internal and external. He has been an Associate Fellow of AIAA since 1994.

JONATHAN P. HOW is currently an Associate Professor in the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT). He received a B.A.Sc. in Engineering Science (Aerospace Option) from the University of Toronto in 1987 and his S.M. and Ph.D. in Aeronautics and Astronautics from MIT in 1990 and 1993, respectively. He then studied for two years at MIT as a Postdoctoral Associate in charge of the design and analysis of robust controllers for the Middeck Active Control Experiment (MACE), which flew on-board the Space Shuttle Endeavour in March 1995. Prior to joining MIT in 2000, he worked for five years as an Assistant Professor in the Department of Aeronautics and Astronautics at Stanford University. His current research focuses on: 1) various aspects of spacecraft navigation, control, and autonomy, including GPS sensing for formation-flying vehicles; 2) optimal coordination and trajectory design for teams of cooperating UAVs; and 3) theoretical analysis and synthesis of robust, hybrid, and adaptive controllers. He is a Senior Member of the AIAA and is active in the IEEE and the ION.

ANDREW J. KURDILA is a Full Professor in the Department of Aerospace Engineering, Mechanics, and Engineering Science at the University of Florida. He attended the University of Cincinnati from September 1978 until June 1983, where he earned his B.S. degree in Applied Mechanics in the Department of Aerospace Engineering and Applied Mechanics. He subsequently entered the University of Texas at Austin in August 1983, and he received his M.S. degree in Engineering Mechanics the following year. After working as a Research Engineer in the Geometric Modeling Group at Structural Dynamics Research Corporation, he entered the Department of Engineering Science and Mechanics at the Georgia Institute of Technology as a Presidential Fellow. He earned his Ph.D. in January 1989. He joined the faculty of the Aerospace Engineering Department at Texas A&M University on 1 January 1989 as an Assistant Professor, and he was tenured and promoted to Associate Professor in September 1993. He was recognized as a Select Faculty Fellow at Texas A&M University in 1994 and a Faculty Fellow in 1996. In July 1996, he joined the faculty of the Department of Aerospace, Mechanics, and Engineering Science at the University of Florida as an Associate Professor. He was awarded the Raymond L. Bisplinghoff Award at the University of Florida in 1999 for excellence in teaching. He was promoted to Full Professor of Aerospace Engineering in 1998. He is the author of over 40 archival journal publications, 100 conference presentations and publications, and 4 book chapters. He is an Associate Editor of the *Journal of Vibration and Control* and Editor of the book entitled *Wavelets and Multiscale Methods for Partial Differential Equations.* His current research is in the areas of dynamical systems theory, control theory, and computational mechanics.

PING LU, Associate Professor of Aerospace Engineering and Engineering Mechanics at Iowa State University, received his Bachelor's degree from the Beijing Institute of Aeronautics and Astronautics, China, in 1982, and his M.S.E. and Ph.D. degrees in Aerospace Engineering from the University of Michigan in 1984 and 1988, respectively. He worked as a Postdoctoral Research Fellow from 1988 to 1989 at the University of Michigan. Since 1990, he has been with Iowa State University. His research interests include guidance, nonlinear control theory and applications, and trajectory optimization. He is an Associate Fellow of AIAA and has served as a Member of the AIAA Technical Committee on Guidance, Navigation, and Control.



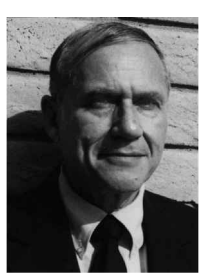
PEIMAN G. MAGHAMI, a Senior Engineer with the Flight Dynamics Analysis Branch at NASA Goddard Space Flight Center in Greenbelt, Maryland, received his D.Sc. degree from the George Washington University in Washington, DC, in 1984. He is currently responsible for conducting research and development in dynamics and control of aerospace flight systems, with an emphasis in fine pointing space systems. His technical areas of interest include dynamics and control of flexible aerospace systems, control of multi-body systems, multidisciplinary design and optimization, fault accommodation, and stochastic systems. Dr. Maghami has published over 30 articles in a variety of refereed journals. He has held adjunct/research professor positions at the George Washington University and Old Dominion University, Norfolk, Virginia. He is a Senior Member of the AIAA and a Member of the Institute of Electrical and Electronics Engineers.

MICHAEL B. MCFARLAND, Senior Systems Engineer with Raytheon Electronic Systems, is involved in a variety of research and development activities related to advanced missile guidance and control algorithms. He received his B.S.E. degree in Aerospace Engineering with high honors from the University of Florida in 1991, and his M.S. and Ph.D. degrees in Aerospace Engineering from the Georgia Institute of Technology in 1992 and 1997, respectively. From 1991 to 1999, he was a Research Aerospace Engineer with the Air Force Research Laboratory Munitions Directorate at Eglin Air Force Base. Some of his previous research efforts focused on genetic algorithms, hybrid numerical/analytical methods for optimal aeroassisted orbit transfer vehicle guidance, robust nonlinear missile autopiolot architectures, missile guidance laws, adaptive nonlinear control using artificial neural networks, and optimal path planning. His current research interests include guidance and control of hypersonic missiles, applications of adaptive and nonlinear control theory, and artificial neural networks. He is a Senior Member of AIAA, Member of the AIAA Missile Systems Technical Committee, Member of IEEE, and Life Member of Tau Beta Pi.

ROBERT G. MELTON is Professor of Aerospace Engineering at the Pennsylvania State University. He received his B.S. in physics (cum laude) 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. His research includes work in celestial mechanics, non-Keplerian astrodynamics, trajectory optimization, optimum station-keeping for space-based interferometry, and satellite attitude dynamics and control. An Associate Fellow of AIAA, he has served on its Astrodynamics Technical Committee and on this journal's Applications Advisory Board. He is a member of Sigma Pi Sigma (Physics Honor Society) and a Senior Member of the American Astronautical Society, in which he has served on the Space Flight Mechanics Technical Committee, and where he is currently serving as Vice President-Technical.

ARUN K. MISRA is Professor and Chairman of the Department of Mechanical Engineering at McGill University, Montreal, Canada. He received his B.S. (Honors) degree in mechanical engineering from the Indian Institute of Technology, Kharagpur, in 1969, and his Ph.D. in mechanical engineering from the University of British Columbia, Vancouver, Canada, in 1974. His research interests include dynamics and control of flexible multibody systems, tethered satellites, space robotics, and smart structures. He is an Associate Fellow of AIAA and a Corresponding Member of the International Academy of Astronautics.

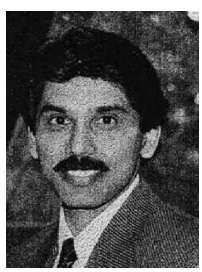
VIVEK MUKHOPADHYAY received his S.M. and Sc.D. degrees in Aeronautics and Astronautics from Massachusetts Institute of Technology in 1970 and 1972. He is presently a Senior Research Engineer at NASA Langley Research Center, Aerospace Systems Concepts and Analysis Division. His prior positions include Assistant Professor, Indian Institute of Technology; Research Specialist, Planning Research Corporation; Adjunct Associate Professor, George Washington University, Joint Institute for Advancement of Flight Sciences; Senior Research Engineer, Aeroelasticity Branch, and Systems Analysis Branch at NASA Langley. He is an Associate Fellow of American Institute of Aeronautics and Astronautics, and a recipient of the prestigious NASA Floyd Thompson Fellowship. He has 30 years of research and teaching experience in the areas of optimal control, aeroelasticity, and structural dynamics. He was a contributing author to the Academic Press series, "Advances in Controls and Dynamics." His research interests are in the areas of robust control, active flutter suppression, multidisciplinary analysis and optimization of advanced aerospace concepts.



STEPHEN OSDER is currently an independent consultant in guidance, controls, and avionics systems design, having retired from McDonnell Douglas Helicopter Systems, where he was a Corporate Fellow. He has a B.E.E. from the 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 Controls and Avionics and was responsible for advanced development in rotorcraft flight control, fire control, navigation, and related avionics. He spent many years at Sperry Flight Systems (now Honeywell), where he was Director of Research and Development. His contributions have been in guidance and control systems for transports, fighters, bombers, helicopters, missiles, re-entry vehicles, spacecraft, and UAVs. He has published many papers on fly-by-wire systems, fault tolerant computer technology, avionics architectures, and guidance and navigation, and he holds 16 patents in related areas. He is an Associate Fellow of AIAA and a Member of the Institute of Electrical and Electronics Engineers and the American Helicopter Society, and he has been Associate Editor of the *Journal of Guidance, Control, and Dynamics* since the journal's inception.

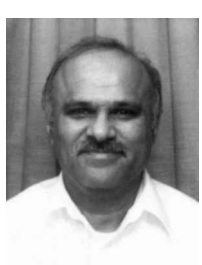
MINH Q. PHAN is an Associate Professor of Engineering in Thayer School of Engineering, Dartmouth College. He received his undergraduate education from the University of California at Berkeley (B.S. in 1985) and graduate education from Columbia University in Mechanical Engineering (M.S. in 1986, M.Phil. in 1987 and Ph.D. in 1989). Prior to joining the Dartmouth faculty he was National Research Council Fellow at NASA Langley Research Center (1989–1991), Senior Engineer at Lockheed Engineering and Sciences (1991–1994), and Assistant Professor of Mechanical and Aerospace Engineering at Princeton University (1994–2000). His current research interests are in the areas of system identification and control of aerospace structures, nonlinear optimal and adaptive control, and intelligent control (learning control, neural networks, fuzzy logic) with applications to aircraft, satellites, acoustic enclosures, robots, manufacturing machines, and quantum-mechanical systems. Professor Phan has authored or co-authored more than 70 technical papers, and the textbook Identification and Control of Mechanical Systems published by Cambridge University Press in 2001.

MARK L. PSIAKI is an Associate Professor in the Sibley School of Mechanical and Aerospace Engineering at Cornell University in Ithaca, N.Y. He received a B.A. in Physics from Princeton University in 1979. After graduation, he worked at the RCA Space Center in East Windsor, N.J. as a Mechanical Design Engineer for the TIROS program. In 1982, he reentered Princeton as a graduate student in Mechanical and Aerospace Engineering and earned an M.A. in that subject in 1984 and a Ph.D. in 1987. He has worked at Cornell continuously since 1986 except for a one year sabbatical from 1994–1995 when he had the honor of being a Lady Davis fellow in the Aerospace Faculty at the Technion in Haifa, Israel. Currently, his principal research interests are in the areas of estimation and filtering, spacecraft attitude and orbit determination, GPS systems, and spacecraft attitude dynamics and control. He has received the best paper awards for the 1997 AIAA Guidance, Navigation, and Control conference and the 1998 AIAA/AAS Astrodynamics Specialist conference. In 2000, Cornell's Mechanical and Aerospace Engineering School selected him to receive its Dennis Shepherd teaching award. He is an Associate Fellow of the AIAA and served on its Guidance, Navigation, and Control Technical Committee from 1992 to 1995.



I. MICHAEL ROSS obtained his doctorate in Aerospace Engineering in 1990 from the Pennsylvania State University and thereafter joined the Naval Postgraduate School (NPS) in Monterey, CA, as an Adjunct Professor in the Department of Aeronautics and Astronautics. Presently, he is on an extended sabbatical at The Charles Stark Draper Laboratory in Cambridge, MA, as a Visiting Associate Professor. His current research interests are in dynamic optimization, space vehicle guidance, the applications of singular optimal control theory to spacecraft trajectory design, and the deflection of near-Earth-objects. His recent research work involves extending pseudospectral theory and techniques for rapid trajectory optimization of launch vehicles, missiles, and spacecraft. He has been the Project Lead on PANSAT, a small experimental communications satellite built at NPS, currently in low-Earth-orbit. He has served on the AIAA Astrodynamics Technical Committee, the AIAA Mechanics and Control of Flight Award Committee and the American Astronomical Society Spaceflight Mechanics Technical Committee. He has also participated in organizing several AAS/AIAA conferences. He is an Associate Fellow of AIAA, and a Member of AAS, SIAM, and Sigma Xi.

JUREK Z. SASIADEK; Professor of Aerospace Engineering in the Department of Mechanical and Aerospace Engineering at Carleton University, Ottawa, Ontario, Canada; received his M.Sc. (1972), Ph.D. (1975), and D.Sc. degrees from the Technical University of Wroclaw, Wroclaw, Poland. His research interests focus in two main areas. The first is robotics, especially space robotics and unmanned autonomous vehicles (UAV). The second area involves guidance, navigation, and control, especially spacecraft and aircraft control and nonlinear control. In 1989–1991 Dr. Sasiadek was with the Canadian Space Agency in Ottawa, and in 1985–1987 he was a Technical Director for Alberta Research Council, Calgary, Alberta. He has authored/co-authored over 100 journal and refereed conference papers. Professor Sasiadek is a Member of the AIAA Guidance, Navigation, and Control Technical Committee. An Associate Fellow of AIAA, he was a Program Chair of the 1994 AIAA Guidance, Navigation, and Control Conference in Scottsdale, Arizona. In August 2001, he was General Chair of the 2001 AIAA Guidance, Navigation , and Control Conference in Montreal, Quebec.



M. BALA SUBRAHMANYAM was born in the state of Andhra Pradesh, India, in 1949. He received the B.S. (1970) degree in Electrical Engineering from the Regional Engineering College, Warangal, India, and the M.S. (1972) and Ph.D. (1975) degrees in Electrical Engineering from the University of Iowa, Iowa City, Iowa. Dr. Subrahmanyam has held faculty positions at Texas A&M University, Kingsville, Texas, and the University of Missouri–Columbia, Columbia, Missouri. He was also with the Naval Air Warfare Center, Patuxent River, Maryland, working in the area of research and development of flight control systems of advanced Naval aircraft. Currently he is with Lockheed Martin in Orlando, Florida, working on the flight control system of the Joint Air-to-Surface Standoff Missile. He is also an Adjunct Professor with the Florida Institute of Technology. Dr. Subrahmanyam's research interests include the areas of guidance and control problems of aircraft and missiles, H_∞ control, and optimal control. He has published over 30 journal papers in these areas. In addition, he has written the books *Optimal Control with a Worst-Case Performance Criterion and Applications* (Springer–Verlag: 1990) and *Finite Horizon H_∞ and Related Control Problems* (Birkhäuser :1995). He is an Associate Fellow of AIAA.

PANAGIOTIS TSIOTRAS received his Engineering Diploma in Mechanical Engineering from the National Technical University, Athens, Greece (1986), his M.Sc. in Aerospace Engineering from Virginia Polytechnic Institute and State University (1987), and his Ph.D. in Aeronautics and Astronautics from Purdue University (1993). He also holds an M.Sc. degree in Mathematics from Purdue (1992). During 1989 he worked at the Interdisciplinary Center for Applied Mathematics at Virginia Polytechnic Institute and State University and from 1993 to 1994 he was a Postdoctoral Fellow at Purdue. From 1994 to 1998 he was an Assistant Professor in the Department of Mechanical, Aerospace, and Nuclear Engineering at the University of Virginia. Currently, Dr. Tsiotras is an Associate Professor in the School of Aerospace Engineering at Georgia Institute of Technology. His research interests include attitude dynamics and kinematics, optimal and robust control, and control of nonlinear systems emphasizing mechanical and aerospace applications. He is a recipient of the National Science Foundation Career Award and the Sigma Xi Award for Excellence in Research. He is a Senior Member of AIAA and a Member of the Institute for Electrical and Electronics Engineers, the American Society of Mechanical Engineers, and the American Society for Engineering Education, as well as a Member of the Phi Kappa Phi, Tau Beta Pi, and Sigma Gamma Tau honor societies.