JOURNAL OF GUIDANCE, CONTROL, AND DYNAMICS
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Annual Business

THIS is the first issue of the *JGCD* that is available online to our readers, and we also celebrate with a new cover design—the first in its 24 years! Thanks to all at the AIAA who worked hard on these two projects. I asked Founding Editor Don Fraser to review his 17-year-old predictions (see previous pages) so that he could be part of this celebratory issue. His predictions were pretty good, given the funding and international situation at that time. I also wanted everyone to know that Don's 60th birthday is on 20 April, and all should send him greetings! Don has made many contributions to our profession and to the *JGCD*, and I want to thank him and wish him well for the future.

As we start a new century, I am reminded that 2 October 2001 would have been the 100th birthday of Charles Stark (Doc) Draper, who was so inspirational to many of us working in guidance and control. I remember him predicting that someday everyone would wear a device on their wrist that would tell them time and position (no doubt by inertial means). Given that we already have developed an INS/GPS set that is only 8 cubic inches, I predict that in 20 years there will be a comfortable-sized personal INS/GPS wrist device that provides time and position to 1 meter accuracy anywhere on the surface of the Earth.

Looking two years 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. Papers addressing Histories of Key Technologies within the scope of each journal are sought to cover all aspects of aerospace technology. For the *JGCD*, these topics are listed under "Scope" on the inside front cover. Potential authors are invited to contact me as soon as possible to discuss contributions of interest to our readers.

Several of this year's issues will contain sections of papers focused on a particular topic. Associate Editor Vivek Mukopadhyay will finish publishing papers on the Benchmark Active Control Technology Project at NASA. Thank you, Vivek, for all your efforts in preparing the three issues that have included these BACT papers. A Number of papers to be published this year will come from the 3rd U.S.–Russian Space Surveillance Workshop held in late 1998. Guest Editors Felix Hoots and Terry Alfriend are teaming to edit and publish selected papers to provide our readers with an excellent overview of the state of the art. You, the readers, are encouraged to suggest additional focus section topics and papers for future issues.

Also with this issue, I am pleased to announce the reappointment of the several Associate Editors. For one additional year:

Arun Banerjee, Lockheed Martin Advanced Technology Center (seventh year)

Renewed for three-year terms are the following Associate Editors:

S. N. Balakrishnan, University of Missouri–Rolla (third three-year term)

Robert G. Melton, Pennsylvania State University (fourth three-year term)

Vivekanand Mukhopadhyay, NASA Langley Research Center (third three-year term)

Jurek Sasiadek, Carleton University (second three-year term)

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

Victoria L. Coverstone, University of Illinois at Urbana–Champaign

Dale F. Enns, Honeywell Technology Center, Minneapolis

Jonathan P. How, Massachusetts Institute of Technology

Mark L. Psiaki, Cornell University

Karl Bilimoria, NASA Ames Research Center

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

Mark D. Ardema, University of Santa Clara (one year)

Robert H. Bishop, University of Texas at Austin (three years)

Christopher D. Hall, Virginia Polytechnic Institute and State University (six years)

Gary Hartmann, Honeywell Technology Center (three years)

Felix Hoots, General Research Corporation (six years)

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

I must also express my gratitude to all 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 1999 and 30 September 2000, 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 assist us in soliciting high-quality papers that represent technical efforts in their countries. They also assist authors who may have questions about the review process. I would like to thank our retired International Advisors: Vinod Modi, University of British Colombia, Canada, and Ichiro Nakatani, Institute of Space and Astronautical Science, Japan. I welcome as new International Advisors Yoshiaki Ohkami, National Space Development Agency, Japan, and Jurek Sasiadek, Carleton University, Canada (who is also an Associate Editor).

I also wish to acknowledge individuals serving as liaisons between the *JGCD* and AIAA Technical Committees: Richard Fought, Raytheon, with the Atmospheric Flight Mechanics TC; Pin Lu, Iowa State University, with the Guidance, Navigation and Control TC; and Lester Sackett, The Charles Stark Draper Laboratory, with the Astrodynamics TC.

Finally, my thanks to all the editorial staff at AIAA Headquarters and the production staff at TechBooks. These dedicated individuals work at the highest standards in producing the *JGCD*. And to Lisa Gorman and Loretta Mitrano, Draper Laboratory, for making the Editor-in-chief's office operate smoothly and efficently and to Draper Laboratory for its support of the *JGCD*.

In past editorials I have written about the progress made during the year towards meeting the goals that I have as Editor-in-Chief. The goals are 1) to maintain the quality of the *JGCD*, 2) to increase the number of engineering applications-oriented papers, 3) to minimize the time from submission to publication, 4) to increase the international involvement in the *JGCD*, and 5) to 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 the 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 be increased, 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 in trying 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. For example, as of 30 June 2000, of the 307 papers submitted in 1999, only 26 (or 8%) of the papers were "older" than six months. In other words, the Associate Editor had not yet sent the initial assessment of the paper back to the authors. Our goal is to return every paper within three to six months of receipt. Thank you to our Editorial Team! Now it is 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 United States, 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.

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

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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. 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 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 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

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, 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/coauthored 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.

ARUN K. BANERJEE is a Consulting Scientist in the Advanced Technology Center at Palo Alto of Lockheed Martin Missiles and Space Company. He holds Ph.D. degrees from the Indian Institute of Technology, Kharagpur, and the University of Florida. He has published over thirty journal articles with research on stick slip friction, plastic stress waves, tethered satellite dynamics and control, motion induced stiffness of structures, multibody dynamics, and vibration suppression by command shaping. He received the Engineer of the Year award in 1990 from AIAA, San Francisco Chapter, and gave an invited survey lecture on the state of the art in multibody elasto-dynamics in 1992 at the European Space Agency in Noordwijk, Holland. His industrial experience of twenty-seven years includes previous work for Ford Aerospace, Martin-Marietta, and Northrop. Earlier, he taught for five years at IIT, Kharagpur. Dr. Banerjee is an Associate Fellow of the AIAA.

KARL D. BILIMORIA received his B.Tech. degree in aeronautical engineering from the Indian Institute of Technology, Kanpur in 1982, and 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, he 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. Since 1994, Dr. Bilimoria has worked at the NASA Ames Research Center, where he is currently leading 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 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 the 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."

JAMES R. CLOUTIER received his B.S. degree from the University of Southwestern Louisiana and his M.A. and Ph.D. degrees from Rice University. He is currently a Principal Research Scientist at the Air Force Research Laboratory, Munitions Directorate, Eglin AFB, Florida, where he is the Manager and Principal In-House Investigator of the AFOSR-funded Task Modern Control and Estimation for Tactical Missiles. He is an Associate Fellow of AIAA and an Air Force Research Laboratory Fellow. His current research interests are in the areas of nonlinear control, nonlinear estimation, and numerical optimization with applications to target state estimation, advanced guidance law development, missile autopilot design, and integrated system design.

RICHARD D. COLGREN is the Lead for Flight Controls on Reconnaissance and Advanced Programs at the Lockheed Martin Aeronautics Company in Palmdale, California. He earned his B.S.A.A. at the University of Washington, his M.S.E.E. and Ph.D. in electrical engineering—systems at the University of Southern California. Previously he was IPT Lead for Specialist Support on the DarkStar or Tier III-Uninhabited Air Vehicle (UAV), and was IPT Lead for the Vehicle Management System (VMS) for the Lockheed Martin Uninhabited Combat Air Vehicle (UCAV). He was also lead flight controls engineer on the U-2S and on the Air Force Multivariable Control Theory (MCT) project. He has served as project engineer on independent research and development projects including 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 flight control system concepts such as the Crew Return Vehicle (CRV) and HL-20 mini-shuttle, Rockwell/Lockheed A-X proposal, X-33, U-2R/S/ST, ER-2, TR-1, JAST, F-22, F-117A, B-2, F-20, and other classified projects. Work on UAV projects includes the Micro Air Vehicle (MAV), Tier II$^+$, Tier III-, Tier III, and the Wraith Remotely Piloted Vehicle (RPV). Dr. Colgren is a past chairman of the Integrated Controls Subcommittee of the Lockheed Corporate Task Force. He previously worked for the Northrop Advanced Systems Division and the Northrop Aircraft Company. Dr. Colgren is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). He is a past secretary and is currently a Member of the National AIAA Technical Committee on Guidance, Navigation, and Control. He was the AIAA review chairman for the 1992 American Control Conference, and was the co-chair for the 1998 conference. He also was the Program Chairman of the 1996 AIAA Guidance, Navigation, and Control Conference. Dr. Colgren is an ABET/EAC (Accreditation Board for Engineering and Technology, Inc.) aeronautical engineering evaluator. He is an Adjunct Professor in Electrical Engineering at the University of Southern California. He is a past Associate Editor for the *Journal for Theoretical and Computational Graphics* and for *Workstation News*.

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 designing, modeling, and controlling space systems. 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 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 and he 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 a B.S. (mechanical engineering) in 1972 from Government College of Engineering and Technology, Raipur, Madhya Pradesh, and a M.S. in 1974 and Ph.D. in 1978 (both in aeronautical engineering) from the Indian Institute of Science, Banglaore, India. He passed his M.S. with distinction and his Ph.D. with the P.S. Narayan Gold Medal. From 1978–80, he was a postdoctoral fellow in the Department of Aeronautical and Astronautical Engineering, Purdue University, West Lafayette, Indiana, and for the subsequent 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) Reusable Space Systems, Huntington Beach, California, where currently, he is a Technical Fellow in the Flight Systems Design & Analysis Group. In the past 18 years, he has been responsible for detailed design and simulation of various aspects of attitude control, determination, and guidance of over a dozen spacecraft, satellites, and interceptors. Dr. Hablani has received numerous awards for his contributions, including the Leonardo de Vinci (the Spirit of the Renaissance) Engineer of the Year 1991 award and patent and innovation awards. His expertise and interests are varied and include spacecraft attitude control and determination, multibody flexible dynamics and control, precision pointing and tracking, and guidance and navigation of exoatmospheric interceptors and interplanetary spacecraft. He has numerous publications, both internal and external. He has been an Associate Fellow of AIAA since 1994.

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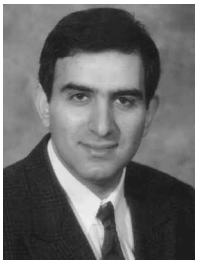

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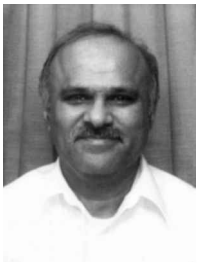
I. MICHAEL ROSS obtained his doctorate in Aerospace Engineering in 1990 from the Pennsylvania State University and thereafter joined the Naval Postgraduate School (NPS) in Monterey, CA, as an Adjunct Professor in the Department of Aeronautics and Astronautics. Presently, he is on an extended sabbatical 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 AAS 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 is a Professor of Aerospace Engineering in the Department of Mechanical and Aerospace Engineering at Carleton University, Ottawa, Ontario, Canada. He 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/coauthored 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.



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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 NSF Career Award and the Sigma Xi Award for Excellence in Research. He is a Senior Member of AIAA and a Member of IEEE, ASME, and ASEE, as well as a Member of the Phi Kappa Phi, Tau Beta Pi, and Sigma Gamma Tau honor societies.