

Reporting on the Next Generation

TO BEGIN this year, I would like to make a strong plea for both technical papers and papers covering the economic aspects associated with such initiatives as the Integrated National Plan for the Next Generation Air Transportation System (NextGen). This Plan fulfills a requirement included in Section 709 of the VISION-100 Century of Aviation Reauthorization Act (P.L. 108-176) signed by the President in December 2003. The Plan, facilitated by the Joint Planning and Development Office, addresses air transportation safety, security, mobility, efficiency, environmental, and capacity needs. It not only engages the alignment of resources of the White House Office of Science and Technology Policy and the Departments of Transportation, Commerce, Defense, Homeland Security, NASA, and the FAA, but it also leverages private sector capabilities. It will take advantage of the latest technologies while incorporating recent developments in security measures. The target is a system capable of handling up to three times the current level of operations.

Two NextGen foundational technologies are being implemented right now. One is the automatic dependent surveillance broadcast developing satellite-based surveillance. The other is system-wide information management. Additional technology efforts will address the impact of aviation on the environment. This would include 1) better scientific understanding, 2) modernization of air traffic management procedures, 3) development of new lower-emission and energy-efficient technologies for aircraft and engines, and (4) exploration of the potential of alternative fuels.

The Federal Aviation Administration (FAA) has two studies underway to “develop a national road-map on the viability of alternative fuels for aviation.” Since the energy crisis of the 1970s, aircraft and engine companies have been investigating the practicality of alternative fuels for aircraft. This was put on hiatus in the 1980s with the glut in oil availability. Currently, growing concerns over the availability of jet fuel, price fluctuations, local air quality, and the global climate impacts of aviation have generated a renewed interest in alternative fuels. In the United States, initiatives to address these concerns have been spearheaded by the U.S. Defense Department. Responding to climate change concerns and airline interest in alternative fuels, the Aerospace Industries Association has joined with the Air Transport Association and the FAA to form the Commercial Aviation Alternative Fuel Initiative.

In December of 2006, the President signed an Executive Order calling on the Departments of Commerce, Defense, Energy, Homeland Security, State, and Transportation, as well as NASA, the FAA, National Science Foundation, the International Trade Commission, and the Executive Office of the President to develop a National Aeronautics Research and Development Plan.

I encourage those of you involved in any of these initiatives to consider sending us your best material for inclusion in the pages of the *Journal of Aircraft*.

Turning now to some journal business, I would like to recognize the continued dedicated service of our fine Associate Editors who appear as the “2008 Team.” The quality of the published papers attests to their thoroughness and willingness to help authors bring out their best. Associate Editor Ken Holt offers the following suggestion. An area that he would like to see explored in submitted papers related to NextGen is how to relieve the congestion at hub airports. With most of the major carriers cutting back on the number of aircraft and cities served, they have the commuter airlines flying passengers to the hubs. One commuter flight with 40 passengers takes up the same airspace that a B-747 does during instrument-flight-rule conditions at the hubs. It is not unusual to see four- to five-hour delays at John F. Kennedy International Airport when they are operating in poor weather. Many times, commuter flights from the hubs are canceled because the scheduled aircraft is not able to land at the hub. The

passenger who paid for an airline ticket is faced with an overnight stay in New York at his expense or with a bus ride to the destination.

Occasionally, an Associate Editor will find that a non-U.S. author needs extra help with publication format or grammar. Authors are encouraged to contact one of our International Editors. Our Board of International Editors, representing 19 countries, appears on the inside front cover. International Board Member Hirotohi Kubota is sponsoring a forthcoming special section on supersonic airplanes prepared by Dr. Ohnuki of the Japan Aerospace Exploration Agency.

We are fortunate to have an Editorial Advisory Board (EAB), also listed on the inside front cover. Most EAB Members also serve on a Technical Committee (TC) relevant to the *Journal of Aircraft*. In this way, these Technical Committees have a solid link to the journal for archival publication of their best meeting papers. EAB Members help identify reviewers and also stimulate ideas for special sections or survey papers dealing with topics of the TCs and *Journal of Aircraft* reader interest. This past year, Dr. Joseph Lee has provided assistance in contacting other EAB Members and, when no EAB Member has been assigned, contacting relevant TC Chairs. As a result, several new EAB Members have been identified and our Reviewer list has grown. EAB Member Jerry Chubb of the Aircraft Operations TC obtained this input recently from his Chair, Brian Baxley:

One thing that comes to my mind is perhaps a closer tie, or an easier process, to encourage the authors of outstanding papers presented at the AIAA Aviation Technology, Integration, and Operations Conference to submit them to the *Journal of Aircraft*. Perhaps a flyer that each session chair could hand out to selected papers that outlines the added value of going through more reviews to get published and how to submit the paper.

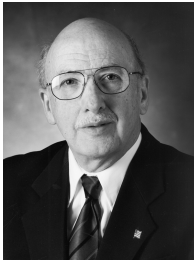
This sounds like a good idea across the AIAA conferences.

The names of the past year’s Reviewers through the first of October appear in this issue. I am sure you recognize many of these individuals and I certainly wish to thank them for their technical insight and willingness to assure that our published articles are accurate, timely, important to readers, and will retain lasting value. The *Journal of Aircraft* would not exist without dedicated peer reviewers.

Norma Brennan ably directed the AIAA Publications staff. She efficiently oversaw all journal activity, along with her other publication duties. She was especially helpful this past year as we further developed the WriteTrack online paper submission procedure for the *Journal of Aircraft*. Amanda Maguire, leaving her post as a Journal Manager is our new Product Manager for the journals. She ably tracked all the details, including scheduling Editorial Board meetings, year-end actions, etc. Luke McCabe became our Managing Editor in January 2004. Luke has been of great help to Associate Editors and authors, demonstrating great patience and thoroughness. Luke expertly helped with the development of the WriteTrack procedure. He patiently and expertly dealt with all the special problems reported by editors and authors and then expertly engaged the technical support staff in correcting the problem. Luke has recently changed jobs within the AIAA and Michael Baden-Campbell has assumed the duties of Editor of the journals. He has already picked up the reins and has been of great help in dealing with some WriteTrack issues, as well as in providing a personal touch in responding to requests by several authors. Michael McGinnes is our Applications Specialist and he ably helps us keep WriteTrack on track. All things considered, this new staff has taken over seamlessly. This is also due in large part to the oversight of the outgoing staff. I look forward to continuing my association with this fine professional team.

Thomas M. Weeks
Editor-in-Chief

Editor-in-Chief



THOMAS M. WEEKS completed his degree work at Syracuse University, Department of Mechanical and Aerospace Engineering, in 1965. He entered active commissioned service that year, assigned to the U.S. Air Force Flight Dynamics Laboratory (now the Air Vehicles Directorate of the U.S. Air Force Research Laboratory) at Wright-Patterson Air Force Base. His initial work was in the field of electrogasdynamics at the nearly completed 50-MW wind-tunnel facility. In 1968, he separated from the U.S. Air Force, but took a civil position at the same location. He worked on a variety of projects, including unsteady hypersonic heating, transonic test techniques, and sonic boom, before becoming the Manager of the External Aerodynamics Group. He served first as the Deputy and then as the Manager of the X-29 Advanced Technology Demonstrator, developed by the Advanced Research Projects Agency, NASA, and the U.S. Air Force. He served as Chief of the Wind Tunnels Branch and the Technology Strategy Branch. He served as Acting Chief Scientist and Acting Deputy Director of the Directorate. He served as Chief of the Integration and Operations Division. He retired from the Air Vehicles Directorate in August of 1998 and is currently with Universal Technology Corporation in Dayton, OH.

Associate Editors



THOMAS W. AUGUSTINE is the Airframe Integration Technology Thrust Leader within The Boeing Company's Phantom Works-Survivability Design and Integration group. He received his B.S. in aeronautical and astronautical engineering from Purdue University in 1982 and his M.S. in engineering management from Washington University in 1991. Mr. Augustine joined McDonnell Douglas in 1982 as a Structural Analysis Engineer and worked on numerous production and developmental aircraft programs. Since 1990, he has worked in the research and development of affordable, survivable, signature-reduction structure technology. He is a Senior Member of the AIAA and a Member of the National Defense Industrial Association and the Tri-Service Low Observables Supportability Working Group.



INDERJIT CHOPRA is the Alfred Gessow Professor in Aerospace Engineering and Director of Alfred Gessow Rotorcraft Center at the University of Maryland. He received his B.S. in aeroengineering from Punjab Engineering College in 1965, his M.E. from Indian Institute of Science in 1968, and his Sc.D. from Massachusetts Institute of Technology (MIT) in 1977. He worked at the National Aerospace Laboratory from 1966 to 1974. His research there included wind-tunnel testing of scaled aeroelastic models of airplanes and launch vehicles. At MIT, he worked on dynamic analysis of wind turbines. In 1977, he joined the NASA Ames Research Center and Stanford University Joint Institute of Aeronautics and Acoustics, where he worked for four-and-a-half years on the development of aeroelastic analysis of advanced rotor systems. In 1981, he joined the University of Maryland. He has been working on problems associated with aeromechanics of helicopters, smart structures, and micro air vehicles. His graduate advising resulted in 34 Ph.D. and 60 M.S. degrees. An author of over 150 archival papers, Dr. Chopra has been Associate Editor of *Journal of the American Helicopter Society* (1987–1991) and *Journal of Intelligent Materials and Systems* (1977–present). He was the recipient of the 2002 AIAA Structures, Structural Dynamics, and Materials Award; 2002 AHS Grover Bell Award; 2001 ASME Adaptive Structures and Material Systems Prize; 2002 A. J. Clark School of Engineering Faculty Outstanding Research Award; and the 2004 SPIE Smart Structures and Materials Lifetime Achievement Award. He has been a Member of the U.S. Army Science Board (1997–2002). He is a Fellow of the AIAA, American Society of Mechanical Engineers, American Helicopter Society, National Institute of Aerospace, and Aeronautical Society of India.



GILBERT L. CROUSE, JR. is an Associate Professor of aerospace engineering at Auburn University. He received his B.S. in physics from Wheaton College and his M.S. and Ph.D. in aerospace engineering from the University of Maryland. His specific areas of expertise and interest include configuration design, unmanned systems, fixed- and rotary-wing aerodynamics, and computational modeling. Gil is also the Founder and President of DaVinci Technologies, LLC, a small business focused on the development of aircraft-design-oriented software tools. He is a Senior Member of the AIAA and a Member of the American Helicopter Society. Gil is an active Member and the incoming Chairman of the AIAA Aircraft Design Technical Committee as well as a Member of the Unmanned Systems Program Committee.



ROBERT E. DUFFY is currently President of RED Associates, a research, development, and consulting firm. A former member of the faculty of the Department of Mechanical Engineering, Aeronautical Engineering, and Mechanics at Rensselaer Polytechnic Institute, he was the Chairman of the aeronautical engineering academic program. He is the author of over 65 published papers and research reports in the areas of applied aerodynamics, flight mechanics, and experimental fluid dynamics. Dr. Duffy has served as a consultant to numerous governmental agencies, industrial concerns, and individuals. During the summer, Dr. Duffy conducts his consulting from Colorado, where he is a co-owner of a 17,000-acre high-altitude cattle ranch located on the front range of the Colorado Rockies. He is on the Board of Directors of ENECO, Inc., a wind energy development firm that investigates and evaluates innovative concepts. He is a past Member of the Atmospheric Flight Mechanics Technical Committee and is an Associate Fellow of the AIAA.



FRANKLIN E. EASTEP is an Emeritus Professor of aerospace engineering at the University of Dayton. He received a B.S. in aeronautical engineering from Ohio State University in 1958, an M.S. in aeronautics from the Air Force Institute of Technology in 1963, and a Ph.D. in aeronautics and astronautics from Stanford University in 1968. Dr. Eastep has been teaching and conducting research within the technical areas of structural dynamics, aeroelasticity, and unsteady aerodynamics since 1968. During that period, he has been the principal for 18 Ph.D. candidates and over 45 M.S. students. He served on active duty with the U.S. Air Force for 20 years, retiring in 1978. Dr. Eastep is a Member of the American Academy of Mechanics and is a Fellow of the AIAA. He is presently a National Research Council Senior Research Associate with the U.S. Air Force Research Laboratory at Wright-Patterson Air Force Base.



PERETZ P. FRIEDMANN is the François-Xavier Bagnoud (FXB) Professor of aerospace engineering and Director of the FXB Center for Rotary and Fixed Wing Air Vehicle Design in the Aerospace Engineering Department of the University of Michigan. He received his B.S. and M.S. degrees in aeronautical engineering from the Technion—Israel Institute of Technology and his Sc.D. (1972) in Aeronautics and Astronautics from the Massachusetts Institute of Technology (MIT). Before entering the academic world, Dr. Friedmann worked in Israel Aircraft Industries and was a Research Assistant at the Aeroelastic and Structures Laboratory at MIT. He has been with the University of Michigan since January 1999. Between 1972 and 1998, he was a Professor in the Mechanical and Aerospace Engineering Department of the University of California, Los Angeles. Between 1988 and 1991, he served as the Chairman of the Department. Dr. Friedmann has been engaged in research on rotary-wing and fixed-wing aeroelasticity, active control of vibrations, hypersonic aeroelasticity, flutter suppression, structural dynamics, and structural optimization with aeroelastic constraints. He has published extensively (over 250 journal and conference papers). His accomplishments have been recognized by a number of awards: American Society of Mechanical Engineers (ASME) Spirit of St. Louis Medal for 2003; AIAA Structures, Structural Dynamics, and Materials (SDM) Award for 1996; AIAA SDM Lecture Award for 1997; ASME/Boeing Structures and Materials Award (2004); and the ASME Structures and Materials Award (1984). He is a Fellow of the AIAA and the American Helicopter Society and has been a naturalized U.S. citizen since 1977.



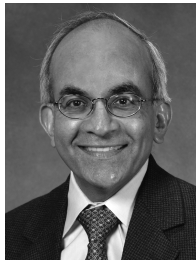
AHMED A. HASSAN is currently a Boeing Technical Fellow at the Boeing Company. His area of expertise is computational fluid dynamics (CFD). Dr. Hassan received his B.S. and M.S. from the University of Cairo in 1974 and 1976 respectively. He then received his Ph.D. from the University of Arizona in 1981. He was on the faculty of Arizona State University from 1981 to 1987 as an Assistant Professor. He joined The Boeing Company (then McDonnell Douglas Helicopter Company) in 1987, where he conducted research related to the application/development of CFD design and analysis tools for rotorcraft problems. He is the company representative on the corporate-wide CFD working group, an Associate Fellow of the AIAA (1981 to the present), and a Member of the American Helicopter Society (1987 to the present). He is currently serving as an Associate Editor for the AIAA *Journal of Aircraft* in the area of CFD. Dr. Hassan has published more than 30 archival studies and presented more than 60 papers at national and international conferences. He holds six patents and has four additional patents pending with the U.S. Patent and Trademark Office. His work has focused on modeling the aerodynamics of rotor blade-vortex interactions and investigating novel flow control techniques for rotorcraft applications.



RONALD A. HESS received B.S., M.S., and Ph.D. degrees in aerospace engineering from the University of Cincinnati. After completing his doctoral degree, he joined the faculty of the Department of Aeronautics at the U.S. Naval Postgraduate School. In 1976, he joined the staff of the Flight Systems Research Division at NASA Ames Research Center. In 1982, he joined the faculty at the University of California, Davis, where he is currently a Professor of mechanical and aeronautical engineering. His research interests lie in the areas of automatic and manual control and in human/machine systems. He is an Associate Fellow of the AIAA and a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). In 2000, he was a recipient of the AIAA Mechanics and Control of Flight Award. He is also an Associate Editor of the *IEEE Transactions on Systems, Man and Cybernetics, Part A* and of the *British Journal of Aerospace Engineering*.



KENNETH J. HOLT retired from McDonnell Douglas Corporation in 1990. He had been involved in flight test operations and marketing. He received his B.S. from Hampton University and his M.B.A. from the University of Missouri. He served 20 years in the U.S. Air Force and retired as a Lieutenant Colonel and a Command Pilot. His background is in fighters. He has flown the F-86, F-100, F-4, F-15, and F-18, and he spent tours in the Air Training Command and Strategic Air Command. He joined McDonnell Douglas in 1973. There, he flew production test flights and was the company's interface with the military and Federal Aviation Administration for test flights. He developed much of the flight test operating procedure for the F-18 and AV8B, and he was the McDonnell Douglas flight operations consultant to the Government Aircraft Factory F-18 facility in Avalon, Australia. He retired from active flying in 1984. Mr. Holt served as Chair of the Aircraft Operations Technical Committee from 1985 to 1987. He is a Senior Member of the AIAA.



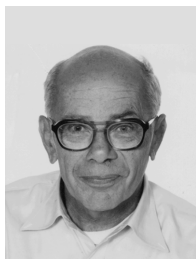
MAHENDRA JOSHI is the Chief Engineer of Noise and Emissions at Boeing Commercial Airplanes. He leads a team that is responsible for developing acoustical and emissions designs that meet the requirements for new and derivative airplanes, developing efficient technologies and tools to enable these designs, achieving noise and emissions certification for these products, providing operational environmental support to customers, and coordinating regulatory development. Mahendra has over 30 years' experience in this field. Mahendra has held several positions, all related to environmental performance, during his career at The Boeing Company (including McDonnell Douglas). His prior responsibilities included Research Engineer, Senior Manager/Technical Fellow of Acoustics and Propulsion Technology, Manager of Environmental Performance for the NASA High-Speed Civil Transport, Manager of Single-Aisle Airplane Program Noise Support, Manager of Community Noise, and Manager of 787 Community Noise, Product Development and Emissions. Mahendra received a Ph.D. in mechanical/aerospace engineering from the University of Tennessee Space Institute. He has also performed noise research and design at NASA Langley Research Center and at Bell Helicopter Textron. He is an Associate Fellow of the AIAA and was a Member of the Aeroacoustics Technical Committee.



THOMAS WILLIAM STRGANAC is a Professor of aerospace engineering at Texas A&M University. He received his B.S. in aerospace engineering from North Carolina State University in 1977, his M.S. in aerospace engineering from Texas A&M University in 1980, and his Ph.D. in engineering mechanics from Virginia Polytechnic Institute and State University in 1987. His research interests focus on structural dynamics, nonlinear mechanics, and aeroelastic phenomena. He served as an Engineer at NASA Wallops Flight Center from 1975 to 1982 and at NASA Langley Research Center from 1982 to 1989. He has internationally presented short courses on advanced flight tests and aeroelasticity, and he is the coauthor of the texts *Introduction to Flight Test Engineering* and *A Modern Course in Aeroelasticity*. He has served on the Lighter-Than-Air Systems Technical Committee (TC), the Balloon Systems and Technology TC, and the Structural Dynamics TC. He served as the General Chairman of the AIAA Structures, Structural Dynamics and Materials Conference in 1999 and served as the General Chairman of the AIAA Dynamics Specialists Conference in 1996. He is an AIAA Associate Fellow and a registered Professional Engineer.



BRIAN E. THOMPSON holds the Natural Sciences and Engineering Research Council and General Motors of Canada Chair of Engineering Design and Innovation at The University of Western Ontario. He received his B.A.Sc. (mechanical engineering) from the University of Waterloo in 1979 and a Ph.D. from Imperial College of Science and Technology in 1984. He has been a licensed Professional Engineer since 1986. Dr. Thompson is a seasoned engineering designer with experience in advanced medical, automotive, aircraft, rocket-engine, and instrumentation concepts. He has industrial experience at Bell Northern Research, Scientific Research Associates, and The Boeing Company, and he has held previous academic appointments at Imperial College, the University of Waterloo, and Rensselaer Polytechnic Institute (RPI). His research places emphasis on studio pedagogy, trailing-edge flows, vehicular design, and emerging technologies. He was the Chief Engineer of the Aircraft Studio at RPI, which produced the world's largest student-engineered aircraft. Dr. Thompson has engineering experience in a wide range of applications, including commercial aircraft, high-speed snow plowing, hybrid electric automobiles, axial turbomachinery, centrifugal pumps, heat exchangers, telephony heat transfer, gas and steam turbines, and pulmonary ventilation. He has authored over 160 publications and technical reports, is a patent holder, and has presented invited lectures and short courses on aerodynamics, engineering studios, and aircraft design in the United States, Europe, Canada, and the United Kingdom.



MURRAY TOBAK is a Senior Staff Scientist at NASA Ames Research Center. He has degrees from the University of California and Stanford University and has been a Research Scientist at NACA–NASA Ames Research Center since 1948. He has specialized in theoretical studies of fluid and flight dynamics of high-speed aircraft and missiles. His studies have been aimed at identifying problems in nonlinear dynamics, flow stability, 3D separated flow, and vortex phenomena requiring basic research and new analytical and experimental tools for their solution. He is an Associate Fellow of the AIAA and has received NASA's Exceptional Service Award.