Smart Ice System Improves Flight Safety

A smart ice-management system being developed at the University of Illinois would sense the effect of accreted ice on the performance and handling qualities of an aircraft, then alert the pilot, restrict the aircraft from potentially dangerous maneuvers, and adapt the flight control system to maintain safe operation.

"Current ice-protection systems attempt to prevent or remove an ice accretion and may provide limited sensing of the presence of ice," said Michael Bragg, professor and head of aerospace engineering at the U of I. "But these systems use little, if any, information about the present state of the aircraft. Our approach is to provide the pilot with a near real-time characterization of the effect that ice is actually having upon the aircraft."

When ice accumulates on flight surfaces, it can change an aircraft's performance, stability, and controllability. Accidents can occur not only from degraded aerodynamic performance but also from well-intentioned pilots making bad decisions in the absence of adequate information. "Pilots expect an aircraft to respond in a certain way to their commands, and when it doesn't, they might assume the wrong reason and take improper measures that can result in a dangerously unstable aircraft," said Tamer Basar, the Fredric G. and Elizabeth H. Nearing Professor of Electrical and Computer Engineering at the U of I. "We have to provide more relevant information to the pilots so that they can make informed decisions and safely fly an aircraft under severe icing conditions."

Using systems identification techniques, the researchers first modeled the effects that ice can have on an aircraft's flight dynamics. Then they developed methods to detect and characterize those effects.

"Instead of relying only upon an ice-thickness sensor, for example, we're measuring the changes in aircraft performance and control during an icing encounter," said James Melody, a graduate student in the university's Coordinated Science Laboratory. "We use a neural network to extract information from the flight dynamics and various other sensors to better inform the pilot of the current state of the aircraft."

Ultimately, the researchers want their ice-management system to automatically adapt the flight control system to make an aircraft easier—and safer—to fly when iced. For larger, newer aircraft, the system could operate autonomously, while still keeping the pilot properly informed.

A prototype of the smart ice-management system will be flight-tested following tests to validate the researchers' models and algorithms.

This work is supported in part by the National Aeronautics and Space Administration.

—courtesy of James E. Kloeppel, University of Illinois News Bureau

Of Note...

Graduate rankings from US News & World Report... The university's Engineering program retained its top 10 ranking for 2004, standing fifth nationally. The Department of Aerospace Engineering moved up one notch from 2002, ranking seventh. The results were released in April 2003.

In December 2002, President Bush signed a bill that doubled the National Science Foundation's budget. How might this affect the Urbana campus? "It's particularly important to the Urbana campus because it is the number one recipient (in terms of universities) of NSF support. For fiscal year 2001, we got about $80 million in NSF research funds. Last year, it was more like $90 million to $100 million." —Rick Schoell, executive director for government relations and director of federal relations, University Office of Governmental Relations.

—Inside Illinois, January 23, 2003 issue

CLASS NOTES

1950s

Richard Martin, '50, MS '51, is in his 54th year of working on the Atlas rocket vehicle. Martin, an AIAA Fellow, has produced two CDs with Peter Hunter and Robert Bradley, entitled "Atlas in the Twentieth Century," which contain a pictorial, database, and seminal paper history of the program. The CDs have been donated to several aerospace museums.

Thaddeus Swiecki, '58, has retired from American Airlines. Prof. Emeritus Al Ormsbee and he socialized at a glider competition in Freeport, Illinois, in May 2003.

1960s

William Cotton, '64, was manager of air traffic and flight systems at United Airlines for 14 years. He has been a UA pilot for over 33 years. During his managerial tenure, he led United's efforts to improve air traffic control industry-wide. Cotton also served as president and chairman of the board of ATN Systems, Inc., a consortium of airlines developing Aeronautical Telecommunications Network products in cooperation with the Federal Aviation Administration. He is currently president and director of Flight Safety Technologies, Inc.

1970s

Gus Nystrom, '70, visited the campus in March to share his experiences in the aerospace, automotive, and petroleum industries with students. He also gave them tips on how to find full-time or summer employment.

1980s

Richard DeFrancesco, '82, founded Spiritech Advanced Products Inc. in 2000 with two other partners. He was employed for 18 years at Pratt & Whitney. Spiritech, located in Jupiter, Florida, was one of 12 Florida companies that received a small business innovation grant from NASA to develop a pulse detonation engine.

Catherine (Larson) Koerner, '87, MS '89, is scheduled to direct three of the next four Space Shuttle missions. Koerner is a flight director at Johnson Space Center in Houston, Texas.

Dan Jensen, '88, participated recently in the department's 2003 Aerospace Illinois summer camp for high school students. He talked about his career and work at Rolls-Royce.

Russ Wenzel, '89, MS '91, moved from California to Colorado and is senior engineer at a relatively new startup company, Maptuit Corporation. He is involved in routing trucks over the North American road network in an efficeint way.

In Memoriam...

Lee Dutton '65, of rural Wyoming, Illinois, died on April 14, 2003, at OSF St. Francis Medical Center in Peoria. He was born in 1942 in Kewanee, and married Marlis Caspary in April 1974 in Wiesbaden, Germany. She survives. Other survivors include a daughter, Tanya Dutton, of Vandenburg Air Force Base, California; his mother of Toulon, and two sisters. He was a Vietnam War veteran, serving in the Air Force for 14 years, and was a member of the Society of Wild Weasels. (*Editor's note*: The Wild Weasels originated in the mid-1960s during the Vietnam War, to battle surface-to-air missiles (SAMs) launched by the North Vietnamese Army against U.S. fighters. Wild Weasel missions were among the most dangerous during the war—these fighters deliberately attracted the attention of SAM sites in order to destroy them or went on hunter-killer missions to guide other bombers to the sites.) Dutton later served with the 183rd Tactical Fighter Group of the Air National Guard in Springfield for 10 years, retiring as a lieutenant colonel in March 1993. He also farmed in rural Wyoming. He was a member of Toulon Lions Club and served on the Stark County board for many years. He was a member, treasurer, and former deacon of First Baptist Church in Toulon. Memorials may be made to the American Red Cross or his church.

John Hyatt, '87, MS '88, died on August 3, 2003, in LaGrange, Illinois. He received a law degree from Vanderbilt University and practiced law in the Chicago firm of Jenkins and Gilchrist. Memorial gifts may be made to the Vanderbilt Law School for the "John Hyatt Memorial Fund." The money will be used to plant and maintain a tree, with a plaque in remembrance of Hyatt. Checks should be sent to Kathryn Bricken, Vanderbilt Law School, Dept. of Alumni Services, 131/21st Avenue S., Suite 291, Nashville, TN 37203.

Mahadevan "Devan" Ramaswamy, PhD '94, died suddenly on March 21, 2003, in Austin, Texas. He was 40 years old. Born in Nagercoil, Tamil Nadu, India, in 1963, he came to the United States in 1990. Ramaswamy worked for two years at Aerospace Engineering as a post-doctoral fellow after receiving his doctorate from the U of I. He moved to Cincinnati in 1996 and held various positions at ASE Technologies, Belcan Corporation, and I2 Technologies before

moving to Austin in 2002 to join Dell. He earned his bachelor's degree in 1985 from the College of Engineering, Trivandrum, and his master's at the Indian Institute of Technology, Kanpur, in 1987. He joined Hindustan Aeronautics Limited, Bangalore, and later worked for the Indian Space and Research Organization in Trivandrum. Survivors include his wife Seetha; son Sreyas and daughter Smrithi; his parents M. Ramaswamy Iyer and Lokanayaki; sister Meena, and brother Ramakrishnan. A college fund has been set up for his children at the Wells Fargo Bank, 10401 Anderson Mill Road, Austin, Texas 78750; phone number (512) 250-8114. Make checks out to Seetha Saraswathy, account number 8705321290.

Beddini, *continued from page 1*

McElmurray of Columbia, Missouri; and two sisters, Janet Beddini of Belle Meade, New Jersey, and Elissa Jury of High Falls, New York.

Beddini joined the University of Illinois in 1985 as an assistant professor in the Aerospace Engineering and Mechanical and Industrial Engineering departments. He was promoted to associate professor in 1987. At the time of his death, he was supervising or collaborating in research on the large-eddy simulation of turbulence in ducted flows with transpiration, the analytic evaluation of accuracy of numerical methods for compressible turbulence simulation, and the hydrodynamic stability of flows in porous media. He was also director of the department's Aerothermal Simulation Lab.

Beddini received his bachelor's and master's degrees in aeronautical engineering from New York University in 1971 and 1973, respectively. He earned his doctorate in mechanical and aerospace engineering from Rutgers in 1981. In summer 1981, Beddini was a visiting research scientist for the U.S. Air Force Rocket Propulsion Lab in Edwards Air Force Base, California. From 1981 to 1985, he was a senior research scientist in Princeton, New Jersey, for Science Applications, Inc., in the propulsion gas dynamics division.

Memorials may be made to the American Cancer Society.

1990s

Thomas Ray Oakley, '92, MS '95, and Valerie Ruth Hockgraver were married on September 21, 2001 in St. Lucia, West Indies. Oakley works for Boeing Flight Test at the Naval Air Station, Patuxent River, Maryland.

Abdollah "Abdi" Khodadoust, PhD '93, became an AIAA associate fellow in January 2003. Khodadoust was recognized for his accomplishments with Boeing, which have "allowed him to contribute to programs ranging from research and development, the Boeing 717-200 certification flight test, and the Space Shuttle program," according to the commendation. He received AE's Outstanding Recent Alumnus Award in 2002.

Nicholas Tiliakos, MS '93, PhD '97, is a senior scientist at Allied Aerospace in Ronkonkoma, New York. He is also an adjunct professor in the Mechanical Engineering Department at Columbia University.

Mark Craig, '95, of Rantoul married Jennifer White, of Lincoln, on September 29, 2001. Craig is employed in corporate sales in Ottawa, Illinois.

Lizz and Gabe Rogers are pictured with their son, Nathaniel William.

Gabe Rogers, '96, MS '97, and his wife Lizz are new parents to Nathaniel William. The baby was born on August 19 and weighed 7 lb 4 oz. Rogers works at the Applied Physics Lab, Johns Hopkins University, in Laurel, Maryland, on the Messenger and New Horizons satellites.

Erik Antonsen, '97, MS '01, attended the International Electric Propulsion Conference in Toulouse, France, in March 2003. He submitted a paper and presentation of his ongoing dissertation research being performed at Edwards Air Force Base in California. The research concerns development of a time-resolved surface temperature diagnostic for pulsed ablative thrusters. Antonsen is also enrolled in the 2003-2004 Medical Scholars Program. He plans to combine his two degrees to study the limitations of radiation exposure in relation to long-term human space flight.

Antonsen with simian friend in Gilbraltar, one of his stops on a recent backpacking trip.

Eng Soon Liau, '98, left Singapore to attend graduate school at Stanford University, beginning this fall.

Andrew Builta, '99, is stationed at RAF Lakenheath in the United Kingdom. He began flight school after he received his commission through the Air Force ROTC. He is now a weapons system operator aboard the F-15E Strike Eagle.

Burke Jensen, '99, was awarded the Navy Achievement Medal in October 2001 for leadership, initiative, and devotion to duty. Jensen served on the USS *Normandy* from January to October 2001.

Pong Lee, '99, moved to Wichita, Kansas, in August, to begin his new job at Boeing. He is a structural analyst in the airborne laser program. In his spare time, he is volunteering in the restoration of a B-29 Superfortress called "Doc." Lee graduated in 2001 from the Massachusetts Institute of Technology with his master's degree in aeronautics and astronautics.

Jason Merret, '99, MS '01, was interviewed on local TV after the Space Shuttle *Columbia* tragedy in February 2003. He spoke about his research, which involves analyzing the yaw control of a lifting body reentry vehicle at high angles of attack. He is studying the high angle-of-attack aerodynamics for the X-38.

Robert Bruce Powers, MS '99, is working as a research test engineer in the Pilot Systems and Operations Branch at the NASA Langley Research Center in Hampton, Virginia. He is attached to the Airborne Systems Division, helping to develop advanced concepts for aircraft operations in the national airspace system. At the same time, Powers will pursue his second, parallel career in the Navy Reserve.

Mike Sexauer, '99, MS '01, was hired by the Air Force and started working at Edwards Air Force Base in California in August.

Brent Van Arsdell, '99, president of American Stirling Company, was quoted in a *New York Times* article in April 2002 in a story about Dean Kamen's Segway scooter. Kamen plans to manufacture a Stirling engine to power Segways. Stirling engines are powered by heat that is produced from any type of fuel. Van Arsdell worked for a year at Cessna Aircraft before devoting himself full-time to his educational Stirling company, which he moved to San Diego, California, in 2001.

2000s

Kelly (McAllister) Broms, '01, and husband Joseph became parents recently. Christopher Gerard Broms was born on October 4, 2002 in Urbana. Baby Broms weighed 8 lb 15 oz and was 20 inches long.

Bryan McGranahan, '01, wed Abigail Layne Musson on May 24, 2003, in Urbana. He is working on his master's degree in aerospace engineering and plans to graduate in December 2003.

NASA Scientist Donates Collection to UI Library

The John C. Houbolt collection at the University of Illinois was dedicated at a ceremony in the Grainger Engineering Library on October 9, 2003. Houbolt, a College of Engineering alumnus, was chief aeronautical scientist for the National Aeronautics and Space Administration (NASA) from 1976 to 1985. He is best known for developing the lunar orbit rendezvous concept, which was instrumental in the success of Apollo 11, the nation's first landing on the Moon. Special guests at the ceremony included **Robert Farquhar** ('59), mission director of the NEAR (Near Earth Asteroid Rendezvous) project at Johns Hopkins University; NASA astronaut Joe Tanner, also an Engineering alumnus, and AE professor John Prussing.

Houbolt's collection includes books, designs, manuscripts, models, and papers, which will be managed by the University Archives. A grant from the NASA Langley Research Center will enable the University Library to process, index and preserve the collection, and to develop an electronic searching aid for the materials and online access to the documents.

AE Advisory Board 2003

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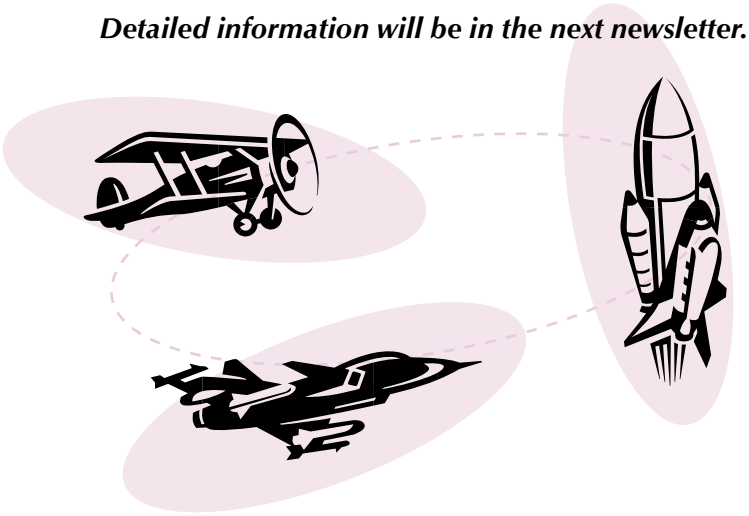
Jennifer Hargens, '97, MS '01, and **Filip Rysanek**, '98, MS '02, were married on August 9 in Fairborn, Ohio. Aerospace Engineering alumni who attended the wedding included **Jennifer Bradley** ('97, MS '99), **Phil Briscoe** ('98), **Andy Broeren** (MS '96), **Stewart Bushman** (MS '99), **Todd Cerven** ('97, MS '99), **Chris Giganti** ('97), **Holly Gurbacki** (MS '00), **Carrie Hartman** ('97, MS '99), **Bill Hartmann** ('96, MS '99), **Kishwar Hossein** (MS '03), **Tim Hutchison** ('98), **Jason Kamphaus** (MS '02), **Benjamin Keen** ('97), **Han Kim** ('97), **Darren King** ('96, MS '00), **Sam Lee** (MS '97, PhD '01), **Casey Madsen** ('97), **Bill Mason** ('96), **Benjamin Mui** ('97), **Steve Neurater** ('00, MS '02), **Ryan Oltman** ('98, MS '02), **Mark Ulrich** (MS '03), and **Brian Woodard** ('01).

60th Anniversary Celebration
April 29–30, 2005

Detailed information will be in the next newsletter.



Min–Po Shiue, MS '01, is leaving California and the space/satellite industry for the world of fighter aircraft. Shiue will be a senior systems engineer on the Joint Strike Fighter program with Lockheed Martin Aeronautics Company in Fort Worth, Texas. He will focus on the international version of the strike fighter and be responsible for cockpit integration and requirements definition, testing, and verification.

Nicholas Sinnokrak, '01, was designated a Naval aviator in September 2002, when he was presented his "Wings of Gold." He received his wings, marking the culmination of months of flight training, while serving with Training Squadron 86 at the Naval Air Station in Pensacola, Florida.

Evgeniy Sklyanskiy, '01, ran and finished the second official marathon of his life, the 106th Boston Marathon, on April 15, 2002. His first was only six months earlier, the LaSalle Bank Chicago marathon, in October 2001. "I finished the race by 17 minutes slower than what I demonstrated in the Chicago marathon. My official chip time was 3 hr 27 min 52 seconds."

Darien Gipson, '02, works for Frasca International in Urbana. He is a member of the National Society of Black Engineers.

Jason Kamphaus, MS '02, graduated in December with his master's in Aerospace Engineering and is working toward his doctorate with Prof. Scott White. Kamphaus and Cindy Bartels were married on July 6, 2002, in Palos Heights, Illinois.

Ryan Nurnberger, '02, accepted a graduate fellowship with the Georgia Institute of Technology, in Atlanta, to study for his master's degree. He will be doing research in jet propulsion design at Georgia Tech's Aerospace Systems Design Laboratory. Nurnberger plans to graduate in December 2003 and hopes to work in industry on advanced manned space launch vehicles after his graduation.

Michael Rynne, '02, of Lemont, and Suzanne Vig, of Petersburg, will be married in June 2004. Rynne is an aeronautical engineer with Northrop Grumman in Los Angeles.

Daniel Alexander Vidakovich, '02, and Morgan Leigh Mastny were married on July 20, 2003, at Allerton Park, Monticello, Illinois. He is a nuclear submarine officer in the Navy. The couple live in Fernandina Beach, Florida.

Leia Blumenthal, '03, received the Stanley H. Pierce award in April 2003. Blumenthal graduated with her bachelor's in AE in May and is working towards a master's. The Pierce Award is given to one faculty member and one undergraduate student annually to recognize their efforts in developing student-faculty cooperation.

Nicholas McFall, '03, is working with special mission aircraft in the flight sciences division for Gulfstream. The division works with flight test data in order to