

PURDUE & AeroGRAM Astro



A newsletter for alumni & friends of the School of Aeronautics & Astronautics • Summer 1997

Mach-6 Wind Tunnel Research A Reality

Construction has begun on two Mach-6 quiet-flow Ludwig tubes—a prototype and a full scale—which will be used to conduct experiments on laminar-turbulent transition. Quiet-flow tunnels provide noise levels that are 10 to 100 times lower than those in conventional tunnels, and are critical to experiments on noise-sensitive phenomena such as transition. The new wind tunnels are designed to yield the highest quiet Reynolds numbers available anywhere in the world, and will complement the existing Boeing Subsonic Wind Tunnel and the existing four inch, Mach-4 quiet-flow Ludwig tube.

The Boeing subsonic wind tunnel was renovated in 1991 through a \$500,000 grant from The Boeing Company. The original Ludwig tube was funded by NASA Langley and a gift in memory of Kenneth H. Hobbie.

"The Boeing gift, and subsequent research funding from NASA Langley and the Air Force Office of Scientific Research, has allowed the School to establish excellent research facilities, which in turn has allowed us to secure additional research funds. Our state-of-the-art facilities have been helpful in recruiting quality graduate students, and in retaining and attracting new faculty. The new Mach-6

tunnels will continue the School's tradition of innovation in aerodynamics," stated ASL Director and Professor Steven Schneider.

The prototype currently being constructed will have a nine-inch, Mach-6 test section with a quiet-flow Reynolds number of 13 million. This quiet Reynolds number is nearly 30 times larger than that available in the four inch, Mach-4 tunnel, yet operating costs remain low due to the short, six second run time. The prototype is scheduled for completion in 1998, and will validate the design and fabrication methods to be used for the 24-inch diameter full-scale tunnel. The full-scale tunnel will be driven from a 30-inch diameter stainless tube

that is 200-ft long, and is currently scheduled for completion in 2002.

Once completed, the tunnels will position the School as the only academic institution in the world with a hypersonic quiet-flow wind tunnel. (NASA Langley does have a decommissioned seven inch, Mach-6 tunnel, along with a nearly-completed 18-inch, Mach-8 tunnel.)

"Laminar-turbulent transition in high-speed boundary layers is important for prediction and control of heat transfer, skin friction, and other boundary layer properties. Yet the mechanisms leading to transition are still poorly understood, even in low-noise environments," stated Dr. Schneider. "This difficulty caused

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AAE Briefing

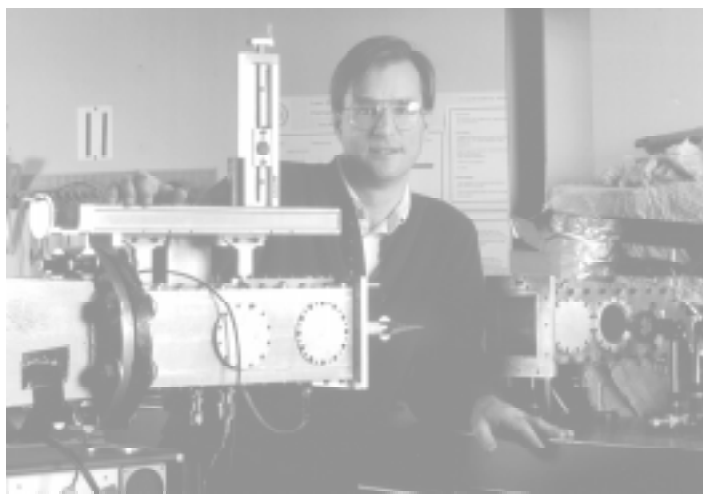
It hardly seems possible that six years has passed since we dedicated



the Boeing Wind Tunnel, funded in part by a major gift from The Boeing Company. We still remain grateful for Boeing's generosity for it allowed us to enter a new era in aerodynamic research. Hundreds of students and our faculty members have been given the opportunity to learn more about aeronautical engineering through the use of this and other laboratory facilities.

We are now preparing to install a new tunnel to complement the Boeing and Mach-4 wind tunnels. The Mach-6 prototype facility, design and construction is under the direction of Aerospace Sciences Laboratory Director, Professor Steven Schneider. No other university in the world has a Mach-6 wind tunnel. When the full scale model is completed, this will strategically position

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Professor Schneider in the Aerospace Sciences Laboratory.

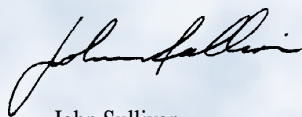
AAE Briefing • continued

the School to draw research dollars, facilitating hypersonic flight research in laminar-turbulent transition.

Like Boeing, many other corporations have reached out over our 52 year history and through their help have assisted in educating future aeronautical engineers. These good corporate citizens have experienced the tremendous benefits of having employees who are well-grounded in the basics and respected in the industry.

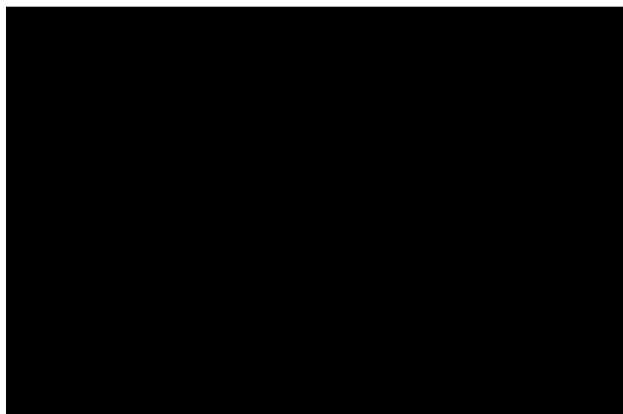
With less than one third of our support dollars coming from the State of Indiana and less than 20% coming from tuition, it is important for us to join with our corporate partners to insure that our research program is thriving and continues to be leading edge. Members of our Industrial Affiliates Program, which was started in 1982, are committed corporate citizens. We are grateful for their continued financial support.

Quality research does matter. It is part of the School's mission. Corporate citizens help the School fulfill that mission while simultaneously providing quality education to future aeronautical engineers, university professors, and, yes, astronauts.



John Sullivan
Professor and Head

Mach-6 Wind Tunnel Research A Reality • continued



Professor Steven Schneider adjusts measurement equipment of the Ludwig tube.

the Defense Science Board to find that boundary-layer transition on the National Aerospace Plane could not be determined with sufficient accuracy to justify construction of a demonstrator vehicle. Other applications hindered by this lack of understanding include high-speed interceptor missiles, and reusable re-entry vehicles. A re-entry vehicle with a metal skin based on X-33 technology will only be feasible if transition does not occur as early as it sometimes does on the Shuttle," stated Schneider.

"Reliable simulation and control of high-speed laminar-turbulent transition on realistic flight vehicles will require further experimental research, even though much progress has been made. The interpretation of nearly all existing transition data is ambiguous due to the high levels of noise in conventional supersonic wind tunnels. Although we are continuing to develop instrumentation for making detailed measurements of transition mechanisms at Mach-4, the Purdue Mach-4 quiet-flow wind tunnel cannot maintain low-noise flow to the high Reynolds numbers needed in order to obtain

natural transition on models of Air Force interest," Professor Schneider said.

"Mach-6 is high enough to be in the range of Air Force interest and to involve second-mode instability waves. Yet, the substantially lower temperatures required to reach Mach 6 (as compared to Mach 8) dramatically reduce the cost of construction, instrumentation, and maintenance," Schneider stated.

"Since the new wind tunnel will be constructed based on the proven Ludwig tube design, the operating costs will be much lower than those at NASA Langley. The nozzle will also be provided with aspheric nozzle-matching windows to provide optical access to the quiet flow region," stated Professor Schneider.


Professor Steven Collicott leads the development of optical instrumentation associated with the project. "Working as the number two man on the hypersonic experiments has been exciting. Rarely do you find someone like Steve Schneider who is as competent with a PDE software package as a fork-lift, understands boundary layer instability and pressure vessel and

boiler codes, and can design 0.0001-inch diameter hot-wire anemometers and 30-foot long quiet-flow nozzles," stated Professor Collicott.

"Because of the facilities available to them, the students in our School are gaining experience in a fast-paced, high-quality research program. This is very satisfying to me," said Collicott.

"Our School has a respected, worldwide reputation which I attribute to the 52 years worth of alumni accomplishments," stated Professor Collicott. "Our efforts in teaching and in conducting research with our students strengthen us both, and, I hope, strengthens the reputation of our school. With the Mach-6 facilities, we are continuing a long tradition of excellence in research and discovery."

Concerning his research, Professor Schneider stated, "There is a special satisfaction in being able to design and create new kinds of experiments—it's rather like being an architect or an artist. I design and manage the creation of new equipment and processes. I enjoy seeing the students mature as their struggles with their projects begin to bear fruit. I hope to see our research become a significant, although small part of an important new class of aerospace vehicles."

The Mach-6 prototype wind tunnel is being funded by The Boeing Company and the Air Force Office of Scientific Research. Infrastructure for the full-scale tunnel is also being constructed with these funds; however, fund raising for the full scale tunnel continues. 

Corporate Giving

Listed below are those corporations and businesses that donated to the School between the period of June 1, 1996 and May 31, 1997. Thank you for supporting our School!

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•Member of the School's Industrial Affiliates Program.



Engineering Giving Clubs

Giving to the School of Aeronautics and Astronautics, or to the Schools of Engineering, will qualify you for the following engineering giving club membership:

| | |
|---------------------------------|-------------------------|
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| Dean's Club | \$500-999 annually |
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Gifts *anywhere* to the University totaling \$1,000 or more annually qualifies you for membership in the President's Council. In all giving clubs, matching gifts by your employer do count towards membership.



Thanks to each of you who contributed through the annual Phone-a-thon which took place during the month of February. More than 500 alumni gave nearly \$50,000 by the end of the fiscal year. The student callers enjoyed talking with you and updating you about School activities.

Donor Honor Roll

Listed below are donors, both alumni and friends, to the School of Aeronautics and Astronautics. We are ever so grateful for your generous contributions. The University receives less than 50% of its operating budget from the state and student fees. So the need for individual financial support of our School is great. Your contributions—whatever the amount—do make a difference and assist the School in achieving its mission, which is dedication to teaching, research, and service.

This year more than 762 individuals donated to our School which totaled more than \$159,000 in gift money with an additional \$28,000 in matching funds. The following individuals listed on the Donor Honor Roll donated to the School during the period from June 1, 1996 through May 31, 1997. An asterisk next to a donor's name indicates membership in a giving club.

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Denison Bassett
Bradley Bolster
Roger Branson
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Glen & Dolores (Chanson) Childress
William Clingenpeel

Faculty UPDATE

Professor Dominick Andrisani

served as the Dean of the NASA Academy at Dryden Flight Research Center in Edwards, CA. The purpose of the academy is to guide potential leaders in the space program.

Professor James F. Doyle will be one of the speakers at the 25th annual Midwestern Mechanics Conference scheduled for September 21st through the 24th. His talk is titled "Spectral Element Method for Wave Propagation in Structures."

In May, Professor Horacio

Espinosa was awarded the Office of Naval Research Young Investigator Award for his proposal, "An Experimental/Computational Investigation of Inelasticity in Nanostructured and Layered Materials."

Professor James Longuski was the School's 1997 nominee for the Murphy Outstanding Teaching Award.

Promotions

- **Kathleen C. Howell** from Associate Professor to Professor of Aeronautical and Astronautical Engineering
- **Gregory A. Blaisdell** from Assistant Professor to Associate Professor with tenure.
- **Horacio D. Espinosa** from Assistant Professor to Associate Professor with tenure.


AIAA National Honors C.T. Sun

Professor C.T. Sun is the 1997 recipient of the *AIAA Structures, Structural Dynamics and Materials Award*. This award is presented for "outstanding recent technical or sci-

entific contribution in aerospace structures, structural dynamics, or materials."

An AIAA Fellow, Professor Sun has made significant contributions

in the areas of impact on composite structures, plastic and viscoplastic behavior of composites, and dynamics of large space structures. Dr. Sun has published more than 140 journal articles, has made more than 100 conference presentations, and has presented in excess of 55 lectures.

The award, which Professor Sun received during the April AIAA Conference, reads: "In recognition of pioneering work in the area of impact and inelastic behavior of composite structures, including practical methodologies widely adopted by aerospace engineers." 



Professor C.T. Sun, right, the 1997 recipient of the Structural Dynamics and Materials Award with last year's recipient, Peretz P. Friedmann.

Grandt Earns Outstanding Teaching and AIAA Honors

Professor Alten “Skip” Grandt is this year’s recipient of the Elmer F. Bruhn Teaching Award.

Professor Grandt, Head of the School from 1985-92, began teaching at the School in 1979. He is interested in developing methodology to analyze and design damage tolerant aerospace structures and materials and to evaluate the remaining safe operating life of aging aircraft. Emphasis is placed on predicting the initial growth and subsequent fracture of pre-existent cracks due to cyclic and or static structural loads, and both experimental and numerical approaches are employed.

The Elmer F. Bruhn Teaching Award is administered by the School of Aeronautics and Astro-

nautics and all undergraduate AAE students are eligible to submit nominations.

Additionally, Professor Grandt was elected as an 1997 AIAA Fellow. Selection of Fellows, according to AIAA, is “limited to those who have not only distinguished themselves in the field of aerospace, but who show strong potential for leadership in the future. Approximately one AIAA Fellow is elected for every 1,000 voting members.”



1997 AIAA Fellow, Professor Alten F. Grandt, right, with AIAA president, Skip Fletcher.

Faculty Roster

Professors

M. J. Corless
J. F. Doyle
T. N. Farris
A. E. Frazho
A. F. Grandt
W. A. Gustafson, Associate Head
K. C. Howell
R. E. Skelton
J. P. Sullivan, Head
C. T. Sun
T. A. Weisshaar
M. H. Williams

Associate Professors

D. Andrisani
G. A. Blaisdell
S. H. Collicott
H. D. Espinosa
S. D. Heister
J. M. Longuski
A. S. Lyrantzis
M. A. Rotea
S. P. Schneider

Assistant Professor

W. A. Crossley

According to AIAA, the title of AIAA Fellow is given “only to exceptional individuals who embody the highest standards possible in the aeronautics and astronautics field.”

Michael & Sandra (Gann) Corso
Scott & Lois (Bradtmueller) Courtney
William Curdts
Edmond Dabrowski
C. Bruce Daugherty
Gerry Daugherty
Richard Davignon
Duane Davis
Thomas DeMuesy
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Indiana

Gerald Ahern *
David & Eugena (LaRoche) Amerman *

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Professor Stitz Dies

It is with sadness that we announce that Professor E.O. Stitz died this past April. Professor Stitz retired in 1975 after serving the University and School for 38 years as a faculty member. Professor Stitz, right, is seen here with Dean Emeritus Potter.



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Memories of an Aerospace Education



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Spring semester and finals week are just memories now, but what memories they are.....

Down the hall from Room 340, my office in Grissom Hall, is the student lounge. The South wall is covered with an impressive, wall-sized mural of the Space Shuttle, the North wall is home to a chalk board, filled with descriptive messages about the pressures of finals week. In the corner is nestled a vending machine willing, for a mere 50 cents, to disburse your favorite flavor of caffeine enriched beverage.

At any given time during the day—or night, or wee hours of the morning—you could find dedicated, hard-working AAE students studying for finals or meeting to make last minute changes to their final design project. Whether it was 36 or 24 hours until touchdown, they endured the challenges of being an AAE student and knew with each completed project and test, they were one step closer to their ultimate goal.

Do the memories of your finals week make you a bit nauseous?

It's funny. No matter how long one has been out of School, it seems finals week is branded in every college student's memory. With that memory comes a tremendous sense of pride and accomplishment knowing that you made it.

What other memories do you have of your time here at the School or Purdue? What was your favorite hangout? (Harry's Chocolate Shop is still around, and years ago, before prohibition, it really was an ice cream parlor!) What fads were all the rage? Any peculiar things happen in class? Any unique experiments in the Aerospace Sciences Laboratory? Any near mishaps?

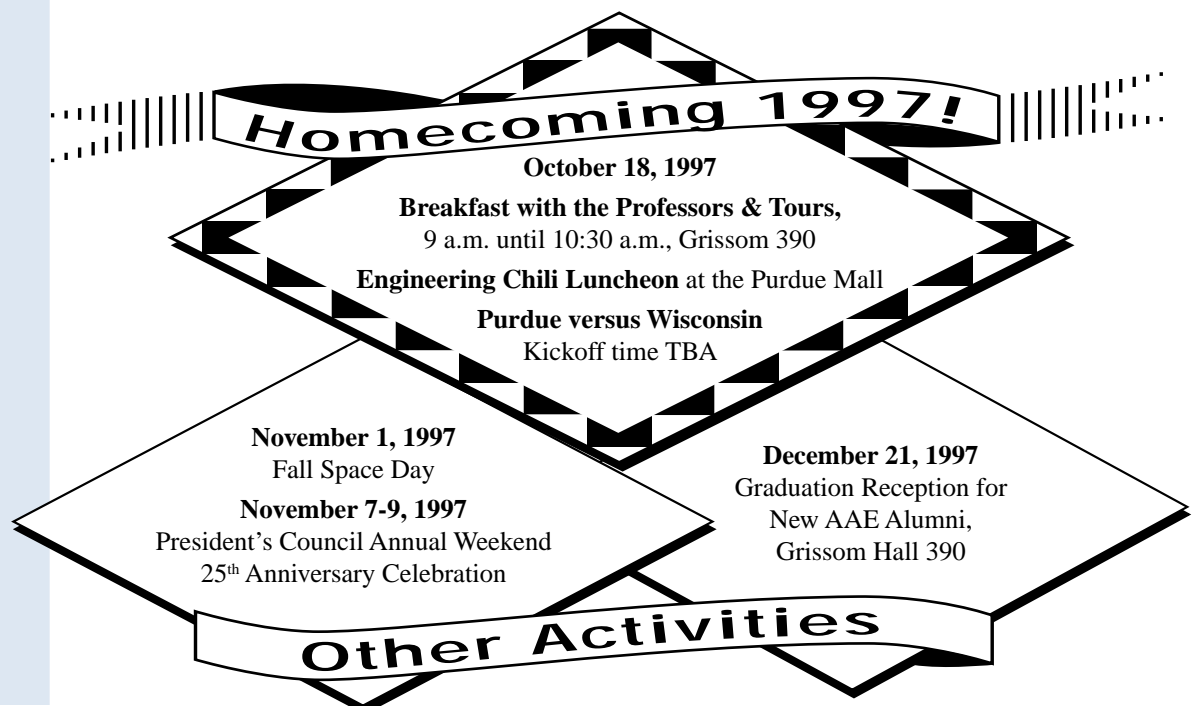
For the Winter issue of **AeroGRAM**, your favorite AAE memories will be featured. It will be fun to see what memories are consistent throughout the decades and what memories are

unique to certain class years. Just jot down your thoughts and forward them to me, attention: **AeroGRAM**, or send e-mail to: aae-alumni@ecn.purdue.edu. I do hope you'll take a moment and let the faculty and staff and your fellow alumni know what you remember best about your days in West Lafayette.

Speaking of memories, by the time you receive this newsletter, fiscal year 1996-97 will be one. And with the end of the year, I would be remiss if I did not thank all our donors (see Donor Honor Roll on page 3), our honored guests who gave special presentations, and our corporate partners. *Each of you help us help our students. We thank you for the opportunity to do so!*

Until Next Time,

Nan Claire Ross



O'Neil Receives 1997 DEA Award

by Lisa Tally

William J. O'Neil, BS '61, is the School of Aeronautics and Astronautics recipient of the 1997 Schools of Engineering Distinguished Engineering Alumnus Award. The DEA awards were given in April, during Gala Week. Mr. O'Neil is the Project Manager for Galileo and has been at the Jet Propulsion Laboratory in California for the past 34 years. He received this award for his significant contributions to the exploration of the Moon, Mars, and Jupiter.

"I am the person responsible for the entire Galileo project, so Harry Truman's line "The buck stops here" applies. My main interest is in identifying where the technical threats to the project might be and where the most difficult challenges are," stated O'Neil.

"One incident in particular illustrates the challenges that we face. Galileo's tape recorder is the bulk storage device that holds images and other science data until they can be compressed and sent to Earth over the low-gain antenna. Any images, except those taken for optical navigation, are incrementally read from the tape recorder and compressed into far fewer bits than would otherwise be required," O'Neil said.

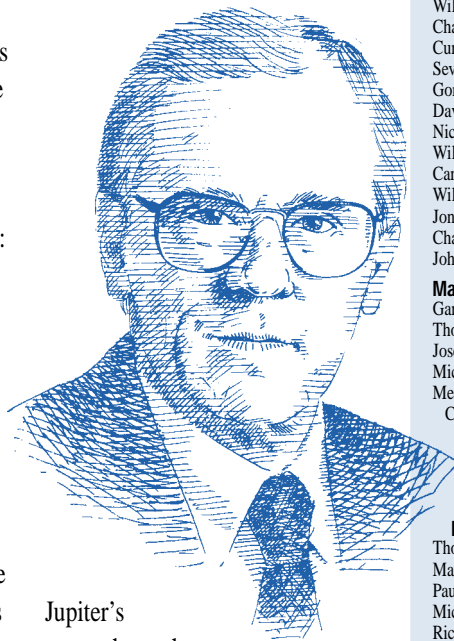
"Talk about trauma! Two months before our December 1995 arrival at Jupiter, we recorded three filtered

images of the planet with two of its satellites in view. These were to be played back and process into a color image of Jupiter—the only approach image— from Galileo before the spacecraft went into orbit: an historic image. When we commanded the tape to rewind, just as you would on your VCR to play back the programming, the signals were that the tape recorder was continuing to rewind," O'Neil explained.


Continuing O'Neil said, "That conjured up all sorts of ideas—like the tape had broken! In fact, it was hard to imagine that the recorder wasn't broken, given the symptoms. You can't fix anything like this, of course, a half-billion miles away from earth."

"But in the space of three days—thinking the recorder was broken (happily it wasn't)—we invented a way to get pictures back by using the central computer only. And, this goes back to the challenges of our work. It's often thought routine. It's anything but routine. You have to solve very interesting technology problems under tight schedule pressures. We do some of the greatest Sherlock Holmes work you can image," O'Neil said.

According to O'Neil, "The arrival at Jupiter in 1995 was the ultimate. The delivery of the probe into



Jupiter's atmosphere; the relay link, that is, the orbiter catching the transmission from the probe in real time; the burning of our main engine for nearly an hour to get into orbit—all had to work properly, or we would have lost a major part, possible all, of the mission. It was a do or die situation."

O'Neil stated that the challenges ahead for the Jet Propulsion Laboratory "is to properly harness the exploding technology to do the best possible deep-space exploration at acceptable cost without major failures. The cost-risk-performance trade-offs are tougher now than ever. We're directed to do more with less and take more risks as appropriate." 

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Stephen Hahn
Karl Hellman
Clayton Huben
Lowell John
Richard Lane
James & Stacey (Myers) McCarthy
Frank Murdock
Donald Nefske & Shung Sung
Walter Newgeon *
Albert & Joyce (Bichmiller) Roberts *
Gene & Beverly (Wyrozumski) Ross *
Yuting Rui
Robert Sadenwater
Douglas Schumann
John & Frances Wiley *

Minnesota

Donald & Deserie (Hettinger) Bremer
William Fouts
Donald Kamis
Dawn Kinsey
Rhonda (Stanforth) Thornton
James Weil

Missouri

Phillip Baggett
Dean Bristow
William Bucher
Kenneth Burg
Donald Chamberlain
Richard Clark
John Cooley
Raymond Cosner
Bruce & Mary Cramer
Walter Croker
Emile & Christine (Mazurkiewicz) Davidzuk
Gregory Dunn
Walter & Elizabeth (Anderson) Eversman
Marty Ferman
Gary Halt
George Hibbard
Rikard & Brenda (Godier) Hill
Paul Homsher
Thomas Kaemming
Jack & Mary Lewis
Gerald & Kathryn (Stickley) Lukavich
Terrence McClure
David Meek
H. Frederick & Joanne Nelson
William & Karen (Kaldenberg) Riggs

continued on next page

The Society

The R.B. Stewart Society was established years ago by the University to recognize those alumni and friends who make provisions in their wills for the University and or any of its schools and departments. The Society was named after Robert Bruce Stewart who was the chief business officer and served the University for 36 years.

If you would like additional information on how to become a member of the Society, or if you have made provisions in your will for the School of Aeronautics and Astronautics and would like us to know, please contact Nan Ross, Director of Communications and Development, at (765) 494-9124, or by e-mail at: aae-alumni@ecn.purdue.edu. Thank you for remembering your School in your will.

James Russell
Stanley Safranski
Jeffrey & Sarah (Zesch) Shultz
Raymond Stone
Paul Stover
Stephen & JoAnn Stukel
Howard Sutherland
David & Linda (Schimmel) Swain *
Lennart Thunstrom
Gary Wheeler
George Wiemer

Montana

Joseph Harper

Nebraska

William Moses
David Ringer

Nevada

Kelly Scott
Ray Scott
Lewis Weitland

New Hampshire

Nelson Carter
Douglas & Joan Joyce
Robert Ottaway
Barbara Slaiby
Gerald Spade

New Jersey

George Anderson
Robert & Dolores (Masten) Byrne
Chih-Tsai & Hern-Jen (Lin) Chen
Richard & Jean (Antonsen) Combs
Bruce Feitz
Paul & Karen Johnson
Louis Liporace
Edwin & Doris (Ward) Roof
John VanderHoven

New Mexico

Kevin Bryant
Russell Burley *
Barry Grigsby
Mary (Barger) Slimak

New York

James Crane
Frederic & Kathryn (Crews) Gates
George & Charline (Bond) Hawk *
Edwin Johnston
Robert Kelly
Jeffrey & Darla Layton
William McColgin
Francis & Rebecca (Williams) Mlynarczyk
George Myers
Kenneth & Shirley Naab
Robert Paddock
Stanley Strauss
John & Lois (Moffitt) Thomas
Joseph Tyler
Joseph VanAtta

North Carolina

Merlin Bell
Donald & Adelaide Blake
Mark Carmel
George & Maryann (Whisler) Cusack
James Day
Donald Nellis
J. Allan Schuerman

Ohio

Noel Ashbaugh
John & Kathy (Boling) Baughman
Joseph Bloom
Lawrence & Sandra Bogemann
David & Jeanne (Dobbeck) Bowditch
Robert Brandt
Frank & Grace Cafarella *
Vincent Capasso
Steven & Louise (Sidner) Crago
Robert Eidson
Edward Elbert
Peter Eodice
Kenneth Foley
James & Tammy (Freed) Fong
Robert Forbes

CLASS NOTES

Listed below in our *Class Notes* section are updates about your fellow alumni and friends. If space permits, we will try our best to publish almost any short update you send to us. (However, we will not include engagements and divorces and possibly other miscellaneous tidbits.) To submit information for the Winter 1998 edition of *AeroGRAM*, please complete a *Class Notes* information update form, located on page 12, and send it to the school address, attention: **AeroGRAM** or e-mail to: aae-alumni@ecn.purdue.edu.

1940's

William C. Edwards, BS '49 - Retired Allison Division Regional Manager, General Motors Corporation.

Ralph E. Grey, BS '45 - Retired Development Specialist, Garrett Turbine Engine Co., Phoenix, AZ.

1950's

A. Dwight Abbott, BS '58 - Promoted to General Manager, Engineering and Technology Group, Systems Engineering Division, Aerospace Corporation.

Neil A. Armstrong, BS '55 - Recently awarded the 1997 Lindbergh Award for achievements in aeronautical and space research.

Ernest F. Binz, BS '56 - Retired Associate Program Manager, Space Station Power, Rocketdyne; employed 36 years with Rockwell International North American Aviation; currently consulting executive.

Jerry L. Glancy, BS '57 - Retired Engineering Manager, after 24 years of employment with The Boeing Company.

Charles P. Hagberg, BS '57 - Retired Vice President, Compensation, The Boeing Company.

David L. Johnson, BS '53 - Retired from Delco Electronics Corporation.

Phillip Mack, BS '50 - Retired Director of Business Airplane Sales, The Boeing Company; own consulting firm, Mack Aviation Company, Inc.

James F. Meyers, BS '59 - Retired from McDonnell Douglas; residing in Palm Desert, CA.

James P. Noblitt, BS '57 - Retired Vice President and General Manager, Missiles and Space Division, The Boeing Company, after 37 year Boeing career. Recipient of the 1996 Werner Von Braun Award.

Roger E. Whiteway, BS '51 - Retired Director of Systems Development, Maintenance and Engineering Department, American Airlines, Tulsa, OK.

Willy A. Wolter, BS '56 - Retired Structures Technical Specialist, Grumman Corporation.

Charles J. Yarber, BS '50 - Retired from Westinghouse Aerospace Divisions.

1960's

Lee A. Bertram, BS '63, MS '64 - Recently named a fellow of the American Society of Mechanical Engineers.

John E. Blaha, MS '66 - Successfully completed a recent mission on Space Station M.I.R.

Roy D. Bridges, Jr., MS '64 - Appointed as Director, Kennedy Space Center, NASA.

John H. Casper, MS '67 - Was recently featured in *Aviation Week & Space Technology* for achieving many milestones during STS 77.

Richard O. Covey, MS '69 - Appointed to Division Director, Space and Defense Systems, McDonnell Douglas Aerospace.

Ronald G. Elkins, BS '64 - Promoted to General Manager, Engineering Services Division and Program Director, Goddard Space Flight Center's Systems Engineering, Integration, and Management Support Services, McDonnell Douglas.

Robert A. Oakley, BSAAE '68, MBA '69 and PhD '73 from Ohio State University - Featured speaker at the Krannert Executive Forum, September 1997, Purdue University.

Steven C. Riedel, BS '68 - Appointed as President and Chief Operating Officer, Precision Castparts Corporation.

Loren J. Shriver, BS '68 - Named the Deputy Director of NASA's Kennedy Space Center for Launch and Payload Processing.

1970's

Raymond R. Cosner, BS '72, MS '72 - Promoted to Senior Fellow, Advanced Systems and Technology Division, McDonnell Douglas.

James S. Green, BS '76 - Retired from U.S. Navy 1991; currently Instructor, Instrumentation and Control and Semiconductor Manufacturing Technology, San Juan College, Farmington, NM.

Timothy J. Greene, BS '75, MSIE '77, PhD '80 - Associate Dean for Research, College of Engineering, Architecture, and Technology, Oklahoma State University; International President of the Institute of Industrial Engineers 1997-98.

Gregory J. Harbaugh, BS '78 - Successfully completed STS 82.

Robert Jackson, BS '75 - Programs Manager, View Engineering Division, General Scanning.

Michael P. Pumlilia, BS '72 - Promoted to Engineering Specialist, Lead Engineer, PQA Group, Lockheed Martin Aeronautical Systems.

Louis S. Szabo, BS '79 - U.S.A.F. Major, Chief of Maintenance/Chief of Systems, Eastern Range, 45th Space Wing, 45th Squadron, Patrick Air Force Base, FL; certified as Range Engineer for STS Atlas, Delta, Titan, Trident, and other vehicles in development.

1980's

Ron W. Askin, BS '84 - Staff Engineer, Structures Technology; Lead Stress Engineer, (V-22/BB609 Tiltrotors), Boeing Defense & Space Group - Helicopters.

Jerry A. Brown, BS '88 - Sales Representative, Hubbell Power Systems, Cincinnati, OH.

Michael H. Campbell, BS '83 - Was featured in *Crain's Chicago Business*, with a focus on his software company.

Roger A. Crussel, BS '89 - Flight Test Data Requirement Engineer, Boeing JSF Program, McDonnell Douglas.

Mark G. Feuerstein, BS '81 - Engineering Test Pilot, The Boeing Company.



James Raisbeck, BS '61, is Chief Executive Officer of Raisbeck Engineering, based in Seattle, Washington. His company recently received FAA approval for its Noise Abatement System, which brings Boeing 727-100 and 727-200 airplanes into compliance with Stage 3 noise standards. No hush kits or engine modification of any type is required or utilized. The noise problems were solved through the reoptimization of the 727's high-lift system to minimize drag for both the take-off and landing configurations.

James R. Fields, BS '85 - Astronautical Engineer, Analytical Graphics, Inc., King of Prussia, PA.

Jeffrey A. Karnes, BS '86 - Major, U.S. Marine Corps; Project Test Pilot for the JSF STOVL Program.

Ronald J. Oard, BS '83 - Lieutenant Commander, U.S. Navy; Executive Officer, USS Gunston Hall (LSD 44).

James P. Renna, BS '86 - Senior Structural Test Engineer; Lead Engineer for S-92 Structural Test, Sikorsky Aircraft.

Troy K. Wright, BS '84 - Awarded the Superior Civilian Award from the U.S. Navy.

1990's

Christie M. Amrozowicz, BS '94 - Associate Design Engineer, Powder Systems Group, Nordson Corporation.

Henry (Hank) A. Conard, BS '90, MBA '96 from St. Louis University - Senior Engineer, T-45 Propulsion Fleet Support, McDonnell Douglas Aerospace.

Scott D. Courtney, BS '92, MS '93 - U.S. Air Force Engineering Support Contractor - F-16 Flutter Analysis/Flight Test Engineer, TYBRIN Corporation, Eglin Air Force Base, FL.

Paul A. Crump, BS '92 - Promoted to a naval aviator after successfully completing four months of flight training.

Edwin E. Forster, BS '92, MS '94 - Currently working on Doctorate in Aeronautics & Astronautics, University of Washington.

Eric N. Graves, BS '92, MS '94 - Corporate Account Application Engineer, Parametric Technology Corporation, Waltham, MA. Currently consultant to Lockheed-Martin, Denver, CO.

Jennifer M. Gruber (Graves), BS '92 - Law student at Franklin Pierce Law Center in the Intellectual Property Program, Concord, NH.

William A. Kirschner, MS '91 - Member of Technical Staff, F/A-18 Software Engineer, Hughes Aircraft.

Brenda L. (Trisciani) Moss, BS '90 - Captain, U.S. Air Force, Launch Controller for the Atlas II Rocket Program at Cape Canaveral, AS, FL.

Frederick R. Shaffer, BS '90 - Lockheed Martin JSF Control Logic Engineer, Pratt and Whitney, W. Palm Beach, FL.

Jon A. Sims, MS '93, PhD '96 - Trajectory Designer, Jet Propulsion Laboratory; recent projects include: a comet sample return mission, a mission to Europa, and new software for low-thrust trajectories.

Kay Sundaram, BS '94, Stanford MS '97, Thermodynamicist, Lockheed Martin Missiles and Space.

Timothy G. Vendrely, BS '90 - Project Engineer, MidCheck, West Lafayette, IN.

Bruhn Undergraduate Assistantship Established

Dwayne Bevis, a Junior in the School of Aeronautics and Astronautics, is the first recipient of the Elmer F. Bruhn Undergraduate Assistantship. Dwayne's summer research assistantship is being supervised by Professor William Crossley.

The overall objective of the research is to construct and test a model rotor-blade, which will be used to construct a human powered helicopter. This research will benefit the American Helicopter Society, which plans on entering the completed project—and must be capable of one minute of hover reaching a height of three meters—in a national AHS contest.

Professor Bruhn came from industry experience to Purdue in 1941. He worked tirelessly with then Dean of Engineering A.A. Potter and fellow colleagues to establish a program

dedicated to aeronautical engineering. Through his efforts, the School of Aeronautics was established.

AAE alumnus Lloyd Hackman, BS '52, and his wife Rosalene, decided they wanted to honor Professor Bruhn for the impact he made on students' lives. Through their generosity, the Elmer F. Bruhn undergraduate Assistantship was created in March.

"I got a lot out of my education at Purdue and felt that I owed something back. The senior project I did in the Aero School under Professor Bruhn allowed me to innovate and do some things the way I wanted. That put me in a position that when I graduated, I had the confidence that I could take charge of a project and do it right,"

Mr. Hackman stated.

*Congratulations to
Norm Haynes, BS '59, the Jet
Propulsion Laboratory's Director of
the Mars Exploration Directorate,
and his team for a successful
landing on Mars.*

Astronaut John Blaha with Aero students during an April visit to Purdue.



Dwayne Bevis, the first recipient of the Elmer F. Bruhn Undergraduate Assistantship, with one of his model rotor blades.

Since the initial establishment of the Assistantship, other AAE alumni have generously contributed. The goal is to build the endowment so that several summer research assistantships will be offered each year. Students will grow educationally from the experience and faculty members will be able to develop their research interests. 🌐



In Memory

Since the last publication of **AeroGRAM**, the following AAE alumni have been reported as deceased. Our sympathy and prayers are extended to their family and friends.

Everitt Bersinger, BS '52
John Black, BS '58
Arthur Burgeson, BS '48
Michael Davidson, BS '59
James Dunlop, BS '48
Wesley Eggerman, BS '53
Dale Fearn, BS '48
Henry Gordon, BS '50
William Hawthorne, BS '48
Walter Lanzer, BS '49
John McCorkle, BS '48
Charles McHale, BS '63
David. Mullin, BS '49
R. Daniel Nettesheim, BS '47
James Volk, BS '69
Thomas Washington, BS '50
E. Stanford Wennerstrom, BS '57
Robert Yates, BS '49

Contact Us!

As an alumna or alumnus of our School, you are our best ambassador. If you know of someone interested in earning an undergraduate or graduate degree in aeronautical and astronautical engineering, we want to know!

Please encourage them to contact us at:
Counseling Office, School of Aeronautics & Astronautics
Purdue University, 1282 Grissom Hall
West Lafayette, IN 47907-1282
(765) 494-5152.

Sanjay Garg
Thomas & Nancy (Nevins) Gaudion
Samuel Gilkey *
Douglas Harlan
Mark & Denise Hensch
William Herman *
Daniel & Rebecca (Teders) Herr
Richard Hiernaux
William & Ruthanne Holder
Tracey Homburg
David Howe *
Richard & Michelle (Hartman) Huffman
David Huliba
James & Lynn Hunsicker
Kenneth & Betty (Jones) Johnson *
William Jones
Robert Kielb
Raymond Knight
Jeffrey & Christine (Moutseous) Kress
Charles & Julia Lamb
Glenn & Janet (Sullivan) Liston
Dean & Susan (Mueller) Loomis
Andrew Lopuszynski
Walter & Myrtle Melloncamp
Marvin & Ardath Miller
William & Jennie Miller
William Miller
David Nus
Charles & Teresa (McClintic) Orkiszewski
Richard Parker
Richard & Elizabeth (Perkins) Peticolas
Charles Plafcan
Leonard Pohlar
Charles Pratt *
Donald Rizzetta
Philip & Jonell (Lloyd) Roberts
Robert Roth
Steven Runge *
Robert Rutkowski
Donald Sandercock
William Sanker
Kenneth Schuning
John Shuter
Charles Skira
Thomas & Mary (Rosenthal) Smith
George & Ellen (Williams) Staab
Daniel & Kim (Chandler) Suffoletta
James Sunkes
Norma Taylor *
William Troha
Gary Ullestad
John Unger *
Jack Willer
David & Carol (Donner) Yates
Steven Zakem

Oklahoma

Jack & Dorothy (Studabaker) Cearing
Robert Gilson
Mark Lilley
Jeffrey Tyrcha
Daniel Vasicek

Oregon

John Biermann
Walter Harrison
Larry Kellogg
Clyde Matthews
Pennsylvania
Harry Burgos
Ronald Cassano
Melvin Corbett
Frank Elliott
William Frick
Joseph & Lisa Hess
Earl Simpkins
Kenneth Strack
Joseph & Mary Walters
Richard Williams
William Woebkenberg
Peter Yost

South Carolina

Robert & Martha Alter
John & Margaret (Fickle) Haheer

continued on next page

Paul Hughes
David Ochiltree
David & Dianne Smith

Tennessee

David Bokash
Rick & Bonnie (Kunes) Gamble
Douglas Hodges
Steven & Susan (Ede) Krein
Scott & Barbara (Souline) Meyer
Lewis Murphy
William Peters
Richard Ptacin
Ronald Tolbert

Texas

Darryl Asp
Terry Baughn
Roger Biggs
James & Camille Bigham
John & Marjorie Bowman
Darrell Carney
John Ciambrone
Dean Davis
Timothy Doyle
Dale Ford
David Forrest
Donald & Karen (Brubaker) Frye
Edward Halletky
John Hoffschwelle
Jon Hoops
David Hull
R. Kevin Hyatt
George Irving
Gail Jewell *
Stanley Jones
John Kelley
George & Marilyn (Gilbert) Komechak
John & Shirley Larrison
Stanley Lewiecki
Stan Lowy *
Gary & Deborah Naville
David Petri
Brian Roland
Michael Sanders
Robert Sawyer
Carl & Angela Soderland
Andrew Steinbeck
George Strack
Dan Sturdevant
William Swingle
William Tamblin
Janice Voss
Kenneth Wait
Leon Walters
Edward Warres *
Ralph Welton
Lois (Hollingsworth) Ziler

Utah

Vernon Arne
William & Karen (Nielsen) Brant
Ping Fong
Thomas & T. Dawna Gailey
John Hinchman *
Stephen Neidig

Virginia

Michael & Susan Allen
Norman Baffer *
David & Anita (Douglass) Clegg
Lana (Murphy) Couch *
Mark Director
Robert & Mary (Martin) Dudley *
Douglas & Kelly (West) Fritchen
Jay Hardin
Lee & Jane (Rademacher) Hesler
David & Nancy (Cutshaw) Hook
Samuel Hutchinson
Michael Hyer
David & Debbie Keever
David & Mary Lane *
Charles & Aino (Stewart) Leedom
Ralph Lehman
James & Diane Long
James & Karen (Fetter) Luckring
Ty Marien

Vomit Comet Experiments

Four students in the Students for the Exploration and Development of Space (SEDS) got the ride of their academic life by participating in a NASA pilot program called the 1997 Reduced Gravity Student Flight Opportunities Program.

The 24 teams of undergraduate college students developed and flew experiments on the KC-135A aircraft that, according to NASA, “flies a roller-coaster-like flight profile over the Gulf of Mexico. During each two to three hour flight, the aircraft maneuvers through steep climbs and descents. At the top of each ascent, passengers inside the aircraft experience 25 to 40 seconds of weightlessness. Astronauts use the KC-135A

Purdue’s experiment titled, “The Study of Fluid Sloshing in a Low-g Environment” was supervised by AAE Professor Steven Collicott. According to Professor Collicott, “The study of sloshing of liquid fuel in tanks under microgravity conditions is important to the control of satellites in space. This flight opportunity allowed the students to refine their test and data collection techniques.”

“Information from this experiment shows us how best to build a long-duration 2-D slosh experiment for testing on the Space Shuttle. This will be in a Space Experiment Module (SEM), available through NASA Goddard,” stated Professor Collicott. “I am very proud, stated Professor Collicott, in the fine manner in which the students tackled these problems in a field which was new to them. Their preparation of the experiments and performance at the testing site was exceptional.”

The Purdue team flew twice and each flight included 30 to 50 parabolic arcs. NASA states, “Depending on the precise trajectory, passengers and their




Above: Professor Steven Collicott with students Jason Toschlog, Scott Schoenherr, Michelle Lucas, and Chet Kumar.
Below left: Aero Student Michelle Lucas floats in midair.




to train for space flight and scientists have conducted extensive experiments aboard this aircraft.” Because of these maneuvers, the aircraft is affectionately known as the “Vomit Comet.”

experiments would experience about 25 seconds of zero gravity, 30 seconds of one-sixth gravity (the same as the gravity on the surface of the Moon), or 40 seconds of one-third gravity (the same as Mars).”

Leading the Purdue team was Chetan Kumar, ME’ 97, Michelle Lucas, AAE ’00, Scott Schoenherr, AAE’97, and Jason Toschlog, Physics ’97. The on-ground team who helped prepare the flight team and experiment consisted of Mike Burke and Rob Bunnell, both doctoral candidates in the School.

The sloshing experiment was funded through Professor Collicott’s National Science Foundation CAREER Award and travel made possible by the NASA Indiana Space Grant Consortium, located at the School of Aeronautics and Astronautics. 

Student Designs Award Winning

The first place team for the AAE 251 Thiokol Space Awards for Fall Semester 1996 were David Bockmiller, Dan Javorsek, Greg Rodgers, and Marc Spicer. The AAE 451 Lockheed Senior Design Award winners were Belinda Marchand (Group Leader) Danielle Ehardt, Sergio Hasebe, Angela Walker, and Craig Williamson. Congratulations to each group member and thank you to Thiokol and Lockheed for sponsoring these design awards. 


AIAA Chapter Outstanding

The American Institute of Aeronautics and Astronautics Foundation presented the Purdue University Chapter of AIAA the "Outstanding Student Branch Award" for the most exemplary student branch in the Midwest Region for the 1995-96 academic year.

During the year, the organization was involved with the AIAA Student

Professional Awareness Conference, helped host a Fall and Spring Members Banquet, invited more than five industry-related, guest speakers to present during AIAA meetings, and hosted FLITE—Forum Linking Industry to Education.

The AIAA officers for the 1995-96 academic year were: President Greg Roth, Vice President

Tamaira Ross, Treasurer Stephen Krautheim, Secretary Emily Birkhauser, Publicity Chair Charity Lawson, Professional Enhancement Bob Blomquist and Jeff Michlitsch, and Aeronautical Education Reach Out Chair Philip Schoonover. Professor Steven Collicott served as the AIAA advisor. 

Applause, Applause, Applause!!!

Kudos and Congratulations to the following AAE students who earned special recognition this year.



Evangelos Koutsvadis, left, and John Jameson, recipients of Vertical Flight Foundation Scholarships, sponsored by AHS.

Undergraduate Students

- **Kerrie Benish**—William Koerner Scholarship
- **Lisa Brilliant**—William Koerner Scholarship
- **Daniel Bodony**—William Koerner Scholarship
- **Ryoichi Sergio Hasebe**—Sigma Gamma Tau Outstanding Senior Award
- **Daniel Javorsek**—William Koerner Scholarship
- **Derek Liechty**—William Koerner Scholarship
- **Scott W. Sabau**—US Navy ROTC Merit Scholarship

- **Scott Schoenherr**—Herbert F. Rogers Scholarship
- **Craig Williamson**—William Koerner Scholarship

Graduate Students

- **Eric Campbell**—Magoon Award for Outstanding Teaching Assistant
- **David Fanjoy**—Magoon Award for Outstanding Teaching Assistant
- **John Jameson**—Vertical Flight Foundation Scholarship
- **Evangelos Koutsvadis**—Vertical Flight Foundation Scholarship
- **Stephen Norris**—Magoon Award for Outstanding Teaching Assistant

Carolyn Mattick
Harvey McComb
Ronald Morrison
John Olsavsky
Gary Payton
Frank & Maria (Baker) Perry
Richard & Nancy (Miller) Powell
Brian Quinn
Charles & Tawnya (Sharps) Racoosin
Stephen & Angela (Stoke) Rizzi
David & Susan (VanWanzele) Scheessele
James & Malynna (Jones) Silverthorn *
Robert Sommer
George Stalk
Clarence Steen
Robert & Mary (Carroll) Strickler *
James Trask
Frank & Donna (Turner) Tse
Bartow Tucker
Kenneth Uffelman
Dan Vicroy
Charles & Susan Walker
John Wang
Arthur & Arden Wiggins
James & Darlene (Swanson) Williamson
Troy Wright

Washington

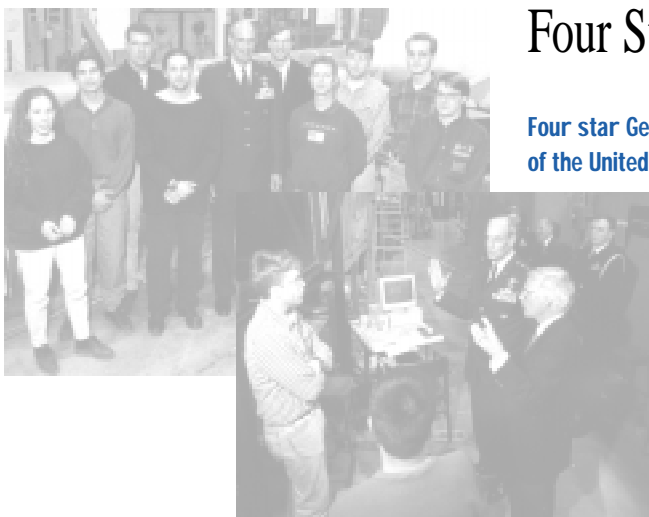
Herbert deBruyn
William Baker *
Thomas Bander
Vernon Brown
Kathleen Brumbaugh *
Michael Butcher
William Callaway *
R. Joseph Cassidy
Kenneth Cummings
Michael DiBello
Roy Eggink
John & Beverly (VanLenten) Emerson
Nicholas & Laura Ferraiolo
James Haas
Charles Hagberg *
John & Linda Hayhurst *
David Hemmig
Robert Herderhorst
John & Isabel (Carrel) Hindmarch
D. Dean Hofferth
David & Karen (Washburn) Hollenback
Martin Ingwersen
Robert Keller *
James Kelley
John Krehbiel
Subir Lahiri
Edwin Lamb
Benjamin & Jennifer Linder
Patricia (Paschen) Martin
Richard Mathias
D. David Moore
James & Carmen (Rosario) Noblitt *
Stephen Northcraft
Henry Queen
Lee Ross
Marc & Deborah (Proffitt) Schuld
Randolph & Deborah (Lostutter) Shields
David & Ann (Clemens) Shikany
Howard Snyder
Christine Titzer
Wayne Tygert
Kirk Valanis
John Wasson *
Stephen & Heather (Carr) Whiston
Wayne & Christine Willich *
West Virginia
William Ferrell

Wisconsin

William Bolles
Robert Hayes
Wayne Hunnicutt *
James Kaufman
Robert & Dorothy (Hennis) Knepper
Chadwick & Angela Oldenburg
Jack Olson
Richard Swenson *

Four Star General Visits

Four star General Howell Estes, the Commander in Chief of the United States Space Command and the North American Aerospace Defense Command, stopped by the Aerospace Sciences Laboratory in March. Students were happy to show General Estes the Ludwig tube, autoclave, and wind tunnel cross-section experiments. General Estes was in town to give a presentation titled, "Space in the 21st Century," to the annual military convocation. He is shown here with faculty, staff, and students.



Class Notes Information Update Form

Your friends and former classmates want to know what is happening in your life! Please jot down personal news that you want to appear in the next edition of **AeroGRAM** and forward it to: School of Aeronautics and Astronautics, 1282 Grissom Hall, West Lafayette, IN 47907-1282, or send us e-mail at:

aae-alumni@ecn.purdue.edu.

Send Us Your Stories!

Send us your favorite AAE memory and we will publish it in the Winter **AeroGRAM**.

Deadline for submission is Monday, October 20, 1997. Due to space limitations, your story may be edited, so help us out by submitting no more than two paragraphs. Thank You!



 **Would you like a School Research Report? Just let us know where to send it!**

aer•o•gram
(â€™ə gram/),
n. an airmail letter.

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& Astronautics
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