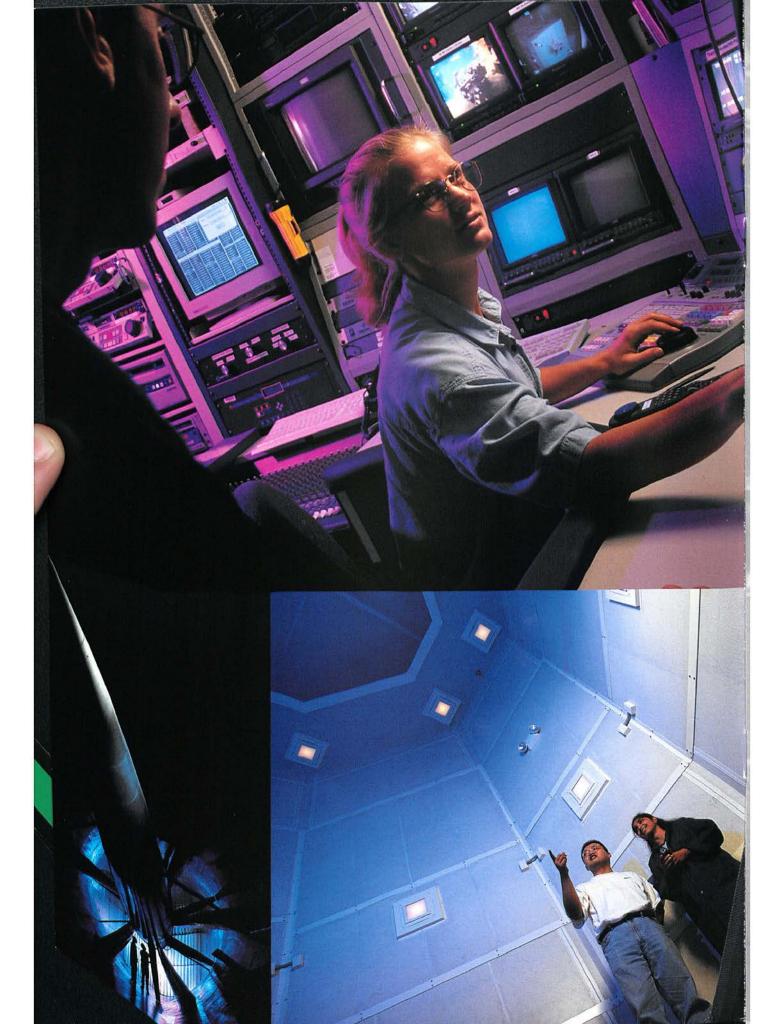


SOARING HIGH 1949–1999

UNIVERSITY OF MARYLAND



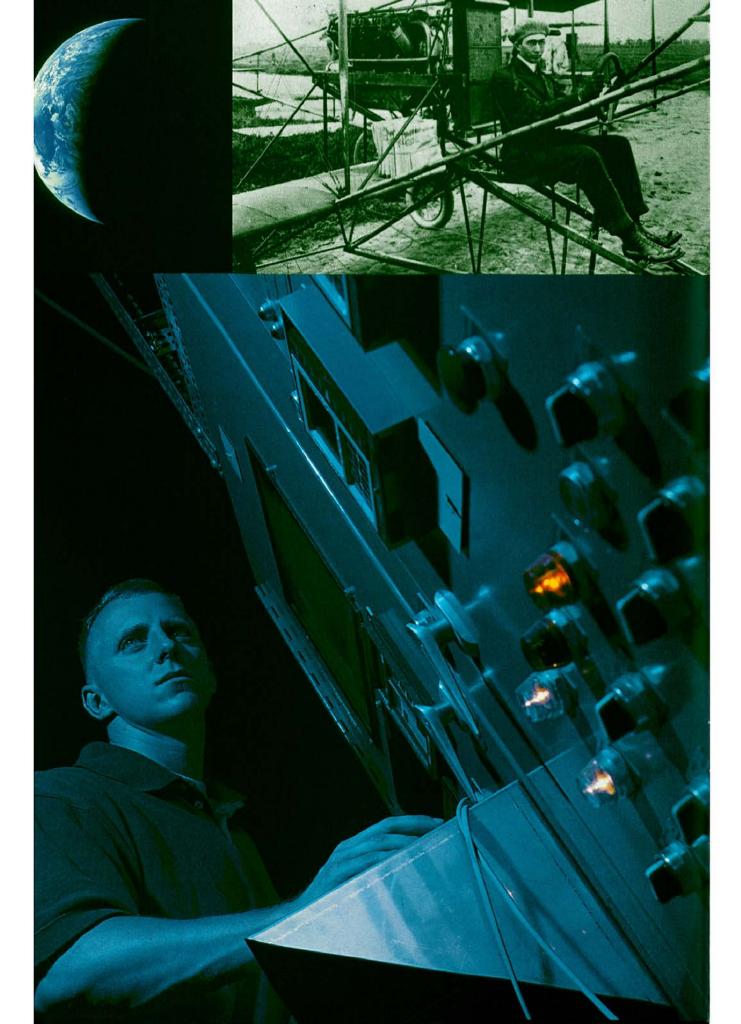
"THE WAY TO BUILD AN AIRCRAFT OR TO DO ANYTHING ELSE WORTHWHILE
IS TO THINK OUT QUIETLY EVERY DETAIL, ANALYZE EVERY SITUATION THAT MAY
POSSIBLY OCCUR, AND, WHEN YOU HAVE IT ALL WORKED OUT IN A PRACTICAL
SEQUENCE IN YOUR MIND, RAISE HEAVEN AND EARTH AND NEVER STOP UNTIL
YOU HAVE PRODUCED THE THING YOU HAVE STARTED TO MAKE."

GLENN L. MARTIN (1886-1955)

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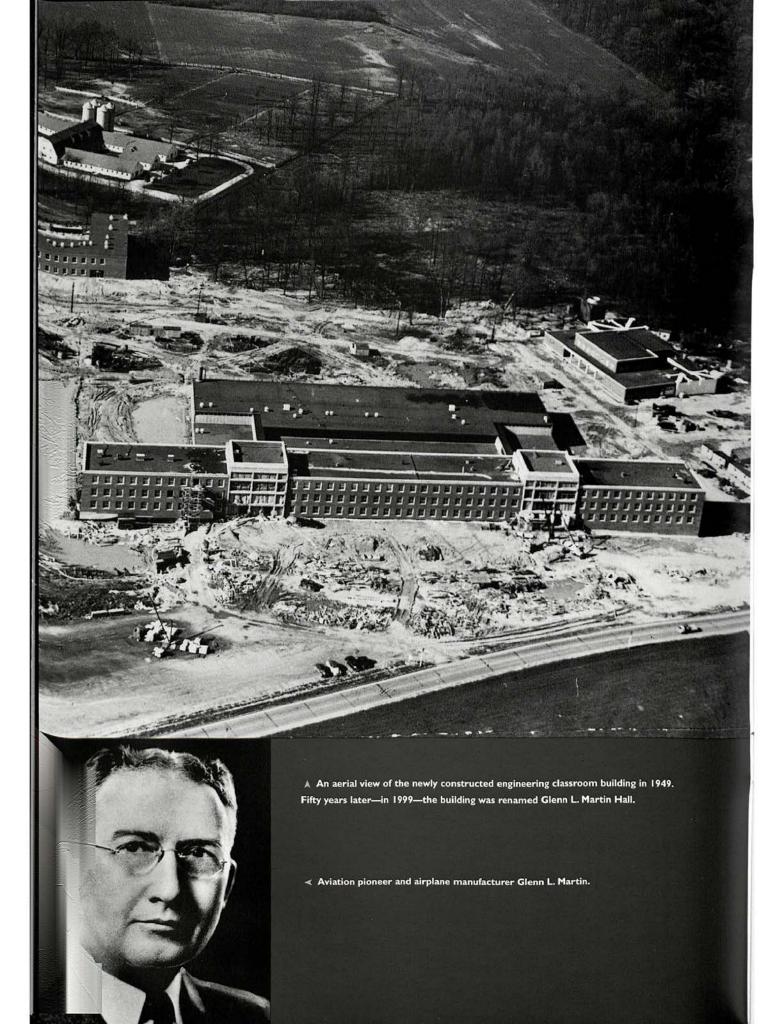


ADVANCING FLIGHT ...

EXPLORING SPACE ...

DESIGNING NEW SMART MATERIAL SYSTEMS, VEHICLES AND DEVICES ...

HESE ARE THE ABIDING INTERESTS OF FACULTY AND STUDENTS II
THE DEPARTMENT OF AEROSPACE ENGINEERING AT THE UNIVERSIT
OF MARYLAND. > SINCE THE DEPARTMENT'S FOUNDING IN 1949, W
HAVE BEEN AT THE FOREFRONT OF AEROSPACE SCIENCE—CONDUCT
ING IMPORTANT RESEARCH, DEVELOPING NEW TECHNOLOGIES AND
EDUCATING NEW GENERATIONS OF TALENTED ENGINEERS TO STUD
AND IMPROVE THE VAST WORLD OF FLIGHT. > IN ALL OF OU
ENDEAVORS, WE CONTINUE TO REACH BEYOND TRADITIONAL ENG
NEERING RESEARCH AND EDUCATION. > THE FOLLOWING PAGE
EXPLORE THE DEPARTMENT'S HISTORY, GROWTH AND SIGNIFICAN
MILESTONES DURING THE LAST HALF-CENTURY. JOIN US AS WE CELE
BRATE 50 YEARS OF AEROSPACE ENGINEERING EXCELLENCE A
MARYLAND. >



PRE-FLIGHT CHECK

The Years Before 1949

The end of World War II brought both challenge and opportunity to the field of aeronautical engineering in the United States. The emerging Cold War put America's engineers on short notice to develop prevailing military aircraft to counter those of the Soviet Union. Also, advanced research and development in the new area of long-range intercontinental missiles would become paramount. Military matters aside, America's postwar public thirsted for new technological advances in commercial flight-better, faster, farther, higher could be heard res-

Glenn L. Martin, one of the nation's first aviation pioneers, saw early on the value of research and education in the aeronautical sciences. Martin himself lacked a formal technical background, yet the company he founded

onating across the nation.

in 1912 would grow to become the leading airplane manufacturer in the nation. From the beginning, Martin continuously hired skilled engineers to design his planes and talented managers to run his factories. The Martin Aircraft Co. provided training and experience to a remarkable number of future aviation manufacturers: William Boeing, Donald Douglas, Lawrence Bell and James S. McDonnell all worked for Martin before forming their own companies.

Martin was pivotal in developing an aerospace engineering program at the University of Maryland. In 1944-the 50th anniversary of engineering at the university-Martin made a gift of \$1.7 million to the university to establish instruction and research in the aeronautical sciences. A second gift of \$800,000, named in honor of Martin's mother, Minta Martin, was made the following year.

TIMELINE IN THE NEWS

HEADLINES FROM THE DIAMONDBACK. THE UNIVERSITY OF MARYLAND STUDENT NEWSPAPER

3/3/39 PROFESSOR JOHN YOUNGER OF MECHANICAL ENGINEERING RECEIVES AERONAUTIC AWARD

3/24/39 FLYING COURSE HERE SEEN AS POSSIBILITY BY DEAN STEINBERG

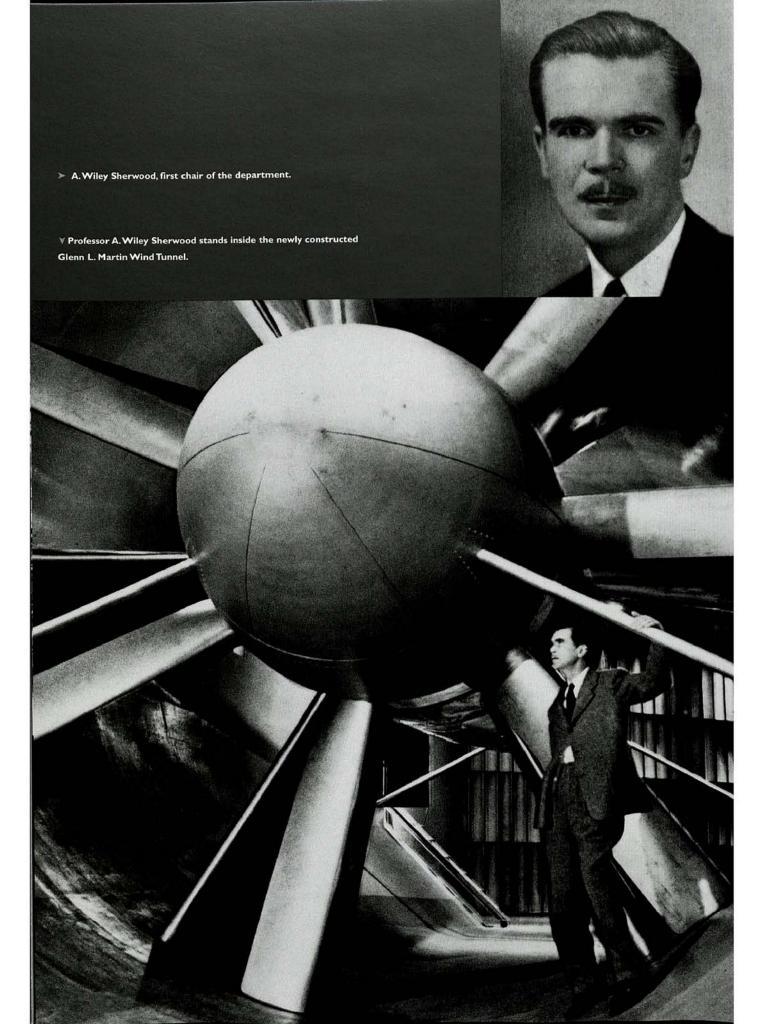
9/19/39 MARYLAND GETS CAA AIR COURSE

10/17/39 FORTY-ONE TAKE AVIATION COURSE OFFERED BY CAA

11/7/39 CAA AVIATION STUDENTS START FLIGHT LESSONS

Today, this endowment is a major source of research funding for the A. James Clark School of Engineering.

The state of Maryland, in support of Martin's efforts and foresight, appropriated funds in the late 1940s to construct four new buildings at the university including a state-of-the-art wind tunnel. In recognition of his philanthropic gifts and pioneering spirit in the field of aeronautics, the University of Maryland in 1949 designated the College of Engineering as the Glenn L. Martin College of Engineering and Aeronautical Sciences. That same year, a newly formed Department of Aeronautical Engineering began providing full-time instruction in the aeronautical sciences.



THE DEPARTMENT TAKES FLIGHT

The Sherwood Era: 1949-1968

3/15/40 ENGINEERS CONDUCT STUDY OF AIRPLANES

3/29/40 PROFESSOR JOHN YOUNGER PREDICTS GREAT AVIATION FUTURE

10/1/40 PROFESSOR JOHN YOUNGER BEGINS AERO EXPERIMENTS

2/25/41 PROFESSOR YOUNGER RECEIVES ASME "SPIRIT OF ST. LOUIS" GOLD MEDAL FOR GREAT SERVICE TO AVIATION

9/19/47 GLENN L. MARTIN ENGINEERING BUILDING PLANS REVEALED TO PUBLIC

1/13/48 GLENN L. MARTIN ENGINEERING SCHOOL BUILDING PLANS GO TO BOARD

2/25/49 FOUR ENGINEERING BUILDINGS COST \$2,700,279.48, NEW FIGURES SHOW

Before 1949, aeronautics research and instruction at the University of Maryland were limited in scope and were carried out by but a few dedicated individuals—most notably Professor John Younger of the mechanical engineering department. Younger shared a similar vision to that of Glenn L. Martin—that is, that commercial passenger flight on a large scale would soon become a reality.

In fall of 1949, the aeronautical sciences option was separated as a discipline from the mechanical engineering department. A. Wiley Sherwood was chosen as chair of the new department, beginning what is commonly referred to within the department as the Sherwood Era. During these formative years, most of the department's activity was focused on developing a quality undergraduate curriculum in aeronautical engineering.

With the launch of Russia's Sputnik in 1957, the department, along with the rest of the nation, took a keen interest in aerospace flight. The name of the department was changed from aeronautical engineering to aerospace engineering that same year.

To support instruction in the course work necessary for an aerospace engineering degree, Sherwood used lecturers and faculty from the nearby Naval Ordnance Laboratory and the Institute for Fluid Dynamics.

During those years, the emphasis was on teaching. Professor Gerald Corning taught leading edge courses in aircraft design and was the author of a number of nationally used texts in subsonic and supersonic aircraft design. The newly-constructed and self-supported Glenn L. Martin Wind Tunnel, under the direction of Donald Gross, was widely used in service testing by the automotive and aviation industries.

One of the most significant accomplishments during this time was the establishment of the master's and doctoral degree programs in aerospace engineering. This led to the department's first master's degree graduate, Dale Scott '50 (deceased). After graduation, Scott went on to a successful engineering career at the Martin Aircraft Co., NASA Goddard Space Flight Center and later as a private consultant. The first doctoral degrees in aerospace engineering were awarded in 1963 to Irvin Pollin and John Nutant.

The early 1970s saw NASA's commitment to manned space flight take a precipitous drop. Other factors on the national level led to a decrease in aerospace engineering enrollments across the country. Through aggressive leadership by Professor John Anderson, Maryland's aerospace program was able to persevere and begin new research in hypersonics.



TURBULENCE AHEAD

The 1970s: Low Enrollments Amid a Decline in the Aerospace Industry

The 1970s proved a diffi-L cult time for the aerospace engineering community nationwide. A national decline began in 1969 after Neil Armstrong became the first man to set foot on the moon. In much of the public's eye-and also within the political sphere that funded NASA-America had won the space race and further space exploration was not needed. Consequently, NASA's manned space flight program shrunk precipitously.

In addition, the U.S. Air Force had reached a plateau in its deployment of intercontinental ballistic missiles and began to cut back on the testing and production of ICBMs. As if this were not enough to diminish research and production in the aerospace field, the commercial transport business had also peaked. Boeing, the nation's largest airplane manufacturer,

laid off a large number of professional employees. This was the period of the famous billboard in Seattle—where Boeing maintained its head-quarters and a large work force—that read: "Will the last person leaving Seattle please turn out the lights."

As a result, the early 1970s saw the bottom drop out of the job market in aerospace engineering. This led to an almost catastrophic drop in university enrollments in the field. From 1970–73, the aerospace engineering program at Maryland had a 70 percent drop in enrollment—very similar to the enrollment decline in aerospace studies at other universities across the nation.

This was not the best environment for Professor John Anderson to assume his position as new department chair in May of 1973.

Among his most serious

concerns were a low faculty morale; poor "weighted credit hour" statistics associated with low enrollment—with the consequent danger of the department being eliminated by the university; and the virtual non-existence of funded research programs in the department.

From 1973–80, the department made progress to reverse these adverse trends. It began by making the university community more aware of the nature and importance of aerospace engineering as a separate department. Also, the importance and value of funded faculty research was encouraged.

On a sad note, the department lost Gerald Corning due to an untimely death. Corning was a well-known airplane design professor and author of two books on vehicle design. Other faculty changes occurred when Robert Rivello, a well-respected professor of aircraft structures who had served as acting chair of the department, retired to go full time with the Johns Hopkins Applied Physics Laboratory. Former department chair A. Wiley Sherwood also retired during this period. With these changes, the "old guard," who had been so instrumental in the early success of the department, were gone.

The department continued to build research programs—predominantly in the area of aerodynamics and propulsion—and by the end of the 1970s had established a program of hypersonic aerodynamic research through support of the NASA Langley Research Center.

Subsequently, a major general aviation program with Langley was initiated, resulting in both computational and wind tunnel research in that area.

Finally, a significant administrative change was made.

The Glenn L. Martin Wind
Tunnel, which had previously reported directly to the dean of engineering, was now made part of the Department of Aerospace Engineering.

Jewel Barlow was made directivations.

tor of the facility, which greatly augmented the research funding in the department. The wind tunnel expanded its mission to include academic research in addition to its usual corporate and government-sponsored investigation. In addition to jet aircraft research, the list of the more than 1,500 projects to date includes helicopter, submarine, automobile and sailboat design testing and development.

3/4/49 WIND TUNNEL OPENING SLATED FOR APRIL

4/29/49 MARTIN COLLEGE OCCUPIED

5/20/49 WIND TUNNEL STARTS OPERATION

9/22/49 AEROSPACE ENGINEERS NOW IN NEW HOME

3/3/50 PINES, OAKS, SHRUBS PLANTED ON MARTIN COLLEGE MUD FLATS

3/7/50 GLENN L MARTIN INSTITUTE OF TECHNOLOGY EXPANDS INTO \$8,000,000 BUILDING PROJECT

4/1/52 ENGINEERING COLLEGE
CONDUCTS TESTS ON MODERN AIRCRAFT

4/19/63 OUTER SPACE EXPANDS AEROSPACE ENGINEERING

5/4/66 WIND TUNNEL ASSISTS EXPERIMENTATION

The 1970s marked the beginning of research in hypersonics at the University of Maryland. Current investigation in the NASA-sponsored Center of Excellence in Hypersonics Research and Education, directed by Professor Mark Lewis, includes the study of of sharp, high-speed shapes for a variety of applications. This "star body" (below) is used in tests for low drag configuration.



The Alfred Gessow Center for Rotorcraft Education and Research, established in 1982 as a U.S. Army Center of Excellence in Helicopter Technology, is arguably the leading such rotorcraft center in the world. The center now conducts research in rotorcraft acoustics, CFD, aerodynamics, dynamics, flight mechanics and smart structures applications to rotorcraft.



NEW IDEAS AND A NEW ERA

The 1980s: Emergence of Rotorcraft Research and Education

7ith the appointment of Professor Alfred Gessow as chair of the department in 1980, the next decade saw the department experience tremendous growth in undergraduate and graduate enrollments and degrees awarded; in research expenditures and scholarly presentations and publications; and in national and international recognition of its programs. The surge in undergraduate students reflected a national trend, but a major source of growth at Maryland was when Gessow, as new chair of the department, made a commitment to expand the department's research activities and establish new rotorcraft graduate education and research programs in aerodynamics, dynamics, flight mechanics and composite structures.

Gessow came to the university after a long and distinguished career as a researcher and administrator. As one of the world's leading helicopter experts, he provided new theoretical approaches to expand knowledge of helicopter aerodynamics and flight dynamics to improved designs. His textbook on the subject is still in use today, 50 years after its first printing.

During his eight-year tenure as department chair, Gessow's research and contacts with government and university researchers across the nation greatly expanded the department's research and educational activities in rotorcraft, composite structures, hypersonics and space systems. The undergraduate and graduate aerospace programs also achieved national rankings during this period. In 1981, Gessow founded, and for the next 12 years directed, the Center for Rotorcraft Education and

Research. The center is now an internationally recognized research center in rotorcraft science and technology with leading-edge research conducted by professors James Baeder, Roberto Celi, Inderjit Chopra, J. Gordon Leishman, Darryll Pines, Frederic Schmitz, Norman Wereley and Anthony Vizzini. Professors Jewel Barlow and Sung Lee were earlier contributors to the center, and Professor Chopra is the current director of the center.

The rotorcraft center boasts one of the most comprehensive graduate programs in the country, and graduates hold high level positions with NASA, the Federal Aviation Administration, the U.S. Army and Navy, and in private industry (Sikorsky, Boeing and Bell) as well as other universities nationwide. The center has awarded more than 200 master of science

and 45 doctoral degrees to date.

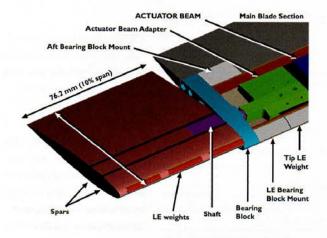
Funded mainly by extensive NASA, military and industry grants to the rotorcraft center, the department's yearly research expenditures rose during the 1980s from several hundred thousand dollars to \$2.3 million. This research income provided much needed operational and teaching expenses for the department, as well as funding for the construction of a number of specialized research facilities. Rotorcraft funds provided for an upgrade to the department's Glenn L. Martin Wind Tunnel; complex articulated and bearingless rotor systems for testing in that tunnel; two hover test facilities; an invacuo 10 ft. diameter rotor test facility; wide-field shadowgraphy and schlieren flow visualization facilities; and a 3-D laser Doppler system. Spawned by the activities of the Rotorcraft Center and the ONR-URI contract awarded to Sung W. Lee, the Composites Research Laboratory was founded in 1987 by Anthony J. Vizzini. The laboratory has developed extensive capabilities to build and test helicopter blades, perform leading-edge research in composite structures and manufacturing, and interact with local government laboratories and industry.

One indication of how far the department advanced in the 1980s was its rankings compared to other departments in the college and other departments nationwide. Aerospace engineering outperformed all other departments in the college by most measures of productivity per faculty member: undergraduate students; research dollars awarded; and refereed journal articles.

Also during the 1980s, the hypersonics program under John Anderson contributed significantly to the stature of the department. During much of the decade, the department almost single-handedly provided the United States with young professionals with specialized training in hypersonics. Its graduates have all been recruited vigorously by industry and government. Mark J. Lewis joined the faculty in 1988 and greatly expanded the program and steered it in new directions.



Current research in the department includes development and testing of ER and MR dampers (above) by Professor Norman Wereley and his graduate students. Other research involves development of an active blade tip (below) designed by Professor Inderjit Chopra with assistance from his graduate students.





An endowed chair named for Alfred Gessow (far left) was established in 1998 through an endowment given by Gessow's son, Jody (left). To further support education and research in rotorcraft engineering and enhance the department, Jody Gessow donated additional funds to create the Elaine Gessow Endowment, which is named for his mother. The Space Systems Laboratory is a nationally recognized leader in the area of astronautics. Much of the research is centered around a 50-foot diameter, 25-foot deep water tank used to simulate the microgravity environment of space. Maryland's neutral buoyancy tank is the only such facility in the nation that is located at a university. There are currently five robots being tested, including Ranger, a four-armed satellite repair robot. Ranger and its predecessor robot were both constructed in the Space Systems Lab.



HIGH FLIGHT

The 1990s: Space—The Final Frontier

The department entered the 1990s in an excellent position to take on new challenges, particularly in its research and graduate programs.

The already highly successful rotorcraft team, with the further addition of dedicated and talented faculty, expanded its efforts and funding in its core programs and branched out in the area of smart structures research and applications to rotorcraft.

In 1992, the Army Research Office selected the University of Maryland as one of three University Research Initiatives on multidisciplinary activities in smart structures. Under the leadership of Professor Inderjit Chopra, faculty from throughout the A. James Clark School of Engineering—including those from aerospace, mechanical, electrical and materials engineering—worked together on research projects.

In 1995, the Department of

Defense awarded Chopra and colleagues at affiliate universities a five-year grant for research on the reduction of rotorcraft vibration and noise through the use of active control and smart structures technology. These two competitively won awards boosted the international reputation of the rotorcraft center to its highest level.

The Composites Research Laboratory expanded its relationship with NASA Goddard in the 1990s, working on programs such as FUSE, MAP, TOPHAT and AIMS. The laboratory currently is designing and manufacturing a composite skirt for the Mars Micro Mission.

The department continued to make other significant strides, including a more comprehensive expansion into high-speed research. This was motivated by a national interest in the X-30 high-speed research vehicle, more commonly known as the

National Aerospace Plane (NASP). The promise of NASP was a vehicle that could take off and land like a conventional aircraft, but also accelerate to speeds beyond Mach 25 using air breathing propulsion, NASA realized that to design such a vehicle, it was necessary to train engineers in the field of hypersonics, including aerodynamics, propulsion, design, structures, materials and flight dynamics and control. This lead to the creation of the NASA-sponsored Center of Excellence in Hypersonics at the university. Now in its sixth year and under the direction of Professor Mark Lewis, the center's ongoing projects include hypersonic missiles, transatmospheric cruisers, accelerators, SSTO, TSTO and reentry vehicles. Other research activitiesfocused on propulsion, fluid dynamics, inverse design and vehicle optimization, flight dynamics and control and

structures—are conducted in conjunction with industrial partners and government laboratories.

While activities in hypersonics extended the research capability of the department to the uppermost region of the earth's atmosphere, the department was still lacking in the area of astronautics research and education. Prior to 1990 there were a limited number of courses devoted to space science and engineering. This changed with the addition of Professor David Akin to the faculty.

The Space Systems Laboratory (SSL), previously located at MIT, moved to the University of Maryland in 1990. The SSL has built eight robots, including the Multimode Proximity Operations Device (MPOD), an orbital maneuvering vehicle or "space tugboat;" the Secondary Camera and Maneuvering Platform (SCAMP), a "floating eyeball;" and Ranger, a robot designed to be capable of replicating a Hubble Space Telescope servicing mission. A modified version of Ranger, Ranger TSX, is scheduled to be launched on the Space Shuttle in 2001.

In 1992, the Neutral Buoyancy Research Facility (NBRF) was completed with substantial funding from NASA. It is the only neutral buoyancy facility located at a university in the United States, and gives the SSL world-class research facilities. The SSL continues to work cooperatively with other research facilities at the university, including the Human-Computer Interaction Lab and the Autonomous Mobile Robotics Lab. With the addition of Professor Robert Sanner, the SSL began research into advanced spacecraft control systems.

In 1997, NASA Goddard transferred operation of the Solar, Anomalous and Magnetospheric Particle Explorer (SAMPEX) to the Flight Dynamics and Control Laboratory (FDCL) housed within the department. SAM-PEX gathers information on high-velocity radiation arriving at Earth from the sun and interstellar space. In collaboration with Tom Stengle of Goddard Space Flight Center and the Computer Science Corp., the FDCL has developed the capability to provide real-time mission support of SAMPEX as well as other NASA spacecraft. Aerospace undergraduate and graduate students perform orbit determination, orbit prediction, scheduling of ground-station access times, ground tracking, attitude determination and monitoring of the satellite's sensors. Students learn about mission control in the classroom and then put this knowledge to practice on the SAMPEX project. This is just one example of research that involves both theoretical and applied investigations in aeronautics and astronautics.

The SSL is also developing control systems that work well with humans, and can adapt to changing conditions that affect the spacecraft's motion, such as temperature extremes, hardware failures and decreasing mass due to fuel loss.

The addition of the SSL and FDCL to the department has had a significant impact on the expansion of the department's astronautics curriculum.

OTHER SIGNIFICANT DATES

1977–78 FIRST FULL YEAR OF OPERATION
OF WIND TUNNEL AS PART OF THE
DEPARTMENT OF AEROSPACE ENGINEERING

1982 CENTER FOR ROTORCRAFT
EDUCATION AND RESEARCH IS FOUNDED.

1987 COMPOSITES RESEARCH LABORATORY IS FOUNDED

1990 SPACE SYSTEMS LABORATORY IS FOUNDED

1992 COMPOSITES RESEARCH
LABORATORY MOVES TO A NEW 5000SQUARE-FOOT FACILITY IN THE
MANUFACTURING BUILDING

1994 NASA CENTER FOR EXCELLENCE IN HYPERSONICS CREATED

1994 RANGER, A FOUR-ARMED NASA SATELLITE REPAIR ROBOT IS ROLLED OUT FOR DISPLAY

1995 SMART STRUCTURES LABORATORY
CREATED IN THE J.M. PATTERSON BUILDING

1996 ROTORCRAFT CENTER AND HYPERSONICS CENTER MOVED TO J.M. PATTERSON BUILDING

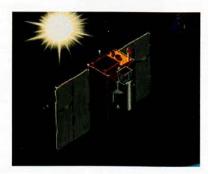
1997 FLIGHT DYNAMICS AND CONTROL LABORATORY FOUNDED IN THE GLENN L MARTIN WIND TUNNEL BUILDING

1997 UNDERGRADUATE STUDENTS CON-TROL SAMPEX SATELLITE ORBIT AND ATTI-TUDE DETERMINATION

1998 ANECHOIC CHAMBER BUILT FOR ROTORCRAFT ACOUSTICS RESEARCH

1998 DEPARTMENT'S GRADUATE PRO-GRAMS ARE RANKED 10TH IN THE NATION BY U.S. NEWS & WORLD REPORT

1999 MEYERS BUILDING UNDERGOES RENOVATION TO HOUSE AEROSPACE RESEARCH ACTIVITIES



Through collaboration with NASA Goddard, aerospace students provide real-time mission support for several NASA spacecraft, including the SAMPEX satellite.

DEPARTMENT OF AEROSPACE ENGINEERING

Vital Statistics of Department: (1999-2000) Full-time Faculty 16 Number of 231 undergraduate students Number of students enrolled in M.S. program Number of students enrolled in Ph.D. program 66 Average SAT scores Ken Yu (UC Berkeley) of incoming freshmen 1313 Average GPA of incoming freshmen 3.7 Average GRE scores of incoming graduate students (Q+A) Brig Agrawal Average GPA of incoming Nicholas Basdekas graduate students 3.6 Frederick Billig Clinton Brown Russell Carpenter Department Research Expenditures William R. Case \$8.1 million Department Rankings

Undergraduate Program (7th as listed by most recent Gorman Report)

Graduate Program (10th as listed by 1998 U.S. News & World Report)

Major Research Areas

Rotorcraft

Hypersonics Space Systems Composites and Smart Structures Flight Dynamics and Control Aerodynamics and Propulsion

Current Faculty

(University where Ph.D. earned in parentheses)

John Anderson (Ohio State) (Emeritus) David Akins (MIT) Ella Atkins (University of Michigan) James Baeder (Stanford) Jewel Barlow (University of Toronto) Mary Bowden (MIT) Roberto Celi (UCLA) Inderjit Chopra (MIT) William Fourney, Department Chair (University of Illinois, Urbana) Robert Korkegi (CalTech) Sung Lee (MIT)

J. Gordon Leishman (Glasgow) Mark Lewis (MIT) Darryll Pines (MIT) Robert Sanner (MIT) Dave Schmidt (Purdue) Frederic Schmitz (Princeton) Anne Spence (University of Maryland) Anthony Vizzini (MIT) Norman Wereley (MIT) Allen Winkelman (University of Maryland)

Other (Former Faculty and Current Adjunct Faculty, Lecturers and Visiting Professors)

Suresh Chander Kuei-Yuan Chien Gerald Corning (deceased) Bruce Donaldson James Fabumni Les Filotas Albert J. Fleig James Garrison Alfred Gessow (Emeritus) Stuart Greenwood Michael Griffin Larry Guess David Haas Hamilton Hagar Richard Hallion Daniel Heimerdinger Young S. Hong Arne Johnson Everett Jones (Emeritus) Peter Kammeyer Kibong Kim Frank Klemm Robert Korkegi Boris Krayterman Chien, Kuei-Yuan H. Kurzweg

Allen Kushner

Spiro Lekoudis

Ruthann Lewis

Colin Marks

Iames Mason

Walter Melnik

Raymond Mills

Robert Nelson

Francis O'Brimski

Allen Plotkin Frank Regan Bob Rivello (deceased) David E Rogers Joseph Rom (deceased) Horace Russell Michael Salking Harry Schaefer Leon Schindel P.N. Shankar Shan-fu Shen A. Wiley Sherwood (deceased) Joseph Shetz Kaydon Stanzione Norman Starkey Richard Thomas John S. Vamos David Van Wie Paul Waltrup Andrew Wardlaw Kraytermas Wardlaw Terry Weisshaar Clem Weissman J. Weske (deceased)

S.I. Pai (Emeritus, deceased)

List of Current and Former Department Staff

Roger Winblade

William Yanta

Pat Baker Deborah Chandler Brian Cugle Sue Cunningham Janet Giles Michael Green Chris Fuller Bryan Hill Bernard LaFrance Dawn Leavell Kevin Lewy Maureen Meyer Janet Murphy Mark O'Connor Carol Pironto Rebecca Sarni Pat Salvotore

Past Department Chairs

Jennifer Widdis

1997-Present William Fourney 1994-1997 William Fourney (interim chair)

1993-1994 David K. Schmidt 1991-1993

Sung Lee (acting chair)

1990-1991

Bryan Hunt

1988-1990

Inderjit Chopra (acting chair)

1980-1988

Alfred Gessow

1973-1980

John Anderson

1970-1973

Robert Rivello (acting chair)

1968-1970

Richard Thomas

1949-1968

A. Wiley Sherwood

Glenn L. Martin Wind Tunnel Directors

1973-Present

Jewel Barlow

1951-1973

Donald Gross

Glenn L. Martin Wind Tunnel Staff

Mark Dresser Donald Gross

Ahmad Kassaee

Charles Lessig Jr.

Robert Ranzenbach

Books Authored by Department of Aerospace Engineering Faculty

John Anderson

Gasdynamic Lasers: An Introduction, Academic Press (1976)

Introduction to Flight, McGraw-Hill 1st Ed. (1978), 2nd Ed. (1985), 3rd Ed. (1989), 4th Ed. (in preparation)

Modern Compressible Flow: With Historical Perspective, McGraw-Hill 1st Ed (1982), 2nd Ed (1990) Fundamentals of Aerodynamics, McGraw-Hill 1st Ed. (1984), 2nd Ed. (1991)

Hypersonic and High Temperature Gasdynamics, McGraw-Hill (1989)

Computational Fluid Dynamics: The Basics with Applications, McGraw-Hill (1995) A History of Aerodynamics, and Its Impact on Flying Machines, Cambridge University Press (1997)

Aircraft Performance and Design, McGraw-Hill (1999)

Jewel Barlow, with William Rae and Alan Pope Low Speed Wind Tinnel Testing, McGraw-Hill (1999)

Gerald Corning Supersonic and Subsonic, CTOL, VTOL, Aircraft Design, 4th Ed. (1976); 1st Ed. (1960)

Alfred Gessow, with Gary Myers Jr. Aerodynamics of the Helicopter, Macmillan (1952), Frederich Ungar

(1967), College Park Press (1985)

Bruce Donaldson Analysis of Aircraft Structures: An Introduction, McGraw-Hill Series in Aeronautical and Aerospace Engineering (1992)

J. Gordon Leishman Helicopter Aerodynamics, Cambridge University Press (2000)

Fellows of the American Institute of Aeronautics and Astronautics

John Anderson Inderjit Chopra Alfred Gessow Robert Korkegi

Fellows of the American Helicopter Society

Alfred Gessow (Honorary) Inderjit Chopra Frederic Schmitz

Fellow of the Royal Aeronautical Society

John Anderson

In response to ever-increasing importance of composite materials in aerospace structures, the department has developed a strong program in composite materials. The Composites Research Laboratory is comprised of modern equipment including a computer-controlled autoclave and a vacuum hot press which permit the manufacture, inspection, testing and analysis of composite materials and structures. The laboratory integrates faculty from other departments on campus and interfaces with industry and government laboratories.

Fellow of the Society for Experimental Mechanics

William Fourney

Fellow of the Institute of Physics

Norman Wereley

Presidential Early Career or Young Investigator Awards

Darryll Pines (NSF) Norman Wereley (NSF, Army)

Graduate Scholarships and Fellowships

Gustave Hokenson Award Minta Martin Fellowship Rotorcraft Fellowship Hypersonic Fellowship Sloan Fellowship

Undergraduate Scholarships

Robert Rivello Scholarship John Younger Scholarship Elaine Gessow Scholarship

Endowed Chairs

Alfred Gessow Chair in Rotorcraft Engineering Minta Martin Professorship



Advisory Board

In 1995, the department established an advisory board to guide and support the graduate and undergraduate programs. The board, comprised of leading experts in the field of aerospace engineering, meets once each semester.

Current Board Members

John Clark Jr. Naval Air Warfare Center

Leo Dadone Boeing Helicopter

Douglas Dwoyer NASA Langley Research Center

Antonio Elias Orbital Sciences Corp.

Richard Freeman NASA Goddard Space Flight Center

Michael Griffin Orbital Sciences Corp.

Barnes McCormick Professor Emeritus Pennsylvania State University

Vincent Pisacane Johns Hopkins University Applied Physics Laboratory

Ken Rosen Sikorsky Aircraft Corp.

Alan Sherman (Chair) Lockheed Martin Corp.

Joe Soderquist Federal Aviation Administration (retired)

Previous Board Members

H. Lee Beach NASA Langley Research Center

James D. Lang McDonnell Douglas

Ron Paulson Lockheed Martin Corp.

Robert Whitehead NASA Headquarters

Academy of Distinguished Alumni

In fall of 1999, the Department of Aerospace Engineering inducted four graduates as well as aviation pioneer Glenn L. Martin into its Academy of Distinguished Alumni. The academy recognizes alumni who have made notable contributions to the field of aerospace engineering and/or achieved other significant accomplishments. The five inductees are:



Glenn L. Martin (1886–1955) Aviation pioneer Glenn L. Martin was instrumental in providing

funding to support education in the aeronautical sciences at the University of Maryland. In recognition of his philanthropic gifts and pioneering spirit in the field of aeronautics, the University of Maryland in 1949 designated the College of Engineering as the Glenn L. Martin College of Engineering and Aeronautical Sciences. This name again changed in 1955 when the engineering building and those of chemistry, mathematics and physics were designated the Glenn L. Martin Institute of Technology.



Kevin G. Bowcutt B.S. '82, M.S. '84, Ph.D. '86 Kevin Bowcutt is chief scientist of hypersonics

with the Boeing Co., in Long Beach, Calif. Bowcutt has been with Boeing (formerly Rockwell International, North American Aircraft) since 1986 and was named a senior technical fellow by Boeing in 1998. Much of his professional career has involved research in and development of airbreathing hypersonic vehicles, including missiles, aircraft and space launch vehicles.



Gary L. Curtin

Maj. Gen. U.S. Air Force
(Ret.), B.S. '65
Gary Curtin is senior
vice president with the

Defense Group Inc. In 1998, Curtin retired with the rank of major general after 33 years of service with the U.S. Air Force. His military career included duties with intercontinental ballistic missile operations, command and control, military intelligence and political/military affairs. Curtin was assigned in 1989 as the senior U.S. military representative to the Strategic Arms Reduction Talks (START) in Geneva, Switzerland, and was instrumental in negotiating the START I Treaty signed in 1991.



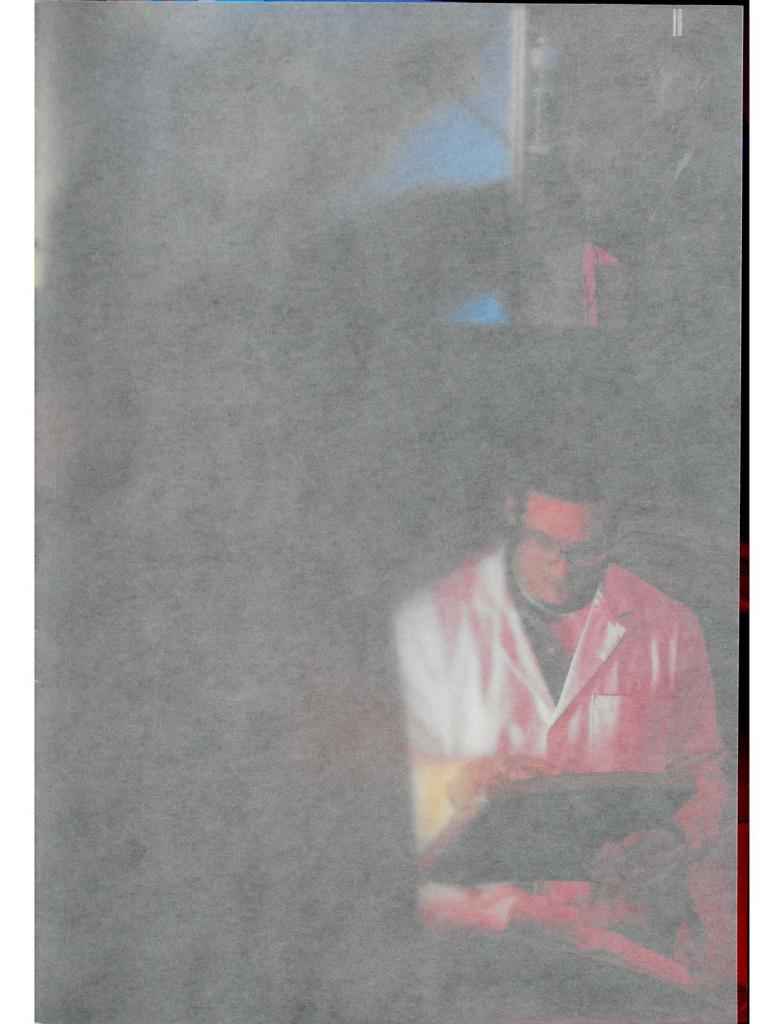
Michael D. Griffin Ph.D.*77 Michael Griffin is executive vice president and chief technical officer

with Orbital Sciences Corp., in Dulles, Va. Prior to joining Orbital in 1995, he served as senior vice president for program development at Space Industries International as well as general manager of Space Industries in Houston, Texas. He supported numerous space missions while working at Computer Sciences Corp., the Johns Hopkins Applied Physics Laboratory and the Jet Propulsion Laboratory.



Bastian "Buz" Hello B.S. '48 Although semi-retired, Bastian "Buz" Hello is still an active manage-

ment consultant to Rockwell
International Corp. His distinguished career at Rockwell includes management of strategic military aircraft programs as well as making important contributions to America's space efforts. He was responsible for prelaunch preparation and launch support for six Apollo missions that included three successful moon landings.



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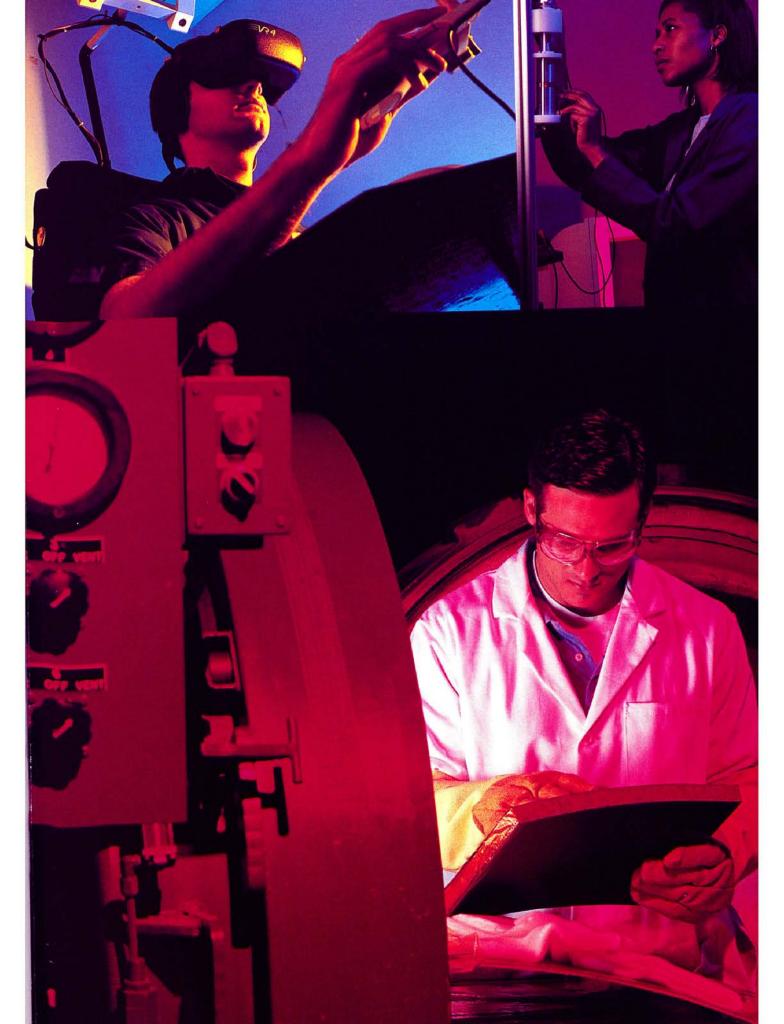
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