NASA
National Aeronautics and
Space Administration

Langley Research Center

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Researcher News

Bi-weekly Employee and Contractor Publication

Langley Colloquium and The Sigma Series

Nobel Laureate To Discuss 'Chemical Parables'

"Chemical Parables: How Nylon Stockings Won World War II" will be the topic of two lectures presented on the Peninsula Monday, January 23, by Dr. Dudley R. Herschbach, professor of science at Harvard University.

At 2 p.m. Herschbach will give his talk to Langley employees during a colloquium in the H.J.E. Reid Conference Center, Building 1222. A question and answer session and an informal discussion will follow in the Langley Room.

At 7:30 Herschbach will present the same lecture at the Radisson Hotel, Hampton, as part of The Sigma Series. The Sigma Series is a series of public lectures sponsored by the Daily Press, the City of Hampton and NASA.

According to Herschbach, our society is both handicapped and threatened with the prevalent attitude that science is for specialists rather than a central part of our culture. The Nobel Laureate says chemistry is important in history, for example, and is intended to broaden the perspective of people interested in either science or the humanities.

In his talks, Herschbach will show the importance of chemistry using several parables as examples. He will also demonstrate that even chemistry can be a laughing matter. The parables include Aristotle and the puzzle of the water pump; Cleopatra and her pearl-on-vinegar cocktail; beer drinking related to the fractal squirming of the coast of Maine; and the stock market. The major illustration will show how the development of nylon proved to be vital when the United States found that its rubber supply was cut off during World War II.

Herschbach is one of the premier chemists in the world. Since his education at Stanford and Harvard universities, he has spent his career teaching and conducting research into the fundamentals of chemical reactions, the area in which he was awarded the Nobel Prize in 1986.

Director for Aeronautics Awarded AIAA Wright Brothers Lectureship

Roy V. Harris, Jr., director for Aeronautics, has been selected to receive the Wright Brothers Lectureship in Aeronautics by the American Institute of Aeronautics and Astronuatics (AIAA). Harris shares this honor with distinguished past awardees, among them Hugh L. Dryden, John Stack and Theodore Von Karman.

"The Wright Brothers Lectureship in Aeronautics commemorates the first powered flights made by Orville and Wilbur Wright at Kitty Hawk in 1903, and is intended to emphasize significant advances in aeronautics by recognizing major leaders and contributors thereto," says John Swihart, chairman of the AIAA Honors and Awards Committee.

As a Wright Brothers honoree, Harris has been invited to present a lecture on supersonic and hypersonic aircraft at the AIAA/American Helicopter Society (AHS)/American Society for Engineering Education (ASEE) Aircraft Design, Systems and Operations meeting, July 31—August 2, 1989, in Seattle, Washington. In addition, Harris will participate in the AIAA Distinguished Lecture program during 1989-90.

A nationally recognized authority in the field of supersonic aerodynamics, Harris joined the Langley staff in 1958 as an aerospace engineer. From 1959 to 1962 he was a U.S. Air Force officer assigned to NASA. He was named head of the Advanced Configuration Branch in 1973, and became chief of the High-Speed Aerodynamics Division in September 1974. In his present position since July 1985, Harris coordinates aeronautical research at the Center and is responsible for a $70 million research program involving approximately 800 people.

Harris has had a leading role in developing the technology for supersonic military aircraft and the newest generation of advanced fighter aircraft. Hypersonic research under his direction has been widely recognized as providing much of the technical basis for the National Aero-Space Plane Program.

A native of Augusta, Georgia, Harris graduated from the Richmond Academy. He earned a bachelor of science degree in aeronautical engineering from the Georgia Institute of Technology. The author of more than 30 technical publications, he is co-holder of a patent on the SCAT 15F supersonic transport design.

Harris received the AIAA Lawrence Sperry Award and the NASA Exceptional Service Award in 1968 for research that led to "a significant technological foun-

dation for the development of supersonic aircraft." He was a member of the team that received a NASA Group Achievement Award in 1976 for contributions in support of the U.S. Air Force lightweight fighter prototype, resulting in the F-16 and YF-17/18 fighter aircraft. He was awarded a Langley Special Achievement Award in July 1982 and, in October, received a NASA Medal for Outstanding Leadership for High-Speed Aerodynamics Research. In June 1985, he received the Presidential Rank of Meritorious Executive in the Senior Executive Service of the U.S. government.

Harris and his wife, Mary Sue, live in Newport News. They have two daughters.

Langley Managers Chosen for Presidential Awards

Two senior managers at the Langley Research Center have been selected to receive 1988 Presidential Rank awards. This honor is bestowed on a small number of career Senior Executive Service members whose career achievements are exceptional.

Dr. Gerald D. Walberg, associate director for Space, and Dr. Robert T. Wingate, deputy director of Systems Engineering and Operations, were recently approved by President Reagan to receive the Meritorious Executive Award. The awards will be presented January 31 during a special ceremony at the Goddard Space Flight Center.

Walberg will receive his award for "sustained accomplishment in the career Federal service and superior achievements in the fields of systems engineering and engineering management. These contributions have significantly advanced the Nation's state-of-the-art in aerospace technology and have demonstrated a high level of quality and efficiency in the public service."

Wingate is considered a national authority in space flight systems and ground research facilities engineering. He is widely used by NASA management, leading key efforts in major agency thrusts, such as post-Challenger evaluations of the solid rocket booster; the National Transonic Facility; and a major restoration of the NASA Ames Research Center 12-Foot Pressure Wind Tunnel. Wingate has set the pace for the agency

Walberg

Wingate

in the Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) area, exporting Langley technology to other centers and private industry.

Both Walberg and Wingate have 30 years with NASA and have served the agency in management positions, such as section head, branch head and division chief before being appointed to their present positions. Walberg now assists the director for Space in managing Langley's research in advanced space transportation, planetary entry, Space Station Freedom, large space antenna and atmospheric sciences programs. Wingate provides general direction to the overall technical operations and activities of the directorate consisting of 1,000 engineers and technicians who provide highly specialized support service to Langley's research programs.

Each year only one percent of the federal government SES executives may receive the rank of Distinguished Executive, with a $20,000 stipend, and five percent may receive the rank of Meritorious Executive, with a $10,000 stipend. NASA's 1988 honorees include five of the 60 Distinguished Executives and 26 of the 296 Meritorious Executives selected government-wide.

News Briefs

HEADQUARTERS, Washington, D.C. — NASA and the National Oceanic and Atmospheric Administration (NOAA) have announced a cooperative investigation to better understand the nature of potential depletion of stratospheric ozone over the Arctic. During January and February, scores of scientists will carry out an airborne study similar to that done last year on Antarctic ozone depletion. Watch the next issue for information on Langley's involvement in this investigation.

HEADQUARTERS, Washington, D.C. — Results from NASA's C-141 Kuiper Airborne Observatory (KAO) recent supernova expedition are helping to create a detailed picture of the birth of matter in one of nature's most powerful events. The Kuiper team has completed its fourth deployment to observe Supernova 1987A, continuing its studies of charged (ionized) particles, and mass and ejection velocities of heavy metals produced in the giant blue star's explosion, first observed in February 1987.

HEADQUARTERS, Washington, D.C. — NASA and the University Corporation for Atmospheric Research (UCAR), Boulder, Colo., have announced the signing of a memorandum of agreement that establishes the terms and conditions for UCAR's use of Space Shuttle external tanks (ETs) for suborbital experiments. UCAR is interested in conducting scientific research through experiments contained in the unpressurized, 5,000-cubic-foot inter-tank area, between the fuel and oxidizer tank, within the Shuttle external tank. These experiments would be conducted during the suborbital trajectory of the tank following its jettison from the Shuttle and prior to its destruction during reentry.

HEADQUARTERS, Washington, D.C. — Manuel (Manny) Peralta, associate administrator for management, NASA Headquarters, left NASA effective January 6, to become president of the American National Standards Institute (ANSI), Washington, D.C. Dr. C. Howard, Jr., deputy associate administrator for management, is serving as acting head of the Office of Management.

HEADQUARTERS, Washington, D.C. — NASA's Office of Commercial Programs has published a national inventory of information to assist commercial space researchers. Titled "Accessing Space: A Catalog of Process, Equipment and Resources for Commercial Users," the new publication is intended for companies and research organizations who are considering or who have in process a research project involving commercial applications of the unique characteristics of space. Copies may be obtained by writing Office of Commercial Programs, Code CC, NASA Headquarters, Washington, D.C., 20546.

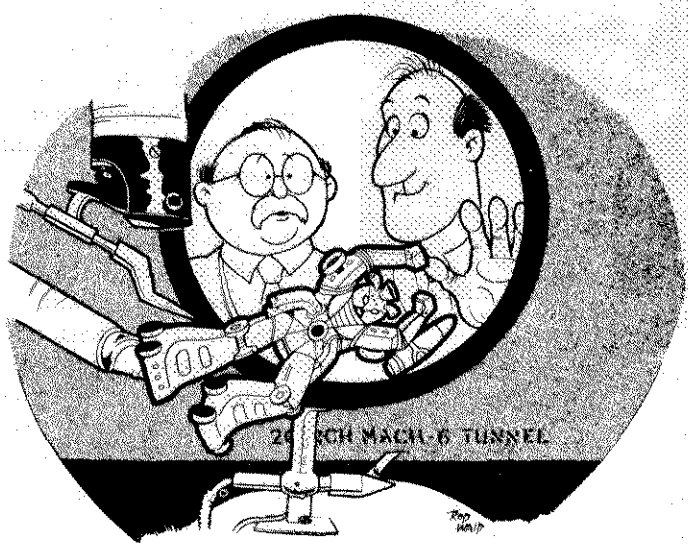
MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. — NASA's MSFC and USBI Co., a subsidiary of United Technologies Corp., Hartford, Conn., finalized the restructuring of USBI's Space Shuttle solid rocket booster assembly and refurbishment. The new contract significantly increases the scope of the work. The extension, effective Sept. 30, 1989, through Sept. 30, 1994, adds $1 billion to the total contract value for the assembly and refurbishment of the SRBs and brings the total contract value to $1.6 billion.

Senior Management Research Review

The Senior Management Research Review will be held Tuesday, January 17, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISMENT	SPEAKER
9:30	Airborne Doppler Radar Detection of Microburst Wind Shear Microburst/Clutter/Radar Simulation Program	Emedio Bracalente (Flight Systems/GCD)
9:45	Laser Vapor Screen Experiment of the Forebody and Strake Vortex Flows About the F-16C at Subsonic and Transonic Speeds	Gary Erickson (Aeronautics/TAD)
10:00	Design of Control and Guidance of Algorithms for Assured Crew Return Capability Vehicle (ACRC)	Richard Powell (Space/SSD)
10:15	Infrared Limb Experiment (IRLE): Phase-A Study and Phase-B Proposal	James Russell (Space/ASD)
10:30	Gas Permeable Membranes	George Wood (Electronics/IRD)
10:45	Rotor Balde-Vortex Interaction Noise Directivity as a Function of Tip-Path-Plane Angle	Ruth Martin (Structures/AcoD)

Lankley



Exactly how **old** was the researcher who brought this model in for testing?

AIAA Meeting

John M. Swihart, vice president of International Affairs, The Boeing Company, will be guest speaker at an AIAA dinner meeting, January 24, at the H.J.E. Reid Conference Center.

The meeting will begin with a social hour at 6 p.m.; dinner will be served at 7; the program will begin at 8 p.m. Cost of the dinner is $11/members; $7/student members; and $13/nonmembers. For information and reservations, contact Karen Credeur, ext. 46856, or Ferd Grosveld, ext. 43586. Deadline for reservations is 4 p.m. January 19.

Editorials

Langley

Headquarters Forum

One of Langley's most enduring qualities is that it provides the opportunity to work on important ideas with talented teams of people. The Langley team spirit exists not only in first line organizations, but it crosses divisions and directorates and extends into the community to involve the best and the brightest. The NASA Atmospheric Sciences Program at Langley combines the best of research and teamwork.

Historically, the systematic study of the atmosphere as the medium of flight has been an important factor in Langley research. In recent years, this research has taken on a vast new importance and is at the center of the great public and scientific debate about man-made changes to the atmosphere.

The blend of traditional Langley skills in remote sensing and electronics, systems engineering and flight systems development have combined to form a highly productive atmospheric measurement program. This effort is providing fundamental new information about humanity's ability to change our climate or alter our ozone shield. Radiative transfer theory and information processing are being used with our space sensors to produce new, long-term global data sets of important geophysical parameters such as ozone, the solar constant and the Earth's radiation balance. Langley and university scientists use these data to validate models and assess the long-term effect of man's activities.

Among the most recent contributions by Langley scientists is the determination of the upper atmosphere ozone trend as measured by SAGE I and II experiments. Langley scientists, as part of the NASA/World Meteorological Organization's efforts to assess the current ozone trend, concluded there was no more than a three percent downward trend in upper stratosphere ozone. This position is in agreement with models, and disputes the catastrophic depletion that some measurement had suggested.

The Langley Earth Radiation Budget Experiment, now being flown in space aboard three satellites, is providing very important information about the effects of cloudiness on climate. Most of the uncertainty in our ability to predict future greenhouse effects lies in our lack of knowledge of the heating and cooling effects of clouds. ERBE is providing—for the first time—precise, quantitative information on the radiation effects of clouds.

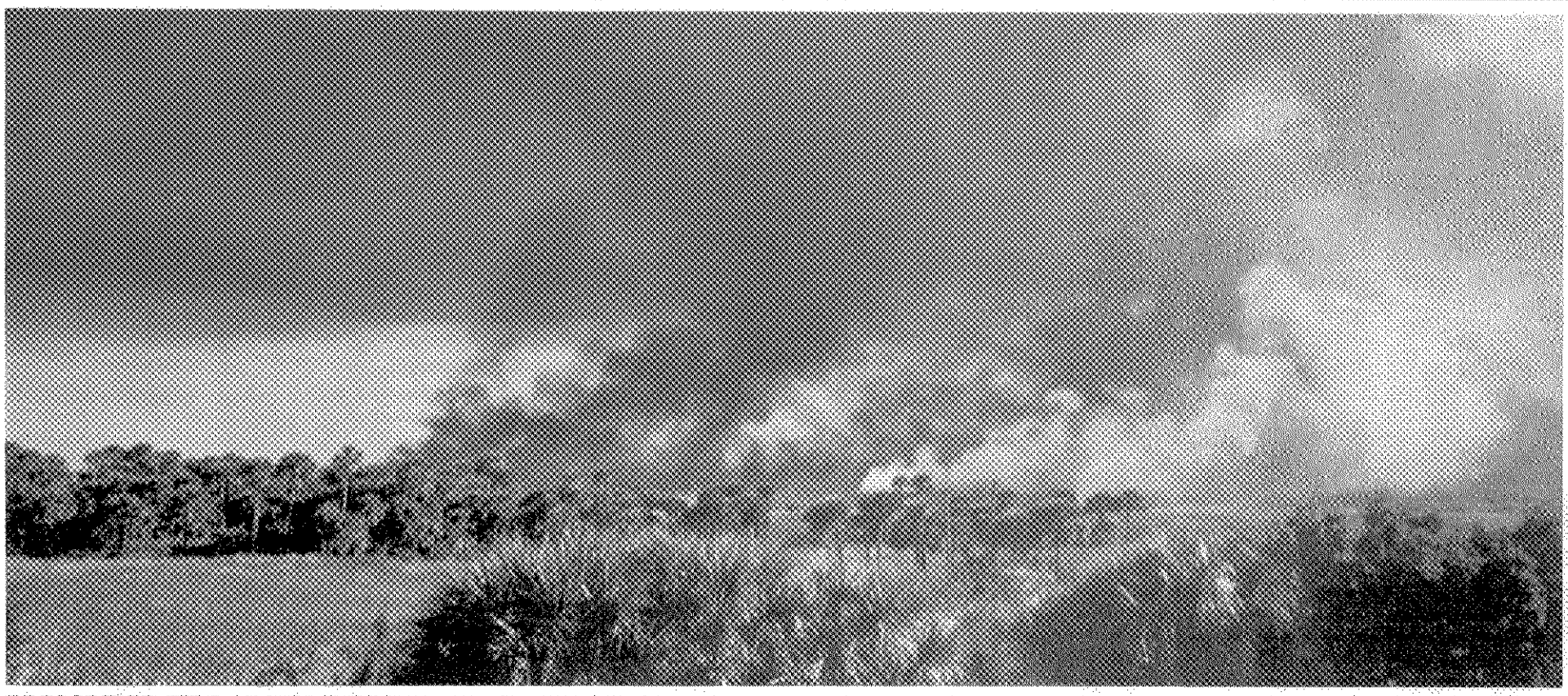
What have we recently learned? First, clouds are the major cooling mechanism for the Earth. The net effect of the large cloud systems in the Tropics is negligible—the cooling and heating effect almost completely balance each other. A second major surprise was to learn from ERBE that very strong net cooling effects are produced by storm clouds in the mid-latitudes. A very precise understanding of the heating and cooling effect of clouds must be achieved if climate models are to adequately assess the smaller greenhouse effects of such man-made gases as carbon dioxide.

Long-range strategic plans of both the Office of Space Science and Applications (OSSA) and the Office of Aeronautics and Space Technology (OAST) identify interdisciplinary studies of global change as the next step in our studies of the planet Earth. Langley will have an important role to play in both programs.

In 1989, Langley will deliver the HALOE experiment for the upper atmosphere research satellite which will directly measure the effects of the chemical by-products of chlorofluoromethanes on the ozone layer. The Center has proposed a number of future flight experiments for the Earth Observing System Polar Orbiting Satellite and Space Station Freedom for flight in the mid-1990s. The proposed experiments are now being evaluated as part of a highly competitive selection process.

The outlook for the NASA Langley team is bright.

W. Ray Hook
Director for Space



PRESCRIBED FIRE AT THE KENNEDY SPACE CENTER, November 7, 1988. Langley researchers measure carbon dioxide, other greenhouse gases and atmospheric particulates produced during the 5,000-acre wetlands blaze to assess the global impact of fires on the atmosphere and climate.

Langley Researchers Study Possible Source

Scientists Warn 'The Heat Is On'

Man continues to be his own worst enemy. Thoughts of the Earth's destruction generally conjure up discussions of nuclear war. But man's everyday activities are, perhaps, more dangerous than the bomb.

The January 2 issue of **Time** magazine pictures, in a double-page photo, the torching of a Brazilian rain forest to clear land for an agricultural area and asks, "What on Earth are we doing?" In a departure from tradition, this year **Time** names no Man/Woman of the Year. Rather, **TIme** designates the "Endangered Earth" as Planet of the Year for 1988.

While temperatures in Tidewater oscillate between the high sixties and the low twenties, the heat-related disasters of the past summer are no longer a prime concern to the general public. But the heat waves, droughts, floods and hurricanes of 1988 may be a preview of what will be the norm if the atmosphere warms 3 to 8 degrees Fahrenheit by the middle of the next century as some scientists predict.

This global warming is thought to be the result of a buildup of carbon dioxide and other gases in the atmosphere. Fires in many diverse ecosystems of the globe, which may cover as much as five percent of the land area of our planet, are significant sources of carbon dioxide and the other "greenhouse" gases that trap thermal radiation in the atmosphere. Other gases produced during fires lead to the chemical production of ozone and atmospheric acids, such as nitric acid, an important component of acid rain.

The exact implications and consequences of fires in ecosystems worldwide are being studied in a research program lead by Langley's Atmospheric Sciences Division (ASD).

On November 7, 1988, Langley researchers participated in a prescribed (planned) fire at the Kennedy Space Center. Researchers on the ground, in a Bell 204B helicopter and in the Langley Cessna 402 obtained measurements of carbon dioxide and other greenhouse gases and atmospheric particulates produced during the 5,000-acre wetlands fire.

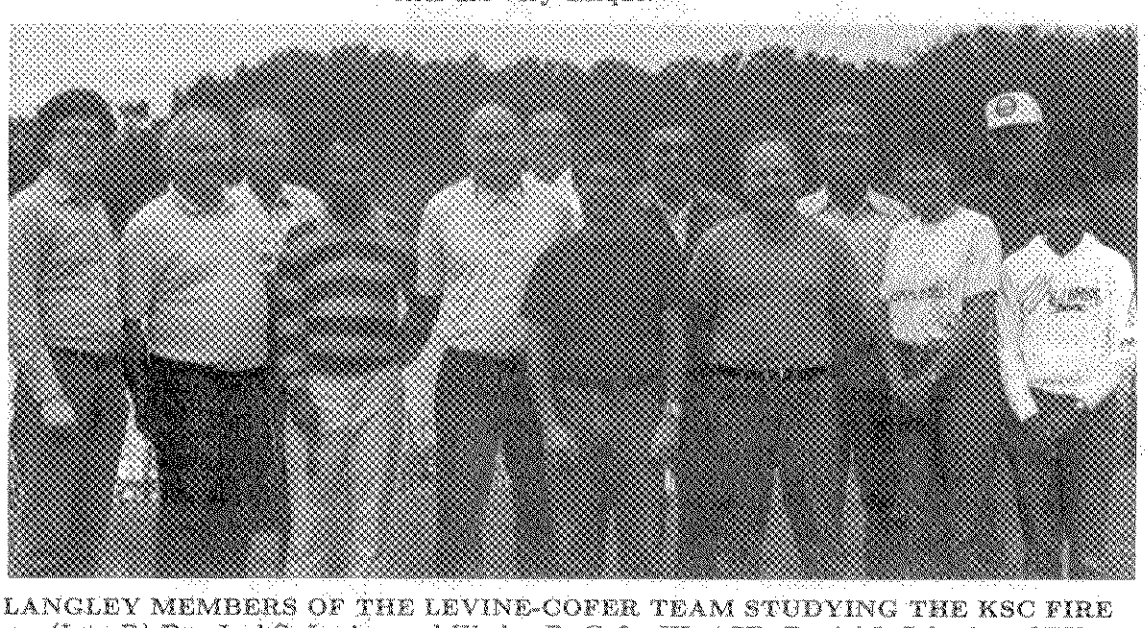
Globally, fires are used as mechanisms to clear large land areas and to eliminate vegetative stubble after a harvest. "The Forest Service has been doing controlled burns for years," says Dr. Joel S. Levine, ASD senior research scientist. "The new twist is science, very important science concerning the gaseous and particulate emissions produced in fires."

The KSC fire was the seventh studied by the group over a two-year period. Directed by Levine and Wesley R. Cofer III, the research program includes scientists from Langley, Ames Research Center, Kennedy Space Center, the U.S. Forest Service, the U.S. Fish and Wildlife Service and the Canadian Forestry Service. The Langley helicopter system for sampling fire gases and particulates was designed, built and installed by Systems Engineering Division personnel. In addition, the chemical analysis of the fire gases and particulates are performed at Langley. Cofer, who collects gas and particulate samples aboard the NASA helicopter, says, "Flying through a burn plume several hundred feet above a fire is a unique experience for a laboratory chemist."

While some are caused by lightning or other natural phenomenon, "the vast majority of fires on the Earth's surface are human-induced," says Levine. **Time** magazine states that man has reached a point in his evolution where he has the power to affect, for better or worse, the present and future state of the planet. Research suggests that biomass burning may do long-term damage to our environment. "Global fires may produce as much as 50-75 percent of the carbon

Continued on page 6.

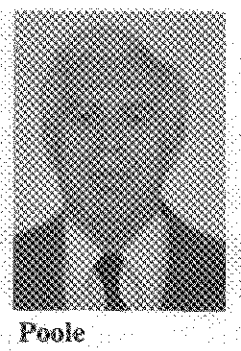
NASA HELICOPTER FLIES THROUGH SMOKE PLUME produced during the Kennedy burn. Langley scientists Wesley R. Cofer III and Edward L. Winstead, STX Corp., are aboard the helicopter collecting samples of smoke gases and particulates. Cofer, who has flown through half a dozen fire plumes collecting samples, says his research activities are very unique.



LANGLEY MEMBERS OF THE LEVINE-COFER TEAM STUDYING THE KSC FIRE are (L to R) Dr. Joel S. Levine and Wesley R. Cofer III, ASD; Daniel I. Sebacher, STX Corp.; David C. Woods, ASD; NASA pilot Dick Yenni, Low-Speed Aerodynamics Division; Robert C. Kendall, PRC/Kentron; Edward L. Winstead, STX Corp.; Ed Hoffman, LSAD; Peter J. LeBel, Flight Electronics Division; Robert M. Thomas Jr., LSAD; Stephanie A. Vay, FED; Robert P. Rhinehart, ASD; and Patricia D. Roberts, Old Dominion University.

Recent Retirees

Coutts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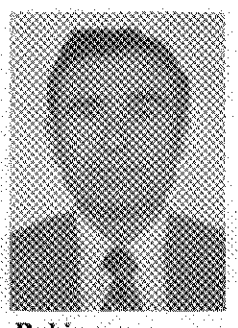
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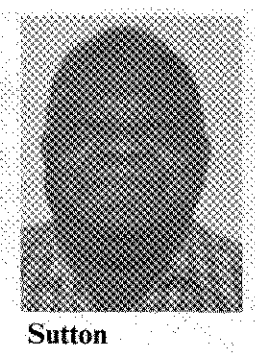
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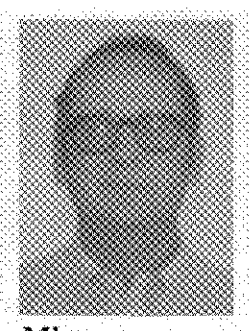
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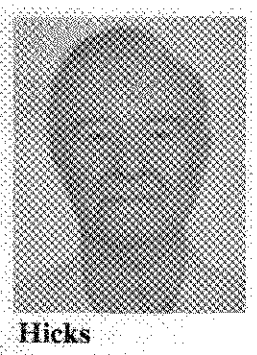
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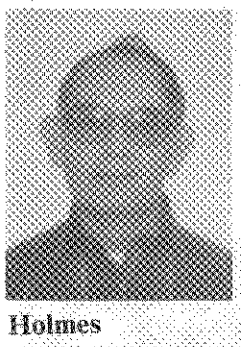
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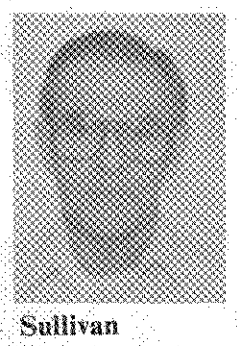
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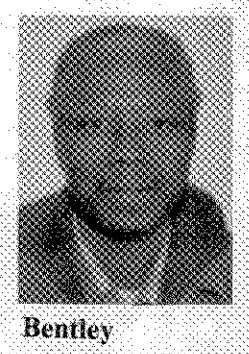
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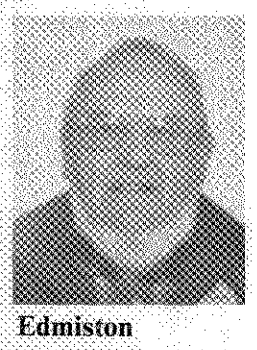
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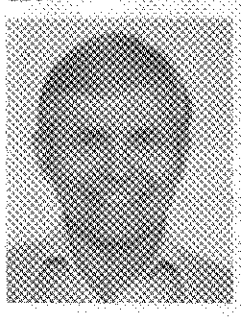
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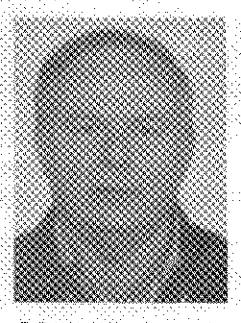
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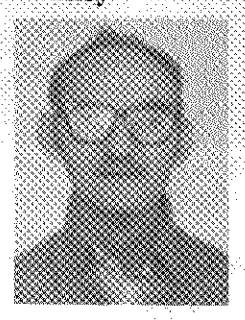
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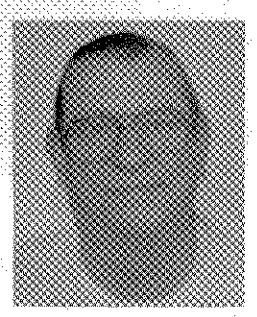
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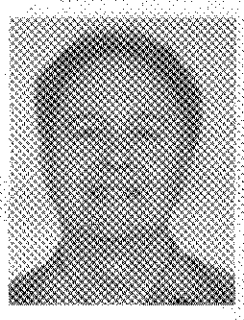
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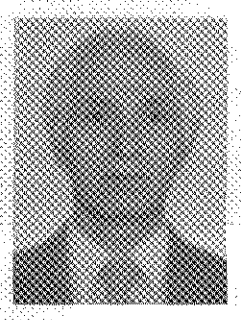
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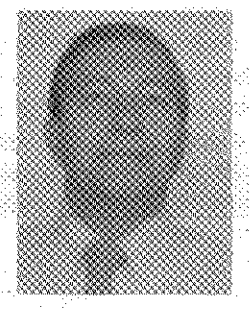
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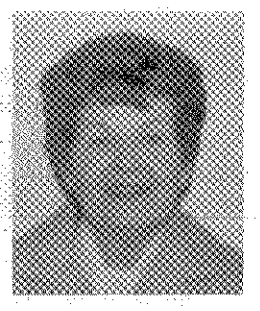

Ferrari

Ray E. Haynes, Flight Electronics Division, and **Paul G. Sandefur, Jr.**, Fabrication Division, retired September 30.

Peter T. Bernot, Space Systems Division, **James E. Coutts**, Facilities Engineering Division, **Robert E. Nye**, Research Information and Applications Division, and **Harold E. Poole**, Flight Electronics Division, retired on October 31.

James C. Robinson, Structural Mechanics Division, and **Ernest Sutton, Jr.**, Operations Support Division, retired November 3.

John S. Mixon, Acoustics Division, **D. Eugene Hicks** and **R. Kenneth Holmes**, Analysis and Computation Division, **Edward M. Sullivan**, Atmospheric Sciences Division;

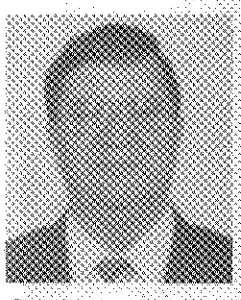
Thomas Bentley, **Charles E. Edmiston**, **Kelley C. Hinnant**, **Edward L. Moore**, **Carl R. Snodgrass**, **John B. Tyler** and **Boyd H. Wilfong**, Fabrication Division;

Willie Lucento and **Frank J. Senft**, Facilities Engineering Division, **Dorothie N. Ferrari**, Financial Management Division, **Amos A. Spady, Jr.**, Flight Management Division;

Leo B. McHenry, Low-Speed Aerodynamics Division, **Robert W. Moore** and **Boyd L. Williams, Jr.**, Operations Support Division, **Malcolm P. Clark**, Personnel Division;

Sue K. Seward and **James W. Sparrer**, Research Information and Applications Division, **Virginia D. Vohringer**, Systems Engineering Division, and **Russell C. Gentry, Jr.**, Systems Safety, Quality and Reliability Division, retired December 31.

Phillip J. Klich, Systems Engineering Division, retired January 3.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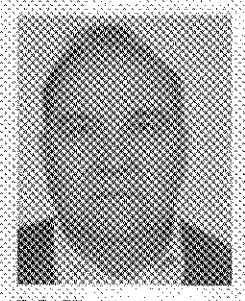
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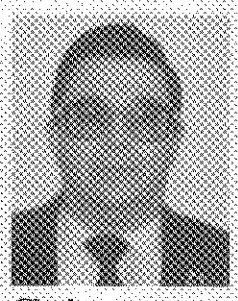
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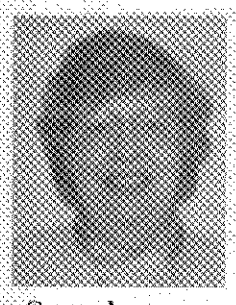
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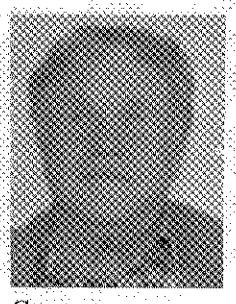
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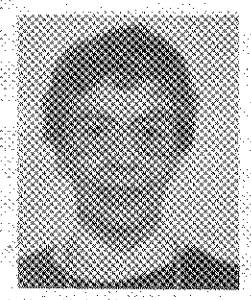
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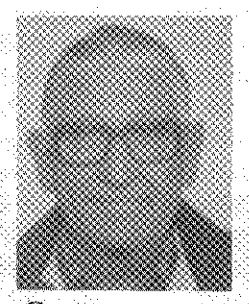

Gentry

Klich

Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The award committee convened on December 1 and selected Crew #3 as Crew of the Month for November. This crew obtained a score of 93.88 out of a possible 95 points. They also received a letter of commendation for the excellent manner in which they consistently maintain all areas of Building 1209. Crew members are (front row, L to R) Suk Gilbert, Sharon Brown, Carmen Tursick, Carolyn Smith; (back row) Elliott Burgess, Viola Holloman, Deborah Wilkens and Charles Gayle.

Snow? Shuttle information? Dial 864-2111.

It's Here--- Are You Next?

Over 2,400 cases of influenza were reported in 1988.

Have you received your FLU shot from the clinic to protect yourself, your family and your co-workers? Call ext. 43193 for details.

Don't take the FLU home to your family!

Retirement Party

Harold Poole will be honored at a retirement social January 25, from 4:30 to 7:30 p.m., at the H.J.E. Reid Conference Center, Building 1222. Cost is $7/person which includes gift. Send cash/check payable to Dick Davis or Dwayne Hinton, Mail Stop 474, no later than January 17.

Martin Luther King Celebrated

The holiday to celebrate Dr. Martin Luther King's life and career is the first federal holiday to commemorate a Black American. Martin Luther King Day, celebrated this year on Monday, January 16, honors a man who is considered great—not just in the U.S. but throughout the world— as the strongest modern voice for peace and brotherhood for all nations and peoples.

Volleyball Club Announces Plans

To help participants become better volleyball players, three clinics are planned during January. The gym has been reserved from 4 to 8 p.m. on clinic nights. Each clinic will be conducted by advanced level volleyball players from the Peninsula area, will last two to three hours, and will start at 5 p.m. The B-League clinic will be Tuesday, January 17, and will concentrate on advanced skills; C-League on Tuesday, January 24, will address intermediate skills; and D-League on Tuesday, January 31, will cover basic skills.

Free play volleyball will continue on Fridays in February and March from 4:30 to 6:30 p.m. The 1989 Spring volleyball season is tentatively scheduled to begin in mid-March and will last for ten weeks. The new season will also bring some rule changes. If you have any special concerns or questions, please contact Susan Althoff, ext. 45059, or Frank Quinto, ext. 45068.

People & Places

Williams Retires from NASA, Goes Out in Style

One look at William L. "Bill" Williams and it's hard to tell if he's coming or going. Williams reported for work on December 30, his last day after nearly thirty years of service to NASA, and—for all outward appearances—it was business as usual.

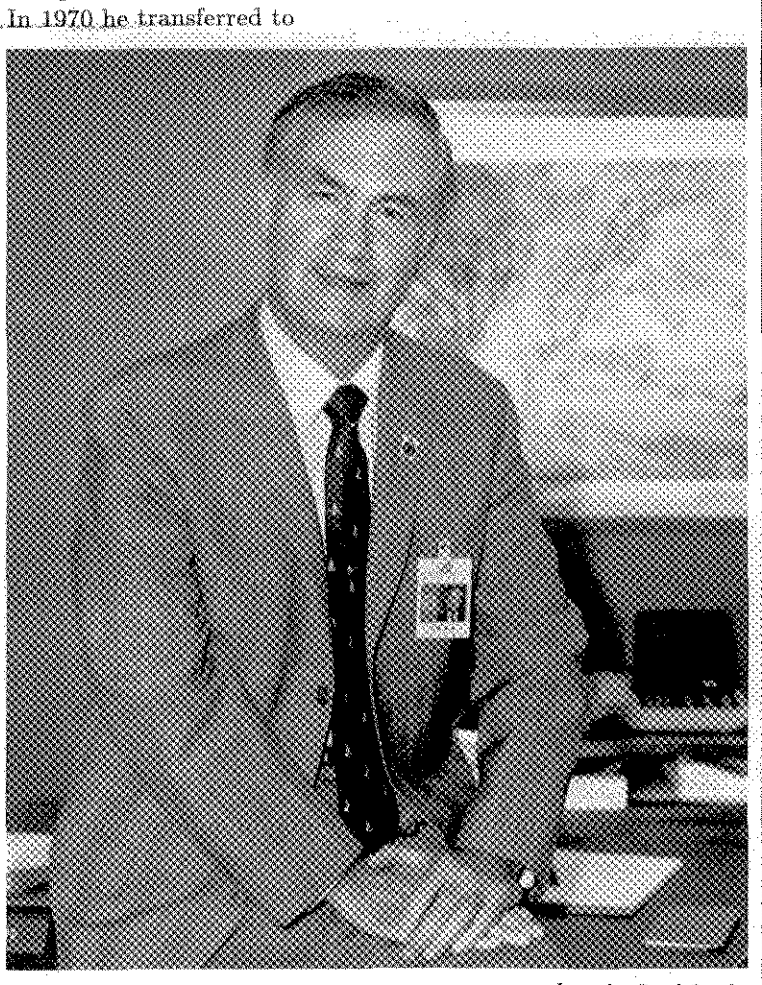
But consistent with his unique sense of humor, only a few knew that our productivity officer was making a statement by his very appearance. Williams was wearing the same suit he wore on May 4, 1959, when he entered on duty as a staffing assistant in the Personnel Division.

"At that time we were hiring for the Space Task Group. It was a very exciting time to be working at Langley and for NASA," Williams reminisces.

Reviewing the past thirty years, the bulk of his career was spent in Personnel. He was head of the Classification and Organizational Branch, executive assistant to the assistant director for Administration, and head of the Manpower Analysis Branch. In 1970 he transferred to the Ames Research Center, Mountain View, Calif., as personnel officer. He returned to Langley in 1972 as assistant personnel officer and was named chief of the Personnel Division in 1974, charged with directing overall personnel management activites.

In September 1983, he was a loaned executive at Hampton University as NASA visiting professor of management for two academic years. In May 1985, he was named special assistant for productivity improvement and has since served as the Center's focal point for productivity.

A graduate of Youngstown University, Williams earned master's degrees in personnel management from George Washington University and in public administration from Indiana University. He has taught graduate level courses for George Washington University for 15 years and will continue to work for GWU as planning coordinator for productivity, quality, and projects.



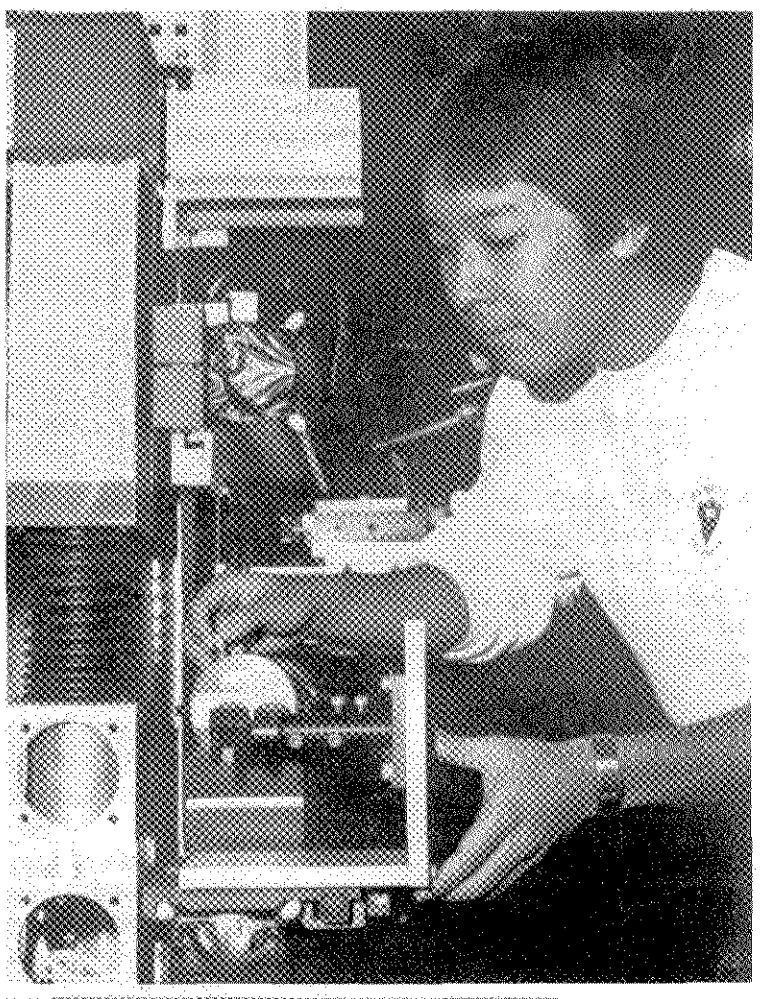
-photo by Paul Bagby

William L. "Bill" Williams makes a statement by his very appearance. Pictured on the day of his retirement, Williams wears the same suit he wore on his first day on the job at NASA Langley almost 30 years ago. That's productivity!

Notes of Thanks

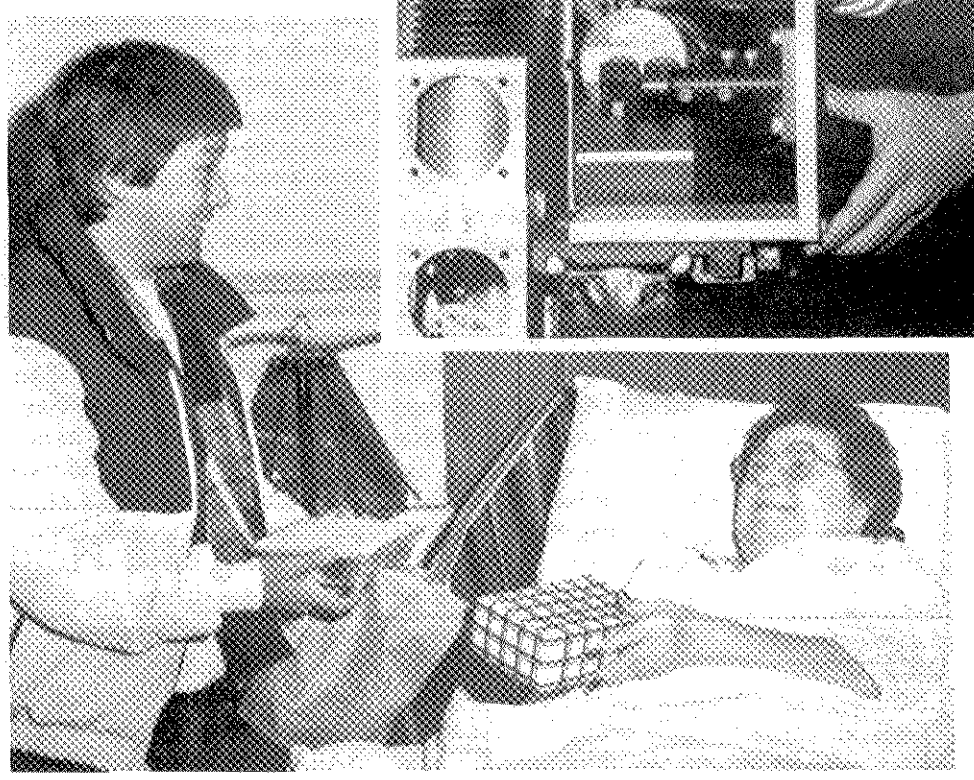
Johnny Jordan writes: "Many thanks for the wonderful retirement party recently given me and a special thanks to the ones who planned and worked for this special event for me and my family. The gifts and mementos will always be treasured."

Ed Sullivan writes: "Thank you to everyone in the Theoretical Studies Branch and Atmospheric Sciences Division for the retirement social. It was a special occasion and I will cherish the gifts."



ON CENTER (right) Derek Kamemoto makes an adjustment to the laser optics in the Basic Aerodynamics Research Facility (BARF) tunnel.

-photos by Don Ward



OFF CENTER Kamemoto delivers a hot lunch to homebound client, Pearl W. Faulk, on his regular Monday route. Mrs. Faulk appreciates Derek's kindness, "He's so nice—and always on time."

Langley Employee Skips Lunch To Bring Hot Meals To Homebound

Derek Kamemoto leads two lives. A native of Kailua, Hawaii, he is a graduate research assistant assigned to the Basic Aerodynamics Research Facility. Enrolled in the George Washington University Joint Institute for Advancement of Flight Sciences (JIAFS) program, Kamemoto is studying seeding materials for laser velocimetry applications.

On a more human plane and as part of his "other" life, he is a volunteer driver for "Meals on Wheels," a project of the Peninsula Agency on Aging. Kamemoto gives up his lunch hour two days a week to deliver lunch to those who are homebound and not able to prepare an adequate mid-day meal. Greg Jones, aerospace engineer in the Fluid Dynamics Branch and Kamemoto's supervisor, wholeheartedly supports the generous efforts of his assistant.

He was recruited by Elaine Phillips, Hampton coordinator for Meals on Wheels. Phillips is delighted with the help Kamemoto offers; he handles two routes, driving on Mondays and Thursdays. The program is so attractive because it is so well streamlined. "I map my routes very carefully so those who work, like Derek and my military drivers, can accomplish their deliveries on their lunch hour," said Phillips. The volunteers provide more than just a meal, they also provide brief daily contact to aging Peninsula neighbors. "Derek and my other drivers offer both the physical benefit of a hot, nutritious meal and the courage and friendship for positive mental health."

Meals on Wheels volunteers deliver over 82,000 meals yearly to clients in Hampton, Newport News and Poquoson. Recipients are 60 years or older, homebound and have no other means of securing or preparing an adequate mid-day meal. The program allows many of the Peninsula aging to remain in their own homes and retain some independence.

Mary Ann Wright, nutrition project director, supervises and plans the menus. "Our program is possible because of a spinoff from the NASA space program. We prepare meals in advance much like food is prepared for astronauts for consumption on space flights."

Anyone who has an hour to share between 10 a.m. and 1 p.m. can be a Meals on Wheels volunteer. Wright reports many of the drivers are retired, some are employed and deliver meals on their lunch hour or day off, even mothers with young children participate and use the opportunity to let their children see what it means to care.

Many of us are making or breaking New Year's resolutions; Derek Kamemoto lives the holiday spirit all year long. For more information on how neighbors can help neighbors, call the Peninsula Agency on Aging, 874-2495.

Happenings

LAA SOCIAL will be held Friday, January 20, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

FITNESS CENTER/GYM users please note: locks may not be left on lockers overnight. They will be cut off. Locks may be used on lockers to secure your items while you are using the facilities.

ALUMNI ASSN Annual Meeting and Election of Officers will be a dinner meeting at 6 p.m., January 18, in the H.J.E. Reid Conference Center, Building 1222.

VPI/UVA BUS TRIP, January 25 basketball game. Bus departs Patrick Henry Mall at 5:30 p.m. for Richmond Coliseum. Cost is $26 for transportation and game ticket; $13 for bus only. For details call Joe Drewry, ext. 45832, or Dave Haskins, ext. 873-1398.

LAFB OFFICERS' CLUB is undergoing a much needed kitchen renovation which was begun January 6. Club staff will do their best to provide services and meals as usual during this period.

YOGA. Beginning level yoga class for relaxation, flexibility and strength. Participants will work at their own level. Mondays, 5—6 p.m.; Building 1202, Room 215; $15/8 classes. Call Karen, ext. 41491.

SKI TRIP to Killington, VT. $268. March 10—12. Includes bus transportation, 3-day ski lift ticket, 2 nights lodging, meals. Contact Bill Dorogy 874-3969 (h) or 864-4329 (w).

LOST: Norma-brand mechanical pencil with retractable cartridges, possibly in the library, credit union or Acquisition Division. Sentimental value. Contact Les Rose, ext. 42485.

ROOMMATE. Degreed professional seeks same to share 3BR/2BA house in Foxhill. Deck, great room, fireplace, 2-car garage. $300 mo. + 1/2 utilities. Call Jay at 688-8811 (w) or 851-3339 (h).

ITEMS. Oak leaf mulch, free. Two tires, 195-75-15, will pass inspection, $12. Call 898-7072.

New Telephone System Implemented Today

Rotary dialing is a thing of the past at Langley Research Center. When you return to work January 17, following the Monday holiday, your new ROLMphone and new phone number will be your means of communication both on and off Center.

At the close of business today, "cutover" to the new system begins. The new C&P trunks, our ties to the outside world, will be installed and the current Centrex system will be deactivated.

Evidence of the new telecommunications system has been apparent for several months as workmen have pulled over 350,000 feet of copper and fiber optic cable, constructed four switch rooms and installed 6,500 telephones. Heavy construction equipment has been visible for months; trenches and huge voids have been dug to place the new cable plant. Each employee has been scheduled for and hopefully has attended telephone training. Now the Langley Research Center Telecommunications System (LaTS) is ready to be fully implemented.

The new system, designed specifically for NASA Langley, has numerous features to allow easier and quicker handling of calls. The new touchtone phones feature first number redial (save and repeat), conferencing capabilities, volume control and hands-free dialing. Each Langley employee will experience an increase in his or her vocabulary as we all learn to pick, park, camp and flash—according to the directives issued in telephone training.

Remember, starting Tuesday, your new phone extension will be your link to the outside world. Make it a point to inform your key outside contacts of your new phone number as those dialing your old number will be informed by a recording "The number you have dialed is no longer in service." Those dialing the main NASA-LaRC number will hear, "The number you have called, 865-2000, has been changed. The new number is 864-1000." On Center, we will be using a five-digit extension (4 or 5 + the individual number) to reach on-site colleagues. New directories have been distributed.

LaTS has been a monumental undertaking; this project has affected every NASA Langley employee. "The significant increase in functionality and convenience of the new system will make it well worth going through some initial difficulties in the next few weeks," says Forrest Dickinson, manager, Telecommunications Project Office.

Each employee is now in a position to make the system work for Langley.

SKI

Contact Richard Bennett, 599-5585, for details.

Feeling the Heat

Continued from page 1.

dioxide produced by the burning of fossil fuels, once believed to be the only significant source of carbon dioxide," states Levine. The NASA team is studying fires to determine the composition of gases and particulates produced during the burn.

Burning produces greenhouse gases—carbon dioxide, methane, nitrous oxide—which trap infrared heat in the troposphere, leading to a warming of the Earth. Another harmful effect of global warming could be a melting of ice at the Poles, leading to a flooding of the Earth's low-lying areas.

The Langley-led team has studied fires in diverse ecosystems in California, Florida and Canada. Discussions are underway with officials from Brazil, Sri Lanka and Australia, where our scientists would study fires in other ecosystems giving global significance to the study. **Time** magazine, January 2, 1989, has identified the trends and issued the challenge. The Levine-Cofer team has for years been concerned about our "Endangered Planet."

-photo by Fred Jones

ADVERTISING AGENCY SALUTES NASA. Adams Outdoor Advertising Inc. is proud of Langley Research Center's involvement in NASA's return to flight. Center Director Richard H. Petersen (right) is pictured with Gardner King, Adams' general manager. "Our company is very community-oriented and is especially proud of NASA's accomplishments in aerospace exploration, culminating in the flight of Discovery," said King. The Norfolk agency donated two billboards—one on the Peninsula and the other in the Norfolk/Virginia Beach area. The billboards are on a rotary system and will move every sixty days to a new vicinity in the two locations.

Researcher News

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Volume 3, Issue 2 January 27, 1989

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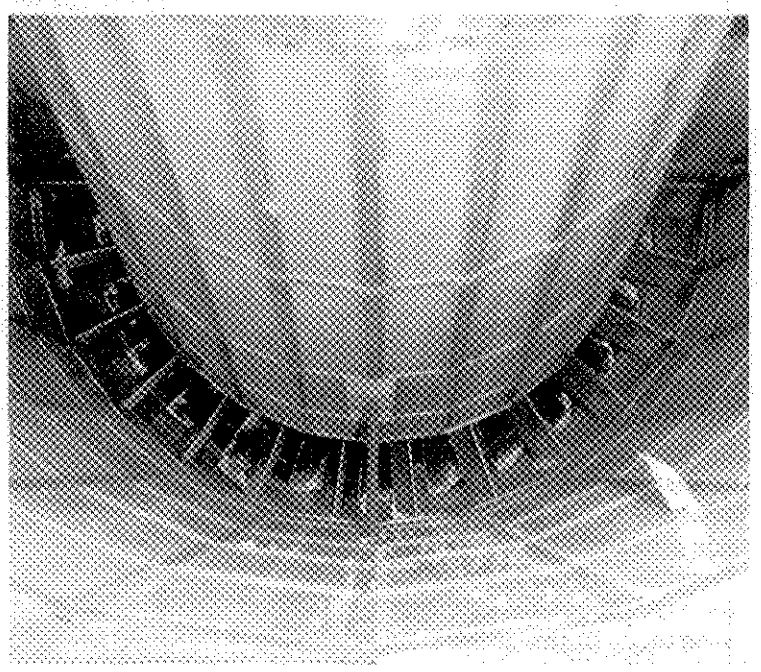
Bi-weekly Employee and Contractor Publication



NTF Mishap Damages Blades

At approximately 3 p.m., January 18, a mishap occurred at the National Transonic Facility (NTF) wind tunnel. No personal injury was reported. Upon initial inspection, it appears that one or more metal parts of the tunnel just upstream of the fan blades came loose during a routine test run. The parts struck and damaged several of the tunnel's 25 fiberglass fan blades.

At the time of the mishap, the tunnel was running in the "air" mode, without supercold cyrogenic nitrogen. Tunnel speed was about Mach .7 (approximately 500 mph) and pressure was about 2 1/2 atmospheres, both well within operating capabilities of the tunnel.

As of **Researcher News** press time, a NASA Accident Investigation Board was being formed to investigate the mishap. A formal damage assessment survey will be accomplished as part of the investigation.

The NTF, Langley's newest major wind tunnel, was completed in 1983. It is a new kind of wind tunnel capable of accurately testing models of advanced aircraft and spacecraft designs that must fly in the transonic speed range.

Gaseous nitrogen or dry air can be used as the tunnel's test medium. When the tunnel is operated cryogencially with gaseous nitrogen, heat is removed by evaporating liquid nitrogen, which is sprayed into the tunnel circuit upstream of the fan. When air is used for ambient temperature operations, heat is removed by a water-cooled heat exchanger (cooling coil).

The NTF is operated by Langley's Directorate for Aeronautics. Research programs for the NTF develop and evaluate aeronautical systems, including studies of components; develop aircraft configurations; assess and then evaluate aerodynamic designs; and perform research and technology studies of fluid mechanics and aeroelasticity.

-photos by Terry Shepard

NTF fan blades were damaged when parts of the tunnel came loose just upstream of the blades. In this close up view, damage to the fiberglass blades is apparent.

Langley Managers Receive AIAA Awards

The American Institute of Aeronautics and Astronautics has selected Langley Research Center staff members Dr. James D. Lawrence Jr. and Joseph L. Johnson Jr. as 1989 awardees.

Lawrence

Johnson

Lawrence, chief of the Atmospheric Sciences Division, received the Losey Atmospheric Sciences award. This award is named in memory of Captain Robert M. Losey, meteorological officer who was the first U.S. officer to die in World War II. It recognizes outstanding contributions to the atmospheric sciences as applied to the advancement of aeronautics and astronautics.

Johnson, head of the Flight Dynamics Branch, received the General Aviation Award. This award recognizes recent technical excellence leading to improvements in safety, productivity or environmental acceptability of general aviation.

Lawrence was cited for "scientific leadership in atmospheric sciences research which has increased the understanding of atmospheric processes and their relationship to the environment" and for "making major contributions to national programs in climate and environmental monitoring." He began his NASA career as a staff scientist in the Instrument Research Division in 1967. Head of the Atmosphere Branch from 1970 to 1972 and head of NASA's Environmental Quality Program Office from 1972 to 1976, he was named to his present position in August 1976. Lawrence is responsible for a broad program of basic and applied research to expand knowledge of the Earth's atmosphere and mankind's impact on it.

Johnson was cited for "innovative contributions to the aerodynamics of advanced configurations and stall/spin safety for general aviation aircraft." He joined the National Advisory Committee for Aeronautics in 1944. Over a period of the last 44 years with NACA/NASA he has conducted and directed low- speed aerodynamic research with emphasis on performance and stability and control of civil and military aircraft. In his current position he is responsible to formulating and directing research using a number of Langley's unique test facilities, including wind tunnels, outdoor radio-controlled free- flight dynamic model facilities and real-time piloted simulators.

The awards were presented January 10 at the 27th Aerospace Sciences Meeting in Reno, Nevada.

Langley to Celebrate Black History Live Via Satellite

Langley Research Center will kick off Black History Month with a live celebration via satellite from Washington, D.C. The two- hour program, Beyond the Dream, will be aired Wednesday, February 1, at 1 p.m. in the H.J.E. Reid Conference Center, Building 1222.

Beyond the Dream explores the contributions of Blacks to this country. Sponsored by the publishers of **Black Issues in Higher Education**, the program features leaders in education, politics, business, sports, the military, entertainment and the arts. A combination of scholarly presentations, wisdom from respected leaders, entertainment by leading artists and performers, inspiring film footage and dynamic presentations, the program consists of live discussions and pre-recorded features.

NASA Astronauts Dr. Mae Jemison and Colonel Charles Bolden, General Bernard Randolph, America's only Black active duty four-star general, and Mary Hatwood Futrell, president of the National Education Association, are among the presenters.

NASA employees, contractors, and retirees are encouraged to attend. Civil servants should charge their time to JO A-1980. The presentation will also be open to the general public. Seating is on a first come-first served basis.

Robins Named AA for Management

Dr. C. Howard Robins Jr. has been named associate administrator for management, effective January 9. He has served as deputy associate administrator for management since 1984.

Robins will replace Manuel Peralta, who left NASA to become president of the American National Standards Institute, New York City.

Robins' primary responsibility will be to help strengthen the agency's core organizational and infrastructure capabilities.

Robins joined the agency as a student aeronautical engineering trainee. He worked at Langley and the Johnson Space Center before transferring, in 1976, to the Headquarters Office of Aeronautics and Space Technology, where he managed the Orbiter Experiments Program and Long Duration Exposure Facility Program.

In 1980, Robins was appointed chief of the Mission Operations and Information Systems Branch of the Planetary Division, Office of Space Science and Applications. He was selected for the President's Executive Exchange Program in 1983 and completed an industrial assignment at Newport News Shipbuilding and Dry Dock before returning to NASA Headquarters.

News Briefs

HEADQUARTERS, Washington, D.C. — E. Ray Tanner has been named director of the Space Station Freedom Program Office, effective January 3. Tanner succeeds Thomas L. Moser who was appointed deputy associate administrator for Space Station, effective December 1.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. — A full- scale static test firing of NASA's redesigned Space Shuttle solid rocket motor was held January 19. The test was rescheduled in order to investigate an unplanned gimballing of the motor nozzle during firing preparation work. The test was the sixth and final firing required to qualify the major design features of the redesigned solid rocket motor.

SPACE TELESCOPE SCIENCE INSTITUTE, Baltimore, Md. — A group of astronomers has discovered evidence of vigorous activity in a white-dwarf star previously thought to be a stellar "corpse" incapable of such lively behavior. The white dwarf star, cataloqued 0950+139, lies at the center of a faint nebula call EGB 6 and is located about 1,500 light-years from Earth in the direction of the constellation Leo. This new and unexpected behavior may offer astronomers new insight into how stars are born, evolve and ultimately die.

HEADQUARTERS, Washington, D.C. — NASA has approved the Investigator Working Group recommendation of Dr. Ulf D. Merbold, European Space Agency (ESA) and Dr. Roger A. Crouch, NASA as candidate payload specialists for materials sciences experiments on the International Microgravity Laboratory (IML)-1 mission aboard the Shuttle Columbia in April 1991. NASA has also extended to the government of Canada through the Ministry of State (Science and Technology) an invitation to nominate two candidate payload specialists for the life sciences experiments on the IML-1 mission. Canada has nominated Dr. Roberta L. Bondar and Dr. Kenneth Money for the mission.

Revised NASA Policy Restricts Shuttle Crew

NASA has unveiled new guidelines on Space Shuttle "passengers." Crews will range in number from five to seven members and flights by non-essential persons will not be considered for a least a year.

"NASA policies and their implementation recognize that every flight of the Shuttle involves risks (and) flight opportunities will be limited to professional NASA astronauts and payload specialists essential for mission requirements," the policy said.

NASA will review Shuttle operations and mission and payload requirements annually to determine when the first opportunity for space flight participants will become available. When that first slot is available, first priority will be given to a 'teacher in space' in fulfillment of space education plans. The new policy suspends the planned 'journalist in space' program indefinitely.

In the Budget . . .

The fiscal year 1990 NASA budget asks for $13.27 billion. Major segments of the request include just over $2 billion for Space Station Freedom, nearly $2 billion for space science and applications and $2.5 billion for Space Shuttle operations.

A proposed new start in planetary exploration is the joint comet rendezvous/asteroid flyby and Cassini mission with the European Space Agency.

Also included in the budget are funds for NASA's share of the National Aero-Space Plane program, Pathfinder technologies, advanced solid rocket motor and manned flight equipment.

NASA Administrator James C. Fletcher says the budget reflects the fact that the space program is back on track.

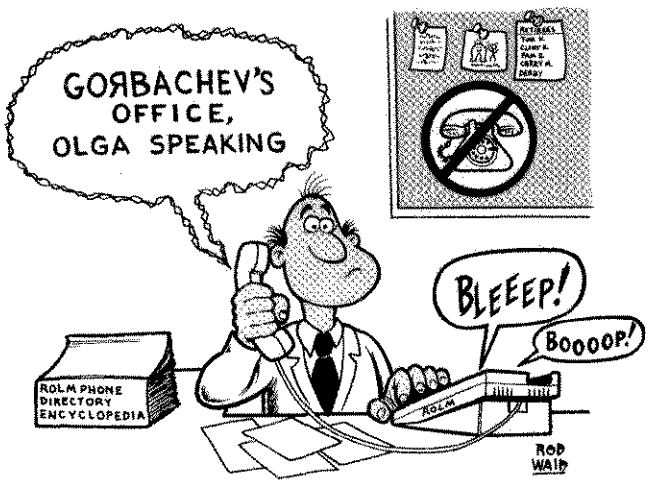
In the Sky . . .

Discoveries in the field of astronomy continue to be revealed at the meeting of the American Astronomical Society in Boston.

Evidence has been found of galaxies in a region of the universe previously thought to be void of all matter. Data was obtained from NASA's Infrared Astronomical Satellite (IRAS) launched into orbit in 1983. Although the massive void still exists, it is much smaller than originally believed.

Radio astronomer Andrew Futcher, of the Carnegie Institute, says a super-dense whirling star in our Milky Way galaxy is devouring another nearby star. The two-star system, called a black widow binary, is one of six double systems known in our galaxy. The star is spinning at a rate of 600 times per second.

Lankley



Having missed his phone class, Lankley continues making blunders with his new phone.

Just Around the Corner . . .

Apollo Anniversary

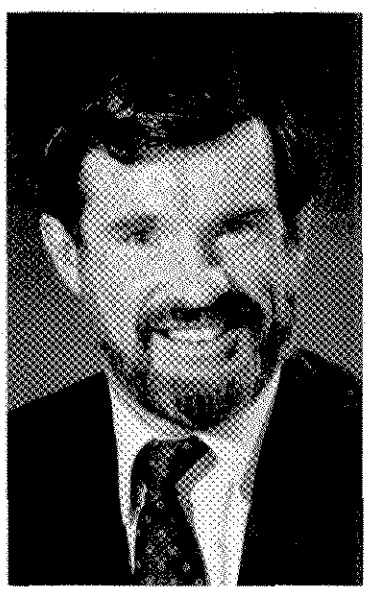
The Office of External Affairs has begun planning the 20th anniversary celebration of the first lunar landing. The office is looking for employees and retirees associated with the Apollo program who could serve as resources in gathering information for a publication on Langley's contributions to the program.

Please send your name and address to Arlene Levine, Mail Stop 154, if you can assist.

Editorials

Langley

Headquarters Forum



Each year over twenty-five NASA employees are awarded fellowships to study various aspects of management at institutions of higher learning across the United States. Last year, nine of those were from Langley.

As a member of both the LaRC committee which recommends candidates for consideration and the intercenter panel which provides Headquarters with a recommended slate of nominees, I know that people at Langley are generally aware of these opportunities. However, I also feel that there are some aspects of the fellowships and nomination process which are not clearly understood. In this article I will briefly comment on some of these aspects as well as discuss the range of fellowships which are available.

The overwhelming majority of us came to Langley Research Center to participate in technical activities—not to be managers. Nevertheless, NASA and LaRC require managers. These can be either management specialists or they can be technically oriented people who move into management positions. For direct management of research programs, I believe the latter approach is clearly preferable. The management training fellowships are designed to foster this latter approach by providing technically oriented people with some information about management concepts and methods.

The NASA management fellowships are quite varied. Their duration ranges from one week to one year and the eligibility requirements vary from GS-12 to Senior Executive Service (SES) level. Some programs offer a public sector viewpoint, while others emphasize management in a business context. All the programs are very good. With such a wide variety of fellowships, a program suitable for almost any interest can be found.

There are two points about these fellowships which may not be widely known. First, those who have participated in the programs are almost universally enthusiastic about their experience. They feel the fellowship opportunity is very rewarding—good friendships are formed which last far beyond the duration of the fellowship, and ideas and approaches are learned which can then be applied at Langley.

The second point is that applicants from Langley fare quite well in the fellowship process. As I mentioned earlier, last year nine Langley employees received fellowships and this year we will probably receive ten or eleven more. These fellowships are attainable!

Since the fellowships are beneficial, constitute a rewarding experience and are attainable, Langley managers should consider nominating future managers, and those who would like to become managers should consider the merits of applying for one of the fellowships.

J. F. Creedon
Director for Flight Systems

For further information on NASA Management Fellowships, contact Joe Mathis, ext.42592, in the Training and Education Section.

NACA Charter Available

The latest of Wesley's Berryman's *Aerospace Penpoints* is the NACA Charter. The Charter, suitable for framing, is available at the Visitor Center Souvenir Counter.

Berryman has plans for two more additions his series of aerospace s produced in calligraphy.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley Participates in Airborne Arctic Stratospheric Expedition

-by Jean Drummond Clough

NASA Langley Research Center has joined other science agencies around the world in an investigation to better understand the nature of potential depletion of stratospheric ozone over the Arctic.

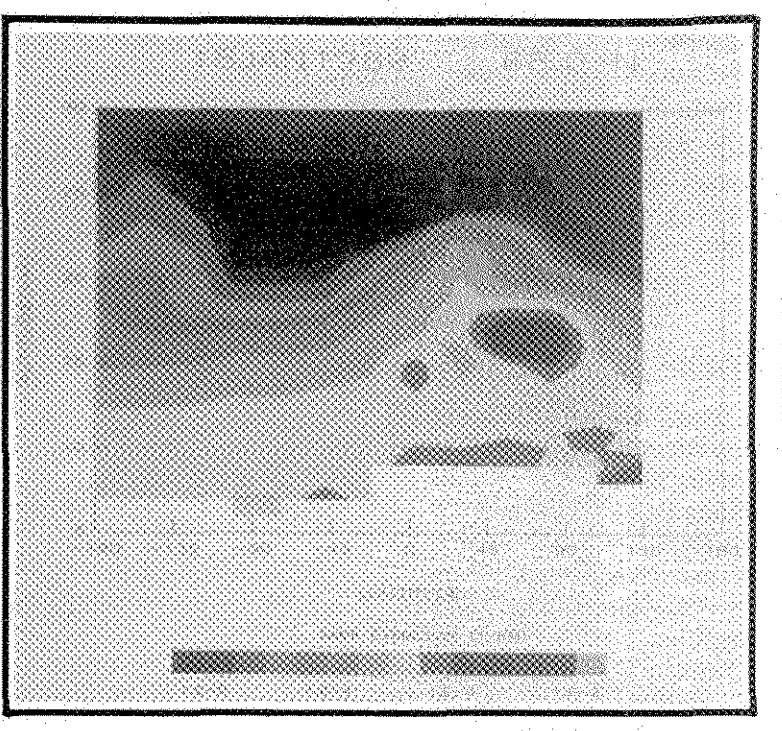
The investigation, called the Airborne Arctic Stratospheric Expedition (AASE), is a cooperative effort between NASA and the National Oceanic and Atmospheric Administration (NOAA). Over 200 scientists and technicians from the United States, United Kingdom, Germany, Denmark, the Soviet Union and Norway are participating in the study, which is similar to a study conducted in 1987 on Antarctic ozone depletion. That study directly implicated man-made chlorofluorocarbons (CFCs) as a cause of the "ozone hole" over Antarctica in the austral spring, and raised the question whether a similar phenomenon could be occurring in the Arctic, perhaps on a reduced scale.

Scientists and engineers are stationed at Stavanger, Norway, until mid- February, flying specially instrumented NASA ER-2 and DC-8 aircraft into the Arctic vortex. The timing of the flights coincides with the statistically most active period for the formation of extremely low-temperature polar stratospheric clouds (PSCs) there. Such clouds are involved in the complex processes that result in the destruction of stratospheric ozone in the Antarctic polar vortex.

Polar stratospheric clouds got their name from Langley's Dr. M. Patrick McCormick in a 1982 paper describing observations made by the Stratospheric Aerosol Measurement II (SAM II) satellite experiment for which he is principal investigator. Clouds were found in the cold polar vortex in winter at locations previously thought too dry for them to form. They were observed in both the Antarctic and Arctic, existing over most of the winter periods.

In addition to the nearly ten years of SAM II data now collected on PSCs, McCormick and his group have flown airborne missions into the Arctic, observing PSCs with a laser system developed at Langley. These missions, conducted from 1982 through 1988, have corroborated the SAM II findings and have provided supporting information on the characteristics of these clouds.

In the present AASE, Langley has three instruments from the Atmospheric Sciences Division flying aboard the DC-8 aircraft.



Peering at the sun as it rises over the Earth's horizon, the SAM II sensor aboard the Nimbus 7 satellite detects clouds in the stratosphere that block out sunlight. The figure shows these clouds between 14 to 18 km altitude over longitudes 0 degrees to 100 degrees E observed on January 18, 1989, at 68 degrees N latitude.

Aerosol lidar experiment . . .

McCormick and Dr. Lamont R. Poole of the Aerosol Research Branch are conducting a dual-polarization aerosol lidar experiment. The instrument aboard the DC-8 aircraft uses an upward-looking laser and measures the reflected light coming back into a telescope, mounted coincident to the laser. The backscattered laser light enables profile measurements of stratospheric aerosols and PSCs to be made 2 to 20 km above the aircraft. The profiles give aerosol and PSC layer location and thickness and are proportional at any altitude to the number and size of particles. In addition, the instrument analyzes two separate polarized planes of backscattered light to determine the shape or type of PSC measured.

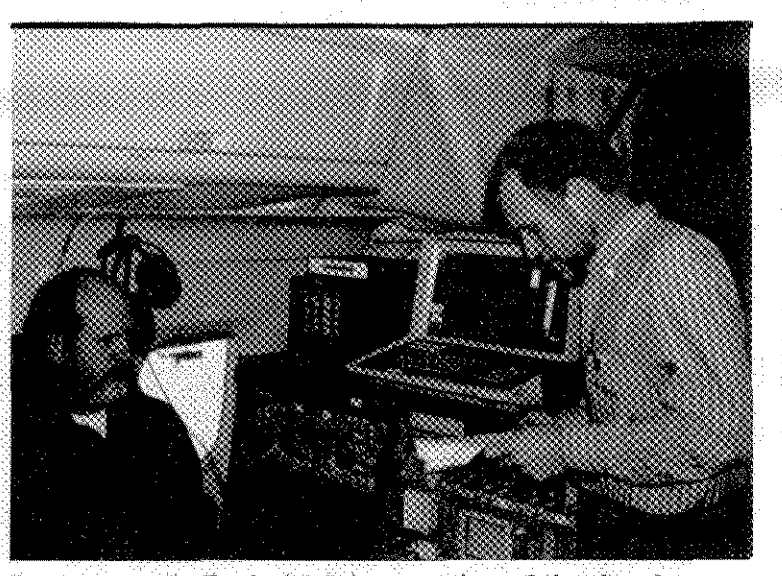
McCormick explained that "PSCs are thought to occur in two types, depending on temperature. The first (called Type I) occurs at temperatures above the frost point at about minus 80 degrees C and are consistent with the condensation of a trihydrate of nitric acid. The second (Type II) occurs at the frost point at about minus 85 degrees C and are made up of large ice particles.

"Our laser backscatter and polarization measurements allow us to separate the two types since the Type I PSCs scatter less and depolarize laser light very little (5 to 10 percent). Type II clouds produce much more backscattering and depolarization (typically 20 to 40 percent)," McCormick added.

Because of its real-time analytical capabilities, the lidar instrument provides inflight characteristics of aerosols and PSCs along the flight track to enable real-time decisions to be made during flight.

In addition, data from the SAM II satellite experiment are being processed at Langley and sent to Stavanger for planning the next flight missions.

"PSCs are necessary if there is to be an ozone hole along with the chlorine and bromine compounds," McCormick explained. "In order for ozone to be destroyed at the rates necessary as observed in the Antarctic springtime, chemistry on the surface of PSCs is necessary."



Dr. Lamont R. Poole (right), a member of the theorist team, plans flight strategy with Bill Hunt of Wyle Labs, who is working on the aerosol lidar. Poole is the only theorist team member from Langley and was chosen through an international competition.

Ozone and aerosol differential absorption system (DIAL) . . .

Dr. Edward V. Browell, Chemistry and Dynamics Branch, is conducting another experiment during the Arctic mission. He is operating an ozone and aerosol differential absorption lidar (DIAL) system. This is a remote sensing ozone detector which uses a laser ranging system to measure laser backscatter and thereby determines the profile of ozone above the DC-8 aircraft.

The DIAL system consists of four lasers which beam four wavelengths of light (300, 314, 600 and 1064 nanometers) simultaneously through a roof-mounted quartz observation window on the DC-8. The 300 and 314 near-ultraviolet wavelengths are used for ozone and the 600 and 1064 wavelengths are for the aerosol and cloud measurements.

The backscattered laser light is collected through reflector telescope optics mounted coincident to the laser transmission optics. The returned laser light is directed to separate detectors and digitized after which the signals are recorded and directed to onboard displays.

The system provides real-time color plots of ozone and aerosol/cloud distributions aboard the DC-8 for assistance in providing flight planning information. Clouds and other aerosols are mapped for a range of 1 to 11 km above the aircraft; ozone is mapped for a range of 1 to 8 km above the DC-8. The instruments provide accuracy of plus or minus 10 percent for ozone and plus or minus 5 percent for the clouds and aerosols.

"These measurements are important for observing the fine structure of ozone which is not available by any other means," McCormick said of Browell's experiment. "Ozone structure delineates regions where the stratosphere exchanges air with the troposphere and at vortex boundaries. Inside the vortex, regions of depleted ozone will be easily observable."

Dr. Edward V. Browell and Carolyn Butler, a programmer with STX, compare the real-time color plots of ozone and aerosol/cloud distribution in the Arctic region.

Continued on page 6.

Positions Open

89-2: Secretary (Stenography), GS-318-06 or 07; Office of Director for Systems Engineering and Operations, Fabrication Division. Closes January 30.

89-3: Secretary (Stenography) and Secretary (Typing), GS-318- 04 or 05; various organizations on Center. Open continuous.

Positions Filled

Marilou S. Phillips has been selected Technical Publications Specialist, Technical Editing Branch, Research Information and Applications Division, Management Operations Directorate, under CPP S-88-5.

Debra E. Watson has been selected AST. Technical Resources Management, Program Analysis Officer, Research and Development Programs Branch, Programs and Resources Division, Management Operations Directorate, under CPP 88-59.

Rosemary C. Froehlich has been selected Supervisory Contract Specialist, Research and Services Contract Branch, Acquisition Division, Management Operations Directorate, under CPP 88-66.

Linda F. McKnight has been selected Administrative Assistant, Operations Support Division, under CPP 88-67.

Passes Available for STS-29

Car passes for the next Shuttle launch, STS-29, are available on a first come-first served basis. Those who plan to be in the Florida area at the end of February and would like passes, contact Ann Suit, ext. 43305, for details.

Retirement Parties

William L. Williams will be honored at a retirement party Friday, January 27, from 5 to 7 p.m. at the H.J.E. Reid Conference Center, Building 1222. Cost is $8/person; $2 for contribution to gift only.

Dick Staib will be honored at a retirement social February 15, in the Chesapeake Room, Ft. Monroe Officers' Club. Cocktail hour from 5:30-6:30 p.m., followed immediately by a beef and burgundy buffet. Cost is $11/person or $21/couple, including gift. Send check payable to Dan Crawford, ext. 47354, or Lee Lillard, ext. 46597, at Mail Stop 157A by February 8.

Tennis Club Presents Tournament Champions

The Langley Tennis Club announces the following tournament winners. Bob Daugherty won the All Players ladder; Carol Wilson, the Women's Fall Singles tournament; Charlie Bryant, the Championship ladder and the Men's Fall Singles tournament; Carol Wieseman, the Women's ladder; R. Ranki, the Fall/Winter ladder tournament, Ed Waggoner and Charlie Bryant won the Men's Doubles tournament. Paul Bagby and Joanne Re won the Ron Amole Memorial Mixed Doubles tournament.

Tennis play in the fall/winter ladder will continue until next April when the spring tournaments are held. For more information on the tennis club, contact Tom Yager, ext. 2796. Paul Bagby and Joanne Re won the Ron Amole Memorial Mixed Doubles tournament.

TENNIS TOURNAMENT WINNERS are shown (L to R) Bob Daugherty, Carol Wilson, Charlie Bryant, Ed Waggoner and Paul Bagby.

Runners Club Announces Race Results

The UNISYS Team won the Runners Club Interdirectorate 5 KM Race held December 8. The first finisher was Steve Robbins, UNISYS, with a time of 16:53. The women's winner was Valerie Plyler, CSC, in 20:34.

Team results follow:

1st...UNISYS....Steve Robbins, Eric Thorsen, Steve Sudik, Bill Henderson

2nd...CSC.....Chris Slominski, Valerie Plyler, Jerry Plassman, Roy Hamm

3rd...TIE...Space Directorate....Mark Shipman, David Bartlett, Greg Buck, Barry Meredith

3rd...TIE...Electronics.....Pete Earls, Bob Ferguson, Joe Drozdowski, Pat Flynn

Langley Runners Club will hold the Handicap Ten Miler on Saturday, February 4, beginning at 10 a.m. in front of the H.J.E. Reid Conference Center, Building 1222. Individual start times will be based on the Fall Intercenter 10 KM results or members' standing on the club achievement chart. For more information, call Richard Shearer, ext. 47033.

Bowling Stats

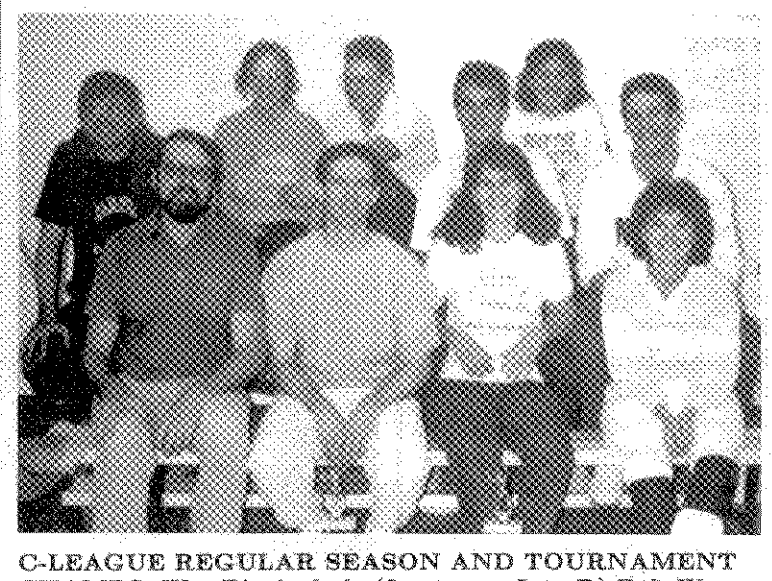
	December 13	December 20
Team High Game	942 Odd Lot	1001 Strike Force
Team High Series	2700 Strikers	2894 Strike Force
Male High Game	225 Ng Ging	234 Three-way tie
Male High Series	629 G. Andrews	634 G. Koren
Female High Game	196 S. Moran	192 S. Moran
Female High Series	500 R. Frizzell	502 R. Koren
Most Pins over Average	59 S. Moran	82 D. Banks
	59 J. P. Morgan	64 G. Bayless

	January 3	January 10
Team High Game	947 Strike Force	967 Thunderbolts
Team High Series	2726 Thunderbolts	2784 Strikers
Male High Game	242 M. Nortness	231 B. Guillotte
Male High Series	675 M. Nortness	639 D. Gates
Female High Game	199 B. Williams	192 B. Whitehurst
Female High Series	555 R. Frizzell	521 B. Whitehurst
Most Pins over Average	71 M. Nortness	69 D. Banks
	64 J. Robb	68 B. Guillotte

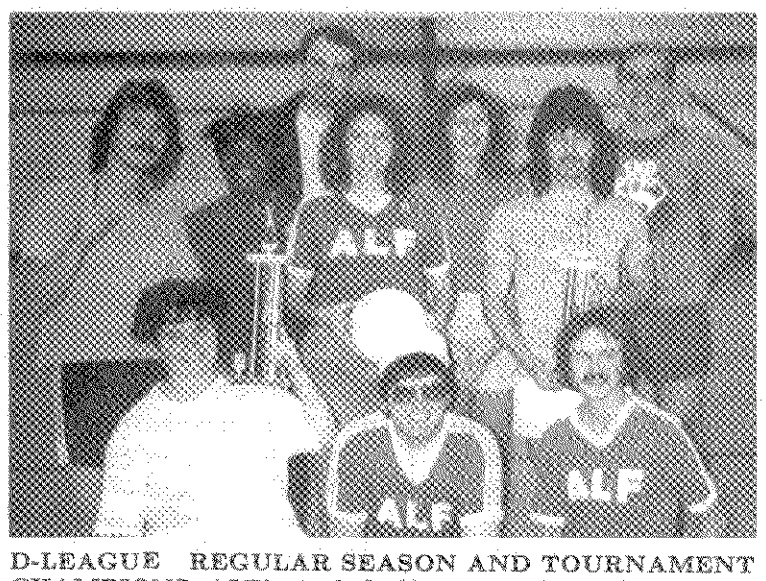
Volleyball League Season and Tournament Champs

B-LEAGUE TOURNAMENT CHAMPS, Brew Crew IV, include (front row, L to R) Bob Hess, Ellen Brantly, Margo Heaney; (back row) Jim Hall, Mark Rollins, Mike Brewer, and David Carey.

B-LEAGUE REGULAR SEASON CHAMPIONS, Wham, include (front row, L to R) Nancy Brinkley, Susie Fulton, Kam Hom; (back row) Tom Brinkley, John Burton and Jim Prohaska.



C-LEAGUE REGULAR SEASON AND TOURNAMENT CHAMPS, Was-B's, include (front row, L to R) Bob Weston, Kyle Anderson, Susie Warren, Melinda Cagle; (back row) Jim Thomas, Patricia Mattingly, Dennis Mattingly, Gary Warren, Jennifer Richardson and Mark Cagle.



D-LEAGUE REGULAR SEASON AND TOURNAMENT CHAMPIONS, ALF's, include (front row, L to R) Lynda Foernsler, Willie Wilkerson, Tim Berry; (back row) Rod Waid, Veloria Hicks, Don Hinson, Pamela Davis, Tina Hawks, Clint Reese and Tom Frasher. Not pictured are Kevin Davis, Gail McQuigg and Andre Lavoie.

Health Corner

Winter Is No Reason to 'Cool' Your Exercise Program

-by Peter Edgette

There's no need to cease your exercise program just because old man winter has arrived—particularly for the outdoor exercisers. Just keep in mind that the cold air can increase the workload placed on the heart by altering the heart rate and raising your blood pressure.

There are, however, a few guidelines to help decrease potentially dangerous situations, especially for high risk individuals.

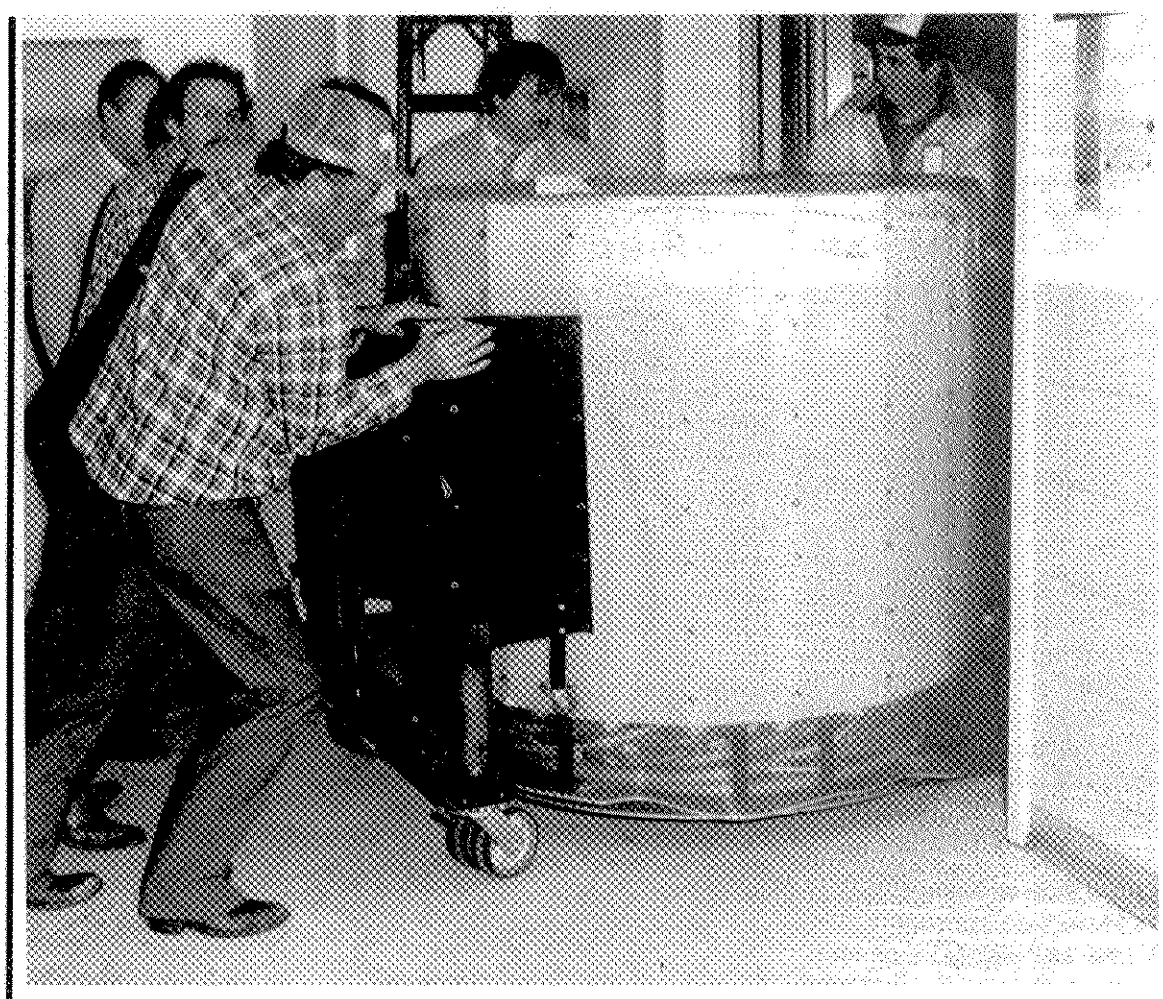
• **Dress warmly!** The two most dangerous situations for cold weather exercisers are frostbite (formation of ice crystals in tissues) and hypothermia (severe drop in internal temperature). Use layers of clothing, preferably cotton or wool, to trap warm air close to the body and keep cold air out. Wear a hat and mittens to reduce additional heat loss.

• **Do not exercise** if you have a severe cold, flu, cough or are physically fatigued. Let your body rest before returning to your exercise program and reduce your exercise intensity once you resume your program.

• **Plan your winter running** or other outdoor activity around daylight. If you do run at night, go with a partner. Wear light colors at night; bright colors in the snow.

• **Cold muscles need warming and stretching.** Warm-up indoors. Jog, cycle or do light calisthenics to increase blood flow to the muscles. Do light stretching emphasizing the muscles that will be used for the activity. You may want to start your pace more slowly to allow for body temperature adjustments and to prevent early over-sweating which can chill the body.

Peter J. Edgette is the head of the Occupational Health Services Office. Watch for more health-related information in the Health Corner.



-photo by Don Ward

Big Things Often Come in Small Packages

Langley's Cray II supercomputer is carefully removed from the elevator on the second floor of Building 1268A where it is being installed. Allied Van Lines movers Robert Weisheipl (foreground in hat) and Terry Jackson (in elevator) are supervised by Cray field engineers (in back L to R) Gene Wiesner, Mark Smith and Frank Schelb.

Ski NASA in '89

Ski the beautiful mountains of Virginia. All trips are on Thursday. Cost is $41 and includes transportation and lift ticket. Rental equipment is available at the slopes. If you need to rent equipment, please include $15 for rental fee in your check. Your check is your reservation. Mail checks to Richard Bennett, Mail Stop 397.

Trip Schedule

February 2	Wintergreen
February 9	Massanutten
February 16	Bryce
February 23	Wintergreen
March 2	Massanutten
March 9	Bryce

The bus arrives at Hechingers, Newmarket South, at 4:30 a.m. and departs at 5. Arrive at ski area by 9:30 a.m. Depart at 5 and arrive home no later than 9:30 p.m.

Trips are open to all NASA employees, contractors and friends.

Golf Association Organizes for '89

The NASA Golf Association will hold its organizational meeting at 7 p.m. Friday, February 17 in the Langley Room of the H.J.E. Reid Conference Center, Building 1222. A social hour with refreshments will preceed the meeting. Membership is open to all NASA employees and retirees. Old and new members are welcome. For additional information, call Al Bell, ext. 46304 or Vince Foretich, ext. 46310.

Management Video Conference

On February 8, Fran Tarkenton, former football star and author of **How to Motivate People, The Team Strategy for Success**, examines the practical ways in which managers can measure activity and use powerful reinforcement methods to improve it.

This Management Video Conference will be held in Building 1194A, Room 203-204 from 3-5 p.m. Those interested in attending should contact their training coordinator.

At the VC During February

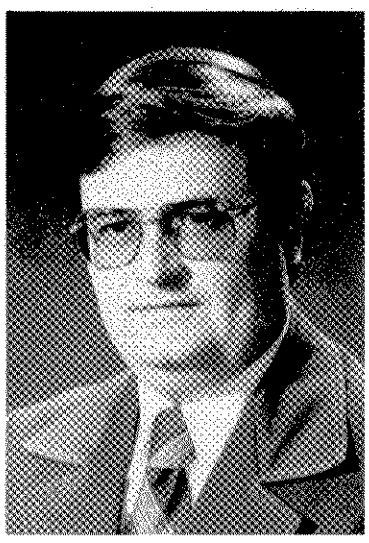
Talay Presents 'Shuttle II: The Next Generation'

In the midst of a new generation of shuttle vehicles emerging in the Soviet Union, Europe and Japan, NASA is studying concepts for Shuttle II. Langley researcher Dr. Theodore Talay will discuss "Shuttle II, the Next Generation" on Thursday, February 9, at 7:30 p.m. in the Visitor Center theater.

"The primary objective in developing a Shuttle II concept is to increase safety and reliability while reducing the cost of manned operations in lower Earth orbit," explains Talay. "It is anticipated that Shuttle II will be operational around the year 2010. By then, NASA technology will have gone far beyond the 1970s technology of the current Space Shuttle."

A two-stage Shuttle II vehicle has been proposed to meet the expected traffic demands of the 21st century. A change in design philosophy will have simple, reliable systems taking precedence over ones designed to maximize performance.

Talay is a research engineer in the Vehicle Analysis Branch, Space Systems Division. He began his career with NASA in 1970. Presently Talay leads an engineering team studying advanced manned launch system concepts.

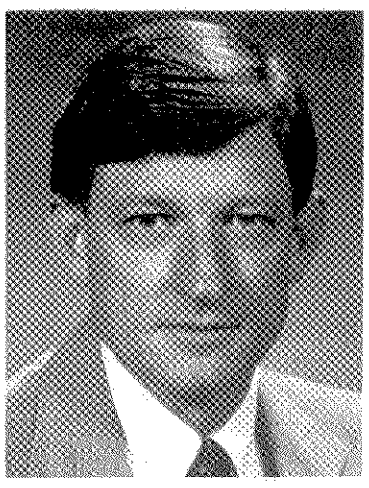


Verstynen Outlines LaRC Aircraft Operations

Harry Verstynen will discuss "Aircraft Operations at NASA Langley" on Wednesday, February 15, at noon in the Visitor Center theater. This presentation is part of the Winter Guest Lecture Series sponsored by the Visitor Center and the AIAA-Hampton Roads Section Student Branch.

Verstynen will give an overview of flight test operations at Langley, including a summary of current flight projects and the research facilities available through the Aircraft Operations Branch. This will include a review of how flight research projects are initiated, approved, planned and conducted with an emphasis on the processes employed to assure flight safety. Verstynen will also discuss the types of specialized personnel and equipment required to conduct research aircraft operations.

Verstynen is head of the Aircraft Operations Branch, Low-Speed Aerodynamics Division. He holds an airline transport pilot certificate and a flight instructor certificate with ratings for single- and multi-engine aircraft, instruments and helicopters. He has accumulated over 2,500 hours in more than 65 different types of aircraft.



Happenings

LAA SOCIAL will be held Friday, February 3, from 4 to 6:30 p.m., in the H.J.E. Reid Conference Center, Building 1222. A special Valentine social will be held Friday, February 10, from 4 to 7 p.m.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, February 14, 7:30 a.m., in the H.J.E. Reid Conference Center. Concerns to be brought before the board should be addressed to the appropriate chairperson.

YOGA. Beginning level yoga class for relaxation, flexibility and strength. Participants will work at their own level. Mondays, 5-6 p.m.; Building 1202, Room 215; $15/8 classes. Call Karen, ext. 41491.

SKI TRIP to Killington, Vt., March 10-12. Cost is $268 and includes bus transportation, 3-day ski lift ticket, 2-nights lodging, food. Contact Bill Dorogy at 874-3969 (h) or ext. 44239.

BUSINESS CARDS can be ordered through the Visitor Center Souvenir Counter. Stop by or call ext. 41585 for details.

ROOMMATE. Degreed professional seeks same to share 3 BR/2BA house in Foxhill. Deck, great room, fireplace, 2-car garage. $300 mo. + 1/2 utilities. Call Jay at 688-8811 (w) or 851-3339 (h).

I FLY ANYWHERE. Private pilot willing to share expenses. Call 865-2466 or 864-4778. Ask for Claudio Egalon.

FOUND: A book entitled **Introduction to Spectroscopy: A Guide for Students of Organic Chemistry**, by Donald L. Pavia et. al., has been found in the Technical Library. Please call Effie, ext. 42354, to claim.

HELP: Anyone who has a projection screen signed out, please call Ken Dreyer, ext. 46365.

WANTED: Carpool members from Windsor or Smithfield on the 7 a.m. shift. Call Lamb, ext. 43021, or Phillips, ext. 46553.

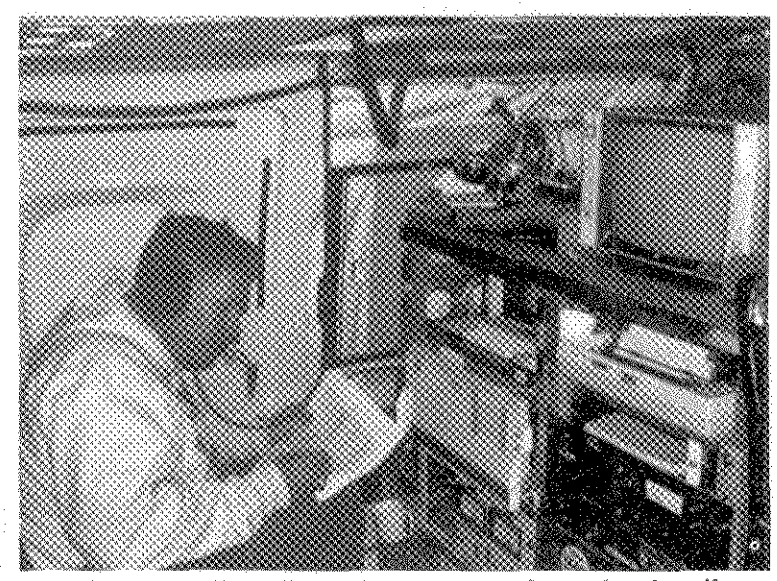
GIFT SUGGESTION: Give your Valentine a **Bear Hug from NASA** for Valentine's Day available at the Visitor Center Souvenir Counter.

Langley Participates in Arctic Expedition

Continued from page 3.

Dr. Gerald L. Gregory, Atmospheric Studies Branch, is conducting a direct measurement experiment which draws an outside air sample into the instrument and then uses a chemical reaction between ozone and ethylene to measure the concentration of ozone at flight level. The ozone-ethylene reaction occurs on a molecular basis and the resulting chemiluminescence is observed by a photomultiplier tube. The technique is accurate to within five parts per billion, can detect as few as two parts per billion ozone, and provides a real-time display of ozone aboard the aircraft important for delineating regions of stratospheric intrusions of high ozone laden air. The air sample is obtained through a specially designed probe mounted external to the aircraft.

In addition to the measurements of ozone, measurements of aerosol distributions and PSCs are observed with the DIAL system in a similar manner to the other Langley lidar.



Dr. Gerald L. Gregory reads a printout from the chemiluminescent ozone detector aboard the DC-8 aircraft.

Dr. Adrian Tuck of NOAA's Aeronomy Laboratory is the project scientist. Personnel from NASA's Ames Research Center, Moffett Field, Calif.; Jet Propulsion Laboratory, Pasadena, Calif.; and Goddard Space Flight Center, Greenbelt, Md., also are participating in the expedition.

Other Langley participants include Susan Warren, Arlen F. Carter, Bill Rouse and Warren Hypes, Atmospheric Sciences Division; Charles H. Hudgins, Donald R. Bagwell, Loyd W. Overbay, Jerry A. Williams and William J. McCabe, Operations Support Division; Bill Hunt and Judith Moore of Wyle Labs; Geoff Kent, STC; Cathy Powell, Mary Osborn and Carolyn Butler, STX; and Neal Mayo, Planning Research Corporation.

Researcher News

National Aeronautics and Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

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Abstract art or concrete science?

See feature article on page 3 for details of Langley's participation in the Arctic Stratospheric Expedition.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 3 February 10, 1988

News Researcher

Bi-weekly Employee and Contractor Publication

Aeronautics Directorate Reorganizes

Langley's Director for Aeronautics, Roy V. Harris Jr., announced a reorganization of the Aeronautics Directorate at an all-hands meeting held January 17.

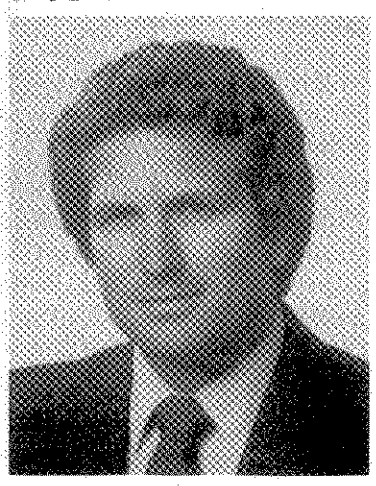
Harris outlined the following reasons for the reorganization: to improve communications with industry, the Department of Defense and NASA Headquarters; to better align Aeronautics Directorate divisions with their functional responsibilities and agency aeronautical program thrusts; and to improve facility planning within the Aeronautics Directorate.

The reorganization affects three of the four divisions (alignment by speed regimes was eliminated), the Hypersonic Technology Office, and creates a new Facilities Planning Office. Discipline research branches are realigned under three new divisions: the Applied Aerodynamics Division headed by P. J. Bobbitt, the Fluid Mechanics Division headed by Dr. D. L. Dwoyer, and the Flight Applications Division. The Chief of the Flight Applications Division will be selected through competitive placement.

R. A. Jones will head the Hypersonic Technology Office and L. W. McKinney will head the Facilities Planning Office. C. M. Jackson remains head of the Advanced Vehicles Division.

Harris also announced that the Center Director has named Joseph W. Stickle, former head of the Low-Speed Aerodynamics Division, to the new Senior Executive Service (SES) position of Center Chief Engineer. In this new position in the Office of the Director, Stickle will be responsible for special studies for the Center.

Ballhaus Returns to Ames



Dr. William F. Ballhaus Jr. has returned to the Ames Research Center, Mountain View, Calif., and resumed his position as center director. Ballhaus had accepted a one-year assignment as acting associate administrator for aeronautics and space technology, NASA Headquarters, which began February 1, 1988. He will continue to serve in this position until a replacement is named.

For the past year, Ballhaus has directed NASA's aeronautics and space research and technology development programs and was responsible for the institutional management of NASA's Ames, Langley and Lewis research centers.

Langley Employees Lauded for Return-to-Flight Efforts

NASA continues to celebrate the outstanding success of STS-26, the flight of Discovery and the agency's return to space. Rear Admiral Richard H. Truly, associate administrator for Space Flight, visited Langley January 23 to present awards to individuals and groups whose outstanding contributions had significant impact on the success of the Space Shuttle recovery mission.

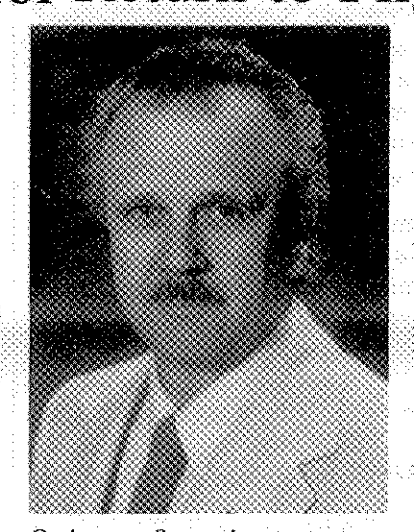
Center Director Richard H. Petersen shared Truly's enthusiasm for Langley's efforts. "The orbiter Discovery carried with it our prayerful hopes and expectations for the future. We rejoiced with the Nation when Discovery landed successfully." Petersen assisted Truly in the presentation of awards.

John A. Tanner was presented the Exceptional Engineering Achievement Medal "for planning, coordination and execution of a series of programs which significantly improved the safety of Space Shuttle landings." Tanner directed efforts to define and expand the Shuttle cross-wind landing capability, to study the feasibility of water landing capability and an emergency net arrestment system as well as to provide astronaut training on Shuttle tire wear. Tanner, who has 22 years of aircraft landing dynamics experience, is head of the Landing and Impact Dynamics Branch.

Exceptional Service Medals were presented to four Langley researchers.

David H. Butler was honored "for engineering management of the Shuttle SRB-ETA Partial Ring Redesign resulting in an improved design for the Shuttle SRB-ETA Ring." Butler led a Langley team of engineers and technicians who worked closely with the Marshall Space Flight Center to solve a major design problem–bolt failures evident in the existing solid rocket booster-external attachment ring. Under Butler's leadership, a tapered ring that provided uniform bolt loading was developed. Butler, an aerospace engineering technican in the Spacecraft Systems Section, has been a Langley employee for the past 33 years.

Mickey R. Gardner was cited "for exemplary dedication and performance in the development of test fixtures and accumulation of data pertinent to the solution of SRB "O" ring seal anomalies." Gardner designed a quarter- scale model of the 12-foot diameter SRB



O-ring configuration to test sealing characteristics under varying conditions and in a controlled environment. This three-year effort contributed to the improved design of the Shuttle vehicle and the mission success of STS-26. Gardner is an engineering technician in Technical Support Section B.

Norman F. Knight Jr. was selected "for outstanding contributions in structural analysis of the O-ring joint and aft skirt of the Shuttle solid rocket booster." Knight contributed to the development of an accurate stress analysis for the O-ring joint and to determining the design parameters which influence the response of the joint to ground and flight loads. He also made significant contributions to verifying the accuracy of the structural analysis model of the aft skirt. These models were used in final certification of the flight hardware articles. Knight is an aerospace engineer in the Structural Mechanics Branch.

Cynthia L. Lach was honored "for establishing critical O-ring sealing parameters for the Shuttle SRB field joint redesign. Lach examined the effects of surface finish, vibrations and contamination on the sealing performance of O-rings. Her research focused on identifying the gap opening rates and temperatures under which candidate O-ring materials would maintain a seal during simulated Shuttle launch conditions. Her tests verified that the redesigned leak check procedure can detect contaminants as small as 0.001 inch. Lach is an aerospace engineer in the Mechanics of Materials Branch.

Group Achievement Awards were presented to three Langley teams which supported NASA's return to flight effort.

The LaRC Crew Escape Studies Team was cited "for quick response design, analysis and testing associated with the development of unique Shuttle-orbiter crew escape concepts." Joseph D. Pride Jr., head of the Aeronautical Systems Section, accepted for the team. Team members include Larry J. Bement, Edward A. Crossley, Kurt N. Detweiler, Mark T. Lord, Homer F. Rush, Michael W. Tyree, Systems Engineering Division; Bernard Spencer Jr., George M. Ware, Space Systems Division; George D. Ware, Facilities Engineering Division; and Fred H. Austin, Low-Speed Aerodynamics Division.

The LaRC Solid Rocket Motor NDE Team was honored "for advancing NDE ultrasonic and thermal technology applied to the Shuttle solid rocket motor and technology transfer to Morton Thiokol, Inc., resulting in procedures and analysis for improved reliability for STS-26." Eric I. Madaras, assistant head of the Nondestructive Measurement Science Branch, accepted for the team. Additional team members are D. Michele Heath, Joseph S. Heyman, Patrick H. Johnston, Robert S. Rogowski, F. Dale Stone, William P. Winfree, Instrument Research Division; Doron Kishoni, Christopher S. Welch, The College of William and Mary; Barry T. Smith, Christopher Newport College; and Milford S. Holben, Planning Research Corporation.

The Shuttle Orbiter Ascent Separation Study Team was selected "for demonstrating the feasibility of aerodynamically separating the Shuttle orbiter from the external tank during ascent with the solid rocket boosters firing." William I. Scallion,

Continued on page 2.

News Briefs

JET PROPULSION LABORATORY, Pasadena, Calif. — A new digital, visual-filtering technology will offer new hope to sufferers from maculopathy or central spot blindness. Such people, mostly elderly, can no longer read or see fine detail, because of degeneration of key retinal cells in the eye. The technology is based on digital image processing, originally developed at JPL to enhance the first pictures of Mars obtained by the Mariner 4 spacecraft in 1965.

JOHNSON SPACE CENTER, Houston, Texas — NASA officials at JSC have released a request for proposal for continued studies and design of an unmanned reusable reentry satellite (RRS) that could significantly expand NASA's capability to investigate the weightlessness environment. The RRS, call LifeSat when carrying life science payloads, will be placed into Earth orbit by an expendable launch vehicle, reserving the National Space Transportation System for activities requiring crew presence.

DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. — Researchers and pilots at NASA Ames-Dryden Flight Research Facility have completed flight tests on the first experimental forward-swept-wing X-29 aircraft and are planning high angle flight tests, now scheduled for spring 1989, for the second X-29. Investigations of the X-29's flight controls, flying qualities and its extensive use of composite materials have shown that the forward-swept-wing concept is practical and have added to the data base for the design of future aircraft.

HEADQUARTERS, Washington, D.C. — NASA has requested proposals from industry for a ground-based radar that will quantify and characterize debris orbiting between 180 to 360 miles above Earth. The radar would have the capability of detecting debris as small as one centimeter in diamerer, contrasted with the ten-centimeter capability of current radar systems. The data gathered by the orbital debris radar are needed for designing the permanently manned Space Station Freedom.

JET PROPULSION LABORATORY, Pasadena, Calif. — NASA's JPL has established a new scientific instrument project office to develop and design a major new system for observing Earth's atmosphere. The instrument, called the Atmospheric Infrared Sounder (AIRS), was selected in late November 1988 to ride aboard the Earth Observing System (EOS) polar orbiting platform as a facility instrument, beginning in the 1990s. The AIRS system will provide global, three-dimensional information on the temperature and composition distributions in the atmosphere (including humidity and clouds) as well as climate-related properties of sea and land. It will also measure and help map ozone and various other greenhouse gases.

HEADQUARTERS, Washington, D.C. — NASA's Dr. Lennard Fisk, associate administrator of the Office of Space Science and Applications, and Dr. James Wyngaarden, director of the National Institutes of Health (NIH), appointed a panel to explore a variety of cooperative and complementary programs in biomedical research. Joint programs, ground-based and space-flight, would investigate the biological changes in living organisms that occur or could occur during or after space flight.

Return-to-Flight Honorees

Continued from page 1.

senior aerospace research engineer in the Experimental Aerodynamics Branch, accepted for the team. Team members include Bernard Spencer Jr., George M. Ware, James C. Young, Chris J. Naftel, Richard W. Powell, Space Systems Division; Edward G. Carden, Archie L. Johnson III, Fabrication Division; Vernon E. Watkins Jr., Systems Engineering Division; and John T. Findlay, Flight Mechanics and Control, Inc.

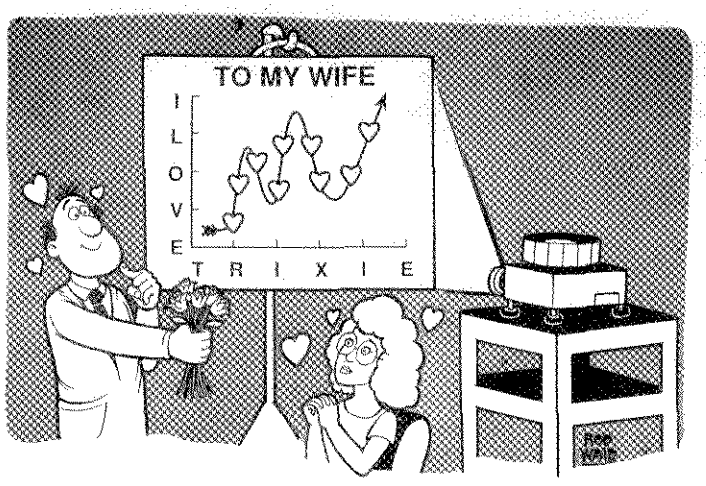
Certificates of Appreciation were awarded to **Wolf Elber** "for initiating and directing the development of critical O-ring sealing parameters for the Shuttle SRB field joint redesign" and to **James C. Newman Jr.** "for exceptional contributions to the Shuttle Recovery Program in conducting stress and fracture mechanics analyses of various Shuttle hardware."

Elber is director of the Aerostructures Directorate, U.S. Army Aviation Research and Technology Activity at Langley. He was codesigner of the unique quarter-scale bore seal fixture used to test O-ring sealing characteristics under varying conditions and in a controlled environment. He looked at the original O-ring material, Viton, used on Challenger in terms of temperature, grease, vibration and pressurization to determine the cause of the failure. Elber began his NASA career in 1972 and has specialized in fatigue crack growth in metals and in fracture and impact resistance in composites.

Newman is a senior scientist in the Materials Division. He made substantial contributions to the Shuttle recovery program by performing detailed stress analyses of the original field joint, the new "capture-tang" field joint, and the aft skirt. Newman also performed fracture- mechanics tests and analyses of the aft-skirt welded joint, the external tank attachment ring and the solid rocket booster material. Employed at Langley since 1964, Newman has specialized in fracture mechanics, elasticity, plasticity and metals.

Truly noted that the efforts leading to the STS-26 success covered a span of two years and eight month, during which approximately 24, 000 individuals— civil service and contractor— were directly involved in the program.

Lankley



Straining his creativity to the limit, Lankley projects his undying love to his wife, Trixie.

NASA Announces Program for a Drug-Free Workplace

NASA Administrator Dr. James C. Fletcher has announced that in support of an executive order calling for a "Drug-Free Federal Workplace," the agency will implement a broad-based program.

Fletcher stressed that the NASA program considers "the unique nature of its work force and the limited scope of drug abuse in the agency." Consequently, the program strongly emphasizes education, training and assistance through the NASA Employee Assistance Program (EAP), coupled with a limited degree of drug testing, as the most effective means of ensuring a continuing drug-free workplace.

"NASA recognizes that drug abuse is debilitating and that prolonged illegal drug use makes it progressively more difficult for the individual to refrain from such drug use. NASA will continue to extend a helping hand to any employee who may be experiencing a problem related to such drug use by encouraging the employee to take advantage of the existing services provided by the NASA EAP," Fletcher said in a letter to all NASA employees.

Fletcher said that employees who occupy "sensitive" positions, as defined in the NASA program and determined by NASA management, will be subject to random drug testing. Included among the agency's sensitive positions are: all senior level management personnel, including the administrator and his deputy, as well as all center directors; flight-related personnel such as astronauts, pilots, mission and payload specialists, flight controllers, test directors and other scientific and engineering personnel involved in the actual planning and managing of manned and unmanned flight-related activities; research personnel such as scientists, engineers, technicians and mechanics; and safety-related personnel such as criminal investigators, firefighters and quality assurance specialists.

He also said that, while drug testing may be required if there is a reasonable suspicion of illegal drug use or an accident or unsafe practice, all drug testing will be conducted in accordance with the mandatory guidelines for federal workplace drug testing programs issued by the Department of Health and Human Services.

Questions and Answers

In an interview with Peter J. Edgette, head of the Office of Occupational Health Services, the following questions related to the Langley program were addressed:

Q. What type of testing will be initiated as a result of the executive order?

A. Langley will follow NASA guidelines and conduct testing on a **random** basis.

Q. Who will be tested at Langley?

A. Langley has identified 242 sensitive positions, of which ten percent (24 civil servants) will be tested yearly. Testing will be conducted on a quarterly basis.

Q. When will testing begin?

A. Testing may not begin prior to 60 days after the Langley workforce has received notification of the program, or March 28. As of **Researcher News** press time, a date for the initial testing has not been scheduled.

Q. Will testing of ten percent of the identified positions yearly (24 of the almost 3,000 civil service workers at Langley) provide a valid indication of a drug-free workplace?

A. The main thrust of the program is drug awareness and education. This coupled with limited testing hopefully will provide a drug-free workplace for the safety of all government employees.

And in a separate issue, according to NASA policy . . . .

Q. Are NASA's contractor workforce also subject to drug testing?

A. The provisions of Public Law 100-690 require that, for contracts and grants awarded on or after March 18, 1989, all contractors and grantees must certify that they will provide drug-free workplaces.

As of **Researcher News** press time, NASA has decided to roll Discovery to the lauch pad in preparation for STS-29. In addition, NASA will proceed with a plan to changeout all three high pressure oxidizer turbopumps (HTOTP) in Discovery's main engines, leading to a launch in mid-March. A launch date will be set at the flight readiness review.

More than just fluff

Effects of Clouds on Climate Measured by NASA Project

-by Arlene S. Levine

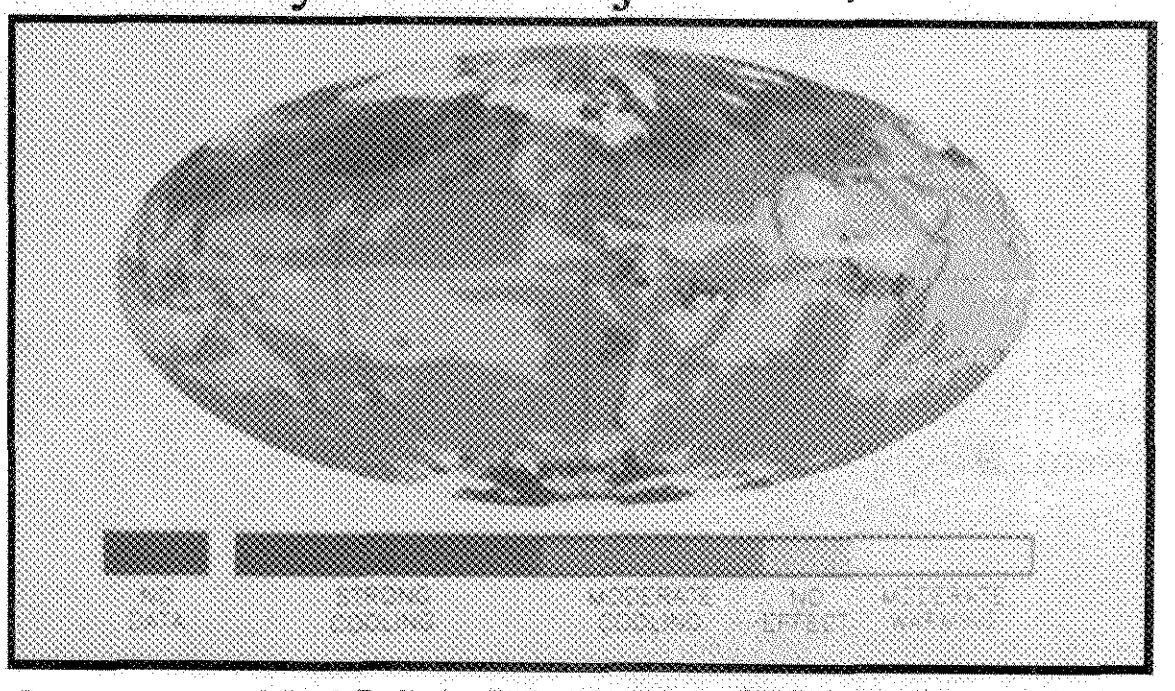
The most accurate Earth radiation budget measurements ever made have been provided by Langley's Earth Radiation Budget Experiment (ERBE). These measurements confirm that clouds result in a net cooling of the Earth.

This research was reported in the January 6 issue of **Science**, published by the American Association for the Advancement of Science. Previously, atmospheric scientists were divided on the net impact clouds have on the Earth's temperature.

The ERBE results are important because they accurately demonstrate that clouds, on average, act to moderate temperatures in our current climate. These measurements serve as the baseline for climate modelers to determine whether clouds will partially offset or enhance the warming of the Earth due to the greenhouse effect.

Greenhouse effect is the term given to the warming of the Earth's atmosphere and surface resulting from increased concentrations of gases, such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbons.

The major uncertainty in our current ability to assess the future impact of greenhouse gases is the effect of clouds. ERBE has given climate modelers some very specific numbers to test and against which to validate their models.



Computer-generated Earth Radiation Budget Experiment (ERBE) data shows net cloud forcing, clouds heating and cooling the Earth. The data shown was gathered in April 1985 and indicates that clouds reflected back to space considerably more radiation than they trapped in the atmosphere and the surface. Without cloud cover, the Earth would be about 20 degrees F warmer.

A little background . . .

At any given time, clouds cover about 60 percent of the Earth. Wispy, high- altitude cirrus (ice) clouds generally tend to warm the surface. They reflect less solar energy back to space than stratus and cumulus (liquid water) clouds. Because they are so high in the atmosphere, ice clouds are more efficient at trapping the infrared heat energy emitted by the Earth and the atmosphere. Low-level water clouds not only shade the Earth's surface from the sun's rays better than high-altitude ice clouds, they emit almost as much infrared radiation as a cloudfree Earth. The net effect of clouds on surface temperature depends on how these different cloud types are distributed over the globe.

The first of the three ERBE satellites, the Earth Radiation Budget Satellite, was launched by the Space Shuttle Challenger in October 1984. National Oceanic and Atmospheric Administration weather satellites NOAA-9 and NOAA-10, launched in December 1984 and September 1986, respectively, also carried the ERBE instruments. The ERBE provided the first opportunity to measure the three components of the Earth's radiation balance with identical instruments flying simultaneously on separate satellites. ERBE's instruments measure the solar radiation striking the Earth and the solar radiation reflected by the Earth. These two measurements determine how much solar energy is absorbed by the Earth. The absorbed solar radiation heats the Earth's surface. The infrared radiation emitted by the Earth and its atmosphere is also measured. This emitted radiation cools the surface of the Earth.

-photo by Terry Shepard

Three members of the ERBE science team examine an image from the Earth Radiation Budget Experiment that shows where clouds heat and cool the Earth. Langley authors of the *Science* paper are (standing L to R) Dr. Bruce Barkstrom, ERBE science team leader, Ed Harrison, head of the Radiation Sciences Branch; and (seated) Patrick Minnis, ERBE science team co-investigator. The data is a result of a month's worth of processing by Langley's Analysis and Computation Division.

New findings . . .

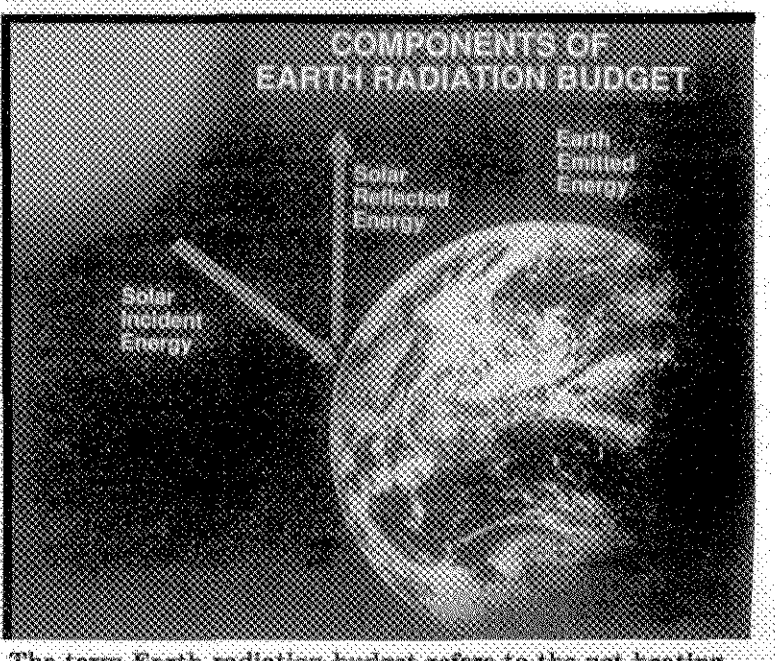
The ERBE measurements indicate that in April 1985, clouds reflected back to space considerably more radiation (13.2 Watts per square meter) than they trapped in the atmosphere and the surface. This loss of radiation due to the clouds is approximately equivalent to a 10-30 degrees Fahrenheit (5-15 degrees Centigrade) decrease in the global surface temperature. Thus, barring changes in any other variables, the Earth would be about 20 degrees F warmer without any cloud cover. In comparison, climate modelers believe that a doubling of carbon dioxide in the atmosphere would result in a warming of about 4-8 degrees F (2-4 degrees C).

Global warming would change circulation patterns, altering the climates and growing seasons of many regions over the globe. Significant warming would also melt large amounts of ice and snow in the polar regions, increasing the height of the world's oceans. Changes in global circulation patterns would also change the distribution of cloudiness over the globe.

The ERBE data confirm earlier reports of global cloud cooling effects based on poorly sampled, less accurate satellite measurements. The data also reveals for the first time the regional distribution of cloud effects over the globe. Langley scientists Patrick Minnis and Edwin F. Harrison published the first paper in 1984 showing the regional cloud effects over part of the Earth. They used data from a weather satellite which only observes North and South America. The ERBE satellites view all of the Earth with sensors which are much more accurate than those normally carried on weather satellites.

NASA has a long-term program for studying climate change; ERBE is the first step in that program. ERBE is a national and international effort supported by several government agencies and universities. The ERBE satellite instruments were developed at Langley and the TRW Corporation, Redondo Beach, Calif. Langley is responsible for the data analysis. The ERB Satellite (ERBS) was developed at NASA Goddard Space Flight Center, Greenbelt, Md., and Ball Aerospace, Boulder, Colo. NOAA supplied the two weather satellites, NOAA-9 and NOAA-10.

The authors of the **Science** paper are Veerabhadran Ramanathan and Ejaz Ahmad from the University of Chicago, Robert D. Cess from the State University of New York at Stony Brook; Edwin F. Harrison, Patrick Minnis and Bruce R. Barkstrom from Langley; and Dennis Hartmann from the University of Washington.



The term Earth radiation budget refers to the net heating or cooling of the Earth measured by the amount of solar radiation striking the Earth, the amount of solar radiation reflected by clouds and the Earth's surface and the infrared radiation emitted by the Earth. The most accurate Earth radiation budget measurements ever made have been provided by Langley's Earth Radiation Budget Experiment.

Positions Open

89-6: Aerospace Engineer, GS-0861-14 or 15; Office of Director for Structures, Acoustics Division. Closes February 22.

89-7: AST, Data Systems Electronics Engineer, GS-0855-09; Office of Director for Flight Systems, Information Systems Division, Information Processing Technology Branch. Closes February 16.

Engineer's Week Awards Banquet

The Peninsula Engineer's Council will mark National Engineers Week with an awards banquet February 25 at the Holiday Inn-Williamsburg Patriot. Guest speaker will be Dr. Hans Mark, distinguished nuclear physicist and former Deputy Administrator of NASA. Mark now heads the University of Texas System.

Events begin with a social (cash bar) at 6 p.m., dinner is at 7 and program begins at 8 p.m. In addition to Mark's presentation, the 1988-89 Peninsula Engineer of the Year will be introduced. A dance, featuring Langley's Charlie Johnson Band, follows. Cost is $18 per person. Contact Abraham Leiss, 877-2939, or Don Avery, ext. 46053, by February 21 for reservations.

Airplane Contest

The Hampton Roads Section of the AIAA is sponsoring a paper airplane contest in celebration of Engineer's Week. The contest will be held Saturday, February 25, at Newmarket North Mall from 11 a.m. to 1 p.m.

The categories for entries are Category I: grades 3-5; and Category II: grades 6-8. There will be two events in each category: endurance and accuracy. No entry fee is required and prizes will be awarded. For additional information, call Linda Bangert, ext. 43022 or 249-2237.

Notes of Thanks

Ann Worth writes: "I sincerely appreciate the kindness of my friends/co-workers who shared their annual leave with me. Thank you."

Bill Williams writes: "Many thanks to all who participated in my recent retirement party. The program was well done, the gifts were thoughtfully selected and your presence provided another highlight to my Langley experience."

Temporary Leave Transfer Program

The Temporary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing a period of unpaid leave as a result of a personal or medical emergency.

As a result of such an emergency, the following employees are approved leave recipients:

- Robert M. Connell Jr.
- Kenneth M. Jones
- Catherine B. Worth

What's New in the Learning Center?

IBM's Info-Window, a computer-controlled interactive videodisc system, which will enable the user to retrieve a variety of pre-programmed materials, information, skills, tasks and instructions by simply touching the system's TV- like screen. Courseware already purchased includes MD-DOS, Dbase and Lotus 1- 2-3.

Design and Synthesis of Ceramic Materials, 1 hr. VHS. Presented October 28 by Dr. Rustum Roy, Penn State University. Discusses the role and importance of material synthesis in the total materials research effort.

Achieving Excellence, 88 min. VHS. "Excellence-oriented" management.

Retirement Parties

Virginia D. Vohringer will be honored at a retirement dinner Wednesday, February 22, in the H.J.E. Reid Conference Center, Building 1222. Cash bar begins at 6 p.m.; steamship round dinner is at 7. Cost, including gift, is $10. Make checks payable to Joanne Belches, Mail Stop 430, and respond by Tuesday, February 14, to Belches or Dick Boykin, ext. 47004.

Pat Clark will be honored at a "country send-off," Friday, February 24, 6 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost for the barbeque dinner is $10, including gift. Send checks payable to Gail Birch, Mail Stop 309, by February 17.

Willie Lucento and **Frank Senft** will be honored at a retirement dinner Wednesday, March 1 at Fort Monroe Officers' Club. Social hour begins at 5:30 p.m.; beef and burgundy buffet at 6:30. Cost is $12.50/person or $24/couple, including gift. Send cash or check to Robert Charles, Mail Stop 451, ext. 47271, no later than February 17.

Kelley C. Hinnant will be honored at a retirement party on March 1, from 6:30 to 9 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost, including gift, is $8/person or $15/couple. Please respond by February 24 to Frank Lawrence, Mail Stop 223, ext. 42766.

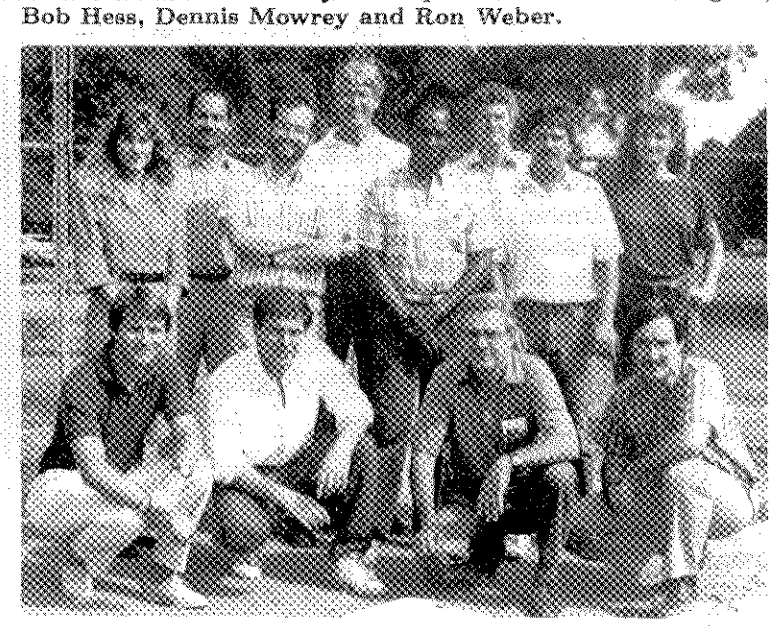
Softball Association Announces Champs

The Langley Softball Association announces the results of the 1988 season.

A-League tournament and regular season champs are the Ballers. Dynamic Engineering is the tournament winner for B-League; Decibals, the regular season champs. Hags, Nuggets, and Decibels are both tournament and regular season winners for C-, D-, and E-Leagues, respectively. F-League tournament winner is Rat Pack; Control Data Corporation (CDC) took regular season honors.

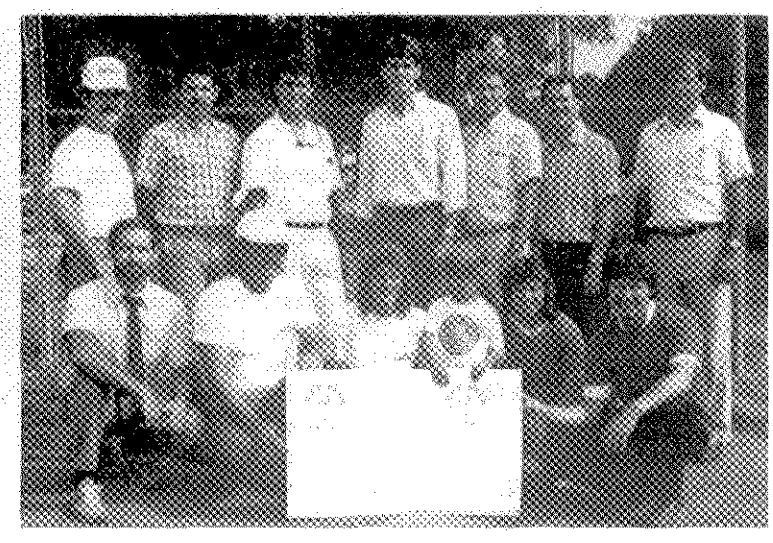
A-LEAGUE SOFTBALL CHAMPIONS, Ballers, are (L to R) Rodney Russell, Richard Bloxom, Tom Evans, Alan Frizzell, Matt Nortness, Ronnie Diggs, Doug Diggs, Ernie Burt and Archie Dimery. Not pictured are Ed Covington, Bob Hess, Dennis Mowrey and Ron Weber.

C-LEAGUE SOFTBALL CHAMPIONS, Hags, are (L to R) Dan Vairo, Ed Dickes, Mark Nixon, Tony Ingraldi, Gregg Buck, Bob Foley, John Taylor, Steve Krist, Tim Kariya, Larry Huebner and Dinesh Naike. Not pictured are Scott Fears, Gaudam Shah and Gregg Brauckmann.



D-LEAGUE SOFTBALL CHAMPIONS, Nuggets, are (front row, L to R) Matt Wilbur, Donald Keller, Bryce Kepley, Michael Durham, coach; (back row) Kathy Perkins, Tony Rivera, Brian Dansberry, Rodney Ricketts, Chester Langston, Stan Cole, Jeff Kepley, Ellen Parker.

E-LEAGUE SOFTBALL CHAMPIONS, Decibels, are (front row, L to R) John Post, Rita Smith, Yvonne Beyer, Todd Beyer, David Conner; (back row) Charlie Smith, Kelly Hayhurst, Robert Hayhurst, Jerry Lyle, and Dave McCurdy. Not pictured are Ken Elliott, Jay Hardin, Mike Marcolini, Kristine Meadows, David Meadows and Travis Turner.



F-LEAGUE SOFTBALL CHAMPIONS, Rat Pack, are (front row, L to R) Richard Walters, Mark Wampler, Nita Bronson, Douglas Bronson, Lindy Fleck, Joe Fleck; (back row) Jim Bronson, Luis Gutierrez, Jeff Smith, Chuck Monroe, Mike Mastaler, John Inge, and Bobby Charles. Not pictured are Cindy Love, Mary Alice Wampler, John Meyer, Bob Davis, Chuck Zeitman, and Jettie Watts.

People & Places

Alumni News

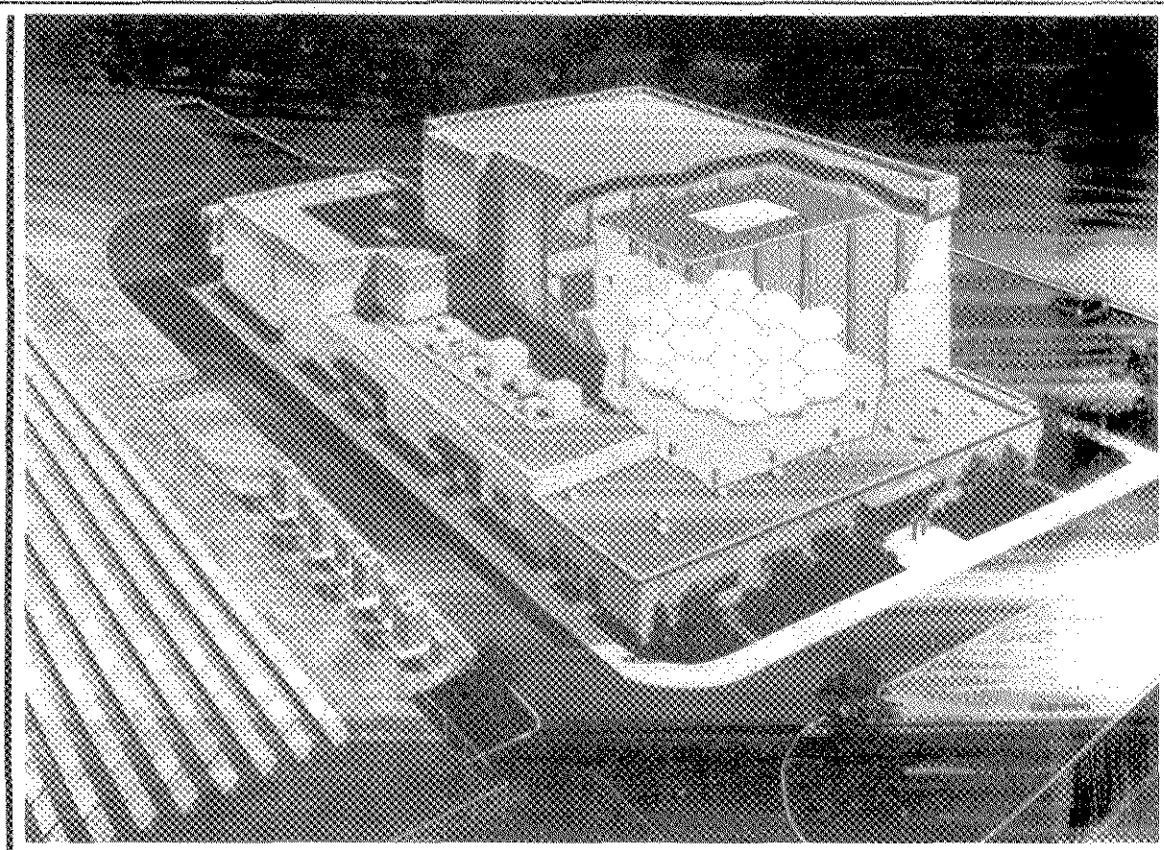
Alumni Association Elects Board

The second annual dinner meeting and election of Board of Directors of the Langley Alumni Association was held January 18. Eighty-two members and guests attended; 65 ballots were cast.

The following were elected for three-year terms: John L. Patterson, William C. Henley, George W. Lamb, Hubert K. Clark, Louis P. Tosti, George L. Meidinger, Kitty B. Brand, I. George Recant and Charlotte N. Phillips. Other board members include Mary J. Mesic, Betty P. Joyner, Donald H. Ward, Dwight G. McSmith, Joyce M. Wright, Abraham Leiss, Israel Taback, William J. Boyer and John E. Duberg, who serve two-year terms; and Axel T. Mattson, Edmund A. Brummer, L. Cornell Burcher, Richard T. Whitcomb, Domenic J. Maglieri, John P. Reeder, Clarence A. Brown Jr., Emanuel Boxer and T. Melvin Butler, who serve one-year terms.

In an organizational meeting of the Board of Directors, officers will be elected and committee chairpersons will be appointed. Results will be announced in the next **Researcher News**.

Dues for the coming year are now due. Those members who have not already done so should send $5 to Mail Stop 496, Langley Research Center, Hampton, Va. 23665. Recent retirees who wish to join the Association may call Bill Boyer, 722-0443, to obtain information and an application form.



Around the Agency

Freedom Facility Dedicated in Ohio

NASA Lewis Research Center, Cleveland, Ohio, recently dedicated the Power System Facility (PSF), the first facility in the country built specifically to test Space Station Freedom hardware. The PSF, a $6.2 million facility, will provide a wide range of electrical power component and system testing for S.S. Freedom.

Lewis is responsible for Freedom's electric power system (EPS) which includes power management, distribution hardware and on-orbit operations support. Rocketdyne, a division of rockwell International, has been awarded a contract to develop and build EPS hardware and software.

Wolf Elber, director USAARTA-AVSCOM, presents Director's Award to Robert V. Doggett Jr. (right).

Diane E. Forrest

Robert J. Huston

Directorate Recognizes Employees

The Aerostructures Directorate, USAARTA-AVSCOM, hosted its first annual Employee Recognition dinner November 4. Dr. Wolf Elber, director, recognized 40 employees who had made significant contributions throughout the year.

Highlighting the recognition ceremony was presentation of awards to three individuals who had made outstanding contributions to the Army rotorcraft research effort. Diane E. Forrest, personnel specialist, received the Director's Award for her exceptional support to the Army. Robert V. Doggett Jr., former branch head for the Transonic Dynamics Tunnel, received the Director's Award for Technical Contributions. Robert J. Huston, manager of Langley's rotorcraft research and technology, received the Commander's Award for Civilian Service for outstanding leadership of rotorcraft-related research and for significant contributions which enhanced the effectiveness of the collocation of the Army Directorate at NASA.

Elber also announced plans to hold a competition for two scholarships which would send Army employees to helicopter flight school. The scholarship objective is to promote a greater understanding of the results of Army research.

Senior Management Research Review

The Senior Management Research Review will be held Tuesday, February 21, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHEMENT	SPEAKER
9:30	Analysis of Technology Transparency in the Space Station Data Management System (DMS)	Barry Meredith (Space/SSO)
9:45	Transport Guidance and Control Technology Path Redefinition Algorithms for RNAV/MLS Transition	Richard Hueschen (Flight Systems/GCD)
10:00	Initial Combustion Test Results from the JHU/APL Generic Scramjet Engine	James Eggers (Aeronautics/HSAD)
10:15	Effect of Real Gas on First and Second Mode Instability in Hypersonic Boundary Layers	Mujeek Malik (Aeronautics/High Tech.)
10:30	Ground Vibration Test of Helicopter Airframe Identifies Important Contributors to Vibratory Response	Raymond Kvaternik (Structures/SDyD)
10:45	Member Exchange Procedure Developed for Improving Surface Accuracy in Truss Reflector Structures	William Greene (Structures/SMD)

Introducing . . . Langley Toastmaster Leaders

The NASA Langley Chapter of Toastmasters International announces 1989 Officers: (L to R) Gene Morelli, Treasurer; Richard Booth, Sergeant-at-Arms; Pamela Davis, Publicity Vice President; Steve Yaros, President; Ron Harvey, Past President; Jim Norris, Educational Vice President; Natalie Shrader, Secretary; and Bob Miserentino, chapter member and Eastern Division Governor. Not pictured is Capt. Steve Long, Membership Vice President. Langley Toastmasters meet the second and fourth Wednesdays of the month. Membership is open to all.

Happenings

VALENTINE SOCIAL. A special social sponsored by the Langley Activities Association will be held **today** in the H.J.E. Reid Conference Center, Building 1222, from 4 to 7 p.m. Join your co-workers in some "heart"-felt fun!

LAA BOARD will meet Tuesday, February 14, 7:30 a.m., in the H.J.E. Reid Conference Center, Building 1222. Concerns to be brought before the board should be addressed to the appropriate chairperson.

TALENT SEARCH. LAA is looking for local talent for socials and other activities. Call Frankie Ward, ext. 46369.

COUNTRY-WESTERN DANCE Club will hold a dance at the H.J.E. Reid Conference Center February 18, beginning at 7:30 p.m. Dance to the continuous music of D.J. Chuck Kessler. Members and guests welcome. For more information, contact Sam Sokol, ext. 41863.

SKI NASA. Thursday trips to Virginia slopes are planned by Richard Bennett. Cost is $41. For details, call 599-5585.

SKI TRIP to Killington, Vt. $268. March 10—12. Includes bus transportation, 3-day ski lift ticket, 2 nights lodging, meals. Contact Bill Dorogy, 874-3969 (h) or ext. 44239.

BASKETBALL TICKETS for ODU vs. American University are on sale for $3 at the LAA Office. Don't miss the game March 1 at 7:35 p.m.

THANKS for your patience and cooperation during Langley Officers' Club kitchen renovation. Plans are on schedule and renovation should be completed by late March.

NEEDED: ROOMMATE. Degreed professional seeks same to share 3BR/2BA house. $300/mo + 1/2 utilities. Call Jay at 688-8811 (w) or 851- 3339.

LOST: Woman's burgundy leather coat, size 10, taken by mistake at the H.J.E. Reid Conference Center, Building 1222, on Friday, Jan. 20, during LAA Social. I have yours. Please call 868-7306 after 4:30 p.m. to make switch.

FOR RENT: ROOM in nice neighborhood. Close to NASA and LAFB. Includes kitchen and washer/dryer privileges. $200/mo. Call 864-2521.

FOR SALE: AUTO. 1966 Mercury Monterey, 4-door, in good shape; and 18 ft. Smokey camping trailer, very good condition. Call 723-1250.

FOR SALE: AUTO. 1986 Pontiac Fiero Sport Coupe, 23,000 miles, 5-speed, AC, AM/FM cassette, etc. $5,500. Call ext. 43485 or 827-0284 after 5 p.m. or leave message.

FOR SALE: HOUSE, brick rancher in Bayberry, by owner. 3 BR, FR w/fireplace, DR, eat-in kitchen and more; .6 acre lot, ten minutes from NASA. Assume 9.5 percent mortgage. $89,500. Call ext. 42295 or 596-5595.

FOR SALE: CONDO, Willoughby Spit, 3BR/2BA, garage and more. Bay view, beach living. 20 minutes to Langley. $97,500. Call Jim at 588- 8617 after 7 p.m.

FOR SALE: PUPPIES. AKC great dane puppies, black. $200/males; $250/females. Call 591-0361 any time.

Protein Breakdown, Health and Disease, Topic of Colloquium

Virtually every cell in the body is constantly making and breaking down proteins—the proteins that are part of cells and those that are outside of cells. A fixed amount of protein is maintained and continually renewed in healthy adults. The process of protein breakdown is highly controlled and catalyzed by enzymes call "proteinases."

"Protein Breakdown and Health and Disease" will be discussed by one of the world's leading authorities on proteinases, Dr. Judith S. Bond, at a Langley colloquium Monday, February 13, in the H.J.E. Reid Conference Center, Building 1222, at 2 p.m. Dr. Bond is professor and head of the department of biochemistry and nutrition at Virginia Polytechnic Institute and State University.

According to Bond, proteinases are essential for life. They are found in living cells from virus and bacteria to trees and man. Proteinases play an important role in a multitude of physiologic processes and are also responsible for the loss of protein that is observed in wasting diseases, such as forms of diabetes, cancer and muscular dystrophy."

Prior to her appointment at Virginia Tech, Bond was professor of biochemistry at the Medical College of Virginia. She is a pioneer in the field of cell protein degradation. Her research has led to important discoveries about the aging process and has applications related to kidney disease, diabetes and organ transplants. For her important contributions to the biochemistry of cell protein degradation, Bond was selected as Virginia's Outstanding Scientist for 1988.

National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23665-5225

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News Researcher

WINTER WONDERLAND. NASA Langley photographer Fred Jones captured this scene a year ago. Snow and ice made traveling treacherous and the Center was closed January 8, 1988. Those same conditions combined to create a striking, solitary moment.

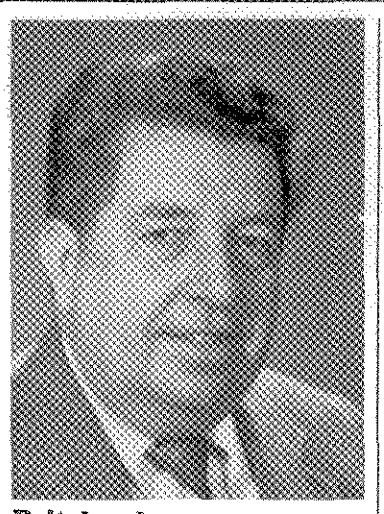
NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 3, Issue 3 February 24, 1988

Bi-weekly Employee and Contractor Publication

Talbot



Pritchard

Talbot, Pritchard Head Space Station Freedom Office

Joseph B. Talbot has been selected manager of Langley's Space Station Freedom Office. In this position he defines and executes Langley's efforts in the NASA Space Station Freedom Program. These efforts include defining the evolutionary growth of the Freedom station beyond its initial capability, supporting systems engineering and integration, representing the engineering community in its use of Freedom for technology development, and providing technology and development support to the Space Station Freedom design and development effort.

E. Brian Pritchard has been named deputy manager of the Space Station Freedom Office. In this position, he assists the manager in directing a 30-person team which supports the Level I Program Office as technical lead for space station evolution; supports the Level II office with special systems engineering studies; and supports both the Office of Aeronautics and Space Technology and Office of Space Station Freedom as lead representative for the technology development user community.

In addition, Pritchard is manager of the Evolutionary Definition Office within Langley's Space Station Freedom Office. He is responsible for directing studies and analyses for evolution of Space Station Freedom.

NASA Scholarships Available

Three college scholarships in the amount of $1,500 each are available for the 1989-90 academic year. The scholarships will be awarded by the NASA College Scholarship Fund, Inc., a non-profit organization established to aid qualified dependents of NASA and former NASA employees, agency-wide.

The NASA College Scholarship Fund is in its seventh year. James O. Pendergraft, son of Odis C. Pendergraft Jr., aerospace engineer in Langley's Propulsion Aerodynamics Branch, won a NASA scholarship in 1983. He attended Virginia Polytechnic Institute, studied electrical engineering and computer science, and graduated in June 1987 with a bachelor's degree in computer science. Current scholarship holders represent dependents of NASA employees at Ames Research Center, Goddard Space Flight Center, Johnson Space Center, Lewis Research Center and NASA Headquarters.

Applicants must be pursuing a course of study that will lead to an undergraduate degree in science or engineering at an accredited college or university in the United States. These scholarships are renewable each academic year to a maximum of $6,000 over six calendar years.

Completed application forms must be received at the Johnson Space Center no later than **March 24**. Late applications will be returned unopened.

The scholarship fund was established as the direct result of a substantial unsolicited gift offer by the noted Pulitzer Prize winning author, James Michener. Many NASA employees have also contributed to the fund.

Employees are encouraged to take advantage of this educational opportunity. For more information on eligibility requirements and selection criteria or to receive application forms, contact Vernelle Robinson, ext. 42493.

Engineers' Week Honorees

Whitlow Named Black Engineer of the Year

Dr. Woodrow Whitlow Jr., senior research scientist, Structural Dynamics Division, has been selected 1989 Black Engineer of the Year for Outstanding Achievement in Government.

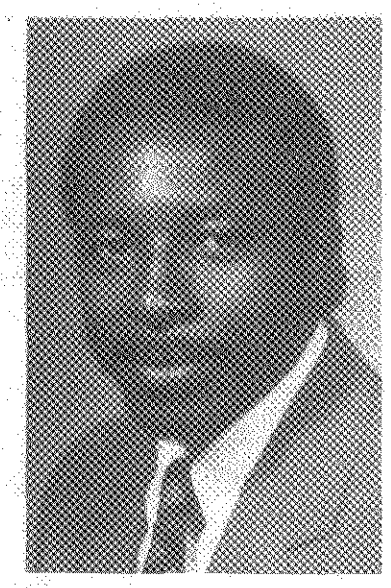
The Black Engineer of the Year awards were created to pay tribute to Black Americans for their contributions in the areas of science, engineering and technology. The awardees also provide positive role models for minority youth.

Whitlow and other award winners will be honored tomorrow evening at a banquet held at the Baltimore Convention Center. The banquet is the culminating event of a three-day conference sponsored by Mobil Oil, the Council of Engineering Deans of the Historically Black Colleges and Universities and Career Communications Group, Inc., publishers of **U.S. Black Engineer** magazine.

Whitlow joined the research staff at Langley in July 1979 as a aerospace technologist. Now a senior research scientist in the Unsteady Aerodynamics Branch, he is an internationally-known researcher in computational unsteady fluid dynamics. His personal research is highly original and involves the development of theoretical and computational methods for predicting air forces on flight vehicles.

As impressive as his professional accomplishments are his contribution to the Black community. He is a strong advocate of minority participation in all phases of science and engineering and is active in promoting science and engineering careers in the local school systems. A volunteer tutor in the local high schools and colleges, Whitlow has also evaluated proposed papers for technical symposiums organized by the National Technical Association for minority college students.

In the spring of 1988, Whitlow, with Old Dominion University (ODU) and the Cooperating Hampton Roads Organizations for Minorities in Engineering (CHROME), helped establish an Institute for Minorities for youth



interested in science and engineering careers. During the eight-week program, 21 Hampton Roads' minority students in grades 6, 7, and 8 attended ODU on Saturdays for computer instruction and for laboratory experiments in science and engineering disciplines. Nearly all of the students reported that, as a result of the Institute, they were now more likely to pursue careers in science or engineering. There are plans to continue the Institute on an annual basis.

Houbolt is Peninsula Engineer of the Year

Dr. John C. Houbolt, former chief aeronautical scientist at Langley, has been named Peninsula Engineer of the Year. He was nominated by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics.

Houbolt's contributions to the field of engineering range from providing the concept that permitted U.S. astronauts to land on the moon and return safely to Earth, to planning and supervising alterations to the rotors of Jacques Cousteau's research sail boat. His professional career spans 48 years, during which he has served the government and private industry.

Houbolt's most far-reaching contribution to space exploration has been to NASA's Apollo program. He and his associates showed that the most efficient flight method for lunar exploration missions was a lunar orbital rendezvous (LOR) approach. The LOR approach required that the Apollo spacecraft consist of a three-man command module, a propulsion or service module, and a lunar landing module in which two of the three-man crew would descend to the surface of the moon. The third crew member would remain in the command module in orbit around the moon. For return to earth, the "lunar lander" would launch from the surface of the moon and rendezvous with the Apollo command module in orbit. The command module and crew of three would return to Earth.

Houbolt joined the Langley staff in June 1942 as an aeronautical eningeer and later served as assistant chief, Dynamic Loads Division; chief of the Theoretical Mechanics Division; and chief aeronautical scientist. At present, Houbolt is associated with Eagle Engineering, Inc.

Houbolt will be presented as Peninsula Engineer of the Year at the National Engineers Week awards banquet, tomorrow evening at the Hol-

iday Inn-Williamsburg Patriot. Guest Speaker will be Dr. Hans Mark, distinguished nuclear physicist and former deputy administrator of NASA. Mark now heads the University of Texas System.

Among the nominees for Peninsula Engineer of the Year were Langley employees Cary R. Spitzer, Advanced Transport Operating Systems Program Office, and Gilbert A. Haynes, Experimental Flight Systems Section.

Engineers: Turning Ideas into Reality
National Engineers Week -- February 19-25, 1989

News Briefs

AMES RESEARCH CENTER, Mountain View, Calif. — The science result of the collaborative U.S./USSR biosatellite mission from Cosmos 1887 have confirmed the adverse physiological and biomedical effects of prolonged space flight. The analyzed mammalian biospecimens suggest that adolescent vertebrate animals will experience significant alterations in calcium metabolism, immune functions and musculoskeletal mass and structure. Cosmos 1887, launched Sept. 29, 1987, was the sixth in a series of unmanned Soviet satellites that flew U.S. and USSR life sciences experiments.

HEADQUARTERS, Washington, D.C. — NASA, in cooperation with DOD and government officials of the United Kingon, has completed a set of concept evaluation studies of advanced short take-off and vertical landing (ASTOVL) fighter aircraft concepts. The aim of the ASTOVL studies was to assess the overall propulsive-lift/airframe system performances and to identify the criticality of various technologies needed to attain these performances.

AMES RESEARCH CENTER, Mountain View, Calif. — Major improvements in the fuel economy of U.S. tractor-trailer trucks could result from a new device, called an aerodynamic boat-tail, recently tested in a wind tunnel at NASA Ames. Estimates based on U.S. Department of Transportation data for fuel consumption by tractor-trailer trucks indicate the savings could reach nearly one billion gallons of fuel per year if the device were widely used by the U.S. trucking industry.

-photo by Don Ward

GOVERNOR BALILES SALUTES NASA. Virginia Governor Gerald Baliles commemorated the American Space Program and recognized the achievements of the Virginia space industry February 14 in Richmond. Gathered for the ceremony and reading of the Senate Joint Resolution are (L to R) astronaut Guy Gardner; Governor Baliles; Conrad Forsythe, director of Defense and Intergovernmental Relations for NASA; Sid Pauls, Langley associate director; Ray Tanner, director of Space Station Freedom Program Office; and astronaut Dave Hilmers. Gardner and Hilmers presented the governor with a montage commemorating the flight of Atlantis.

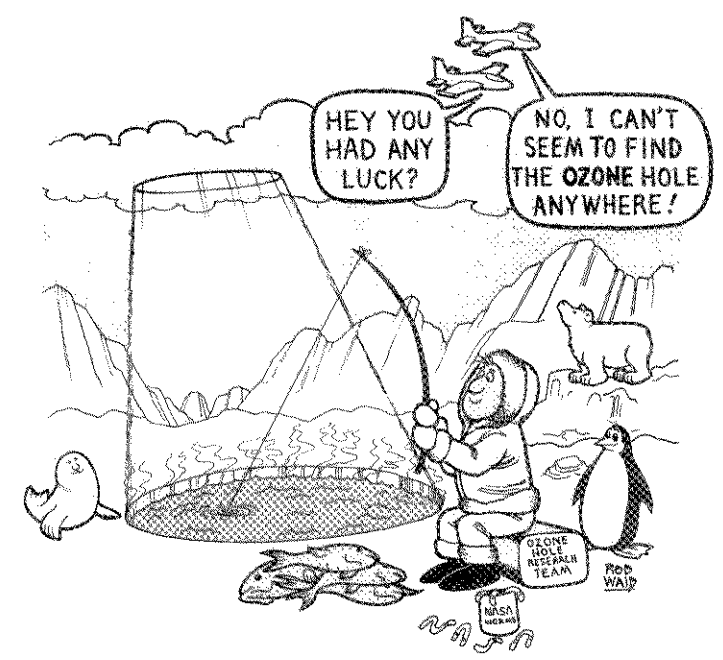
Goddard Third-Time Winner of EO Trophy

The Goddard Space Flight Center has been selected as the 1988 recipient of the NASA Equal Opportunity Trophy—a third time winner. GSFC received the EO Trophy for fiscal years 1980 and 1986.

The EO Trophy recognizes the NASA installation and management team who have implemented the most effective management strategies and have achieved the most positive affirmative action results.

NASA Administrator James C. Fletcher also commended Langley, Marshall Space Flight Center and Johnson Space Center for excellent records in making significant gains in many areas, including progress toward managerial and supervisory placements.

Lankley



AV Week Video

Space Shuttle: the Recovery focuses on the redesign and rebuilding of the Space Shuttle program. This video goes behind the scenes at NASA to pinpoint what went wrong with Challenger and how the problems have been investigated and rectified. It is an informative "video countdown" from January 28, 1986, to the touchdown of Discovery.

To borrow this Aviation Week video, contact Edith Watts, ext. 43293. These video productions are copyrighted and may not be duplicated; they are loaned on a first come-first served basis.

Langley Proposals Selected for Eos Investigations

NASA officials have announced the selection of scientific investigations for the Earth Observing System (Eos) program, a multi-mission observation system of the 1990s to study global changes taking place in planet Earth's environment.

NASA received 455 proposals in response to the announcement of opportunity. The selected proposals include 24 instrument investigations; six research facility instrument investigation team leaders and 87 team members; and 28 interdisciplinary investigators.

Six proposals from Langley have been accepted. "Scientists and engineers from the Flight Electronics Division, the Systems Engineering Division, and the Atmospheric Sciences Division have been working for two years to determine what should be proposed as follow-ons to the present family of very successful space experiments in the atmospheric science arena," said Dr. James D. Lawrence, head of ASD.

Teams from three Langley divisions and colleagues in the national and international space community prepared Eos proposals.

"To be selected, each of the successful Langley proposals passed a critical evaluation by scientific peers including representatives from government, academia, industry and the international Earth-observing community. Each proposal also had to stand up to a careful engineering feasibility evaluation. We are proud of each of the successful teams that pulled together the four instrument investigation proposals and the two interdisciplinary proposals that were selected for the first phase of the Eos program. We now have our work cut out for us as we begin Phase B conceptual design studies for each of the selected instruments."

The Langley proposals are:

Bruce R. Barkstrom: "A Proposal to Investigate Clouds and the Earth's Radiant Energy System Instruments for Attached Payloads on the Manned Space Station (CERES-IS)." In addition to co-investigators from the national and international scientific community, the Langley co-investigators: Thomas P. Charlock, Wayne Darnell, Edwin F. Harrison, Robert B. Lee III, G. Louis Smith, Bruce Wielicki, David R. Brooks, Richard Green, Patrick M. Minnis, and John T. Suttles.

M. Patrick McCormick: "Stratospheric Aerosol and Gas Experiment III Proposal for Eos." Langley co-investigators: W. P. Chu, Joseph M. Zawodny, and Geoffrey Kent.

Henry G. Reichle Jr.: "Tropospheric Radiometer for Atmospheric Chemistry and Environmental Research." Langley co-investigators: Vickie S. Conners, Jack Fishman, Curtis Rinsland and H. Andrew Wallio.

James M. Russell III: "Spectroscopy of the Atmosphere Using Far-IR Emission." Langley co-investigators: Jae H. Park, Ira G. Nolt, William L. Grose, Ellis E. Remsberg and Larry L. Gordley.

William L. Grose: "Observational and Modeling Studies of Radiative, Chemical, and Dynamical Interactions in the Earth's Atmosphere." Langley co- investigators: Richard Eckman, Ellis E. Remsberg, Richard E. Turner, W. Thomas Blackshear.

Bruce Wielicki: "A Proposal for an Interdisciplinary Investigation of Clouds and Earth's Radiant Energy System: Analysis (CERES-A)." Langley co- investigators: Bruce R. Barkstrom, David R. Brooks, Richard Green, Patrick M. Minnis, John T. Suttles, Thomas P. Charlock, Wayne Darnell, Edwin F. Harrison, Robert B. Lee III and G. Louis Smith.

Eos is a science mission with the goal to advance understanding of the entire Earth system on the global scale through development of a deeper understanding of the components of that system, the interactions among those components and how the Earth system is changing.

The Eos mission will create an integrated scientific observing system enabling a multi-disciplinary study of planet Earth, including its atmosphere, oceans, land surfaces and the solid Earth. To quantify changes in Earth's system, Eos will be a long-term mission providing systematic, continuing observations from low-Earth orbit.

Eos will initially make use of a new generation of spacecraft, called polar platforms, being developed as part of the U.S. Space Station Freedom program. The program is a cooperative effort that may eventually include five polar platforms— two from the U.S., two from Europe and one from Japan—as well as use data from future National Oceanic and Atmospheric Administration operational instruments.

People & Places

Langley Selectes EG&G Florida

Langley Research Center has selected EG&G Florida Inc., Rockledge, Fla., for negotiation of a contract for facility and equipment support services at the Center. The base effort for the 5-year, cost-plus-award-fee contract is approximately $74 million, plus optional requirements.

The contract will be effective March 1 and work will be performed at Langley.

The company will provide heating, ventilation, air conditioning and refrigeration services; pipefitting services; electrical services for the maintenance, repair and modification to lighting and power systems and equipment; mechanical services for maintenance and repair of machinery, large valves and other equipment; building trade services, such as general carpentry, painting, masonry, paving and roofing; and rigging, hauling and demolition services. In addition, the contract will include inspection and maintenance of elevators, cranes and other lifting devices; civil, structural, mechanical and electrical engineering support services; and construction and inspection services for modifications, repairs, additions or construction of facilities.

The new contract combines three services contracts under one umbrella. Two of these contracts had been held by Klate Holt Co. of Hampton for the past ten years. EG&G Florida plans to hire a majority of employees from the existing contractors.

Hew-Es-Co Honors Employees

Hew-Es-Co, a Poquoson-based company on contract to NASA Langley for graphics, technical editing, technical typing and typesetting support services, recently honored several employees. Cited for perfect attendance for 1988 were Roger Jones and Patricia Apelt. Ten-year anniversary awards were presented to Cary Moore and Anne Costa; five-year anniversary awards went to Debbie Price and Sandra Little. Awardees, pictured (L to R) with company president Robert Hewes (center), are Apelt, Lindell, Jones, Moore, Costa and Price.

Retirement Parties

Leo B. McHenry will be honored at a retirement luncheon Thursday, March 9, from 11 a.m. to 1 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $8.50/person; $2 for contribution to gift only. Contact Michael Klebitz or Calvin Chandler, ext. 43900, by March 3.

James W. Sparrer will be honored at a retirement social Friday, March 10, from 5 to 7:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost for "open bar/heavy eats" is $7.50/person or $14/couple, including gift. Send check to Ann Wilson, Mail Stop 425, ext. 43524, by March 6.

D. Eugene Hicks will be honored at a retirement party Wednesday, March 22 from 6:30 to 9:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Heavy hor d'oeuvres and cash bar. Cost is $9/person or $15/couple. Contact Jake Houck, ext. 46412, Randy Grove, ext. 45799, or Sonia Herndon, ext 47494, Mail Stop 125B, by March 15 for reservations.

Take Note:

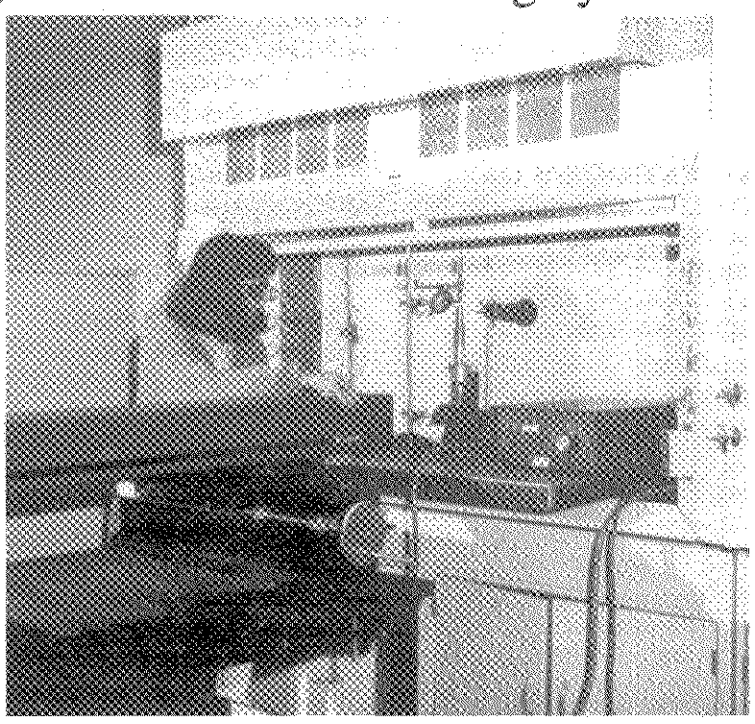
Postal regulations do **not permit** the use of the Langley postal penalty (eagle) on labels, envelopes, cards or forms fabricated to **return** mail to the Center. If your office has developed such a return form, please send one sample to Barbara Newton, Mail Stop 101, for review.

This notice does not apply to mailing envelopes or labels available from stock. For additional information or clarification, contact Newton at ext. 46034.

Space Worker will be aired Monday, February 27 at 8 p.m. on WHRO-TV, Channel 15.

High-Tech Facility to be Dedicated at Langley

What precautions need to be taken to protect people and equipment from the galactic and solar cosmic radiation of deep space? What compounds are formed by the diffusion of hydrogen, the fuel being considered for the National Aero- Space Plane, through titanium aluminum alloys, its proposed structural material? These are but two of the areas studied, on a computational or experimental level, by the High Energy Science Branch in the newest laboratory facility at Langley.



Golda Miner, a chemist in the High Energy Science Branch, prepares an experiment in the new ATR Lab.

The Advanced Technology Research Laboratory, Building 1200, was completed in late 1988 and will be dedicated at 11:30 a.m. Tuesday, February 28. Center Director Richard H. Petersen, Dr. Leonard Harris, chief engineer, Office of Aeronautics and Space Technology (OAST), NASA Headquarters and W. Ray Hook, Langley's director for space will welcome guests.

The ATR lab is a modification of a pre-existing building. In a structure that previously contained shock tubes for studying atmospheric reentry of spacecraft, a million dollar renovation has prepared a site for long range research on advanced technology for the Agency. Dr. Ed Conway, head of the High Energy Science Branch, explains that his group, supported by OAST, is studying future options for power generation and distribution in space. Two areas of this study are spacecraft to spacecraft laser power transmission for propulsion and electric power distribution as well as development of a high power plasma switch to control high currents needed for advaced propulsion systems of the future.

"The payoff," says Conway, "in the direct conversion of solar energy to laser power will be in the flexibility of long-life systems." Conway uses the analogy of our Earth-based power stations that serve entire communities like space-based laser power facilities will be able to service families of satellites. "This is the beginning of a concept that allows satellites to work as a group rather than as independent, self-sustaining entities. When a laser-powered satellite does fail, a new satellite can be powered by redirecting a beam," explains Conway.

The facility contains 15 laboratory rooms and an associated office area. Major facilities include three solar simulators that provide a range of conditions for research into the direct conversion of solar energy to laser power. Theoretical laser and cosmic ray research is supported by state- of-the-art computational facilities in the lab and access to the Space Systems Division's VAX II, the Center's Cray Supercomputer, the Convex and other mainframe computers. A group of laboratories house ultrahigh vacuum equipment which simulates the space environment and specialized conditions associated with advanced spacecraft.

Langley is the only center in the Agency with a significant program on a fundamental level in the area of high power laser transmission.

Langley to Host Second Beamed Space Power Workshop

A 15-foot wingspan model of a Canadian airplane powered by a microwave beam is just one of many exhibits to be featured at the Second Beamed Space Power Workshop.

Approximately 80 representatives from government, industry and universities will gather at the H.J.E. Reid Conference Center February 28 through March 2 to propose future space missions using laser and microwave power beaming. The objectives of the workshop are to analyze selected beam power missions, define beam power advantages, identify technology questions, and to recommend applications for this new technology.

A Langley researcher and chairperson of the workshop, Dr. Russell DeYoung, said power may be beamed from an orbiting power station to the lunar surface to construct habitats, including greenhouse farms and lunar factories, to build smooth roads over the rugged terrain or to mine the raw materials needed to propel manned missions to Mars. "We call it power beaming," said DeYoung. "We would use a laser beam to direct the energy anywhere on the surface."

DeYoung said the idea is reminiscent of the 1960s television series "Star Trek," in which the most famous line was "Beam me up, Scotty." Crew members of the Starship Enterprise used a beam operated by Scotty, the engineer, to transport themselves.

Especially interesting are three mini-workshops, complete with artists' depictions of future beam powered missions, beginning at 9:15 a.m. Wednesday, March 1. "Planetary Power Application," features presentations on either laser or millimeterwave-powered lunar base and surface rovers; "Space Propuslion Applications," examines an Earth-lunar orbit laser freighter and a millimeterwave-powered near Earth transport vehicle; and "Near Earth Applications," includes presentations on millimeterwave or laser-powered platforms, emphasizing power beaming applications in Earth orbit, such as powering Space Station Freedom.

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Problems don't just go away. Help yourself, contact EAP.

Happenings

LAA SOCIAL will be held Friday, March 3, from 4 to 6 p.m. in the H.J.E. Reid Conference Center, Building 1222.

ST. PATRICK'S DAY. The LAA will hold a special St. Patrick's Day social Friday, March 17, from 4 to 8 p.m. Complimentary snacks will be provided and appropriate light dinner will be for sale. Live entertainment will be provided by "Fox Fire." Charge is $1 to defray cost of band.

EASTER EGG HUNT. The annual LAA children's Easter Egg Hunt will be held Saturday, March 18, from 2 to 4 p.m. on the grounds of the H.J.E. Reid Conference Center, Building 1222. Rain date is Sunday, March 19. The movie "E.T." will be shown. Refreshments will be served and special prizes given away. The cost for the egg hunt is $1 per child.

TIDEWATER DINNER THEATER will host the Phyllis Diller Show March 3 and 4. Discount tickets of $20.50 for the cocktail hour and show are on sale at the Activities Office.

CAIRO ON THE JAMES, a special evening of Middle Eastern dance, will be held Saturday, April 1, at the Fellowship Hall, Hidenwood Presbyterian Church, Newport News. Doors open at 8 p.m. Admission is $5. Call 877-1373 for reservations or additional information.

LOST MONEY? Malfunctioning vending machines on Center should be reported to Frankie Ward, ext. 46369.

BUSINESS CARDS can be ordered through the Visitor Center Souvenir Counter. Stop by or call ext. 41585 for details.

FOUND. Pair of ladies' gloves found Feb. 10 outside of Bldg. 1268A. Call Bruce Outlaw, ext. 46653, to identify.

FOUND. Pair of prescription glasses with olive green frames found Monday, Feb. 13 in the parking lot across from Building 1268A. Call ext. 42228 to claim.

FOR SALE: AUTO. 1985 Plymouth Horizon, 4DR-HB, AT, PS, PB, AC, AM-FM, 6 mo. left on warranty, recent tune-up, new tires. $2,950. Call 838- 8937 after 5 p.m.

At the VC during March

Space Station: Gateway to the Future

Although initially Space Station Freedom will be an orbiting research and development facility in the 21st century, it could evolve into a "shipyard in the sky" for lunar or Mars space vehicles. It is part of Barry Meredith's job to anticipate such changes now to make the evolution as smooth as possible.

Meredith will discuss "Space Station: Gateway to the Future" on Thursday, March 9, at 7:30 p.m. at the Visitor Center.

The 30-year operational lifetime of Space Station Freedom dictates that the design be flexible and evolutionary to accommodate diverse mission requirements, evolving user needs and future directions in U.S. space policy. For example, it is anticipated that Freedom will eventually expand from four modules to nine, and from 75 kilowatts to 300 killowatts of power at full maturity.

Meredith is currently responsible for the coordination of an agency-wide program to define design requirements and evolutionary configurations for Space Station Freedom to enable it to meet future needs.

Holographic Measurements of Flow Fields

Leonard Weinstein will discuss "Holographic Measurements of Flow Fields" on Wednesday, March 15, at noon in the Visitor Center theater. This presentation is part of the Spring Guest Lecture Series sponsored by the Visitor Center and the AIAA-Hampton Roads Section Student Branch.

Weinstein will discuss new methods of measurement which can check theoretical and numerical modeling of complex flows and examine the mechanisms operative in turbulent and vortex flow control concepts, providing an entirely unique instrument capable, for the first time, of simultaneous three-space and time measurement in turbulent flows.

Weinstein began his career at NASA Langley in 1962 and is presently Leader of the Turbulence Structure and Modeling Group, Viscous Flow Branch, Fluid Mechanics Division.

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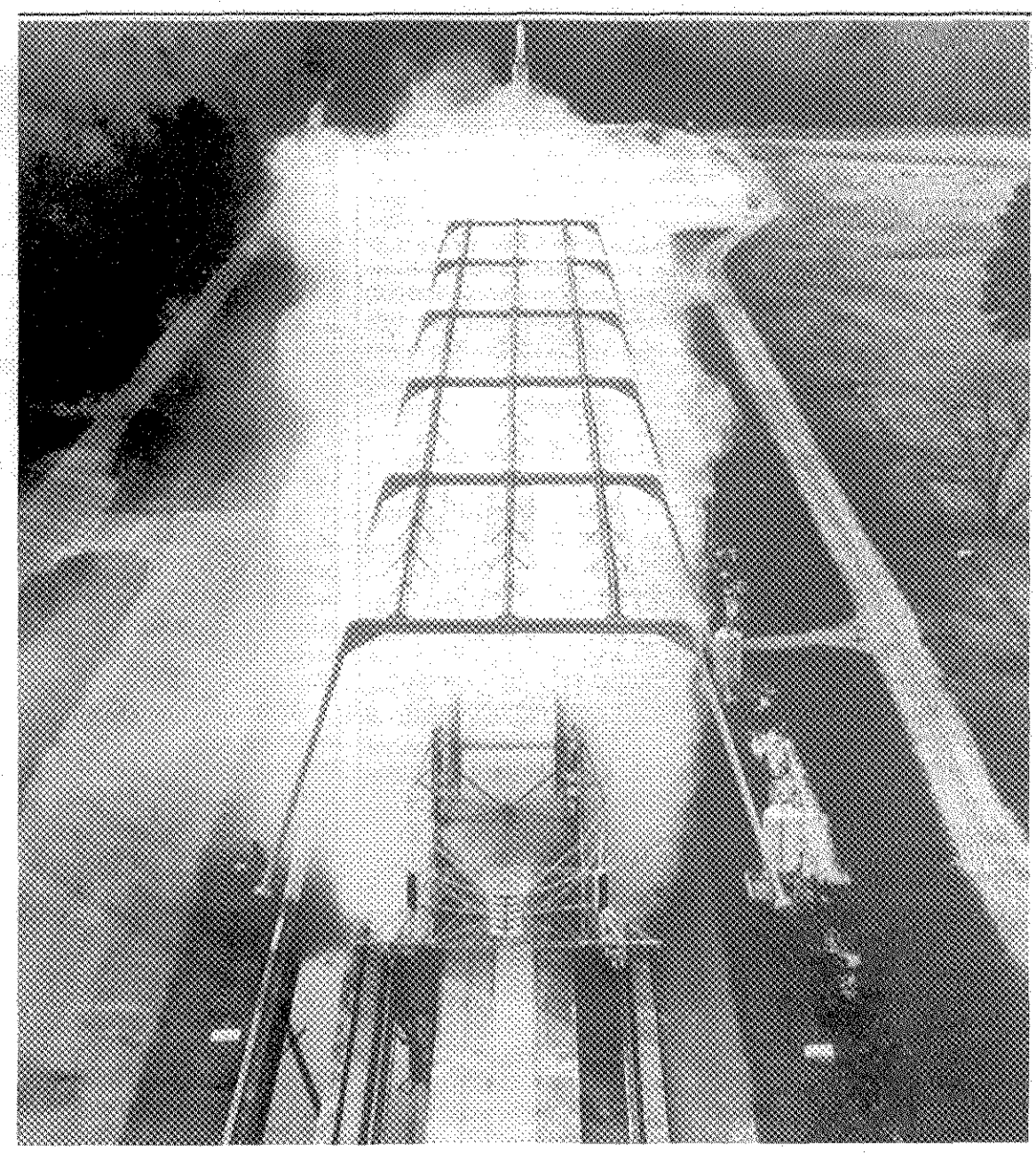


NASA SIMULATES FLIGHT INTO 'HEAVY RAIN' — This giant, tinker- toy-like carriage is propelled to 155 mph in a preliminary test to measure the effects of "heavy rain" on aircraft wing performance. The heavy rain research program is a joint effort of Langley's Applied Aerodynamics, Structural Dynamics and Operations Support Divisions and the Goddard-Wallops Flight Facility. A cover photo by Langley photographer Don Ward and article on the program is featured in the February 13 issue of *Aviation Week*.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 3 March 10, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

Lamar Awarded Dryden Memorial Fellowship

Dr. John E. Lamar, senior research scientist, Applied Aerodynamics Division, has been awarded the National Space Club's Dryden Memorial Fellowship. Nominated by Center Director Richard H. Petersen, Lamar is the second Langley researcher to receive this prestigious award.

Lamar will be recognized at the Space Club's thirty-second annual Goddard Memorial Dinner to be held this evening in Washington, D.C.

The Dryden Fellowship was established in 1966 by the Board of Governors of the National Space Club to provide for the further education of a deserving individual in disciplines applicable to science, astronautics and space administration. The scholarship is awarded in memory of Hugh L. Dryden who, during his distinguished career in government service, played a uniquely important role in the development of science-based technology.

Lamar will spend an academic year at the Naval Postgraduate School, Monterey, California, where he will study with Turgot Sarpkaya, distinguished professor in the mechanical engineering department and an authority on vortex dynamics.

An internationally recognized authority on vortex flows, Lamar's study will focus on current solution techniques being applied to a variety of vortical flow problems. "At the Naval Postgraduate School I will have the opportunity to learm more about vortices from a fundamental, mathematical point of view. I will also examine the research underway and the solutions available in vortical flows in disciplines other than aerodynamic--for exam ple, in meteorology," explains Lamar.

"The weather is dominated by vortices, little tornadoes of energy. We see them on windy days and, most recently and very dramatically, during the uncharacteristic blizzard conditions that overtook the Tidewater area during February. Snow and dust act as particulates to help visualize the tornado-like motions that surround us." Lamar views vortices as the fundamental building blocks of fluid mechanics. He has an insatiable interest in vortex motions--where they occur and how they can be most beneficially utilized.

He has been extensively involved in the Langley-led vortex flap experiment, in which an F-106B was modified in an attempt to increase the maneuverability of delta wing fighter aircraft. Lamar led a team which completed a flow visualization study of the airflow over the F-106 in flight. Utilizing a vapor screen technique, the team discovered two or more co-rotating vortices above the wing of the aircraft, a phenomenon not previously found in wind tunnel testing. The development and use of the vapor screen technique was the first application of this in-flight test method in the West. Lamar is currently on temporary assignment to the Conceptual Studies Office, National Aero-Space Plane program.

Supercomputer Installed at Langley

CRAY-2 Increases Center Computer Capability Five-Fold; Dedication Plans Set

A CRAY-2 system of computers and electronic storage devices, installed and now undergoing hardware and software testing, upgrades Langley's Central Scientific Computing Complex to a state-of-the-art level. This major new computational tool has 128 million words of memory, four central processing units, and increases the Center's supercomputing capacity by a factor of five.

John A. Rollwagen, chairman and chief executive officer of Cray Research, Inc., joins Langley senior management for a ribbon cutting ceremony March 13 dedicating the supercomputer, dubbed Voyager in honor of the first aircraft to fly round the world nonstop without refueling. The ceremony will be held in Building 1268, Room 2101, following Monday's colloquium. Rollwagen is also the colloquium featured speaker; he will address trends in supercomputing technology.

Four years of effort in planning, budget, and technical preparation came to fruition in August 1988 when the Langley Research Center negotiated a contract with Cray for the new supercomputer system. The system, referred to as the Supercomputing Network Subsystem (SNS) will be available to Center researchers within the next few weeks.

The SNS will be used to advance research in areas including aeronautics, astronautics, electronics, structures and acoustics. A typical application will be the computation of the flow field about an aircraft. In such a situation, the aircraft shape is described mathematically and the density, energy and velocity of the air relative to the aircraft is computed at hundreds of thousands of points in the surrounding region. To accomplish this in a reasonable elapsed time, the CRAY-2 will perform hundreds of millions of arithmetic operations per second.

The CRAY-2 "mainframe" contains four identical and independent processors, each with a clock cycle time of 4.1 nanoseconds (4.1 billionth of a second). They operate in vector (string of numbers) and scalar (single number) modes to achieve maximum computational throughput; and they can execute independently on separate jobs or concurrently on a single problem.

The processors access a common Static Random Access Memory (SRAM) of 128 million 64-bit words (a 15 to 25 percent throughput improvement over Dynamic Random Access Memory used on most other CRAY-2's). The entire mainframe, which includes all memory, computer logic and DC power supplies, in integrated into a package consisting of 14 vertical columns arranged in a 300 degree arc--so that it looks like the letter "C" from the top. It stands 45 inches high and has a diameter of 53 inches. This compactness is necessary to avoid delays in electronic communication between components; but it results in the concentration of heat. Cooling is provided by immersion of the integrated circuit package in flourinert, an inert flourocarbon liquid. The CRAY-2 and other computers in the SNS will use versions of UNIX, which is rapidly becoming the industry standard for computer operating systems. FORTRAN will be the principal programming language.

State-of-the-Center Address

Langley Director Richard H. Petersen will address Center employees, retirees and support contractors on the state of NASA and Langley Research Center April 3 and 4 in the H.J.E. Reid Auditorium.

April 3	1:30-2:15 p.m.	Office of the Director Aeronautics Directorate Fabrication Division
	3:00-3:45 p.m.	Electronics Directorate Management Operations Directorate
April 4	8:30-9:15 a.m.	Space Directorate Flight Systems Directorate Operations Support Division
	10:00-10:45 a.m.	Systems Engineering and Operations Directorate (except FD and OSD) Structures Directorate

Time should be charged to Job Order Number A-1980.

Langley Colloquium

Cray Executive Speaks on Trends in Supercomputing Technology

The ability to do large scale simulation via computer has become a competitive edge for the nation's industries and research organizations. Today, confidence in these simulations prompt policy decisions and program acceptance.

John A. Rollwagen, chairman and chief executive officer of Cray Research, Inc., will present "Trends in Supercomputing Technology" at a Langley colloquium Monday, March 13. The lecture will be held at 2:30 p.m. in the H.J.E. Reid Conference Center and will be followed by a question and answer period.

Rollwagen will discuss the need for networking supercomputers. He has noted that, while Cray has about 160 customers, the number of users is in the thousands or hundreds of thousands. To provide proper access to supercomputers, Rollwagen advocates the need for high speed, reliable networks. "Networked supercomputers," says Rollwagen, "will be to science what superhighways were to commerce in the 1950s and 60s."

Rollwagen is responsible for Cray's ongoing development as the leading supplier of supercomputers. He has been an integral part of Cray Research since 1975, when he joined the company as vice president of finance. In his present position, he oversees the activities of the marketing and finance divisions and helps provide an environment for technical people to explore new ideas in system development.

Rollwagen is committed to Seymour Cray's approach to developoment and creativity. He is largely responsible for ensuring a fluid corporate environment that fosters individual creativity, thus enabling individuals in all areas of the company to exercise their potential in the development of innovative ideas and products.

The holder of a bachelor of science degree in electrical engineering from the Massachusetts Institute of Technology and a master's in business administration from the Harvard Business School, Rollwagen received the MIT Alumni Award for Distinguished Corporate Leadership in 1984. In 1985, the University of Minnesota Institute of Technology honored him for his contributions to its electrical engineering and computer science programs and for his support of University of Minnesota supercomputer activities. In 1987, Rollwagen was appointed by President Reagan to the Advisory Committee for Trade Negotiations.

Discovery: STS-29 Mission Report
See page 3

News Briefs

JOHNSON SPACE CENTER, Houston, Texas --- The U.S. Government has released results of a six-month interagency study on orbital debris. The study, co-chaired by NASA and the Department of Defense, cites satellite and rocket body fragmentation as the principal source of orbital debris and concludes that, left unchecked, the growth of debris could threaten the safe and reliable operation of manned and unmanned spacecraft in the next century.

HEADQUARTERS, Washington, D.C. --- NASA has announced the selection of 39 research proposals for negotiations of Phase II contract awards in the Small Business Innovation Research (SBIR) program. Included are 39 small, high technology firms located in 11 states. This is the second group of selections made from a total of 179 proposals submitted by SBIR contractors completing Phase I projects.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- An implantable device that would mark a major advance for insulin-dependent diabetics is now being developed in a collaborative effort among the John Hopkins University Applied Physics Laboratory, Laurel, Md.; the University of New Mexico, Albuquerque, N.M.; and NASA Goddard. Currently known as rechargeable physiologic sensor (RePS), the device would eliminate the numerous daily finger pricks, required of the estimated one million type-1, insulin-dependent patients in the U.S., for proper monitoring of glucose level. The device would also provide a more accurate analysis of glucose level than is possible with finger-prick techniques.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- NASA LeRC has been selected by the Office of Management and Budget (OMB) as a quality improvement prototype, one of the highest honors a federal government facility can achieve for quality and productivity. The Quality Improvement Award is part of the President's Productivity Improvement Program. The program is administered by OMB and this is the second year the national award has been presented.

JOHNSON SPACE CENTER, Houston, Texas --- NASA has named flight crew members to two Space Shuttle missions scheduled to fly in 1990. USN Capt. John O. Creighton has been named to command STS-36, a Department of Defense-dedicated flight aboard Atlantis set for February 1990. USAF Col. John G. Casper will serve as pilot. Mission specialists are USMC Lt. Col. David C. Hilmers, USAF Col. Richard M. Mullane and USN Lt. Cmdr. Pierre J. Thuot. Two NASA astronauts also have been named as mission specialists aboard the Space Shuttle Columbia on STS-40. M. Rhea Seddon, M.D., and James P. Bagian, M.D., have been assigned to the space life sciences-dedicated mission, SLS-1, scheduled for launch in June 1990. SLS-1 payload specialists F. Drew Gaffney and Robert W. Phillips were named in April 1985. The remainder of the flight crew will be assigned later.

Couch Appointed NASA Acting Director for Space

Lana M. Couch has been appointed acting director for space, NASA Headquarters, Washington, D.C. In this position, she will be responsible for the overall direction, advocacy and budget allocation for the space technology program in the Office of Aeronautics and Space Technology (OAST). This action is necessary because Frederick P. Povinelli, current director for space, is spending the majority of his time recently at Lewis Research Center serving as acting director, Administration and Computer Services Directorate.

Couch began her career with NASA at Langley in 1963 conducting research in fluid flow phenomena on subsonic through hypersonic vehicle configurations. She was selected head of the Structural Tunnels Section 1975 and assistant head of the Thermal Structures Branch in 1979.

Following completion of the Maxwell Midcareer Development Fellowship at Syracuse University and an assignment as deputy to the OAST facilities manager, she was selected as program Manager in OAST's Fluid and Thermal Physics Office. During 1983, she served as acting manager of the Program Support Office, Institutional and Program Support Division, followed by a year as acting manager of the Spacecraft Systems Office in the Space Systems Division. She was appointed deputy director of the Flight Projects Division in July 1985 and subsequently served as special assistant to the associate administrator for the National Aero-Space Plane program. In March 1987, she joined Senator Donald W. Riegle's staff as congressional fellow with the Commerce, Science and Transportation Committee. She has served as deputy director for space since July 1988.

Couch and her husband, Richard, live in Mathews County, Virginia.

A Reminder. . .

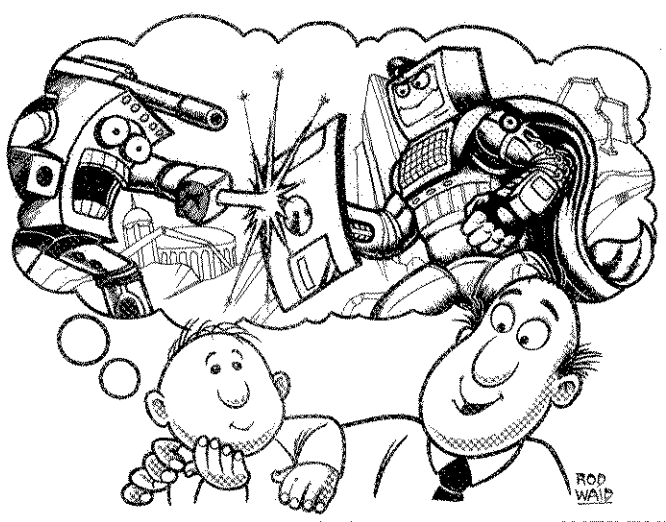
Any survey or questionnaire conducted at the Center requires approval of the Director for Management Operations prior to distribution.

In general, **we discourage surveys.** However, when approval is granted it is normally with the provisions that the survey may be modified and results shared with Center Management.

Take Note:

When requesting graphics services, please use the new LF 63 (Work Request--Graphics) form dated November 1988.

Lankley



...AND ALSO AT NASA WE HAVE THE POWERFUL CRAY-2. IT'S A SUPER COMPUTER !

Editorials

Langley

Headquarters Forum

Those who have worked at the Center for any appreciable time know that the style of management which is used here permits and, in fact, encourages employees to make decisions concerning their work. Another observation that can be made is that there is a strong emphasis on education and training at the Center. It is not by chance that the use of this management style and the emphasis on education both occur here, for the success of the former depends heavily on the results of the latter.

The management style which permits and encourages employees to be involved in decision making is generally known as participatory management. The basic premise of this style is that the person doing a job probably knows best how to do it. Another fundamental tenet is that careful planning is preferable to corrective action; a supervisor should consult with affected employees and consider their opinions before making major decisions. The consequences of this management style are that employees are largely responsible for how their job is to be done, and fewer managers are required since detailed on-the-job direction is not needed in general.

The education and training opportunities available at the Center range from the informal training obtained from one's peers (Langley experts) to formal education activities such as the apprentice program, the graduate programs for engineers and scientists, and the engineering and secretarial co-op programs. Also, numerous training classes on work-related topics are sponsored by the Center each year.

It is education and training which provide employees with the knowledge necessary to make work-related decisions; in effect, they replace the autocratic supervisor of legend who dictated every move of every employee.

Richard W. Barnwell
Chief Scientist

Buyer's Guide to Space Transportation

U.S. Congress Office of Technology Assessment **Launch Options for the Future** is available for review in the LaRC Technical Library.

Billed as a "buyer's guide" to space transportation, the document describes the range of launch systems that exist now or could be available before 2010 and explores the costs of meeting different demand levels for launching humans and spacecraft to orbit. It also discusses the importance of developing advanced technologies for space transportation.

Secondary Payload Projection Issued

NASA has issued a Space Shuttle Secondary Payload Flight Projection, the first publication to highlight secondary payloads. The document includes all secondary payloads, lists the sponsoring organizations and indicates where opportunities for secondary payloads may exist. The projection does not include Expendable Launch Vehicles.

Copies of the document may be obtained from the Headquarters Newsroom, 400 Maryland Ave., S.W., Washington, D.C.

Current News Releases

To obtain a copy of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-19.....NASA Selects SBIR Projects
89-20.....Orbital Debris Study Completed
89-21.....NASA Lewis Receives Prototype Award
89-22.....NASA/University Collaboration May Yield Glucose Monitor
89-23.....STS-29 Press Kit
89-24.....Space Shuttle Crew Members Named to DOD, Life Sciences Missions
89-25.....Shuttle Tile Damage Study Completed; "Go" for Discovery Flight

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

STS-29 countdown milestones

T- 11:00:00.....Retract Rotating Service Structure
T- 09:00:00.....Activate orbiter's fuel cells
T- 08:00:00.....Configure Mission Control communications for launch
T- 06:00:00.....Begin loading external tank
T- 03:00:00.....Wake crew
T- 02:30:00.....Crew begins boarding
T- 01:00:00.....Discovery's hatch sealed
T- 00:09:00.....Mission Management Team polled
T- 00:07:30.....Orbiter access arm retracted
T- 00:03:30.....*Discovery* switches to internal power
T- 00:00:31.....Onboard computers get "go" for liftoff
T- 00:00:06.....Main engines start
T- 00:00:03.....Main engines reach 90 percent thrust
T- 00:00:00.....Solid rocket motors ignite

Deployment of TDRS-D Highlights Mission STS-29

Deployment of the third Tracking and Data Relay Satellite (TDRS-D) will highlight the 28th Space Shuttle mission (STS-29). The assessed launch date is no earlier than March 10.

Three TDRS, operating from geosynchronous orbit, are required to complete the constellation known as the Tracking and Data Relay Satellite System (TDRSS). TDRSS will increase communications, between Earth-orbiting spacecraft and a ground-based tracking station, from 15 to 85 percent per orbit and facilitate much higher rate of data flow.

TDRS-D is the fourth TDRS communications satellite to be carried to carried to space aboard the Shuttle and completes the constellation of on-orbit satellites for NASA's advanced space communications system . TDRS-1 was launched during Challenger's maiden flight in April 1983. The second was lost during the Challenger accident in January 1986. TDRS-3 was launched successfully on September 29, 1988, during the landmark mission of Discovery, which returned the Space Shuttle to flight.

The Crew, the Mission . . .

Commander of the five-man crew is Michael L. Coats, captain, USN. Coats was pilot of STS-41D, the maiden flight of the orbiter Discovery. John E. Blaha, colonel, USAF, is pilot of the mission. STS-29 will be his first space flight.

Rounding out the crew are three mission specialists: James F. Buchli, colonel, USMC; Robert C. Springer, colonel, USMC; and James P. Bagian, M.D. Buchli is making his third Shuttle flight having flown as a mission specialist on STS 51-C, the first Department of Defense Shuttle mission, and STS 61A, the West German Spacelab flight. Springer and Bagian are making their first Shuttle flights.

Discovery, making its eighth flight, is assessed to be ready for launch no earlier than 8:11 a.m. EST, March 10, from the Kennedy Space Center, Fla., launch pad 39-B, into a 160 nautical mile, 28.45 degree orbit. Nominal mission duration is five days, one hour, seven minutes. Deorbit is planned on orbit 80, with landing scheduled for 9:48 a.m. EST, March 15, at Edwards Air Force Base, Calif. In the event of a slip in the lauch, liftoff would occur one minute earlier for each day the lauch is delayed.

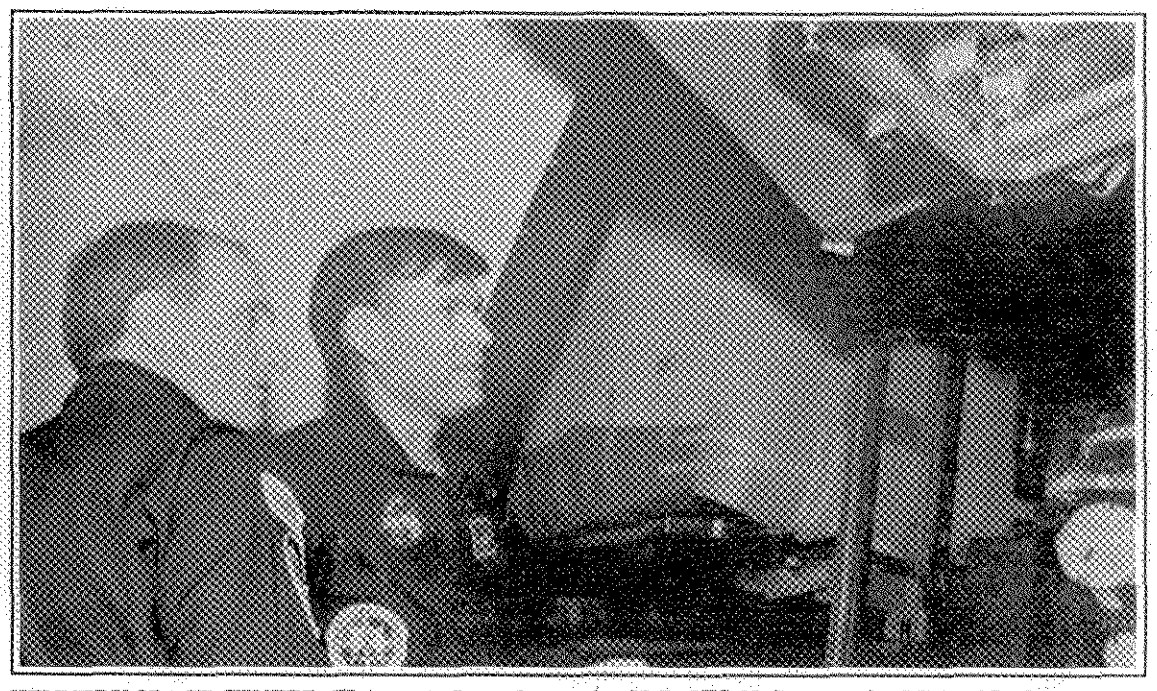
TDRS-D will be deployed six hours, 13 minutes into the mission on flight day 1. Two additional deployment opportunities are available on that day and one the following day.

Secondary Payloads . . .

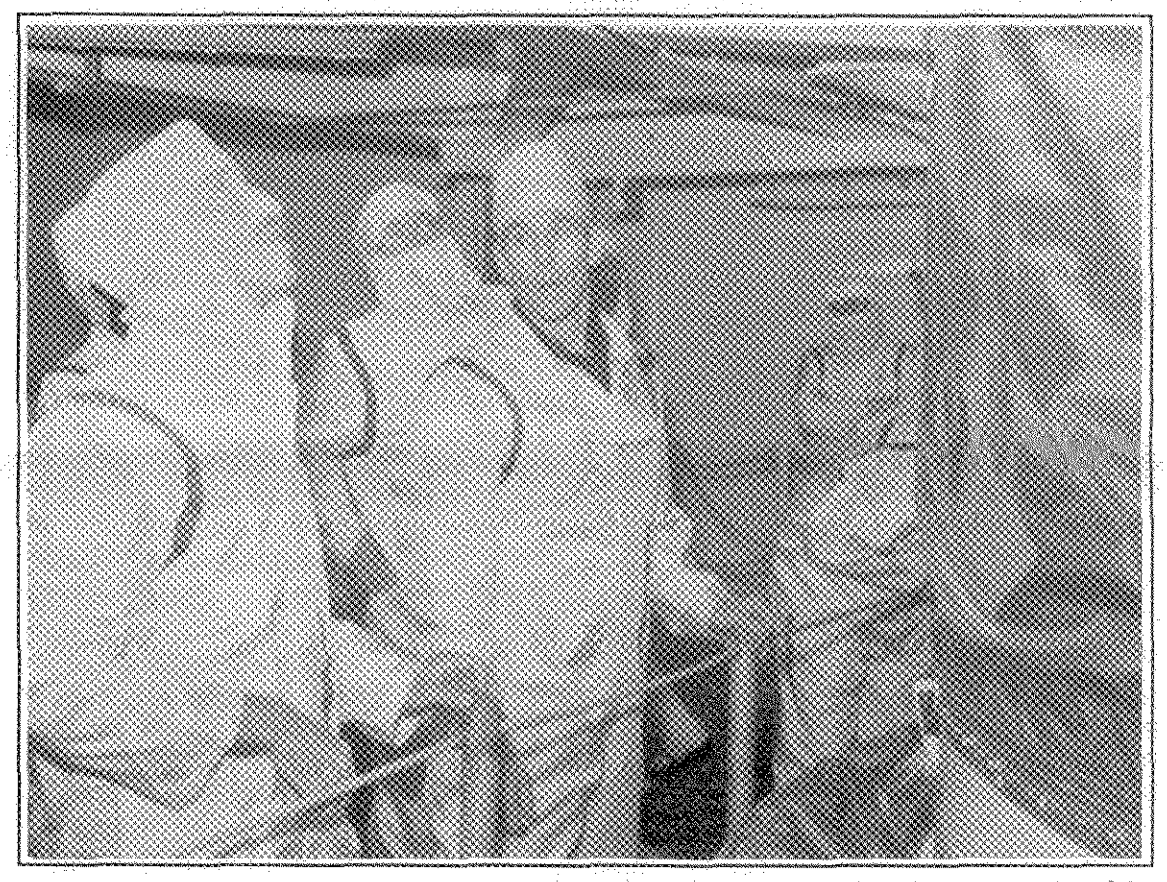
The Orbiter Experiments Program Autonomous Supporting Instrumentation System (OASIS) will be flown again on STS-29 to record environmental data in the orbiter payload bay during flight phases. OASIS will measure TDRS vibration, strain, acoustics and temperature during launch ascent using transducers affixed directly to the payload.

In addition to TDRS-D and OASIS, Discovery will carry the Space Station Heat Pipe Advanced Radiator Element (SHARE) in the payload bay. Several secondary payloads will be carried in the middeck of Discovery, including the IMAX camera, two student experiments, a protein crystal growth experiment and a chromosome and plant cell division experiment.

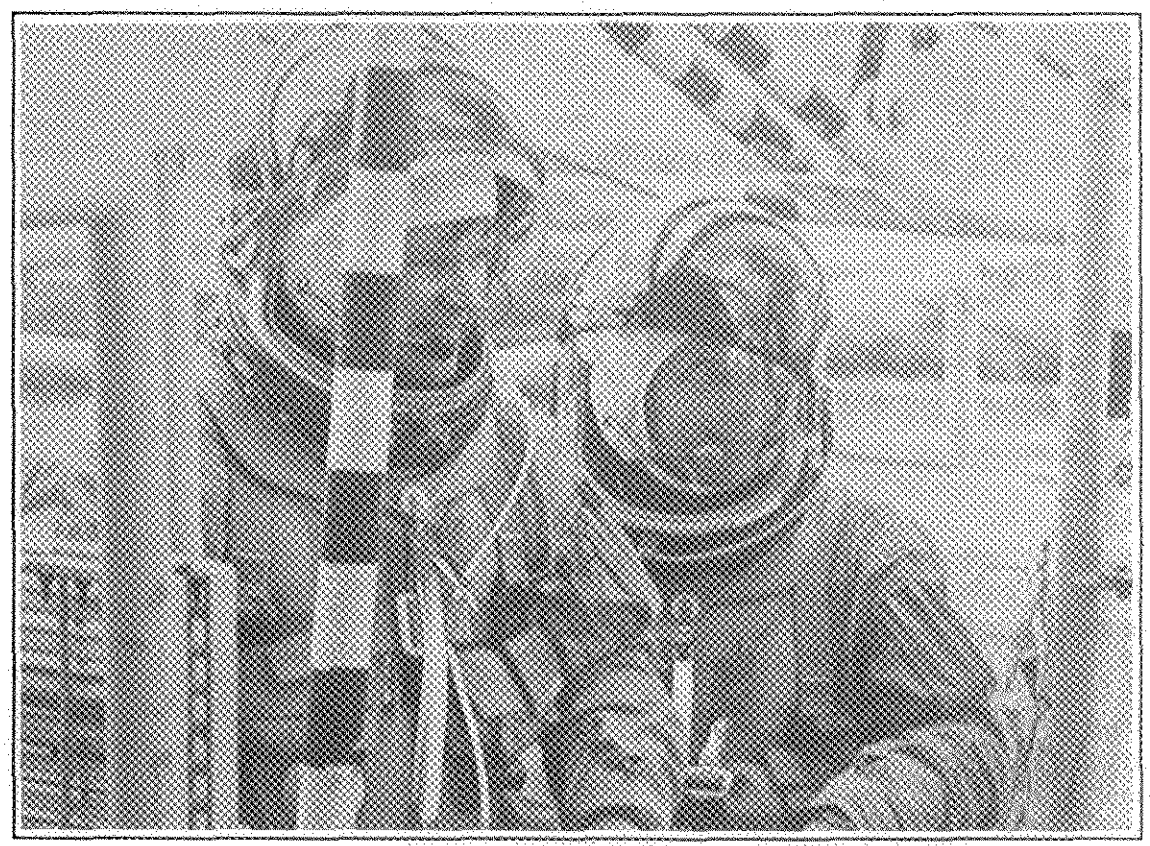
After landing, Discovery will be towed to the NASA Ames-Dryden Flight Facility, hoisted atop the Shuttle Carrier Aircraft and ferried back to the Kennedy Space Center to begin processing for its next flight, scheduled for August.



KENNEDY SPACE CENTER, FLA. --- At Launch complex 39-B, STS-29 Commander Michael L. Coats (right) and Mission Specialist James F. Buchli inspect the area near the three main engines of the Space Shuttle Discovery prior to the removal of one of three oxidizer turbo pumps. New pumps were installed for this mission.



KENNEDY SPACE CENTER, FLA. --- Astronauts James Bagian and Robert Springer inspect a portion of the first stage of the IUS-9 Inertial Upper Stage in a test cell of the Vertical Processing Facility. The crew members will fly aboard Discovery and are responsible for the deployment of the spacecraft.



KENNEDY SPACE CENTER, FLA. --- Sitting in the emergency egress slidewire basket on the 195-foot level of launch complex 39-B, Commander Coates (left) and Pilot John E. Blaha, undergo slidewire training during Terminal Countdown Demonstration Test (TCDT) activities. TCDT is a mock countdown which allows the launch team and crew an opportunity to simulate the actual launch and emergency egress procedures.

Awards

Special Act or Service Awards (

A Special Act or Service Award is a lump-sum cash awa
service or achievement connected with official employm
ployees were granted such special achievements awards
they have substantially contributed to the accomplishme

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Randall T. Voland
Ralph D. Watson
John P. Weidner
Floyd J. Wilcox, Jr.

ranted to Langley Employees

ased on superior performance of a one-time special act, During the 1988 fiscal year, over 800 Langley em- e following individuals can take pride in knowing that Langley Research Center missions and goals.

Hypersonic Technology Office
James C. Ellison
Robert J. Pegg
Dennis H. Petley
Sharon H. Stack
Joe D. Watts

Information Systems Division
Ricky W. Butler
Kelly J. Dotson
Dave E. Eckhardt, Jr.
Walter W. Hankins
Herbert D. Hendricks
C. Michael Holloway
Sandra C. Hurst
Larry D. Lee
Randolph W. Mixon
Peter A. Padilla
Felix L. Pitts
Kurt Severance
Floyd S. Shipman
Carrie K. Walker
Pamela Z. Williams

Instrument Research Division
Richard R. Antcliff
Willard A. Bauserman, Jr.
Colossie N. Batts
Debra L. Carraway
Michael A. Chapman
Toby Comeaux
David C. Davis
Alice T. Ferris
Lorelei S. Gibson
Patrick H. Johnson
Gary E. Koeppel
William E. Larson
James L. Leuci
Ralph B. Lewis
Royce F. McCormick
Min Namkung
William F. Perdue
Paul W. Roberts
Frederick J. Rosensteel
Wayne D. Rowland
Carol H. Satterwhite
Timothy D. Schott
Bradley S. Sealey
Daniel F. Slowikowski
Alphonso C. Smith
Frank H. Supplee, Jr.
Ken K. Tedjojuwono
John S. Tripp
James J. Walsh, Jr.
Kenneth D. Wright II
Allan J. Zuckerwar

Interdisciplinary Research Office
Patricia J. Dinwiddie
James L. Rogers, Jr.
Joanne L. Walsh
Katherine C. Young

LDEF Project Office
Marva J. Mabry

Low-Speed Aerodynamics Division
E. Marie Ashe
W. K. Anderson
Frederick H. Austin
Charles E. Barr
Martin T. Baxter
Gaudy M. Bezos
Dale R. Bowser
Richard T. Bright II
Philip W. Brown
Bryan A. Campbell
Calvin C. Chandler
R. Earl Dunham, Jr.
Dwight E. Elliott
Bruce D. Fisher
Robert T. Fults, Jr.
Robert V. Gifford
William P. Gilbert
David E. Hahn
Bruce J. Holmes
Frank L. Jordan, Jr.
Guy T. Kennerly
Dal V. Maddalon
Gregory S. Manuel
Patricia A. Mattingly
Bettie E. Messier
Nadine E. McHatton
Thomas M. Moul
Daniel G. Murri
Luat R. Nguyen
Marilyn E. Ogburn
Merle S. Ott
William E. Parady
Paul R. Pfeffer
P. Frank Quinto
Ronald H. Smith
Jerry C. South, Jr.
James L. Thomas
Tony Trexler
Patricia A. West
Robert P. Weston
Long P. Yip

Management Support Division
Theresa F. Elliott
Lillian H. Evans
Lisa D. Froyen
Jane V. Gage
Margaret Hall
Charlie B. Harris
Arthur S. Johnson
Ruth A. Koren
Gail L. Lanning
Helen I. Mason
Larry A. Snyder
Edith K. Spritzer
Susan C. Tillman
Lucy B. Watkins
Harry M. Webb

Materials Division
Robert M. Baucom
Angela E. Claud
Shirley B. Crockett
H. Benson Dexter
Dennis L. Dicus
Marcia S. Domack
Marvin B. Dow
Eric K. Hoffman
Brian J. Jensen
W. Steven Johnson
Norman J. Johnston
Sheila Ann T. Long
James B. Nelson
Ruth H. Pater
Clarence C. Poe, Jr.
Philip O. Ransone
Dick M. Royster
Wayne S. Slemp
Anne K. St. Clair
Terry L. St. Clair
Stephen S. Tompkins
Philip R. Young

Office of the Director
Marchelle D. Canright
Gloria Champine
Richard G. Culpepper
Karen Evans
Vivian B. Merritt
Edwin J. Prior

Office of the Director for Aeronautics
Elizabeth F. Buchan
John K. Molloy
Patricia R. Whitehead

Office of the Director for Electronics
Helen M. Bruce
Patricia D. Hurt
Nancy C. Rodgers

Office of the Director for Flight Systems
Gordon F. Bullock
Marna H. Mayo

Office of the Director for Management Operations
Yvonne W. Beyer
Betty S. Burnes
Maria K. Elliott
Arthur R. Friend
Robert L. Huffman, Jr.
Ronald R. Krodel
Howard R. Puckett, Jr.

Office of the Director for Space
Don E. Avery
Barbara B. Clark
Jean M. LaNeave
Julius B. Lovell
Diane S. Wieting

Office of the Director for Structures
Charlotte W. Tyeryar
Rosa C. Webster

Office of the Director for Systems Engineering and Operations
Erica R. Cooper
Tonya E. Washington

Operations Support Division
William C. Alexander
Davis S. Aliff
Carl G. Baab
Robert A. Baals
Donald R. Bagwell
Robert N. Barnes
Billy W. Beasley
Michael D. Benbow
Gerald D. Boggs
Laurence R. Bradshaw
Tracy A. Bridges
Robert F. Bryant, Jr.
Karen A. Burch
Mark R. Carpenter
Conrad L. Chapman
James L. Chiaramida
Patricia Christian
Kenneth N. Cole
Edgar L. Collier, Jr.
Cathy I. Croall
James M. Curro
Charlie R. Debro
Ralph D. Eanes
Johnny E. Ellis
Gloria S. Evans
William E. Felty
Cicero Fields
Thomas A. Gabany
Lelon A. Garner
Hugh C. Gentry III
Thomas A. Grepiotis
Ricky L. Hall
Leon Harris, Jr.
Richard P. Hartman
John R. Hefner, Jr.
Ronald G. Hermansderfer
Barry N. Hogge
Wayne C. Hogge
James M. Howard
William T. Howard
John R. Huffman
Brickey J. Hughes
Jeffrey C. Hyle
Albert B. Insley
Wendy J. Johnson
John D. Johnston
William L. Jones
James A. Keaton
R. Craig Leggette
William A. Lovisz
Linda F. McKnight
Rex M. Meadors
Randy D. Michaelsen
William T. Miller, Jr.
Joseph W. Moore
John R. Nayadley
Edward J. Nisbet
Joseph G. OUDonnell, Jr.
Ronald K. Penner
David W. Pierpont
Hal J. Pinner
James V. Plant
Walter F. Presson
Eric S. Price
James E. Privette III
K. Mason Proctor
David B. Robelen
Philip D. Robinson
Scott R. Runnels
Thomas E. Saunders
Melvin H. Sawyer
Nelson L. Seabolt
Patrick H. Seabolt
Jack L. Smith
Ricky E. Smith
Thomas L. Smith
Mark A. Spiers
Gary P. Stergin
Russell B. Tatum, Jr.
Raymond M. Taylor
Kenneth F. Test
Alfred E. Thomas
John J. Treier
Michael D. Vaccarelli
Darlene A. Walker
John B. Warren
Charles F. West
Richard T. Wheeler
Burnie S. Williams
William K. Williams
Cheri L. Wood
Joe C. Woolsey
Dennis C. Working
Christopher W. Wright
Jerry W. Wright
John A. Young
R. Scott Young
Richard N. Zacharias

Personnel Division
George D. Allison
Patricia M. Borman
Betty S. Burnes
Diane E. Forrest
D. Elaine Gause
Evelyn D. Harris
Lahoma L. Hart
Econyes L. Harvey
Anna H. Jackson
Carolyn T. Kurtz
Patricia K. Martin
Joseph J. Mathis
Janet M. McKenzie
James Frank Meyers
Cathryn L. Murray
James W. Norris, Jr.
Carolyn D. Reaves
Leslie Ricks
Dina L. Slack
Simone E. Stotler
Diane S. Wieting

Programs and Resources Division
Theodore E. Caldwell
Joyce A. Clemens
Buena E. Crawford
Gail R. Dawkins
Bette L. Duncan
Fred H. Josey, Jr.
Jean R. Migneault
Vickie S. Parsons
Delores K. Poupard
Donna M. Silva

Projects Division
Velma L. Clark
Joseph F. Dixon
Rodney L. Duncan
Philip E. Everhart
Grace M. Girton
Patricia A. Holland
Glenna D. Martin
Donald C. McCracken
Eugene D. Morris\
Clyde W. Winters

Research Information and Applications
Thomas H. Brinkley
Harriet Brown
Deborah S. Carroll
Benjamin F. Defendeifer
Emory T. Evans
Allen T. Gray
Tarra D. Gross
Philip K. Hazlett
Carolyn Helmetsie

(Continued on pg. 6)

Kathleen L. Hillard
Cathy Lynn Jenkins
Kaye L. Lee
Effie L. Nicosia
Margaret O'Keefe
Vernelle V. Robinson
Lester J. Rose
Lillian C. Ross
Christine A. Ryan
Charles J. Shoemaker
Bobby E. Silverthorn
Karen D. Thompson
Don W. Ward
Charles W. Watson, Jr.
Ann W. Wilson
Cheryl M. Winstead

Scout Project Office

Priscilla V. Balanis
Joseph F. Dixon
Rodney L. Duncan
Philip E. Everhart
Durward M. Foster
Grace M. Girton
E. Eugene Hall
Franklin P. Keesee
Geneva M. Kelly
Darlene M. Mays
Donald C. McCracken
Eugene D. Morris
Larry R. Tant
James C. Ward, Jr.
Clyde M. Winters

Space Station Office

Karen D. Brender
Robert W. Buchan
Lenwood G. Clark
Leonard J. DeRyder
Emily J. Evans
Shirley M. Freeman
James W. Johnson
Herbert R. Kowitz
Barry D. Meredith
Carole D. Moore
Robert F. Murray
John P. Raney
Joseph B. Talbot
Richard W. Tyson

Special Act or Service Awards

(Continued from page 5.)

Space System Division

Cheryl M. Beargeon
Virginia M. Cordle
Roy J. Duckett
Melvin J. Ferebee, Jr.
Carol M. Forrest
Delma C. Freeman
Peter A. Gnoffo
John W. Goslee
John B. Hall, Jr.
H. Harris Hamilton II
Lin C. Hartung
Lisa M. Harvey
Catherine M. Howard
JoAnn W. Hudgins
Donald H. Humes
Jer-Nan Juang
Leonard R. Melfi, Jr.
John R. Micol
Charles G. Miller III
James N. Moss
J. Christopher Naftel
W. Pelham Phillips
Margarette Pitts
Richard W. Powell
John J. Rehder
Lawrence F. Rowell
William I. Scallion
Bernard Spencer, Jr.
Richard A. Thompson
George M. Ware
Willard R. Weaver, Jr.
K. James Weilmuenster
Nancy H. White
Richard G. Wilmoth
Robert D. Witcofski
William C. Woods
Robert L. Wright
Kathryn E. Wurster
James C. Young
James W. Youngblood
E. Vincent Zoby

Structural Dynamics Division

Kay S. Bales
Samuel R. Bland
Pamela A. Davis
Randall C. Davis, Jr.
Robert V. Doggett, Jr.
Barbara B. Eutsler
Michael G. Gilbert
William H. Greene
Brantley Hanks
Garnett C. Horner
Karen E. Jackson
Norman F. Knight, Jr.
Raymond G. Kvaternik
Barbara V. Murphy
James C. Robinson
Manuel Stein
Eileen M. Strickland
Sandy M. Stubbs
Matthew L. Wilbur
William T. Yeager, Jr.

Structural Mechanics Division

Vickie J. Baker
Charles J. Camarda
Michelle Cohoon
Michael H. Durham
Barbara B. Eutsler
Christopher E. Glass
Chester W. Langston
Michael P. Nemeth
Boyd Perry III
Richard L. Puster
Stephen J. Scotti
Gaylen A. Thurston
Sherwood Tiffany
David A. Seidel
Allan R. Wieting
Eleanor C. Wynne

Systems Engineering Division

Elvin L. Ahl, Jr.
Faith M. Allen
Leilani D. Baals
Cynthia S. Belsches
Laurence J. Bement
Richard M. Boykin, Jr.
Obie H. Bradley, Jr.
Gloria C. Carney
John A. Costulis
Sharon K. Crockett
Joseph F. Delorme
Kurt N. Detweiler
Richard W. Faison
Melinda F. Finch
A. L. Forbes, Jr.
Richard A. Foss
Charlene L. Gleaton
William H. Hollingsworth
Charles E. Jenkins, Jr.
Thomas C. Jones
Brian D. Killough, Jr.
Richard L. Kurtz
Mark T. Lord
James B, Miller
Vance A. Overbay
Ruben A. Remus
Winifred A. Stalnaker
Leonard T. Twigg
Donna B. Vicroy
John W. Wallace
Vernon E. Watkins, Jr.
Dave E. Williams
Charles J. Wittkopp

Systems Safety, Quality and Reliability

Martin T. Baxter
H. W. Beazley
Robert E. Blakeslee
Clarence F. Breen
Cuyler W. Brooks, Jr.
Gary L. Carl
Margaret Foster
Jackie W. Holloway
Elijah C. Kent
George T. King, Jr
Brian J. Jensen.
Mack G. Lawrence
Olaf M. Lawson
Charles E. Mercer
Cadd T. Moore, Jr.
Russell E. McKean
Lloyd Nelson
Warren R. Nichols
Queenella M. Perrin
Joseph A. Poslik
Paul D. Prillaman
Edward J. Ray
James I. Richardson
Robert E. Satterthwaite
John W. Wainwright III
Judy M. Wainwright
Charles B. Zeitman

Transonic Aerodynamics Division

Jerry B. Adcock
E. Ann Bare
Bobby L. Berrier
Karen L. Cole
Lise P. Crowe
David A. Dress
Gary E. Erickson
Joel L. Everhart
Dennis E. Fuller
Charles D. Harris
Judith W. Holye
Pierce L. Lawing
Laurence D. Leavitt
Edwin E. Lee, Jr.
James M. Luckring
Mary L. Mason
Raymond E. Mineck
Perry A. Newman
Odis C. Pendergraft, Jr.
John P. Stack
Craig L. Streett
Doris B. Vandeveer
Catherine B. Worth

**Employees listed represent awardees from July 1987 through September 1988. Awardees are noted by the Divisions that granted the recognition.*

Barry N. Hogge (right), Operations Support Division, is the most recent recipient of Langley's Suggester of the Year Award presented by Deputy Director Paul F. Holloway. Adoption of Hogge's suggestion has resulted in implementation of provisions for keeping recertification documents for pressure systems current. Documentation of changes between certification updates will eliminate duplication efforts and result in a significant savings of manhours.

Positions Filled

Edward M. Riley Jr. has been selected AST, Electronic Instrumentation Systems, Electrical Section, Systems Development Branch, Systems Engineering Division, under CPP 88-79.

George Charles Firth has been selected AST, Experimental Facility Development, Process Systems Section, Facility Systems Branch, Facilities Engineering Division, under CPP 88-80.

Paul R. Pfeffer has been named Supervisory Aerospace Engineering Technician, Research Aircraft Support Section, Aircraft Operations Branch, Low-Speed Aerodynamics Division, under CPP 88-78.

David A. Wineman has been selected AST, Experimental Facilities Technician, 8-Foot Tunnel Project Office, Electronic Systems Branch, Facilities Engineering Division, under CPP 88-88.

Harriet A. Coombs has been named Administrative Assistant, Systems Engineering and Operations Division, under CPP 88-81.

Letty L. Bright has been selected Payroll Technician, Payroll Section, Financial Services Branch, Financial Management Division, under CPP 88-85.

Randy C. Woolard has been named Supervisory Engineering Technician, Metals Technology Development Section, Metals Applications Technology Branch, Fabrication Division, under CPP 88-86.

Retirement Party

The retirement party for **Malcolm P. Clark** has been **rescheduled** for Tuesday, March 14, at 6 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $10/person. Contact Lahoma Hart, ext. 42606, for reservations.

Apollo Anniversary Celebration Planned

The Office of External Affairs is trying to locate those who worked on the Apollo project in any capacity.

Please contact Arlene Levine, Mail Stop 154, or by phone at 864-3318. Don't miss this celebration.

Help Needed . . .

Anyone having clean copies of **Aviation Week** covers October 8, 1979 (rocket propelled crash test); January 9, 1984 (advanced turboprop transport in 14x22-Foot Tunnel; April 30, 1984 (LDEF); July 16, 1984 (GE E-7 stovl aircraft in 14x22) or any other Langley-related **AvWeek** cover from 1979-86, please contact Keith Henry, ext. 46120. The Office of Public Affairs would like to *borrow* them to photograph.

People & Places

Employees Support Bloodmobile

The American Red Cross Bloodmobile visited Langley on November 23 and January 25. A total of 568 units of blood were donated by Langley employees, retirees and contractors.

Achieving gallon status were:

14 gallons — Robert P. Davis;

13 gallons — James L. Leiffer;

11 gallons — Carrol A. Williams;

10 gallons — Eric Madaras;

9 gallons — John H. Crosby II, William G. Johnson, Aubrey M. Raeford;

8 gallons — Danny Barrows, Fred Hines, Doyle Arboneaux;

7 gallons — Henry Zumbrun, Warren W. Smith, James M. Ship, William F. Adkins, Lloyd W. Nelson;

6 gallons — Frank L. Jones, Michael M. Bryan, John R. Nayadley;

5 gallons — Richard S. Young, James M. Brown, William L. Williams, Jerry W. Wright, Thomas H. Leffel, Mark T. Lord, Joseph B. Jackson;

4 gallons — Edgar Collier, Timothy D. Bryant, Lawrence D. Huebner, Douglas S. Johnson, Barry E. Brunner, Donald L. Lansing, Phillip L. Brown;

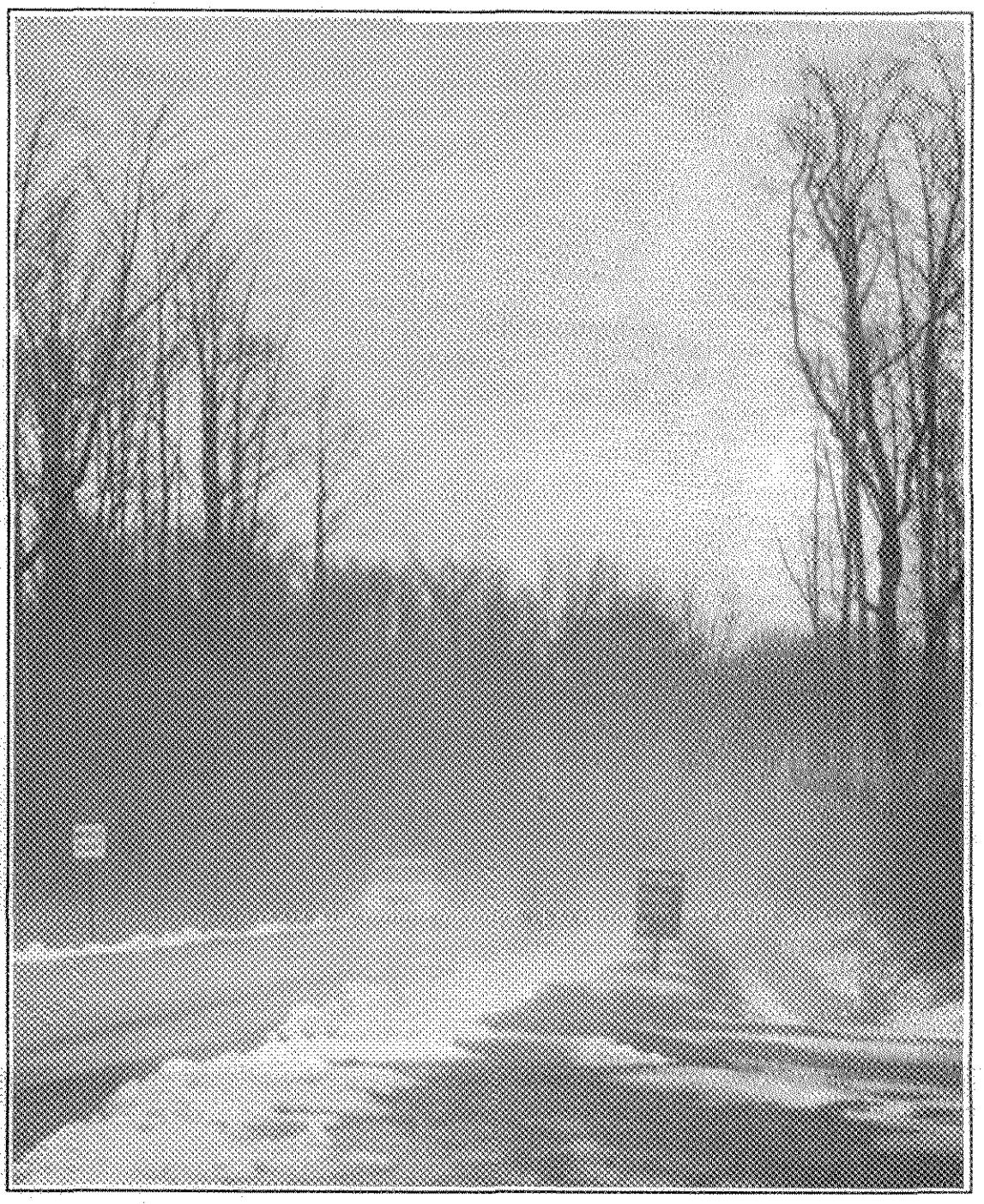
3 gallons — Catherine Herstrom, Scott Runnels, David Johnson, Robert D. Turner, Richard Zacharias, Matthew E. Nortness;

2 gallons — Daniel Millman, Daniel P. Giesy, Wayne D. George, Nettie Orie, Wanda R. Parker, Thomas J. Skalski, Robert J. Mack, Lin C. Harting; Paul Aronsohn, Robert V. Gifford, George T. King Jr., Tammi S. Moat, Augustus D. Scott, Gary F. Wesselmann, Kenvin B. Johnson, Robert Wills;

one gallon — Michael F. Riley, Rita A. Adams, Carrie Walker, Lynn Purkiss, Hal J. Pinner, Sharon Perez, Karin Cornils, Kevin Bonilla, Roland S. Geouge, Franklin Mayhew, Kelvin Boston, Carroll W. Rowland, Sherry Belcher, Stephen Harvin, Dana C. Gould, Shawn Birchenough;

First time donors — Gary Wainwright, Jeffrey W. Bullock, Steven W. Gayle, Stan Husche, Stephen A. Mason, Dan Stead, Peyton Gregory, Michael Haselhuhn, Jack D. Todd and Clinton Duncan.

NASA coordinator for the Bloodmobile visits was Annette L. Forrest; Red Cross coordinator was Barbara Thomas.



February '89: Winter --Spring? Snow --Sun?

Langley photographer Fred Jones snapped this photo essay which aptly sums up the weather extremes plaguing Tidewater this February. Taken Tuesday, February 21, at 3 p.m. near the Wythe Creek gate, this scene is typical of what employees faced getting around on Center all day long. The 80-degree temperature following the weekend snowfall made headlights necessary for safe travel through the dense fog.

The following weekend brought still more uncharacteristic weather. The Center was forced to close Friday, February 24, due to blizzard conditions. This wacky weather precipitated over 4,000 calls to Langley's emergency broadcast network, extension 42111.

Notes of Thanks

Carol Olsen would like to express her appreciation to all her fellow workers who donated annual leave on her behalf through the new leave transfer program. "It was a heartwarming deed, especially knowing how much we all value our leave. Thank you."

The family of **Claude B. Castle** would like to express "our thanks and gratitude to all our friends for your love and support through our time of loss."

The family of **John R. Arrington** wishes to express their sincere appreciation to the blood donors who donated a total of 35 units of blood during the September and January Bloodmobiles to replace blood used during his illness. The blood transfusions were very instrumental in sustaining life for Arrington from April 1988 until he died on January 24 from a bone marrow disorder. Thank you for giving the gift of life.

Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The awards committee convened on February 2 and selected Crew #2, Night Shift, as Crew of the Month for January. This crew obtained a perfect score of 95 points. They also received a letter of commendation for outstanding work performed in Buildings 1237A and 1148. Crew members are (L to R) James Wright, Robert Jones, Lionel Pickens, Robert L. Hardy and Herbert Gilliam.

Senior Management Research Review

The Senior Management Research Review will be held Monday, March 20, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	External Flow Effects on Multiaxis Thrust	Bobby Berrier (Aeronautics/AAD)
9:45	Direct Simulation of Compressible Turbulence	Gordon Erlebacher (Aeronautics/FldMD)
10:00	Vectorized Lanczos Vibration Analysis Algorithm Developed to Exploit NAS CRAY-2	Susan Bostic (Structures/SMD)
10:15	Validation of Fault-Tolerant Software	Dave Eckhardt (Flight Systems/ISD)
10:30	Shock Interactions in Rarefied Hypersonic Inlet Flows	Richard Wilmoth (Space/SSD)
10:45	Cloud-Radiative Forcing and Climate: Insights from ERBE Data	Ed Harrison (Space/ASD)

Upcoming Conferences

OAST Wind Tunnel Calibration Workshop will be held April 19-20 in Building 1212, Room 200. For additional information, contact L. Wayne McKinney or Brenda Steele, ext. 45595

Fourth Meeting of AGARD Working Group will be held April 26-27 in Building 1212, Room 116. Charles L. Ladson, ext 45025, is point of contact.

Happenings

ST. PATRICK'S DAY. The LAA will hold a special St. Patrick's Day social Friday, March 17, from 4 to 8 p.m., in the H.J.E. Reid Conference Center, Building 1222. Complimentary snacks will be provided; wine and a light dinner will be available for sale. Live entertainment by "Foxfire." Cover charge of $1 to defray cost of band.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, March 14, at 2 p.m., in the H.J.E. Reid Conference Center. Concerns to be brought before the board should be addressed to the appropriate chairperson.

NASA TOASTMASTERS will meet Wednesday, March 22, at 11:30 a.m. in the H.J.E. Reid Conference Center. The club meets monthly on the second and fourth Wednesdays; guests are always welcome. For additional information, contact Steve Yaros, ext. 43050.

BUSINESS CARDS can be ordered through the Visitor Center Souvenir Counter. Stop by or call ext. 41585 for details.

EASTER EGG HUNT. The annual LAA children's Easter Egg Hunt will be held Saturday, March 18, from 2 to 4 p.m. on the grounds of the H.J.E. Reid Conference Center, Building 1222. Rain date is Sunday, March 19. The movie "E.T." will be shown. Refreshments will be served and special prizes given away. The cost for the egg hunt is $1 per child.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, March 22, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center, Building 1222. Share your good fortune with someone less fortunate. Give the gift of life.

NASA SOFTBALL ASSN. The organizational meeting and rules clinic for the 1989 softball season will be held Tuesday, March 14, at 4:30 p.m., in the H.J.E. Reid Conference Center, Building 1222. All current team managers, representatives of new teams interested in joining the association, current umpires and persons interested in becoming umpires are encouraged to attend. Umpires are paid.

LOST MONEY? Malfunctioning vending machines on Center should be reported to Frankie Ward, ext. 46369.

FOR RENT: ROOM. Furnished room and bath in private home in Grafton, near Heritage Shopping Center. Cable TV, kitchen privileges, plus use of washer/dryer. Non-smoker please. $200/month. Call 898-8188.

FOR RENT: TOWNHOUSE in Poquoson, 3BR, 2 1/2 BA, LR w/ fireplace, DR, eat-in kitchen, patio w/ storage room, 5 minutes to NASA. $525/month. Call Joan at ext. 42521 or at 838-6000 evenings.

FOR SALE: HOUSE, brick rancher in Bayberry, 3 BR, FR w/fireplace, DR, eat-in kitchen and more; .6 acre lot, ten minutes from NASA. $93,500. Call ext. 42295 or 596-5595.

FOR RENT: CONDO in Denbigh, 1,550 sq. ft., 3 BR, 2 BA, LR w/fireplace, DR, eat-in kitchen, 2 patios, fenced courtyard, washer/dryer, pool, many extras. $625/mo. plus utilities. Call 865-0900 or 874-8248.

Temporary Leave Transfer Program

The Temporary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing a period of unpaid leave as a result of a personal or medical emergency.

As a result of such an emergency, the following employees are approved leave recipients:

- Robert M. Connell, Jr.
- Randolph F. Culotta
- Kenneth M. Jones
- Catherine B. Worth

If you wish to donate annual leave to these recipients, or wish more information concerning the Temporary Leave Transfer Program, please contact Linda Park, Employee Relations Section, ext. 42610.

What's New in the Learning Center?

1988-89 Management Training Video Conferences:

- Building a Winning Team Through Effective Meetings, 2 hrs. VHS
- Making Conflict Work for You: Managing Differences and Agreement, 2 hrs. VHS
- Keys to Service Distinction: Management Fundamentals, 2 hrs. VHS

Management Series

- Communicating Across Cultures, 30 min. VHS
- Managing Differences, 30 min. VHS
- Diversity at Work, 35 min. VHS

Audio Tapes

- Successful Business Borrowing
- Kaisha, the Japanese Corporation
- How to Talk so People Listen
- The Professional Decision Thinker
- When the Bottom Drops
- Memory Makes Money

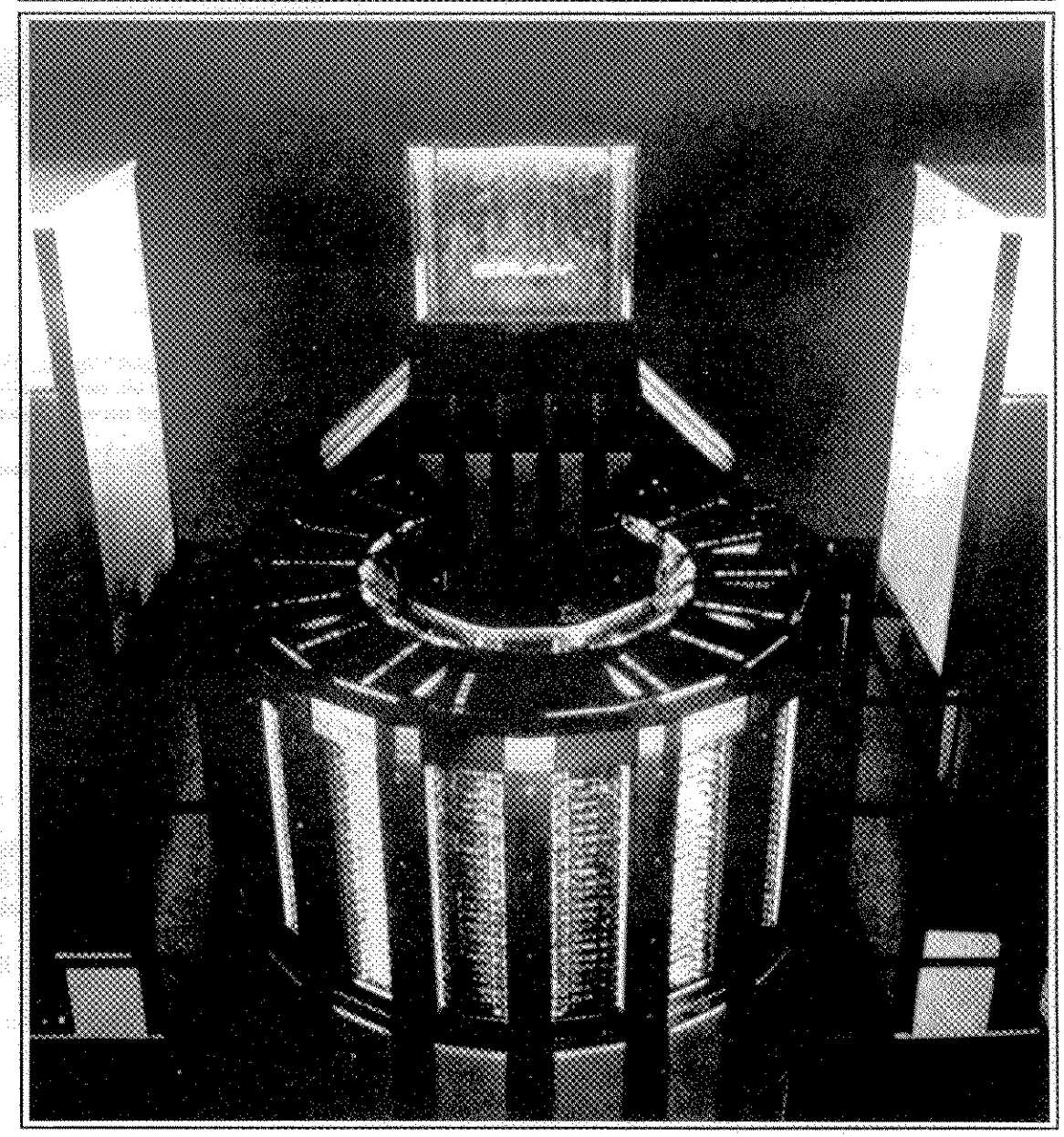
Researcher News

BULK RATE
POSTAGE & FEES PAID
NASA Washington, DC
Permit No. G-27

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

Official Business
Penalty for Private Use $300



CRAY-2 BRINGS FIVE TIMES THE COMPUTING CAPABILITY TO LANGLEY. The supercomputer mainframe, which includes all memory, computer logic and DC power supplies is integrated into a package consisting of 14 vertical columns arranged in a 300 degree arc that looks like the letter "C" from the top. It stands 45 inches high and has a diameter of 53 inches. This compactness is necessary to avoid delays in electronic communication between components; but it results in the concentraion of heat. The liquid immersion cooling technology used by the CRAY-2 computer is a breakthrough in the design of cooling systems for large-scale computers. Langley's supercomputer will be dedicated March 13. See story on page 1.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 6, March 24, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

John L. Whitesides is presented the National Faculty Advisor Award by AIAA President Dr. William F. Ballhaus, Jr., director of NASA Ames.

Whitesides Honored by AIAA

John L. Whitesides, professor of engineering and applied science and associate director of George Washington University's JIAFS program, was awarded the National Faculty Advisor Award by the American Institute of Aeronautics and Astronautics (AIAA) at it annual meeting January 10 in Reno, Nevada.

Whitesides was cited "for over 15 years of service and devotion to students at George Washington University's Joint Institute for Advancement of Flight Sciences, Region I and AIAA Student Programs." Professor Whitesides also serves as Director for AIAA Region I.

The National Faculty Advisor Award is presented annually to the faculty advisor of a chartered AIAA student branch who, in the opinion of the student branch members and the AIAA Student Activities Committee, has made outstanding contributions as a student branch faculty advisor, as evidenced by the record of his student branch in local, regional and national AIAA activities.

Langley Colloquium and The Sigma Series

O'Neill Presents "Building a Rational Space Program"

Just as earthly explorers and settlers were able to "live off the land," we will soon use resources available in space to increase our range and ability in exploration, lower the cost of space operations and make possible the long-term habitation of space.

During two lectures in Hampton Monday, April 10, Dr. Gerard K. O'Neill,a member of the National Commission on Space, will discuss how harvesting space resources will provide important benefits to Earth. At 2 p.m. O'Neill will give his talk to Langley employees during a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 7:30 p.m., he will present the same lecture at the Sheraton Inn Coliseum as part of The Sigma Series. The Sigma Series is a series of public lectures sponsored by the Daily Press, the City of Hampton and NASA.

O'Neill's talk, "Building a Rational Space Program," will examine the benefits to Earth and some of the economic, environmental and social aspects of future space activities, such as solar power satellites, lunar and asteroid mining and space colonies.

O'Neill served on the Princeton University physics faculty from 1954 to 1985. His work consisted mainly of initiating and leading large scale projects in accelerator construction and high-energy physics research.

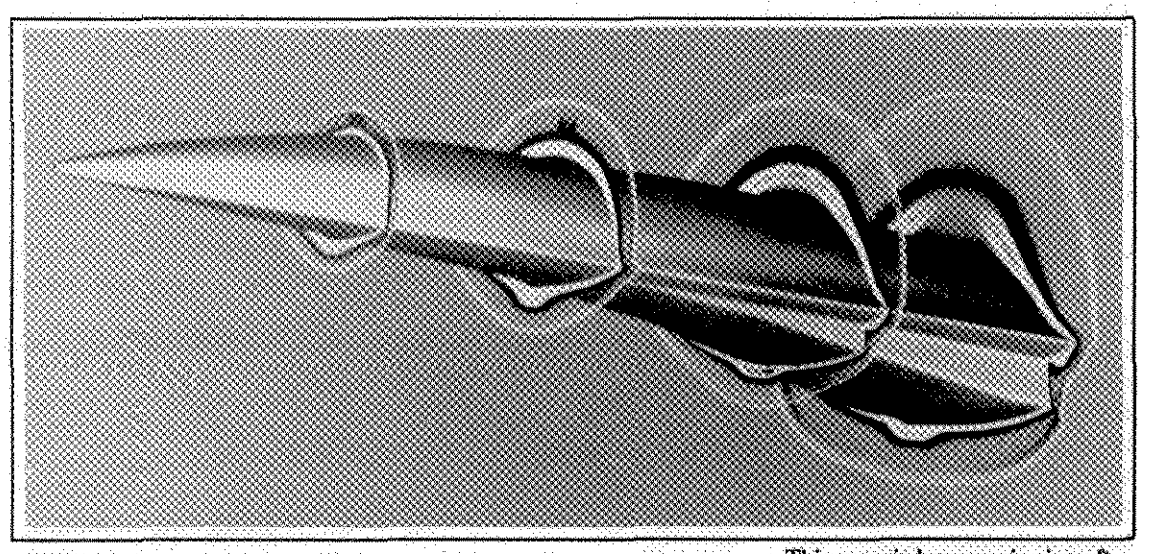
In 1983, O'Neill founded and is now a director of Geostar Corporation, which is developing a commercial system to give precision navigational positioning and guidance, two way communications and emergency services through satellite relays directly to portable terminals. Geostar's first operational satellite relay was launched in March 1988, and is providing service throughout the continental United States.

In 1977, O'Neill founded the Space Studies Institute, which supports engineering research in space development form citizen and corporate donations.

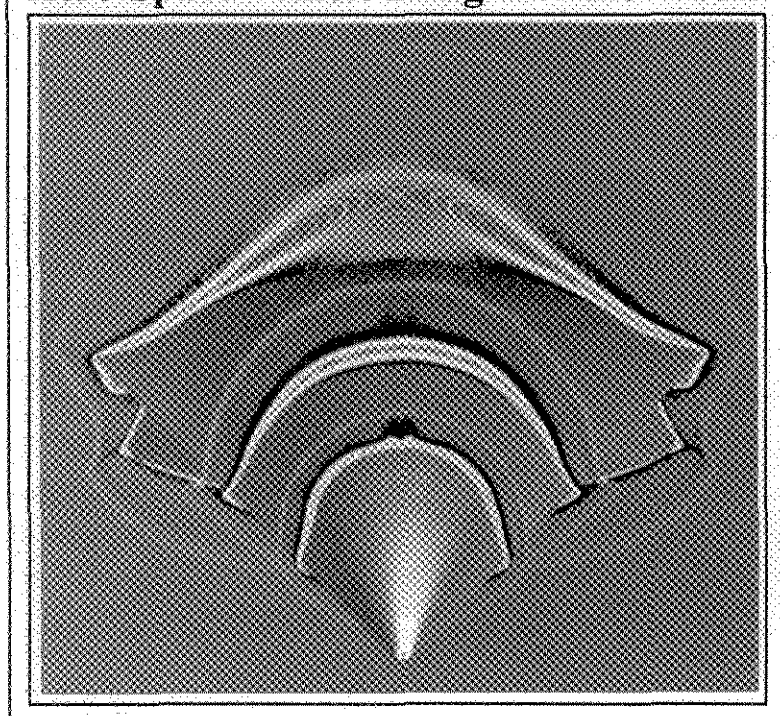
O'Neill received a bachelor of arts degree and an honorary doctorate from Swarthmore College and a doctorate from Cornell University. He has authored four books, one of

which, "The High Frontier," won the Phi Beta Kappa Science book Award. His other honors include the Hunsaker Professorship of Aerospace Engineering at the Massachusetts Institute of Technology, and, in 1986, the Government Industry Service Award of the Electronics and Aerospace Systems Conference of the Institute of Electrical Engineers. In 1985, he was appointed by President Reagan to serve on the National Commission on Space.

An opportunity for informal discussion with O'Neill will follow the colloquium.



Aero-Space Vehicle Design for the 1990s.



This generic hypersonic aircraft model will aid scientists at Langley Research Center in shaping a model of the X-30 space vehicle. The National Aero-Space Plane (NASP), designated the X-30, is an aircraft which, once completed, will take off horizontally from a conventional runway and fly into low-Earth orbit. At Langley, scientists are working to develop computer codes that will simulate the high speed flow about the X-30 aircraft shape. These computer codes will be verified from available computer data and tests conducted now to verify computer codes. Heavy dependence on computer codes is required since wind tunnel facilities may not exist or have the ability to model the entire X-30 flight regime. In the photographs, the contour lines indicate temperature at Mach 19 around a generic vehicle similar to the X-30.

NTF Board Continues Work

The board appointed to investigate the National Transonic Facility (NTF) mishap expects to complete its work by the end of March and report its findings to NASA Headquarters on April 10. The board has been working to determine what caused the tunnel's fan blades to be damaged during a routine test run January 18.

The board is made up of people from NASA Headquarters and NASA Ames, Lewis and Langley Research Centers. They are Joseph Yuska, chairman, Lewis; Sammie Joplin, executive secretary, Langley; Lado Muhlstein, Ames; William Henderson and Dr. Clarence "Buddy" Young, Langley; Lonnie Reid, Lewis; Dr. Charles Smith, Alan Lew and Suey Yee, Headquarters; and Lonnie Owen, ex-officio member, Headquarters.

The Board's activities are being supported by Langley

(*Continued on page 2.*)

State-of-the-Center Address

Langley Director Richard H. Petersen will address Center employees, retirees and support contractors on the state of NASA and Langley Research Center April 3 and 4 in the H.J.E. Reid Auditorium.

April 3	1:30-2:15 p.m.	Office of the Director Aeronautics Directorate Fabrication Division
	3:00-3:45 p.m.	Electronics Directorate Management OperationsDirectorate
April 4	8:30-9:15 a.m.	Space Directorate Flight Systems Directorate Operations Support Division
	10:00-10:45 a.m.	Systems Engineering and Operations Directorate (except FD and OSD) Structures Directorate

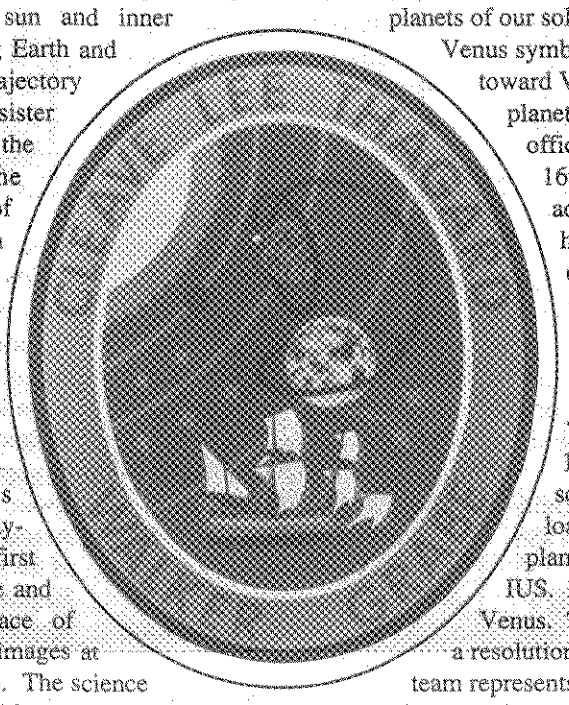
Time should be charged to Job Order Number A-1980.

News Briefs

LEWIS RESEARCH CENTER, Cleveland, Ohio --- A NASA program that has saved billions of gallons of fuel and reduced aircraft engine noise has put more than $19 million back into the U.S. Treasury. Pratt &Whitney, a unit of United Technologies, presented a check for $3,028,951 to Lewis Research Center. The check brings to $19.2 million the amount the company has paid the government through recovery-of-cost provisions on R&D programs begun in the 1970s largely as a result of the oil crisis. Improvement to jet aircraft engines resulting from the Lewis funding have meant savings of from two to four billion gallons of fuel, worth between $1.5 billion to $3 billion, for aircraft entering service in the U.S. through 1990.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- As part of the DOD/NASA Advanced Launch System (ALS) program, MSFC has announced the selectrion of three firms for negotiations leading to award of five contracts for propulsion advanced development efforts to demonstrate and mature new propulsion technologies. The objective of these ALS propulsion advanced development efforts is to demonstrate highly reliable, low-cost engine components for the liquid-fueled engines. Contracts will be awarded to Aeroject General Corp, Sacramento, Calif.; Rocketdyne Division, Rockwell International, Canoga Park, Calif.; and United Technologyu Corp., Pratt and Whitney Division, West Palm Beach, Fla.

STS-30 Crew Insignia --- The STS-30 patch depicts the joining of NASA's manned and unmanned space programs. The sun and inner planets of our solar system are shown with the curve connecting Earth and Venus symbolizing the Shuttle orbit, the spacecraft trajectory toward Venus and its subsequent orbit around our sister planet. A Spanish caravel similar to the ship on the official Magellan program logo commemorates the 16th century explorer's journey and his legacy of adventure and discovery. Seven stars on the patch honor the crew of Challenger. The five-star cluster in the shape of the constellation Cassiopeia represent the STS-30 crew members. Astronauts David M. Walker, commander; Ronald J. Grabe pilot; and mission specialists Mary L. Cleave, Mark C. Lee and Norman E. Thagard collectively designed the patch. Mission STS-30 aboard the orbiter Atlantis is scheduled for launch in April. The primary payload, the spacecraft Magellan, will be the first planetary spacecraft launched from the Shuttle and IUS. Magellan will map 70 to 90 percent of the surface of Venus. The Synthetic Aperture Radar (SAR) will obtain images at a resolution ten time better than the Soviets' Venera 15 and 16. The science team represents academia, industry and government from the U.S. as well as from England, Canada, France and Australia. Martin Marietta built the spacecraft; Hughes Aircraft Co. built the SAR.



NTF Board Continues Work

(Continued from page 1.)

Divisions: From Structures, the Structural Mechanics, Materials, and Structural Dynamics Divisions; from SE&O, the Systems Engineering, Operations Support, Facilities Engineering and Fabrication Divisions; from Aeronautics, the Applied Aerodynamics Division; and from Management Operations, the Research Information and Applications Division.

The NTF, completed in 1983, is Langley's newest major wind tunnel. It is a new kind of tunnel capable of accurately testing models of advanced aircraft and spacecraft designs that must fly in the transonic speed range. Transonic defines a narrow range through the speed of sound from about Mach .8 to Mach 1.2, a speed regime that poses unique challenges for aircraft designers and researchers.

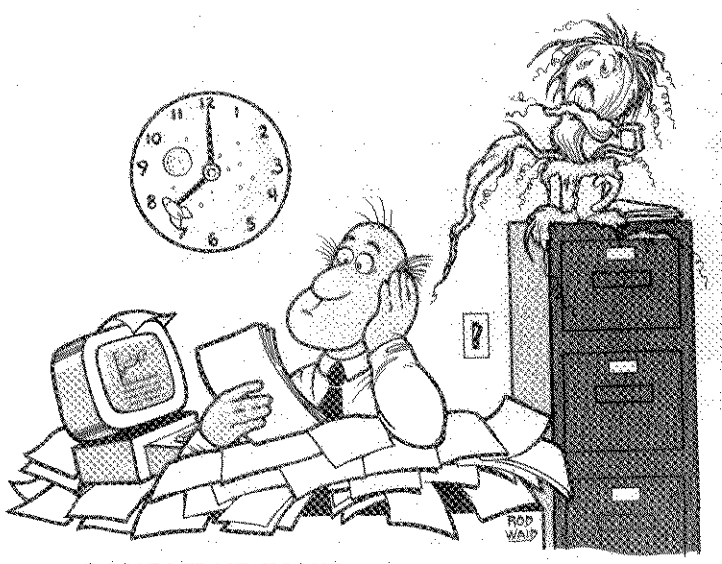
Aerospace Penpoints

Two more of Wesley Berryman's **Aerospace Penpoints** are now available at the Visitor Center Souvenir Counter.

The first is the prayer that was radioed back to Earth when Apollo 8 went into orbit around the moon early on Christmas Eve 1968. The second is a quotation by Abraham Lincoln at age 19. It is a profound expression of how the sixteenth President viewed the universe while gazing at the stars.

In addition, the NACA Charter, recently announced, is of particular interest to present and former NACA employees. Calligrapher Berryman is a former Langley employee.

Lankley



CAUGHT UP IN HIS WORK, LANKLEY IS OBLIVIOUS TO THE FACT THAT THE GIANT MOLD ORGANISM GROWING IN HIS COFFEE CUP IS IN NEED OF WATER.

Syms Victorious at MATHCOUNTS

Syms Middle School students took first place in the Peninsula competition of the national MATHCOUNTS program held Saturday, March 4. The Syms team advances to the state math finals in Richmond.

MATHCOUNTS is a nationwide program designed to answer the problem of declining math skills among students at the precollege level. NASA Langley hosts this competition in cooperation with the Virginia Society of Engineers.

The Syms team included Edward Kerr, Thomas Mack, Gopal Mahadevan and Johnny Tuliner. Mahadevan was also the first place winner in the individual competition.

Schools participating in the program wereYorktown, Tabb, Eaton, Queens Lake and James Blair Intermediate Schools; Lindsay, Spratley, Syms, Dozier, Hines and Gloucester Middle Schools; and Hampton Roads Academy.

Editorials

Langley

Headquarters Forum

I think everyone is well aware by now that the City of Hampton and NASA Langley are leading an effort to build a major new air and space museum on the waterfront in downtown Hampton. The project, which was initiated in 1986, is well underway and the planning is going extremely well. I think that I can speak for everyone on the Steering Committee and say that we could not be more pleased with the progress to date and with the overall support and enthusiasm we are receiving.

The building design has been completed, the construction drawings are being finalized and the bid package should go on the street within the next few weeks. The conceptual phase of the internal exhibits and artifacts program has been completed and the designers and curators are now well into the detail design phase.

The building site, located on Settler's Landing Road at South King Street, was dedicated in December. The ground breaking ceremony will be held May 26 at 10:30 a.m. Actual construction should start this summer and we expect the facility to open by mid- to late-1991.

Those of us here at Langley are very pleased that the City of Hampton and the State of Virginia recognize the importance of air and space technology and the role that Langley and our geographical area have played in developing this technology. Historians throughout the world recognize this region of our nation as the "birthplace of air and space technology."

As I said in the opening paragraph, the support for this project has been overwhelming. We continue to receive many phone calls and visits from private citizens, NASA employees, retirees and contractors as well as private groups and societies, each volunteering to help in some way. In fact, we have far more volunteers than we have work for them at this time, but that will change as the project proceeds.

The material on the facing page should provide you with a few more details. If anyone has any questions or suggestions, please give me a call.. We are always looking for additional ideas.

On behalf of those working on the project team, I would like to thank the City of Hampton, the State of Virginia, the Smithsonian, NASA Headquarters and all who have volunteered their time and money. Langley, NASA and our community will benefit from this exciting project for decades to come.

A. G. Price
Office of External Affairs

Current News Releases

To obtain a copy of these NASA News Releases, contact Edith Watts, Mail Stop 146, ext. 43293.

89-26.....U.S. Government Regains $19 Million from Aircraft Engine Program
89-27.....Contracts Awarded for Advanced Launch System Advanced Development Propulsion

News Researcher

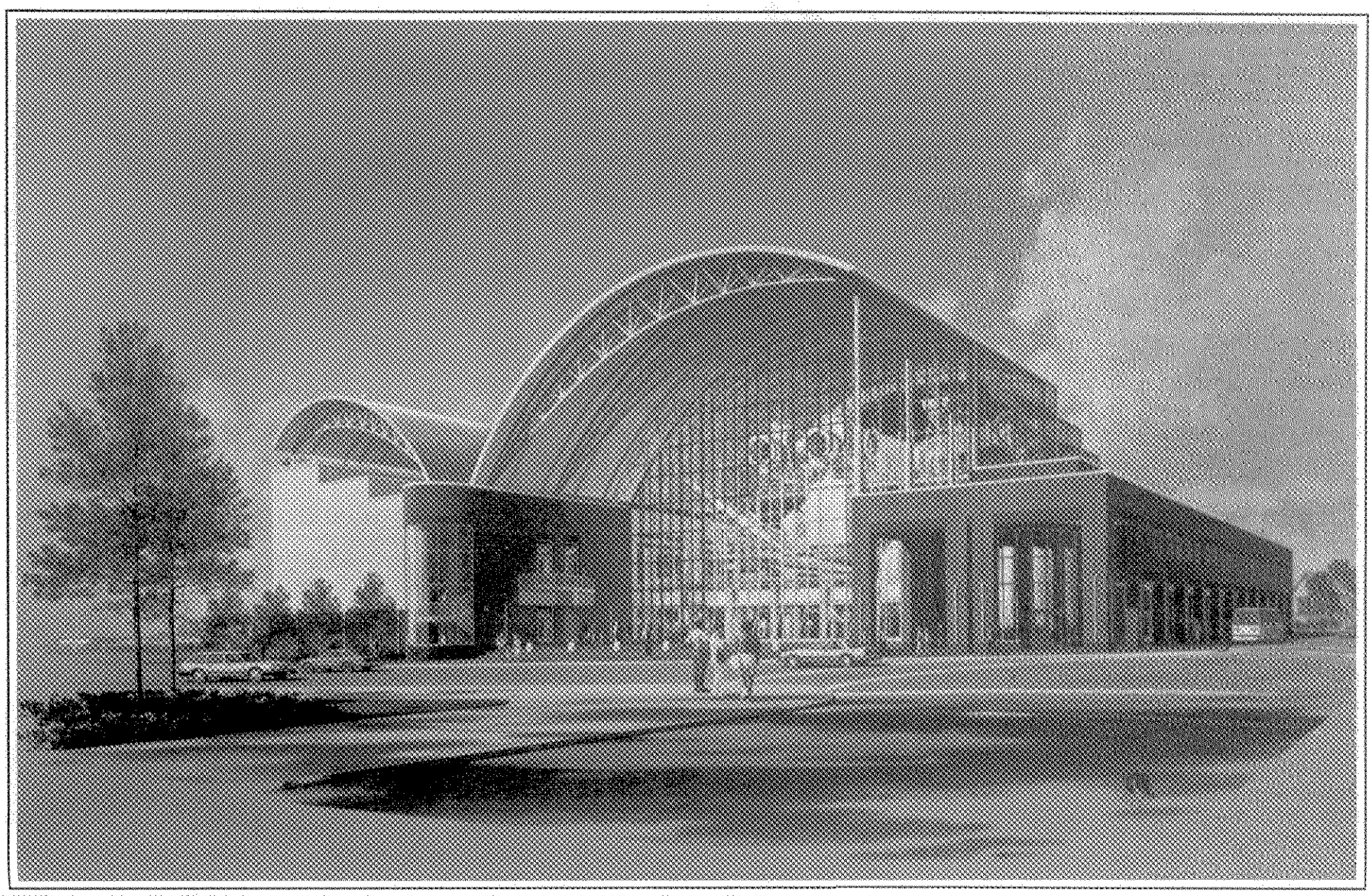
The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.



VIRGINIA AIR AND SPACE CENTER -- HAMPTON ROADS HISTORY CENTER. This rendering by Art Associates, Inc. of Toledo, Ohio, presents the structure designed by Mitchell/Guirgola Architects, New York City, a world-renowned firm, in partnership with Rancorn, Wildman, Krause and Brezinski, York County. The local architectural firm is responsible for the overall construction plans and oversight of the building construction. The building, approximately nine stories high, will include over 100,000 square feet of exhibits, sales shops, classrooms, a NASA Teacher Resource Center, a 100-seat orientation theater and a 320-seat large screen projection theater.

Virginia Air and Space Center to Tell the Story of the "Birthplace of Aerospace Technology"

Eighty-five years after the "first flight," Hampton Roads marked another aerospace milestone. The site of the Virginia Air and Space Center and Hampton Roads History Center was officially dedicated on December 15, 1988, coinciding almost to the day with the anniversary of the Wright brothers' flight at Kitty Hawk.

Thomas P. Chisman, president of the center, served as master of ceremonies. Senator Hunter B. Andrews, Mayor James Eason and Langley Director Richard H. Petersen addressed the estimated 400 guests in attendance. "This is the biggest project in Hampton's history," Eason said. "We expect it to be among the top attractions on the East Coast."

> *"The story of air and space in this region is a dynamic one. We are still writing chapters today."*
> *-Petersen*

Senator Andrews expressed his appreciation to NASA, the Smithsonian, the military and to all members of the community who are making this dream a reality. Petersen emphasized NASA's commitment to the new center. Langley Research Center, he noted, is writing chapters in the history of aerospace every day. "The Virginia Air and Space Center will allow hundreds of thousands of people to see, experience and understand the excitement we all feel. We are very pleased to be a part of this project."

DEDICATION CEREMONY. Participants in the site dedication of the Virginia Air and Space Center--Hampton Roads History Center are (left to right) Senator Hunter Andrews, Thomas Chisman, Mayor James Eason and Langley Director Richard Petersen.

From the Ice Age to the Space Age . .

The museum site is now undergoing over a hundred thousand dollar, state -mandated archaeological dig. The excavation is under the direction of Dr. Robert R. Hunter Jr., director of the College of William and Mary's Archaeological Projects Center.

According to Hunter, the dig provides a perspective of the transformation of Hampton over a 200-year period. The discovery of a spear point made by the Paleo-Indians, semi-nomadic hunters of the late Ice Age, broadens the span of historical interest at this location "from the Ice Age to the Space Age."

The work involves digging a series of trenches on the site to identify the significant archaeological features and then mapping and interpreting what is found. It is hoped evidence dating to the 17th century, the earliest period of settlement by white men in the city, will be uncovered.

Can You Help?

Langley To Help Coordinate Air and Space Artifacts

The Virginia Air and Space Center will use Hampton's "From the Sea to the Stars" theme as a focal point. Many of the exhibits will highlight the research and accomplishments of NASA Langley. LaRC has accepted responsibility for coordinating the majority of the air and space artifacts that will be exhibited in the museum.

Major artifacts, including the Apollo 12 spacecraft, a space suit that was worn on the moon, and full scale models of the Lunar Orbiter and Viking Mars Lander, now on display in the Visitor Center, will be incorporated into the new exhibits.

Langley is asking NASA employees, retirees, contractors and other interested parties to suggest and to donate items which may represent the history of NASA Langley or the geographical history of the region. A vast array of interesting aircraft and space-related hardware from the Smithsonian, the military, industry and private citizens has already been assembled, but the search for unique items is ongoing.

Of particular interest are artifacts dating back to the Wright brothers and to the beginning of NACA in 1917. Please contact Ray Goodman, acting artifacts curator, at 864-3316 if you have anything of interest to share.

Happenings

LAA SOCIAL will be held Friday, March 31, from 2 to 4 p.m., in the H.J.E. Reid Conference Center, Building 1222.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, April 11, at 2 p.m. in the H.J.E. Reid Conference Center. Issues to be brought before the board should be addressed to the appropriate chairperson.

AIAA MEETINGS. Monday, March 27, 5-6 p.m. in the H.J.E. Reid Conference Center, Building 1222; Dr. J. D. Lawrence will speak on "Research to Understand Earth's Environment." Also Friday, April 7, trip to Quantico Aviation Museum and National Air and Space Museum; depart NASA Building 1222 at 6:30 a.m. Cost is $5/members; $10/non-members. Call Karen Credeur, ext. 6852, or Ferd Grosveld, ext. 3586.

HOST FAMILIES are urgently needed for Foreign Exchange Students for summer and school year sessions. In addition, there are opportunities for American students to travel abroad. Please contact Ron Harvey by April 1 at 249-2322.

TOASTMASTERS. Langley Toastmasters will meet Wednesday, April 12 from 11:30 a.m. to 1:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are always welcome. For additional information, contact Pam Davis, ext. 41307.

AA AND AL-ANON meetings are held on-site. For more information, call the Health Office, ext. 43191, or the Occupational Medical Center, ext. 43193.

NEEDED: ROOMMATE. Degreed male seeks same to share 3 BR/2BA house, deck, great room, fireplace, 2-car garage; $300/month + 1/2 utilities. Call Jay at 688-8811 (days) or 851-3339 (evenings).

Reminder:

Daylight Savings Time begins at 2 a.m. Sunday, April 2. Remember to turn your clocks **ahead** before retiring.

At the VC during April

"Leading-Edge Vortex Flows at Supersonic Speeds"

O. J. Rose will discuss "Leading-Edge Vortex Flows at Supersonic Speeds" on Wednesday, April 12, at noon in the Visitor Center theater. This presentation is part of the Spring Guest Lecture Series sponsored by the Visitor Center and the AIAA-Hampton Roads Section Student Branch.

Rose will speak on the importance of being able to predict leading-edge separation in application to supersonic aircraft. He will present recent experimental and computational work involving a generic forebody with sharp strakes.

Rose is supervisor of the Aeronautical Sciences Unit at PRC/Aerospace Technologies Division. Currently he is doing computational fluid dynamics applications for supersonic vehicles for the Supersonic/Hypersonic Aerodynamics Branch.

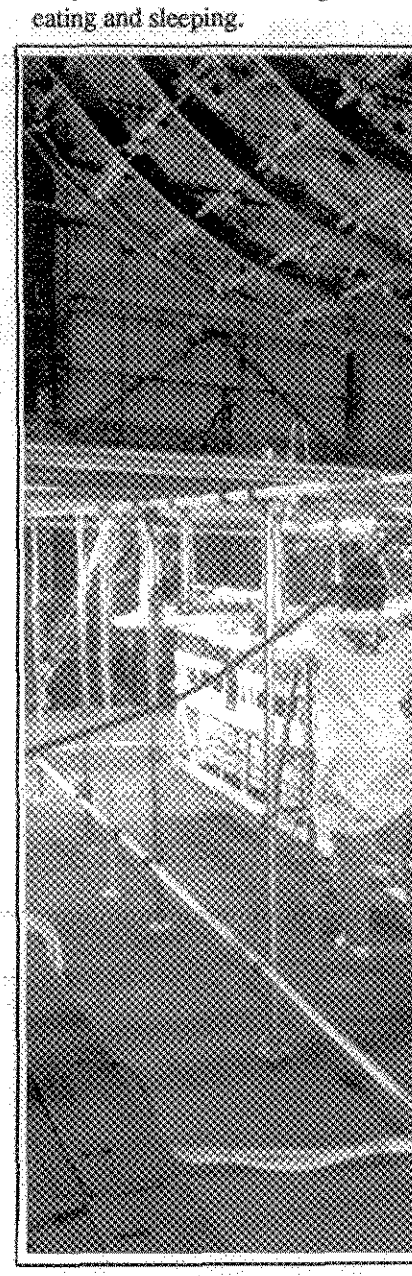
"Living Aboard the Space Station"

Brand Griffin, Habitation Module manager for Boeing Aerospace's Space Station program, will speak on "Living Aboard the Space Station" on Thursday, April 13, at 7:30 p.m. at the Visitor Center.

The Boeing Company, under contract to the NASA Marshall Space Flight Center, has been assigned the task to design and build the working modules and support for Space Station Freedom. The habitation module, designed to house eight astronauts, has everything needed for long duration occupancy, including daily activities like working, eating and sleeping.

To gather Space Station design data, Griffin conducted a series of zero-gravity simulations using Marshall's neutral buoyancy facility and accumulated about 50 hours of simulated weightlessness in the Shuttle space suit during the tests.

Griffin was awarded three NASA/ASEE Faculty Fellowships at the Johnson Space Center and was one of two Americans to receive the Prix de Rome fellowship to spend two years at the American Academy in Rome. He is widely published and his work has been featured on the covers of respected technical publications such as **Aviation Week and Space Technology.**



-photo courtesy of Lockheed Missiles & Space Company, Inc.

FOR SPACE STATION FREEDOM TEMPERATURE CONTROL -- Two Lockheed Missiles & Space Company technicians prepare the Ground Test Unit for operations in the DELTA thermal vacuum chamber in Sunnyvale, Calif. The unit has been shipped to NASA Johnson Space Center where it will undergo futher tests during the next three months. The unit is the engineering forerunner of the Active Thermal Control System that will maintain comfortable and safe temperatures for Space Station Freedom astronauts and hardware. Freedom will be assembled on orbit beginning in 1995 and completed in 1998.

Researcher News

National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23665-5225

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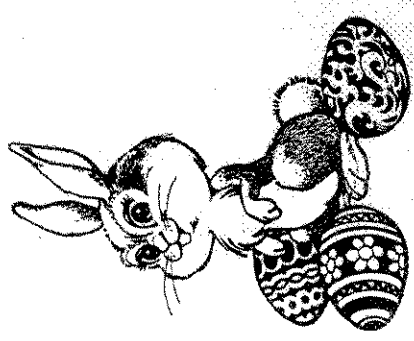


NASA
National Aeronautics and Space Administration
Langley Research Center

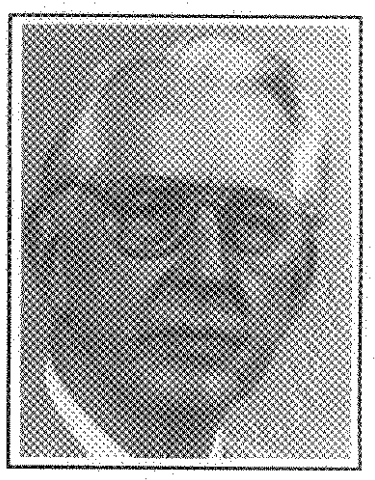
Volume 3, Issue 7 April 7, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

Fletcher Resigns Top Post

NASA Administrator Dr. James C. Fletcher submitted his resignation March 21 to President Bush. The resignation is effective tomorrow.



Fletcher, who was brought back for a second term as administrator after the Challenger accident, says that with the successful conclusion of the third post-Challenger Space Shuttle mission, he feels that he can safely place the leadership of NASA in another's hands.

The letter to the President pledges to continue to work with his successor when appropriate. Fletcher said, "It has been a pleasure to serve you, both in your capacity as vice-president and, in recent weeks, as president. I look forward to an eminently successful Bush presidency."

Fletcher first served as NASA administrator from April 1971 to May 1977. He was called back by President Reagan in May 1986 with a mandate to get the Space Shuttle flying again safely. By virtue of the two terms, Fletcher has served as NASA administrator longer than anyone.

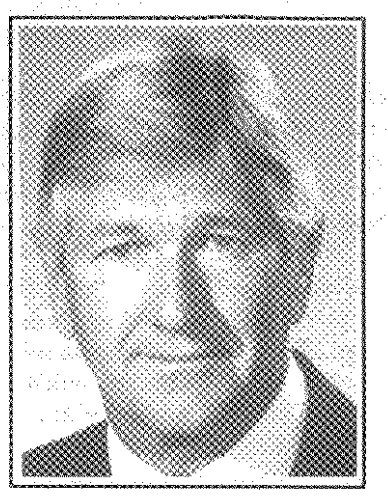
Effective April 8, Deputy Administrator Dale Myers will become acting administrator pending a new presidential appointment.

James, Johnson Retire as Division Chiefs

Two division chiefs at NASA Langley Research Center retire from government service today.

Robert L. James Jr., chief of the Projects Division since April 1987, retires with 30 years of service. David R. Johnson, chief of the Instrument Research Division since October 1981, retires with more than 40 years.

James has been responsible for managing major flight projects at Langley. He began his career in 1959 and assisted in the design and flight test of the SHOTPUT and Scout launch vehicles. He has served as assistant head and head, Flight Projects Branch; and manager, Vector Project, Sunblazer Project, Mission Development Office, Nimbus G Experiments Project Office, Large Space Systems Technology Project Office, Aircraft Energy Efficiency Project Office, and the Long Duration Exposure Facility Project Office.



Robert L. James, Jr.

David R. Johnson

Johnson has been responsible for planning and implementing a broad instrumentation, data system and NDE research, development and application programs to meet Langley's present and future measurement requirements.

He joined the Langley staff in 1953 as an engineer in the Instrument Research Division, conducting research in aeronautical instrumentation. He has served as head of the General Mechanical Instrumentation Section, head of the Electro-Mechanical Instrumentation Branch, the center's ADP officer, and technical assistant to the Director for Electronics. He has specialized in the fields of research facility instrumentation and automatic data processing equipment.

Discovery's Return-to-Flight Photographs Record Many Firsts

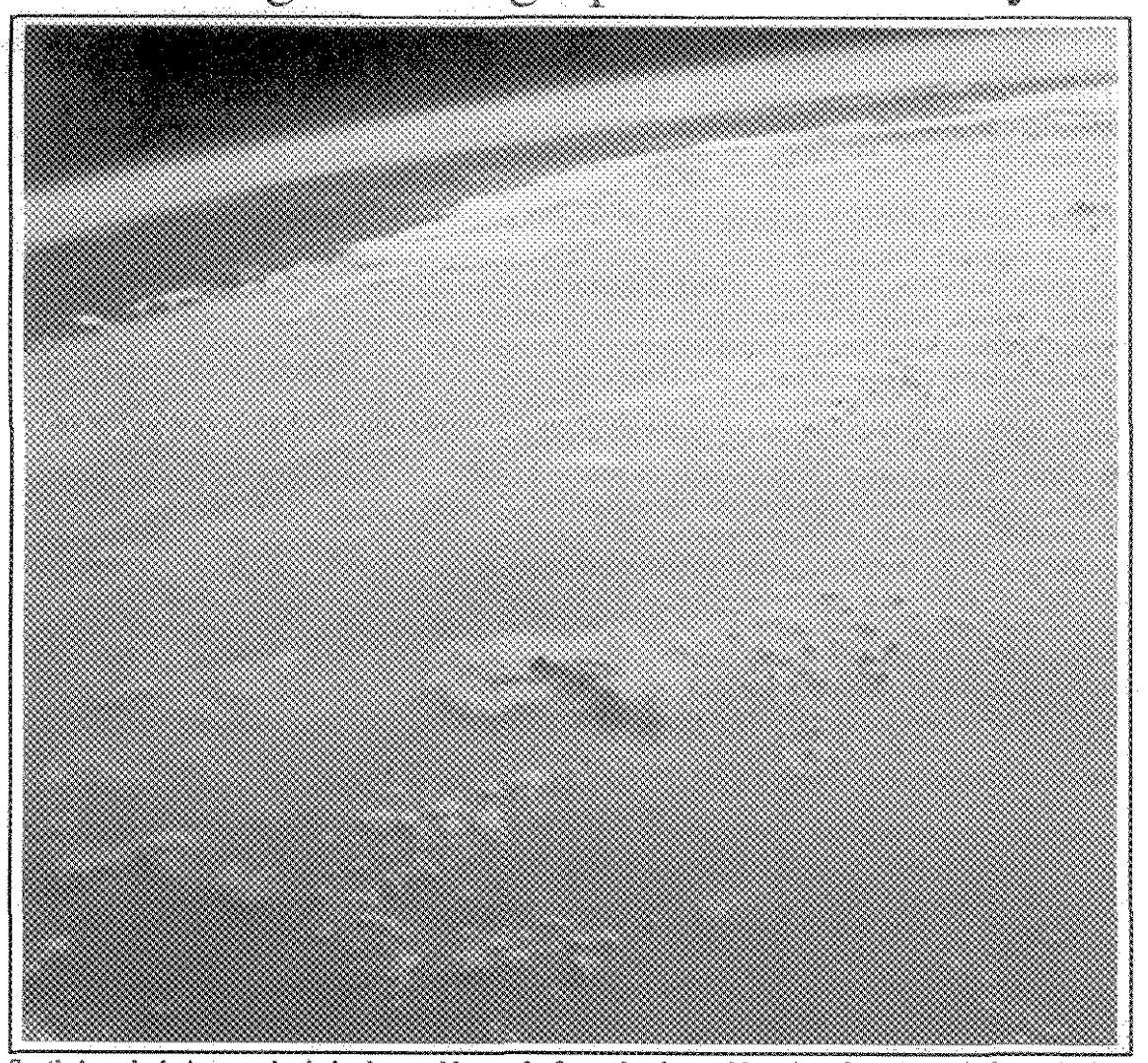
Earth observation photographs taken by Discovery's crew during America's return to piloted space flight in 1988 were among the clearest in more than 20 years, and they captured a variety of environmental conditions.

Included in the astronauts' photography from the September 1988 mission is a photograph showing at least a one-million-square-mile smoke cloud over South America's Amazon River basin and, in Africa, evidence of flooding in areas that have experienced a lengthy drought.

Due to an unexpected improvement in atmospheric clarity over the Northern Hemisphere, the Discovery crew could distinguish ground details about 700 miles away from their spacecraft, much farther than has been normal for Space Shuttle flights. Visibility over the Northern Hemisphere during STS-26 was the best since the 1960s Gemini Program flights.

In total, the crew took 1,505 photographs of Earth during the four-day mission. Discovery was launched into an orbit that kept it above only the tropical and subtropical regions of Earth. That orbit took the spacecraft over about half of Earth's surface, covering parts of 122 nations and regions that hold about 75 percent of the world's population.

Photographs show a dense, white smoke cloud, the result of tropical forest, pasture and croplands being cleared and burned, completely obscuring the ground over much of South America's Amazon River basin.



South America's Amazon basin is obscured by smoke from clearing and burning of tropical rain forest during the area's dry season in this photograph taken from Discovery in September 1988.

If placed over the United States, the same cloud would cover an area of the country more than three times the size of Texas.

It is the largest and thickest accumulation of smoke ever photographed by astronauts, much larger than the previous largest smoke cloud photographed by astronauts over the same region in 1984.

STS-26 also photographed smoke clouds over Sumatra and Borneo, Indonesia, Madagascar, eastern Africa, northern Australia and Bolivia. Some photographs show apparent irrigation features in the tropics--in areas that normally receive 100 inches of annual rainfall.

In Africa, the "green line" of vegetation that generally marks the southern boundary of the Sahara Desert had moved the farthest north it has been in astronaut photography since 1965. Also, standing water was photographed in the Sahara.

For the first time in Shuttle history, Africa's Niger river was photographed in full flood and out of its banks. Photographs of the Blue and White Nile rivers also showed evidence of recent flooding.

Throughout eastern Africa, the landscape was tinted with green, a condition never before seen in this region during the Shuttle program. Still, Africa's Lake Chad and Lake Nasser, two lakes that have long been studied by space photography, were at the lowest levels ever photographed by astronauts. Since 1960, Lake Chad's surface area is estimated to have declined by more than 90 percent.

The extreme atmospheric clarity over the Northern Hemisphere during the mission was due, at least in part, to the absence of major global duststorms. Duststorms of million-square mile dimensions over northern Africa, even extending halfway across the Atlantic Ocean, were photographed during 1984 and 1985 Shuttle flights. But no such African duststorms were seen during STS-26, nor were major duststorms observed elsewhere.

A lack of recent major volcanic eruptions, which cause dust in the upper atmosphere, also may have contributed to the extreme clarity.

As a result, the STS-26 photographs captured details not usually seen in Shuttle photography: for the first time, an aircraft was photographed generating a contrail; individual buildings could be seen in the Canary Islands; a line of electrical transmission pylons was seen in southern Sudan; and oil platform flares were seen in the Gulf of Campeche.

News Briefs

HEADQUARTERS, Washington, D.C. --- Representatives from NASA and the USSR Ministry of Health agreed in Moscow to make U.S. medical expertise available to the Soviet Union in response to long-term medical problems arising from the December 1988 earthquake in Armenia. NASA proposed combining its expertise in satellite communications with the unusual medical care capabilities required by space flight to provide a resource that may help solve medical problems in the aftermath of the earthquake. The proposed "telemedic spacebridge" demonstration will address the longer-term consequences of the disaster, is planned for a period of several months and will provide medical consultation to support rehabilitation, reconstructive surgery, physical therapy, public health and psychological counseling.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA Goddard has requested proposals from commercial sources to launch three identified satellites and options for NASA to order up to 12 additional launches, if exercised, over the next five years. The three identified satellites for which launch services would be procurred under the request for proposals are the Wind, Geotail and Polar satellites of the International Solar Terrestrial Physics Projects. Their launches are scheduled in 1992 and 1993.

WALLOPS FLIGHT FACILITY, Wallops Island, Va. --- Four suborbital rockets, two Black Brant Xs and two Nike-Orions, were scheduled to be launched from Canada during the next few weeks as part of a major NASA sounding rocket campaign. Two of the rocketborne scientific experiments, programmed to create artificial clouds at high altitudes over Canada, were scheduled for launch during late March from Canada's Churchill Research Range on Hudson Bay. These colorful barium releases will be visible, cloud cover permitting, to residents in Central and Eastern Canada and in North-central United States. The objective of the barium release payloads is to measure electric fields aligned with Earth's magnetic field.

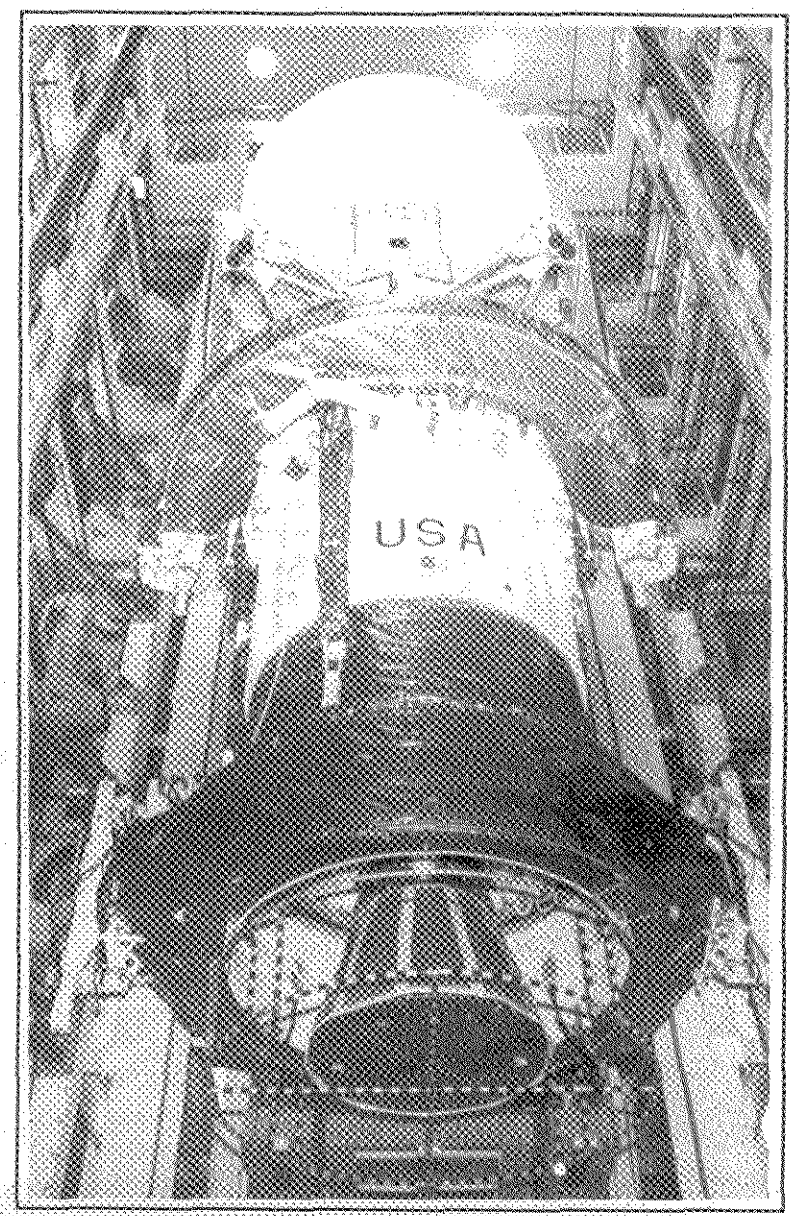
HEADQUARTERS , Washington, D. C. --- NASA Administrator Dr. James C. Fletcher and the Ambassador of Japan to the United States H. E. Nobuo Matsunaga have signed the memorandum of understanding between NASA and the government of Japan on cooperation in the detailed design, development, operation and utilization of the permanently-inhabited, civil space station, which the U.S. calls Freedom. The agreement was signed at a brief ceremony at NASA Headquarters, Washington, D.C.

JET PROPULSION LABORATORY, Pasadena, Calif. --- Several previously unknown geological faults, some of which may be active, have been discovered in the central and eastern Mojave Desert in California by geologists at JPL and Louisiana State University analyzing images from an Earth-orbiting Landsat satellite. The strike-slip faults were identified by images taken by the Thematic Mapper (TM) instrument on Landsat 5, which obtains images simultaneously in seven bands at optical and infrared wavelengths. Scientists used the TM images as a "map" which pointed them in the right direction to locate and confirm the faults in the field.

HEADQUARTERS, Washington, D. C. --- NASA, in cooperation with the Council of Chief State School Officers (CCSSO), has announced the state-level winners in the national student competition to name NASA's replacement Space Shuttle orbiter. Over 71,650 U.S. students formed some 6,100 teams, each led by a school faculty member in kindergarten through 12th grade, and prepared and submitted educational research projects to support and justify the orbiter name submitted. The state-level winning projects will be reviewed by a NASA panel. The final winner from each division and the name selected for the orbiter will be announced in early May.

AMES-DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- NASA's DFRF has successfully completed flight tests of the Mission Adaptive Wing, flown on the Advanced Fighter Technology Integration F-111 aircraft. For the program, the F-111's wing was modified so that the curvature of the leading and trailing edges could be varied in flight. Reductions in air drag from 8 to 20 percent were noted during the tests, as was a 20-percent reduction in wing bending during maneuvers. The airplane's handling qualities improved, with a significant delay in the onset of buffet around the wing.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA has issued the final environmental impact statement for the planned Advanced Solid Rocket Motor (ASRM) project, an approximately 5-year-long program to design, develop, test and evaluate the next-generation Space Shuttle solid rocket motor. Issuance of this statement completes a key step in the agency's process of assessing environmental factors associated with locating the major ASRM production and testing facilities at one or more of three government-owned locations.



KENNEDY SPACE CENTER, Fla.---In KSC's Vertical Processing Facility, the spacecraft Magellan is mated to the Inertial Upper Stage as preparations begin for installation into the payload canister and transport to pad 39-B. Magellan is scheduled to be launched April 28 aboard the orbiter Atlantis on Space Shuttle mission STS-30. Magellan will be the first U.S. planetary mission in 10 years and the first launched by the Shuttle. The mission calls for the spacecraft to make the 15-month-long journey to the planet Venus and perform radar mapping operations, transmitting the information back to NASA's Jet Propulsion Laboratory in California.

Positions Filled

Rudeen Smith-Taylor has been selected Aerospace Engineer, AST, Navigation, Guidance and Control Systems; Controls-Structures Interaction Office, Guidance and Control Division, under CPP 88-49.

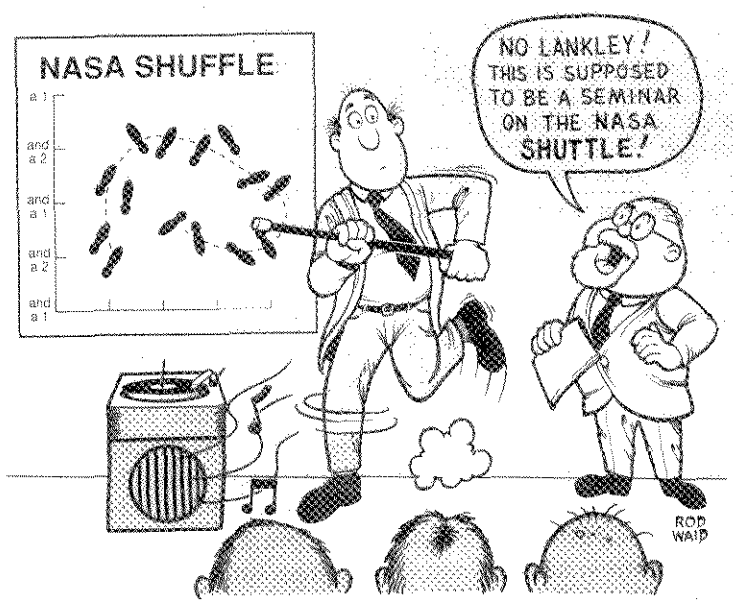
Vickie S. Parsons has been selected AST, Technical Resources Management/Program Analysis Officer, R & D Programs Branch, Programs and Resources Division, under CPP 88-59.

Position Open

89-19: Computer Systems Analyst, GS-0334-12; Office of Director for Management Operations, Business Data Systems Division, Administrative Software Applications Office. Closes April 10.

Editor's Note: Surveys locally and at the Headquarters level indicate that our readers are interested in NASA News Releases summarized here. Request copies of these releases by headline and release number listed below.

Lankley



Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 146, ext. 43293.

89-28.....U.S./USSR to Implement Medical Communications Satellite Link
89-29.....NASA Goddard Center Requests Commercial Launch Services Proposals
89-30.....Artificial Clouds to be Visible in Canada and U.S.
89-31.....Discovery's Return-to-Flight Photographs Record Many Firsts
89-32.....NASA and Japan Sign Space Station Memorandum of Understanding
89-33.....New Earthquake Faults Discovered with Landsat Images
89-34.....Shuttle Orbiter-Naming Competition State -Level Winners Announced
89-35.....NASA Completes Advance Wing Flight Program
89-36.....NASA Administrator Fletcher Resigns
89-37.....NASA Completes EI Statement for ASRM
89-38.....Shuttle-C Users' Conference Slated for May 25-26
89-39.....Astronaut Hauck Departing NASA for Navy Post at Pentagon

News Researcher

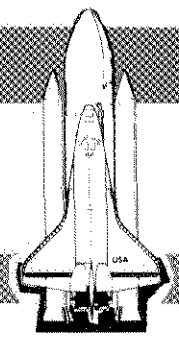
The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

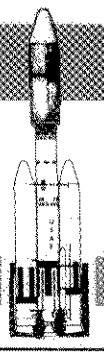
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.



MIXED FLEET

MANIFEST



Space Shuttle

Flight	Date/ Orbiter	Crew/ Duration	Primary Payload	Carrier
29	2/89 *Discovery*	5 5	TDRS-D	IUS
30	4/28/89 *Atlantis*	5 4	Magellan	IUS
28	7/1/89 *Columbia*	5 —	DOD	
33	8/10/89 *Discovery*	5 —	DOD	
34	10/12/89 *Atlantis*	5 4	Galileo	IUS
32	11/13/89 *Columbia*	5 5*	Syncom IV-05 LDEF-1R	Unique
31	12/11/89 *Discovery*	5 5	HST	
36	2/1/90 *Atlantis*	— —	DOD	
35	3/1/90 *Columbia*	7 9*	Astro-01 BBXRT-01	IG+2 PAL TAPS
37	4/5/90 *Discovery*	5 5	GRO	
38	5/10/90 *Atlantis*	5 —	DOD	
40	6/7/90 *Columbia*	7 8	SLS-01	LM
39	7/19/90 *Discovery*	7 7	CIRRIS (DOD) IBSS (DOD STP-01 (DOD)	Pallet SPAS HH-M
41	10/5/90 *Atlantis*	5 4	Ulysses	IUS/PAM
42	11/1/90 *Columbia*	7 7	Starlab (DOD)	LM+1P
43	12/10/90 *Discovery*	5 5	TDRS-E	IUS
44	1/31/91 *Atlantis*	7 7	TSS-01 GPS-01 (DOD)	MPESS+PAL PAM-02
45	2/21/91 *Columbia*	7 10	IML-01	LM
46	3/28/91 *Discovery*	5	DOD	
47	5/2/91 *Atlantis*	5 7	Atlas-01	IG+PAL
48	7/1/91 *Discovery*	7 7	S/L-J	
49	8/1/91 *Atlantis*	5 7	GPS-02 (DOD) Eureca-IL Lageos-02	PAM-D2 Eureca-A Iris
50	10/10/91 *Discovery*	5 5	UARS	
51	11/14/91 *Atlantis*	5 7	Spacehab-01 INMARSAT-01 WAMDII	PAM-D2 TAPS
52	12/19/91 *Columbia*	7 10	S/L-D2	LM+USS
53	3/2/92 OV105	6 7	Geostar-01 Eureca-1R	PAM-D2 Eureca-A
54	3/30/92 *Columbia*	7 10*	USML-01	LM+MPESS
55	5/7/92 *Discovery*	5 7	SRL-01	PAL+MPESS
56	5/28/92 *Atlantis*	5 7	PUR-1 USMP-01	MSL+MPESS
57	6/11/92 OV105	5 7	Atlas-02	IG+PAL
58	7/16/92 *Columbia*	7 8	SLS-02	LM
59	8/13/92 *Discovery*	7 7	Astro-02	IG+2 PAL

*Possibility of extension to 10 days

Expendables

Date	Launch Vehicle	Orbit	Launch Site	Payload
6/89	Delta 184	SS	WSMC	COBE
7/89	Scout	TBD	WSMC	MACSAT (DOD)
9/89	Atlas Centaur 68	GSO	ESMC	FLTSATCOM—F8 (DOD)
9/89	Scout	TBD	WSMC	SALT (DOD)
12/89	Atlas 50E	SS	WSMC	NOAA-D
2/90	Delta	LEO	ESMC	ROSAT
6/90	Atlas Centaur	GTO	ESMC	CRRES
7/90	Atlas I	GSO	ESMC	GOES-I
3/91	Scout	TBD	TBD	USAF-1 (DOD)
5/91	Atlas 34E	SS	WSMC	NOAA-I
8/91	Delta	LEO	ESMC	EUVE
11/91	Atlas I	GSO	ESMC	GOES-J
12/91	Scout	LEO	TBD	Small Expl-01
5/92	Atlas I	GSO	ESMC	Goes-K
5/92	Scout S-215C	LEO	SMR	CRRES-01
6/92	Scout	LEO	TBD	Small Expl-02
7/92	Atlas 11E	SS	WSMC	NOAA-J
7/92	TBD	HE	ESMC	GEOTAIL
9/92	Titan III	EO	ESMC	Mars Observer
12/92	TBD	LEO	TBD	Small Expl-03**
12/92	TBD	HE	ESMC	Wind
3/93	TBD	GSO	ESMC	MSAT**
6/93	TBD	LEO	TBD	Small Expl-04**
6/93	TBD	HE	WSMC	Polar
11/93	Titan II	SS	WSMC	NOAA-K
12/93	TBD	LEO	TBD	Small Expl-05**
6/94	TBD	LEO	TBD	Small Expl-06**
6/94	TBD	LEO	WSMC	Radarsat**
9/94	Titan II	SS	WSMC	NOAA-L

**For Nasa Planning Purposes

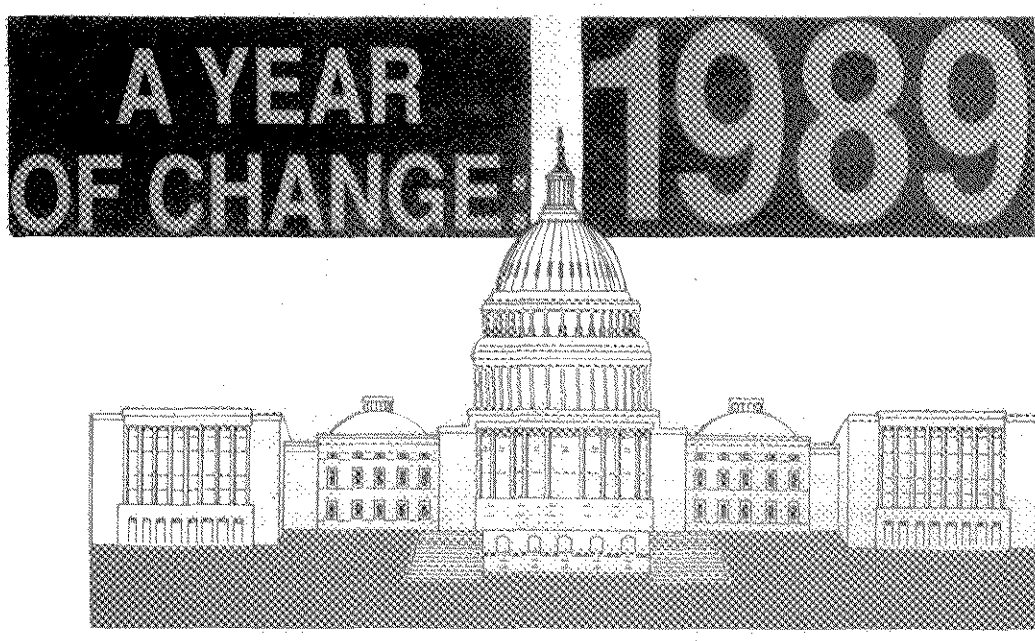
Glossary

ASTRO	Ultraviolet Astronomy Telescope
ATLAS	Atmospheric Laboratory for Applications and Science
BBXRT	Broad Band X-Ray Telescope
CIRRIS	Cryogenic Infrared Radiance Instrument for Shuttle
COBE	Cosmic Background Explorer
CRRES	Combined Radiation Release Experimental Satellite
DOD	Department of Defense
EO	Escape Orbit
ESMC	Eastern Space and Mission Center
EURECA	European Retrievable Carrier
EUVE	Extreme Ultravoilet Explorer
FLTSATCOM	Fleet Communication Satellite
GALILEO	Jupiter Probe
GOES	Geostationary Operational Environmental Satellite
GPS	Global Positioning System
GRO	Gamma Ray Observatory
GSO	Geosynchronous Orbit
GTO	Geosynchronous Transfer Orbit
HST	Hubble Space Telescope
IBSS	Infrared Background Signature Survey
IML	International Microgravity Laboratory
INMARST	International Maritime Satellite
ITV	Instrumented Test Vehicle
IUS	Inertial Upper Stage
LAGEOS	Laser Geodynamics Satellite
LDEF	Long Duration Exposure Facility
LEO	Low Earth Orbit
MAGELLAN	Venus Radar Mapping Probe
MSAT	Mobile Satellite
NOAA	National Oceanic and Atmospheric Administration
NOVA	Advanced Navy Navigation Satellite
PAM	Payload Assist Module
ROSAT	Roentgen Satellite
SAN MARCO	NASA/Italian Earth Physics Satellite
SKYNET	United Kingdom Military Communication Satellite
S/L	Spacelab
SLS	Space Life Sciences
SRL	Space Radar Laboratory
SS	Sun Synchronous Orbit
STARLAB	DOD Spacelab
SYNCOM	Hughes Geosynchronous Communication Satellite
TDRS	Tracking Data Relay Satellite
TRANSIT	Navy Navigation Satellite
TSS	Tethered Satellite System
UARS	Upper Atmosphere Research Satellite
ULYSSES	Formerly International Solar Polar Mission
USML	U.S. Microgravity Laboratory
WAMDII	Wide Angle Michelson Doppler Imaging Interferometer
WFF	Wallops Flight Facility
WSMC	Western Space and Missile Center

Manifest courtesy of Space News Roundup, Johnson Space Center

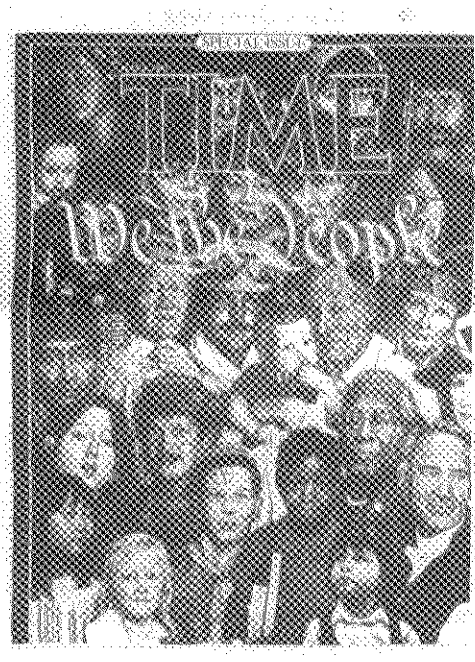
Center Director Richard H. Petersen recently spoke to employees, support contractors and retirees on the state of NASA and the Langley Research Center. Petersen called 1989 "A Year of Change" both for the United States and for NASA. "We have a new President, a new Cabinet and a number of changes in the Congress. We are expecting a major change in NASA with the selection of a new Administrator."

"Langley Research Center has had an excellent year. You have met the challenges, dealt with the frustrations, and produced a record of achievements that are too numerous to go over here."



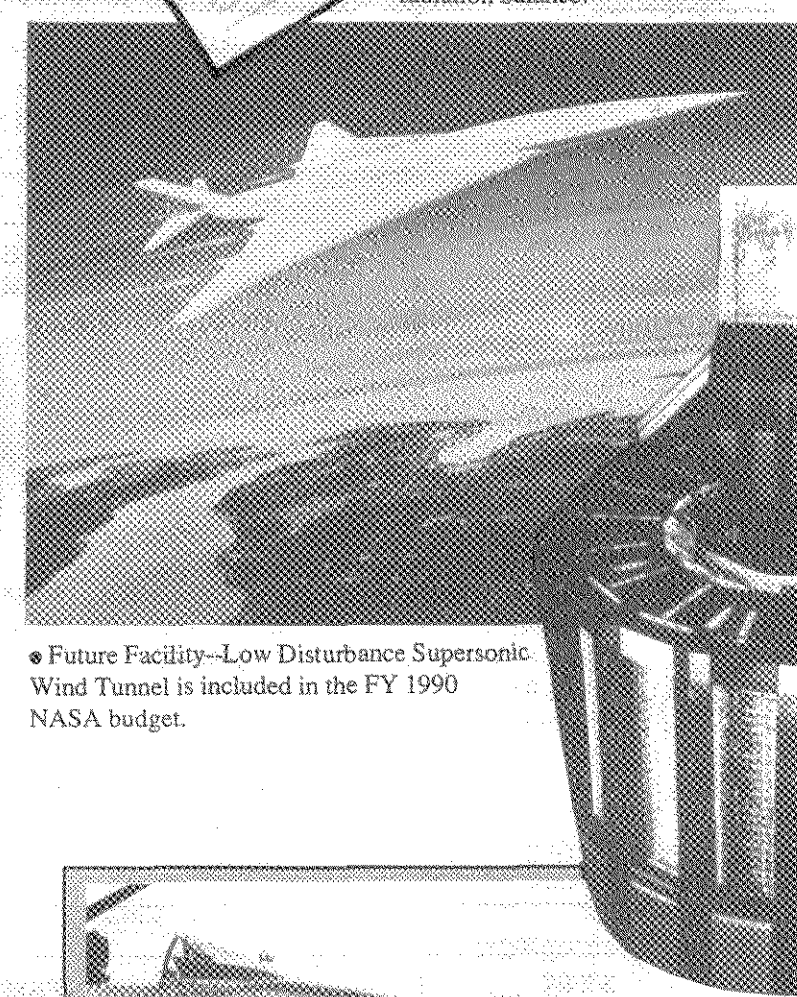
"The biggest challenge for NASA in 1989 is to gain approval of the FY 1990 budget proposed by President Reagan and endorsed by President Bush."

• Climate and climate ch
Science magazine article expl
affect clouds have on the Earth's over
radiation balance.



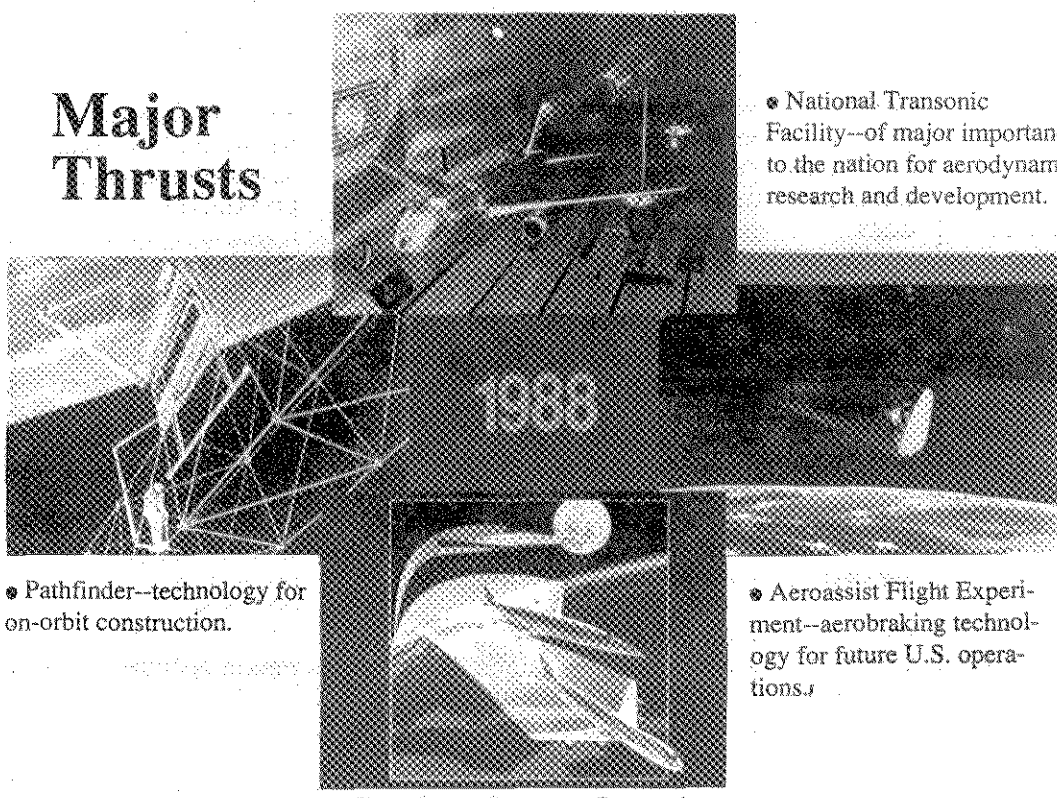
"Public support for NASA is strong and growing. It is my firm belief that the American people want the United States to have a 'world class' civil space program. It is NASA's job to plan that program and advocate it."

"We are fortunate that President Bush is a strong supporter of NASA. I quote from his budget address to Congress, 'We must have a manned space station; a vigorous, safe Space Shuttle program; and more commercial development in space. The space program should always go *full throttle up*. That's not just our ambition, it's our destiny.'"



• Future Facility--Low Disturbance Supersonic Wind Tunnel is included in the FY 1990 NASA budget.

Major Thrusts

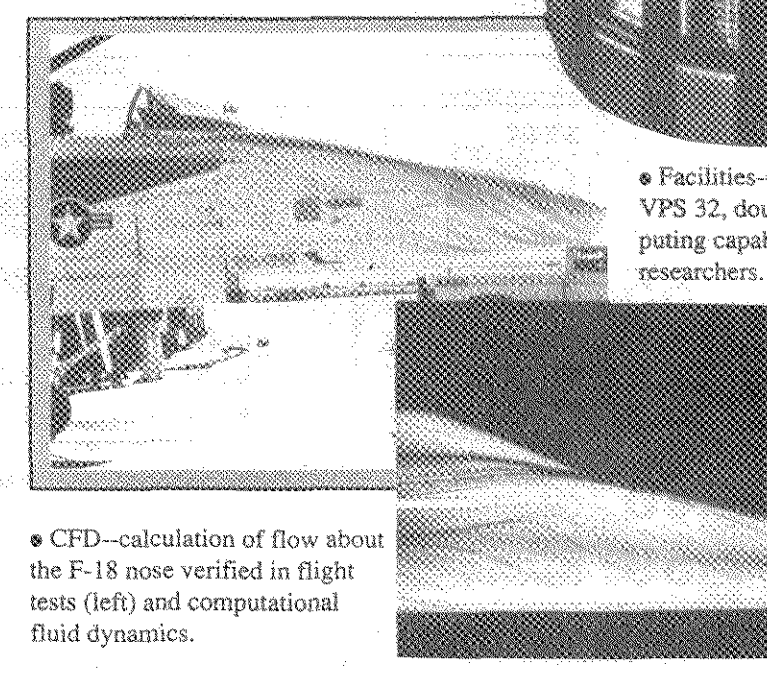


• National Transonic Facility--of major importance to the nation for aerodynamic research and development.

• Pathfinder--technology for on-orbit construction.

• Aeroassist Flight Experiment--aerobraking technology for future U.S. operations.

• High Speed Transport Research--focuses on environmental problems.



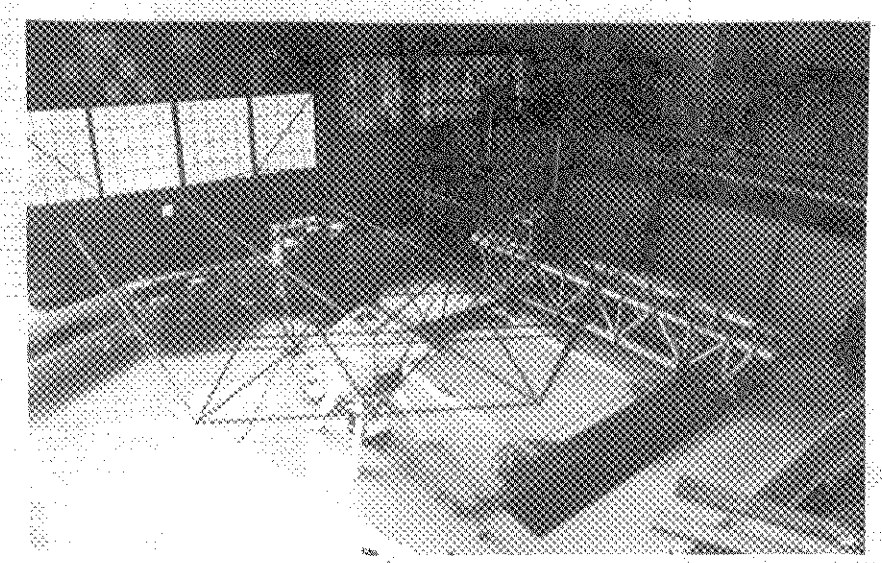
• Facilities--t
VPS 32, doul
puting capabi
researchers.

• CFD--calculation of flow about the F-18 nose verified in flight tests (left) and computational fluid dynamics.

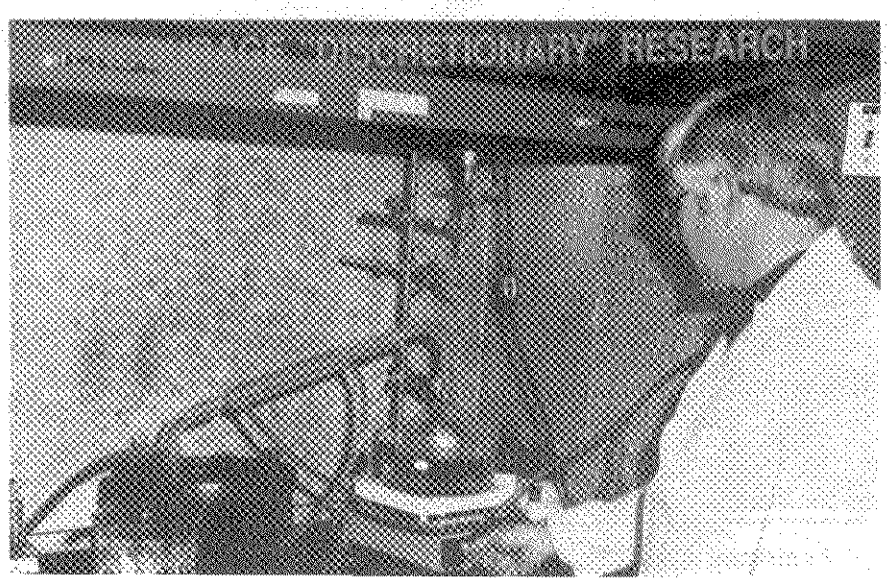
State-of-the-Center Address

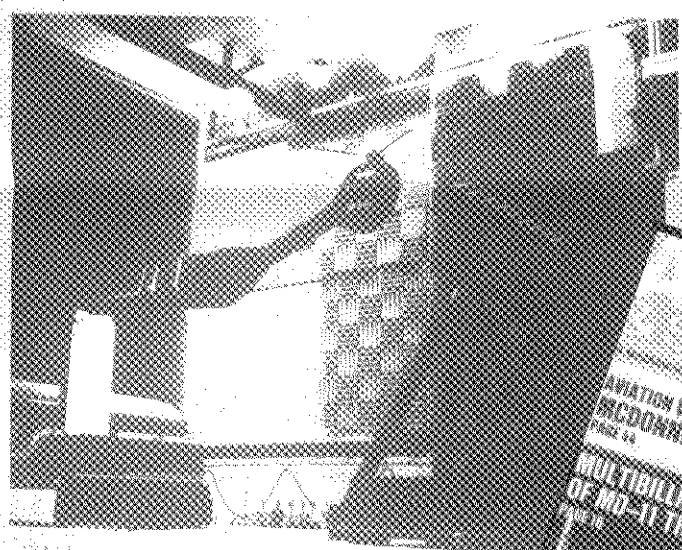
"You should be very proud of the technology you have developed and transferred to industry, of the major scientific discoveries and knowledge you have contributed, and of the development support provided to the Department of Defense and to NASA and, particularly, to the Shuttle recovery."

As a result of a recent strategic planning session, a set of strategic actions to strengthen ongoing programs was identified. "Langley's primary goal is to encourage discretionary research, an action which will allow us to build a base of institutional knowledge and capability. " Specific goals in the areas of aeronautics and space are enumerated below:

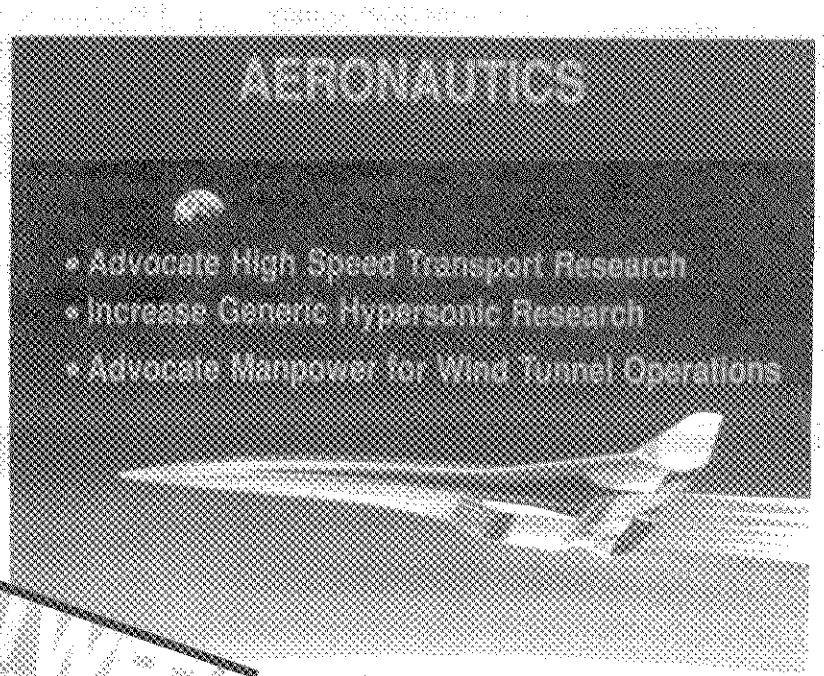


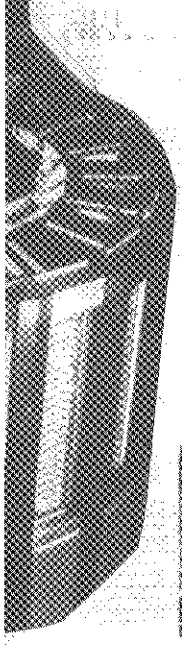
• Space Construction--new automated space assembly lab designed, developed and constructed at Langley.



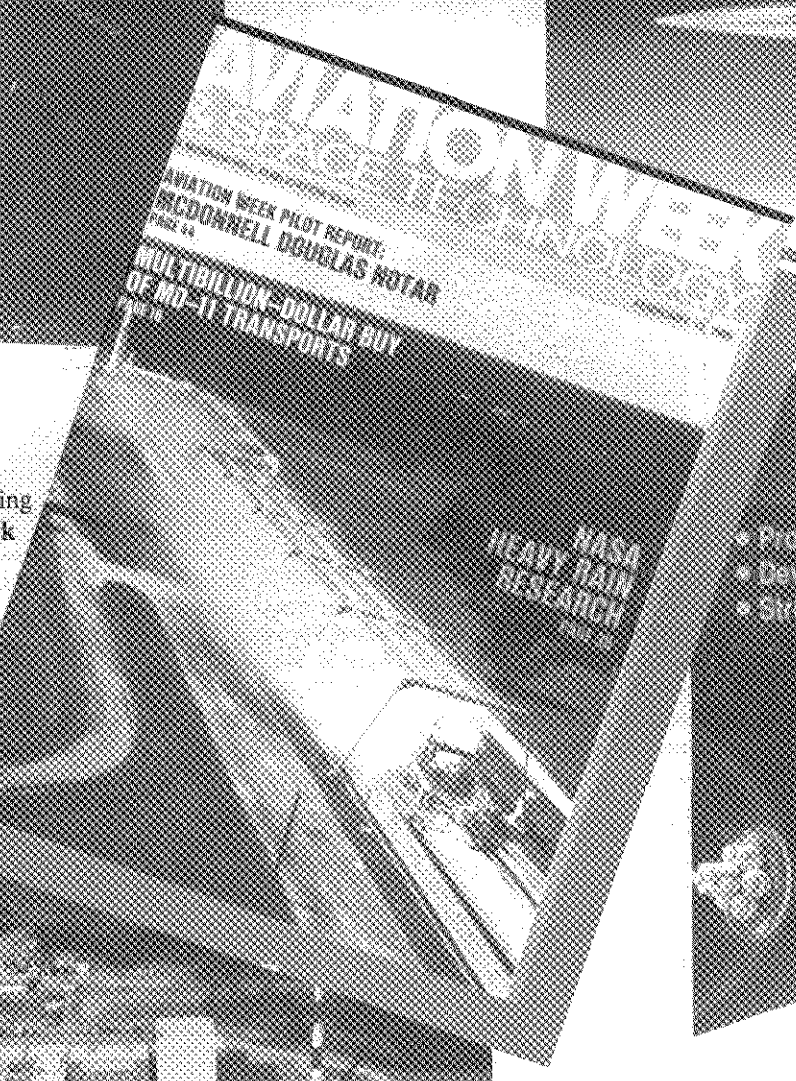


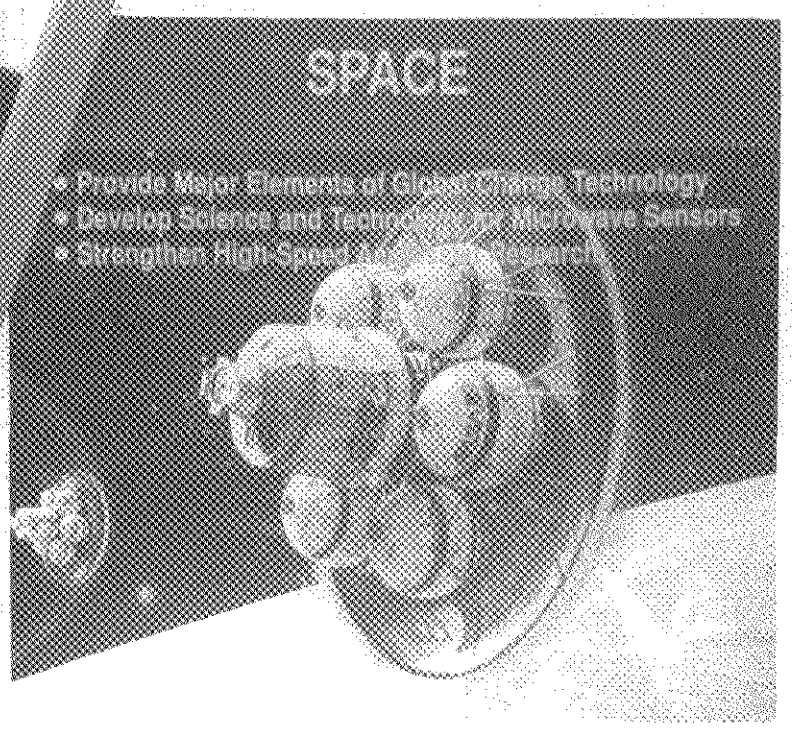
• Acoustics--Langley cooperates with DNW to understand and reduce helicopter rotor noise.





• Innovative use of existing facilities--**Aviation Week** focuses on rain making device built over the Aircraft Landing Dynamics Facility.





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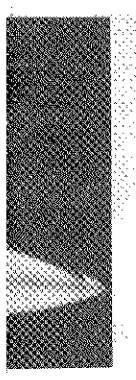


• Modifications--upgrade to the 8-Foot High-Temperature Tunnel gives Langley the premier scramjet testing facility in the world.

"I am proud of the Center's accomplishments and enthusiastic about the exciting work ahead of us. Our resources--people, facilities and funding--are growing. Our opportunities are growing as well. We are building momentum and expanding technologies that are vital to the long term health and welfare of our nation."

Editor's note: The State-of-the-Center Address was videotaped for the convenience of Center employees and retirees unable to attend the scheduled presentations. Copies of the address may be checked out of the technical library for viewing.

Dove, Assistant Chief, Retires

Billy L. Dove, assistant chief of the Information Systems Division, retires today after 32 years of federal service.

As assistant division chief since March 1983, Dove has had technical responsibility for technology programs relating to flight-crucial systems for future aircraft and spacecraft.

Dove began his career in June 1956 as an aeronautical research intern. He served in the U.S. Army from August 1956 to September 1958. Upon his return to Langley, he was a research engineer assigned to the Instrument Research Division. He has served as head, Spacecraft Instrumentation Development Section; head, Aircraft Instrumentation Branch; and a technical program manager in the Flight Control Systems Division.

He has specialized in fault tolerant computing, and aircraft and spacecraft electronics and instrumentation systems. In recognition of his research work in fault tolerant systems technology, Dove received a NASA Exceptional Service Medal in 1983. He served seven years as the NASA member of the Avionics Panel, AGARD-NATO.

This month, Dove concluded a seven-month assignment to Martin Marietta, Denver, Colorado. Assigned to an astronautics group of the vice presidentUs staff, Dove defined a process for improving Langley's relationship with the space industry and increasing the relevance of the center's technical programs.

Dove received a bachelor of science degree in physics from North Georgia College, Dahlonega, Georgia, in 1956.

Dove and his wife, Nell, will live in Chapel Hill, North Carolina. Dove has assumed the position of Associate Director for Business Development and Strategic Planning at the Research Triangle Institute's Center for Digital Systems Research.

Skinner Selected to Head Child Development Center

Kathryn L. Skinner has been selected director of Langley's Child Development Center. She assumed the position March 6. Skinner succeeds Melissa Coleman-White, who had led the center since its opening. Coleman-White, who resigned due to personal constraints, will become a member of the Child Development Center Advisory Board.

Skinner, selected from a field of thirty-two applicants, brings to the center a wide range of experience in early childhood education. Prior to her move to the Peninsula, she was director for a military child care center in Seoul, Korea. Since August 1988, she had served as nutritionist for the Child Development Center at Ft. Eustis.

Impressed with the dynamic Langley program and the very professional staff assembled and nurtured by Coleman-White, Skinner says her immediate goal is "to continue with the kind of quality care the center is known for." In the long range, she would like to see the center establish an after-school program for kindergarteners who spend only half a day in school. "This would be a definite asset for Langley parents," says Skinner.

Skinner holds bachelor of science degrees in early childhood education and nutrition from Austin Peay State University, Clarksville, Tennessee, and a master's in education from Virginia State University in Petersburg.

The Langley Child Development Center, a branch of the Langley Exchange Council, has been operational since September 1985 and currently provides comprehensive developmental child care to 58 children of NASA Langley civil servant, contractor and university personnel. Since its opening, the center has been recognized as a high quality, employer-sponsored child care facility by professional, educational and civic groups.

Keel Club Marks Strongest of CFC Supporters

The Visitor Center Space Gallery was crowded by 8 a.m., Wednesday, March 22. These weren't ordinary visitors--extraordinary is a more accurate adjective.

Gathered together were government employees, well over a hundred men and women, varying in positions and levels of responsibility, many in uniform-but all had one thing in common. All "are the strongest supporters of the Combined Federal Campaign," acknowledged Langley Director Richard H. Petersen in his welcoming remarks. The occasion was the annual meeting of the CFC Keel Club.

Col. Eugene F. Scott, post commander of Fort Monroe and the 1988-89 CFC executive campaign chairman, joins Center Director Richard H. Petersen to honor Keel Club members.

"Keel Club members distinguish themselves by their leadership giving," said Jack Clough, associate executive director, United Way of the Virginia Peninsula. "The 170 federal employees honored today have contributed a minimum of $500 each to the community through the Combined Federal Campaign."

Pleased with the outcome of the 1988-89 campaign, Colonel Eugene F. Scott, post commander of Fort Monroe and CFC executive campaign chairman, noted, "We in the federal community are involved on the Peninsula. CFC is a demonstration of that commitment. And this past campaign has been an outstanding demonstration of selfless involvement."

Seventy Langley employees were among the Keel Club honorees. Milt Holt, NASA Langley campaign chairman, summarized the endeavor: "We set a very challenging goal. As usual, the people at Langley were up to the challenge. We more than exceeded our goal. The people here are leaders in the community and, through the CFC, show their leadership."

Clough confirmed the Peninsula CFC, the ninth largest in the nation, raised $1,267,098 during the 1988-89 campaign.

CRAY RESEARCH EXECUTIVES JOIN LANGLEY OFFICIALS FOR DEDICATION CEREMONY. Gathered for ribbon cutting ceremony are (L to R) Bill Kneisly, Cray Mid-Atlantic district manager; Maurice "Mo" Morin, chief of ACD; Richard Barnwell, Langley chief scientist; Rene Copeland, special assistant to the chairman, Cray, Research; Richard H. Petersen, Langley director; Vern Greenhill, Cray-Langley project manager; John Rollwagen, Cray chief executive officer; Mickey Rowe, assistant chief ACD; Paul Holloway, Langley deputy director; Bill Mace, director for Electronics; Chuck Breckenridge, Cray Eastern Region general manager; and Gene Wiesner and Ron McCraney, Cray Research, Inc.

Runners Club Names Winners; Upcoming Competition

The Langley 1988 Runner-of-the-Year competition was won by Karen Sage, who earned 56.88 points by winning her age group in the four races of the NASA Intercenter Competition. Rounding out the top ten were Nancy Hess, Gale Harvey, Joe Kubalak, Bob Ferguson, Pete Earls, Tracye Nuzzo, Al Graham, Pat Leary and Erik Vedeler.

The Runners Club Handicap-Start 10-Miler was held on February 4, a cold, windy Saturday morning. Steve Sudik was the winner with a time of 74:26. He was followed by Bob Ferguson and Gale Harvey.

NASA Intercenter Competition will be held between April 8 and May 7. The 10-KM races will be on April 10, 20, 24 and May 3; the 2-Mile races will be on April 13, 17, 27 and May 1. These races start at 5 p.m. on Doolittle Road next to Building 1200. Also, a 2-Mile race will be held April 19 on the Bethel High School track at 12 noon. All NASA employees, retirees, on-site contractors and co-ops at work earn points for Langley by participating. Walkers earn points and are welcome in all races. In the Fall, Langley fininshed fifth among the NASA Centers in both the 10-KM and the 2-mile races. For more information, call Richard Shearer at ext. 47033.

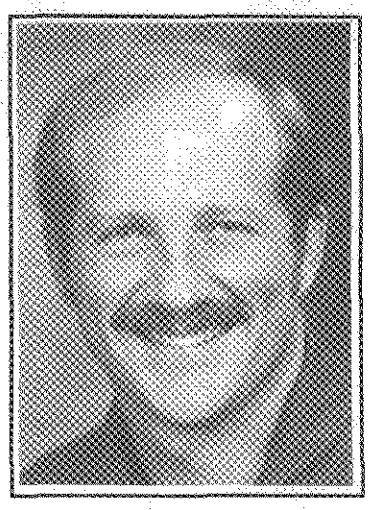
Corrections:

William G. Chapin, Instrument Research Division, and **Dale Rodman**, Scout Project Office, were omitted in the listing of recipients of Special Act or Service Awards, published in the March 10 issue of the **Researcher News**. In addition, the **Facilities Engineering Division** was misidentified as the Flight Engineering Division. Apologies to the folks in FENGD.

People & Places

Astronaut Hauck Leaves NASA; Joins Pentagon Staff

Three-time spaceflight veteran Capt. Frederick Hauck (USN), crew commander of the first post-Challenger Shuttle mission, left NASA April 3 to join the Pentagon staff of the Chief of Naval Operations. Hauck will serve as Director of Navy Space Systems Division, reporting in late May.



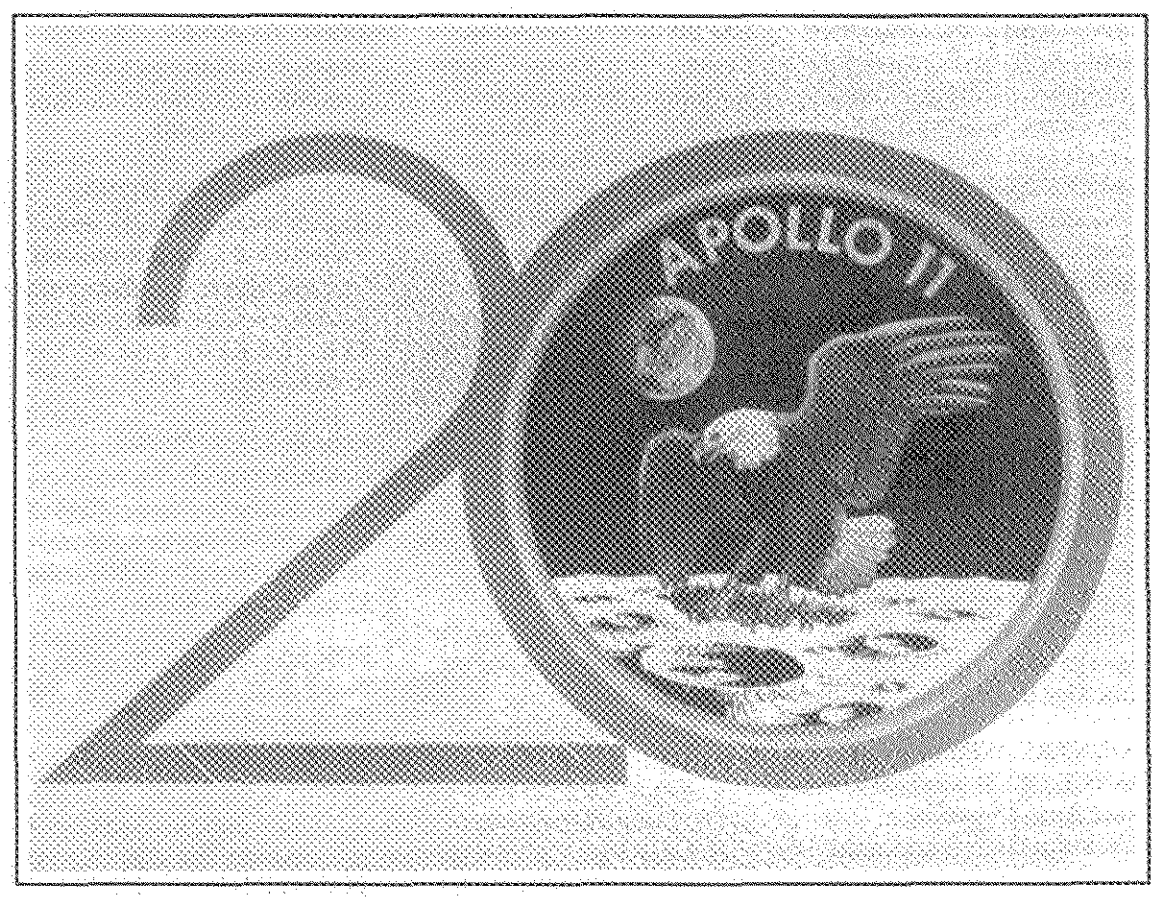
"My 11 years with NASA have been extremely rewarding. I'll miss the challenging environment and the people. I am looking forward to continuing my career in the Navy and to the new challenges it provides," said Hauck.

Selected as an astronaut in January 1978, Hauck made his first Shuttle flight as pilot on mission STS-7 in June 1983. That mission featured the deployment of two communications satellites, the first STS deployment and retrieval demonstration in space and the first formation flying of the orbiter with a free-flying satellite, SPAS-01.

In November 1984, Hauck was STS-51A mission commander, the first space salvage mission in history. Hauck and crew retrieved and returned to Earth the Palapa B-2 and Westar VI communications satellites after deploying Anik D-2 and LEASAT-1 satellites.

Following the Challenger accident, he was appointed associate administrator for external relations at NASA Headquarters, Washington, D.C., in August 1986.

Hauck returned to the astronaut office in February 1987 when he was named to command the first post-Challenger mission, STS-26. In September 1988, the mission deployed the Tracking and Data Relay Satellite (TDRS-C) and conducted 11 mid-deck experiments. Hauck has logged more than 436 hours in space.



Back to the Future

This is the official NASA commemorative logo marking the 20th anniversary of the first lunar landing, July 20, 1969. The design incorporates the original Apollo 11 crew insignia within the circle of the figure 20. The crew insignia depicts an eagle descending upon the lunar surface holding an olive branch, symbolizing America's peaceful mission.

This logo will accompany commemorative photographs and in-depth interviews with Langley employees and retirees who worked in the Apollo days and contributed to the success of the lunar landing. Apollo coverage will begin with the next issue of the *Researcher News* and continue through the 20th anniversary celebration.

Employee Assistance Program

The Employee Assistance Program provides counseling for employees and family members on a wide range of personal problems, including alcoholism, drug abuse, emotional problems, and marriage and family problems.

Free, confidential counseling can help to determine the nature of the problem. A referral may be made to other professional personnel or treatment centers which are best equipped to provide the necessary help. At all points during the counseling process, it is the individual who decides whether to follow a recommended course of action.

Problems do not just go away, although at times they might seem to. Usually they return at a later time. If you need help, use the program early; do not wait until it is your last resort. All contacts with the Employee Assistance Program are confidential. Only you and the counselor need to know that you called **873-0228** for an appointment.

Senior Management Research Review

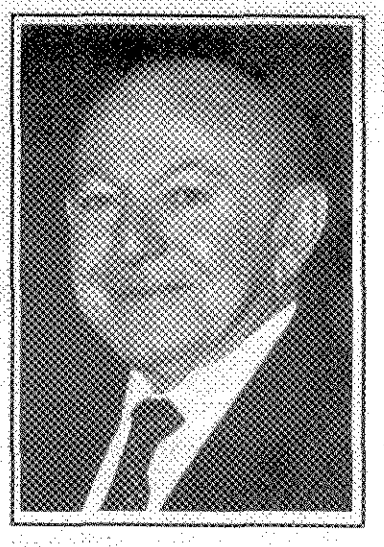
The Senior Management Research Review will be held Monday, April 17, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	An Analysis of a Transatmospheric Vehicle Response to Atmospheric Disturbances During Ascent	John Shaughnessy (Flight Systems GCD)
9:45	Laser Light Sheet Flow Visualization System Developed for TDT	Jose Rivera (Structures/SDyD)
10:00	Fluctuating Pressure Loads in a Scramjet Engine	Tony Parrott (Structures.AcoD)
10:15	Heat Transport in Solid-State Lasers and Its Impact on Remote Sensing Systems Design	O. Farrukh (Electronics/ODU)
10:30	Documentation of Flow Properties on the Fuselage of a Transport Airplane	Arild Bertelrud (Aeronautics/HTC)
10:45	Fire (First ISCCP Regional Experiment): A National Research Program to Study Impact of Clouds on Climate	David McDougal (Space/ASD)

Congratulations to Recipients of Forty-five Year Service Awards

Carl G. Baab
Operations Support Division

Daniel R. Hamlin
Operations Support Division



John Samos
Research Information and Applications Division

Manuel Stein
Structural Mechanics Division

Evelyn D. Wallace
Management Support Division

Happenings

LAA SOCIAL will be held Friday, April 14, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

EASTER EGG HUNT. The LAA apologizes for any inconvenience to the parents of the children who hunted for eggs. Historically, only 75 children have attended each hunt; this year over 200 children attended. In the future, advance tickets will be sold.

THANKS! The LAA thanks everyone who supported the St. Patrick's Day social. It was the biggest and most successful social ever held. The LAA hopes to have many more of the same kind in the future.

COUNTRY-WESTERN DANCE CLUB will hold a dance April 15 starting at 7:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Guests always welcome. Call Sam Sokol, ext. 41863, for additional information.

VOLUNTEERS NEEDED. If you are interested in working with special people, invest some time in Special Olympics. The next event is Area 22 Spring Games, April 29, at Hampton University. Please contact Cliff Gentry, ext. 45053, for details.

PIG PICK'N sponsored by Virginia Tech Alumni Chapter and Hokie Club will be held Saturday, May 6, at Mariners Museum Park. Football coach Frank Beamer to be special guest. Cost is $10/adults; $4/children 6-12; children under 6 and "Old Guard" free. Call Dave Conner, ext. 45276, or Joe Drewry, ext. 45843, for information and reservations.

MEDITATION. Starting a weekly noontime meditation group. All beliefs accepted. Beginners welcome. Call Karen, ext. 41492.

HOST FAMILIES needed for foreign exchange students for summer and school year sessions. Call Ron Harvey at 249-2322.

AFGE Local 2755 will meet Wednesday, April 19, at 4:38 p.m. in the union office, Building 1232B. The union meets the third Wednesday of every month; active, retired and prospective members are welcome.

AA AND AL-ANON meetings are held on-site. For more information, call the Health Office, ext. 43191, or the Occupational Medical Center, ext. 43193.

LOST: GLASSES with tinted lenses, dark rims, black case. Lost March 17. Please call R. Herndon, ext. 46481.

FREE TO GOOD HOME: English springer spaniel; well-mannered, delightful 3-year-old "puppy;" spayed female free to a good home with fenced yard and TLC. Call Karen at ext. 44723 or 627-1389.

FOR SALE: PUPPIES. Golden Retriever. Professionally evaluated for hunter/field trial potential; scored good to excellent. Females, $300; males, $250. Call 868-8400.

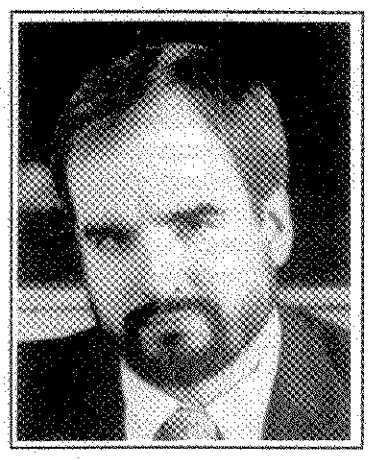
FOR SALE: TRUCK. 1980 Ford F-150, 4 WD, 302 V-8, PS, PB, 4-speed transmission; GC, $3,200 OBO. Call 7289243 after 5

Retirement Party

Taylor C. Fraser, Jr. will be honored at a retirement social, Tuesday, April 25, after work in the H.J.E. Reid Conference Center, Building 1222. Cost is $7.50 (including gift). Contributions of $2 for gift only are also accepted. Cash bar opens at 4:30 p.m. Contact Bill Kluge, Mail Stop 426, ext. 43386, for reservations by April 20.

Change in Colloquium Speaker

Dr. Gregg E. Maryniak, chief executive officer, Space Studies Institute, will discuss how harvesting space resources will provide important benefits to Earth. At 2 p.m., Monday, April 10, Maryniak will present "The Harvest of Space: Opening the High Frontier" to Langley employees in the H.J.E. Reid Conference Center, Building 1222. At 7:30 p.m. he will present the same lecture at the Sheraton Inn-Coliseum as part of the Sigma Series.



Gregg E. Maryniak

Notes of Thanks

Frank Senft writes: "I would like to thank all my fellow workers and their families for the wonderful retirement party. A special thanks to all those who planned and worked on this event for me and my family. I also appreciate the marvelous gifts and assure you they will be put to good use. It was a wonderful evening and I will always remember it."

Marion E. Frederick writes: "The family of Roland 'Fritz' Frederick wishes to thank all our friends at NASA for their kindness, support and flowers during his hospitalization and at the time of his death. All were appreciated."

Kelley C. Hinnant writes: "I would like to thank everyone who attended my retirement party for the wonderful celebration. I will always cherish the gifts and memento items."

Pat Clark writes: "My family and I would like to express our appreciation for the outstanding retirement party given on my behalf. The gifts were beautiful and the thoughts behind them were very kind. The entertainment and warm feeling throughout the evening will always be remembered. The attendance made me realize how many friendships have been established over the years—that's what I will remember most of all."

Researcher News

BULK RATE
POSTAGE & FEES PAID
NASA Washington, DC
Permit No. G-27

National Aeronautics and
Space Administration
Langley Research Center
Hampton, Virginia 23665-5225

Official Business
Penalty for Private Use $300

-photo by Fred Jones

CALLED THE FERRARI OF THE WORLD OF AIRCRAFT, the number two prototype of the Piaggio GP-180 "Avanti" was on display at the Langley Research Center hangar. The Avanti is a new Italian corporate aircraft which incorporates a number of unusual aerodynamic and structural features. These features include a three-lifting-surface configuration, wing-mounted pusher turbopumps, delta fins on the aft fuselage, forward and main wing flaps and highly laminarized surfaces on wings, fuselage and empennage. Construction is 80 percent aluminum alloy and 20 percent composite. The aircraft is nearing completion of Italian certification flight testing and will begin FAA certification testing this spring.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 8 April 21, 1989

News Researcher

Bi-weekly Employee and Contractor Publication

Bush Nominates Truly for NASA Top Post; Marshall's Thompson for Deputy Administrator

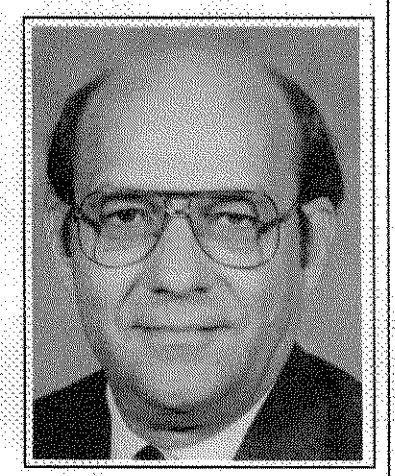
President Bush has nominated Navy Rear Adm. Richard Truly to head NASA. "This marks the first time in its distinguished history that NASA will be led by a hero of its own making, an astronaut who has been to space," Bush told members of Congress and others gathered at the White House for the announcement.

Bush also nominated J. R. Thompson, currently director of the Marshall Space Flight Center, to the number two position. "The President has created a superb team to guide NASA into the future," noted Dale D. Myers, acting administrator. Truly and Thompson "will be inheriting an organization of people who demonstrated anew their ability and determination by the way they recovered from the Challenger disaster and returned the nation to space flight," added Myers. The nominations are pending Congressional approval.

Truly became an astronaut in 1969 and has been the agency's associate administrator for space flight since 1986.

He was pilot for one of the two-man crews that flew the 747/Space Shuttle Enterprise approach and landing test flight during 1977. He was then assigned as backup pilot for STS-1, the first orbital flight test of the Shuttle. His first flight into space was as pilot of STS-2. Next he served as commander of STS-8, which accomplished the first night launch and landing in the Space Shuttle program.

Rear Admiral R. H. Truly



J. R. Thompson Jr.

Thompson has been director of NASA Marshall since September 1986, after having served three years as deputy director for technical operations at Princeton University's Plasma Physics Laboratory in Princeton, N.J. Before assuming his position at Princeton, Thompson spent 20 years with NASA at the Marshall Space Flight Center in various positions, including associate director for engineering in the Science and Engineering Directorate and as manager of the Space Shuttle Main Engine Project in the Shuttle Projects Office.

From March to June of 1986, he served as the vice-chairman of the NASA task force inquiring into the cause of the Challenger accident. In that capacity, he headed the day-to-day operations of the Data and Design Analysis Task Force, which collected and analyzed accident-related information in support of the Presidential Commission on the Space Shuttle Challenger Accident.

West Virginia, NASA Promote Technology Transfer

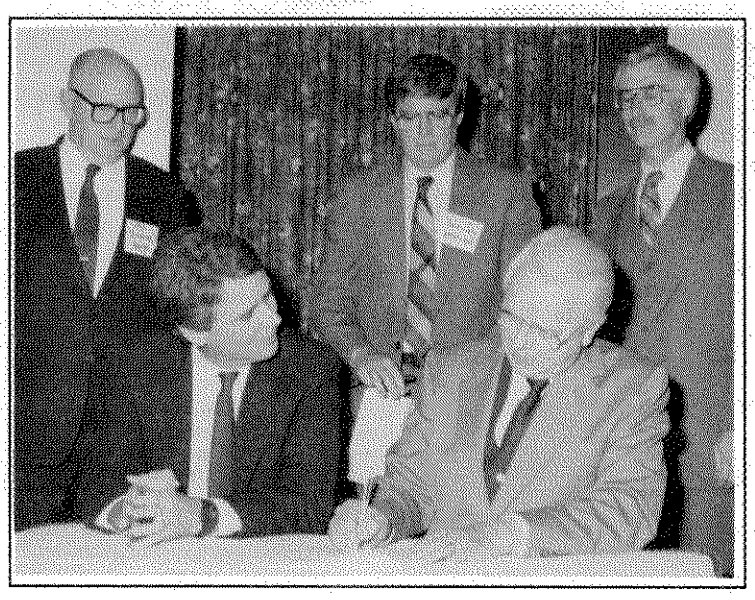
The Langley Research Center and two other NASA centers have signed a memorandum of understanding with the state of West Virginia. The memorandum promotes the transfer of NASA-derived technology to the state's private sector.

On hand for the technology transfer agreement in Wheeling, West Virginia, were Langley Director for Management Operations John F. Stokes; NASA Marshall Space Flight Center Deputy Director Jack Lee; NASA Goddard Space Flight Center Director Dr. John W. Townsend Jr.; West Virginia U.S. Senator Robert C. Byrd; and West Virginia Governor Gasdon Caperton.

The signing occurred during the Software Valley VIII Conference in Wheeling March 23. The purpose of the conference was to promote the development of high-tech industry in West Virginia and it focused on new opportunities for West Virginia businesses in the field of technology transfer.

Langley's Stokes said, "We hope that through programs such as this one in West Virginia, we can hasten the transfer of our aerospace technology to the commercial sector of industry. We stand ready to be part of the NASA team working with West Virginia."

The memorandum pledges the state of West Virginia and the NASA centers to actively cooperate in facilitating technology transfer. It also appoints individuals to serve as official points of contact and to coordinate technology transfer activities. For West Virginia, the contact is James Christie, director, Governor's Office of Community and Industrial Development. The point of contact at each NASA center is the head of the Technology Utilization Office: John Samos, Langley; Ismail Akbay, Marshall; and Don Friedman, Goddard.



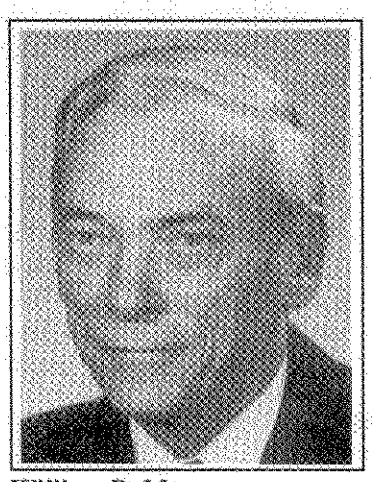
-photo courtesy of Marshall Space Flight Center

NASA-WEST VIRGINIA MEMORANDUM OF UNDERSTANDING is signed by U.S. Senator from West Virginia Robert C. Byrd (seated, right) as West Virginia Governor Gasdon Caperton watches. On hand for the ceremony were NASA field center officials (back row, L to R) Dr. John W. Townsend Jr., Goddard; Jack Lee, Marshall; and John F. Stokes, Langley. The agreement promotes technology transfer.

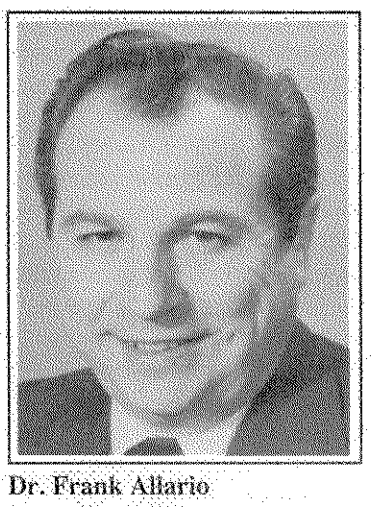
Mace Retires; Allario Named Director for Electronics

William D. Mace, Director for Electronics, retires from government service April 30. Effective May 1, Dr. Frank Allario will succeed Mace as head of the electronics directorate, which employs a staff of about 800 civil service and contract personnel.

Director for Electronics since May 1980, Mace has managed Center functions which involve the acquisition, processing, distribution and presentation of research data. Over his forty-plus years of government service, he counts his work on the "Q-ball" for the X-15 the most personally satisfying. The Q-ball provided angle-of-attack, sideslip and dynamic pressure information to the pilot via cockpit instrumentation. "When I walk into the Smithsonian and view the X-15, I know that the first eighteen inches are mine," Mace reminisces. "That's quite a feeling."



William D. Mace



Dr. Frank Allario

Mace began his Langley career in 1948 as an aeronautical research engineer in the Instrument Research Division. He was appointed head of the Sensor Development Section in 1962 and head of the Measurement Research Branch in 1963. In 1966, he became technical assistant to the Assistant Director and, in 1970, was named assistant chief of the Flight Instrumentation Division, now the Flight Electronics Division (FED). He became chief of FED in 1975, responsible for the division's research in solid state electronics, avionics technology for civil aircraft, and sensor systems for measuring atmospheric characteristics from spacecraft.

Allario, chief of the Flight Electronics Division since December 1982, began his NASA career in November 1967 as an aerospace technologist. He has served as head of the Laser Physics and Applications Section, group leader and principle investigator of the Laser Heterodyne Spectrometer Experiment for Spacelab, and as assistant chief of the Flight Electronics Division.

As Director for Electronics, he will manage research and development activities in measurement science, application of instrumentation systems to aircraft and spacecraft flight experiments, operation of very large scale scientific computer systems and electronics, and instrumentation support for Langley's ground and flight research facilities.

Allario returned to Langley February 24, 1989 after spending 15 weeks at the Massachusettes Institute of Technology Center for Advanced Engineering Study. He was selected an MIT Fellow in June 1988. From 1977-78, he studied at Stanford University under the Sloan fellowship program.

PETERSEN PRESENTED 30-YEAR AWARD. On a recent visit, Dale D. Myers honored LaRC Director Richard H. Petersen for 30 years of service. Myers offered congratulations of former administrator Fletcher.

News Briefs

HEADQUARTERS, Washington, D.C. --- Western Electrochemical Company, Cedar City, Utah, has finalized arrangements for private financing through Security Pacific Bank Washington, Seattle, for construction of an ammonium perchlorate (AP) production plant to be located in Cedar City. Western Electrochemical Company is a subsidiary of Pacific Engineering and Production Company and an AP subcontractor to Morton Thiokol Inc., manufacturer of the Space Shuttle solid rocket motor.

HEADQUARTERS, Washington, D.C. --- Dr. James C. Fletcher named Dr. Robert Rosen as acting associate administrator for Aeronautics and Space Technology (OAST), effective April 2. Rosen has served as deputy associate administrator OAST since March 1986. He replaces acting associate administrator Dr. William F. Ballhaus, Jr., who returned to his permanent position as director of NASA's Amers Research Center, Mountain View, Calif.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- NASA LeRC, with funding from the Department of Energy, has awarded parallel contracts to complete the design, fabrication, construction, assembly and test of an advanced power system. The system would be capable of delivering 25 kilowatts of electricity to a utility grid while operting with solar energy from an 11-meter diameter parabolic dish solar thermal energy concentrator. The advanced power system holds promise for providing highly efficient, lean, long-life and reliable dynamic power for future terrestrial applications. This work also may have application to NASA's research on future space-power systems. The two successful contactor teams are headed by Cummins Engine Compnay, Columbus, Ind., and Stirling Technology Company, Richland, Wash.

HEADQUARTERS, Washington, D.C. --- Dr. Leonard A. Fisk, associate administrator for NASA's Office of Space Science and Applications (OSSA), has announced the selection of the first Small Explorer missions, which will study some of the most important questions in space physics, astrophysics and upper atmosphere science. Termed Small Explorers, these spacecraft weigh approximately 400 pounds and can be launched from available Scout-class expendable launch vehicles. The program provides frequent flight opportunities for highly focussed and relatively inexpensive space science missions.

JOHNSON SPACE CENTER, Houston, Texas --- Astronaut crew members have been named for two scientific Space Shuttle missions scheduled for launch in 1990. USAF Col. Steven R. Nagel will command the Space Shuttle Discovery on mission STS-37; USMC Lt. Col. Kenneth D. Cameron will serve as pilot; mission specialists are USAF Lt. Col. Jerry L. Ross, Jay Apt, Ph.D., and Linda M. Godwin, Ph.D. The apace and life sciences-dedicated mission, SLS-1, will be commanded by USMC Col., Bryan D. O'Connor; STS-40 will be piloted by USAF Col. John E. Blaha; mission specialist is Tamara E. Jernigan; mission specialists M. Rhea Seddon, M.D., and James P. Bagian, M.D., and payload specialists F. Drew Gaffney, Ph.D., and Robert W. Phillips, Ph.D., were named previously.

DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- NASA's Ames-Dryden Flight Research Facility has taken delivery of the first of two U.S. Air Force-loaned F-16XL aircraft for a NASA flight research program. The second aircraft will be delivered in several weeks. The F-16XL is uniquely characterized by it's large cranked-arrow wing, especially well suited for efficient supersonic flight. The aircraft will be used by NASA as testbeds to evaluate aerodynamic concepts designed to improve wing airflow during sustained supersonic flight.

Editor's note: Surveys locally and at the Headquarters level indicate that our readers are interested in NASA News Releases summarized here. Copies are available by contacting Edith Watts, Mail Stop 146, ext. 43293. Request information by headline and release number. See Current News Release information box below.

Upcoming Conferences

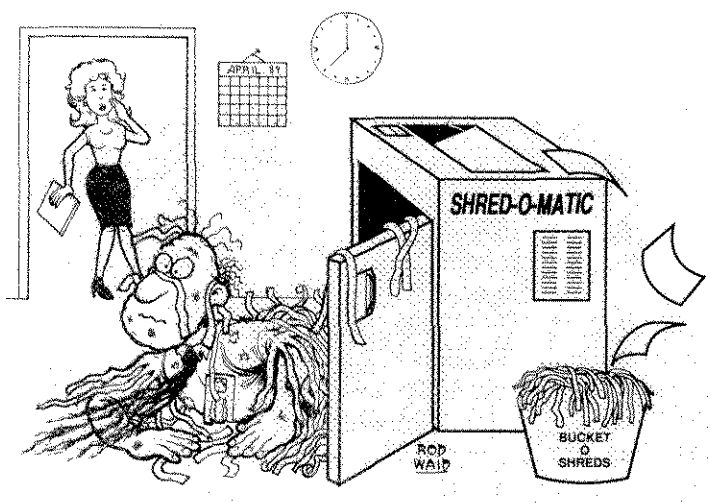
JANNAF NDE Subcommittee Meeting will be held May 2-4 in Building 1222 and several smaller conference rooms. Contact Joseph Heyman, ext. 44970, or Eric Madaras, ext. 44993, for details.

Takeoff Performance Monitoring System (TOPMS) Review and Workshop will be held May 9-10 at Langley Research Center, Building 1212. David B. Middleton, ext. 44034, is point of contact.

Visual Information Processing for Television and Telerobotics will be held May 10-12 in Williamsburg, Va. Contact Friedrich O. Huck, ext. 41517, for additional information.

IEEE Sixth Conference on Real-Time Computer Applications in Nuclear Particle and Plasma Physics will be held May 17-19 in Williamsburg. Charles S. Bryant, ext. 44674, is NASA point of contact.

Lankley



Lankley, you really should invest in a tie tack!

May 2,3,4, 1989

AEROSPACE 89 THE NEW AGENDA

Hyatt Regency Crystal City, Arlington, Virginia

***SPACE DAY** TUESDAY, MAY 2*

***DEFENSE DAY** WEDNESDAY, MAY 3*

***AERONAUTICS DAY** THURSDAY, MAY 4*

Bus transportation to the AIAA 1989 International Aerospace Exhibit is available. Buses will leave at 5 a.m. each day from the Activities Center, Building 1222, and will stop at the James-York Plaza Shopping Center, Route 143, at 5:30 a.m. for the convenience of those in the Williamsburg area. Reservations are requested by today, April 21. Contact Roger Hathaway, ext. 43312, for information.

Positions Filled

Purneel Hopson has been selected Supervisory Electrical Technician, Microelectronics & Technical Support Section, Electronics Technology Branch, Fabrication Division, under CPP 88-69.

Lemuel E. Mauldin III has been selected AST, Atmospheric Chemistry and Dynamics, Theoretical Studies Branch, Atmospheric Sciences Division, under CPP 88-82.

Samuel E. Harvey has been selected Security Specialist, Security Services Branch, Management Support Division, under CPP 88-83.

James R. Rooker has been selected AST, Experimental Facilities Development, Structural Design Branch, Facilities Engineering Division, under CPP 88-87.

David A. Wineman has been selected AST, Experimental Facilities Techniques, 8-Foot Tunnel Project Office, Electronic Systems Branch, Facilities Engineering Division, under CPP 88-88.

Judy W. Evans has been selected Supervisory Cost Accountant, Management Operations Directorate, under CPP 88-89.

Gloria S. Evans has been selected Secretary (Stenography), Operations Support Division, Under CPP 88-90.

Nadine E. McHatton has been selected Secretary (Typing), Fabrication Division, under CPP 89-5.

Stephen L. Ruggles has been selected AST, Data Systems Electronics Engineer, Information Processing Technology Branch, Infomation Systems Division, under CPP 89-7.

Wayne Gerdes has been selected AST, Data Systems Electronics Engineer, Information Processing Technology Branch, Information Systems Division, under CPP 89-8.

Kathy A. Dezern has been selected Secretary (Stenography), Fluid Mechanics Division, under CPP 89-10.

CDC Program

The Langley Child Development Center PTA will present "Helping Young Children Deal with Death and Other Significant Losses" Saturday, April 29, at 7:30 p.m. in the private dining room of the NASA Cafeteria.

The two speakers will be Linda Haugh, a psychologist, and Sue Wilkinson, a pastoral associate. The talk will be preceded by a potluck dinner beginning at 6:30 p.m.

All NASA Langley parents are invited to attend.

Current News Releases

To obtain a acopy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-40.....Financing Arranged for Ammonium Perchlorate Plant

89-41.....Rosen Named Acting Associate Administrator OAST

89-42.....NASA Lewis Awards Contracts for Advanced Power System

89-43.....NASA Selects Small Explorer Missions

89-44.....Astronauts Named for Two Space Science Missions

89-46.....STS-30 Press Kit

89-47.....NASA Plans F-16XL Sustained-Supersonic Airflow Research Tests

News Researcher

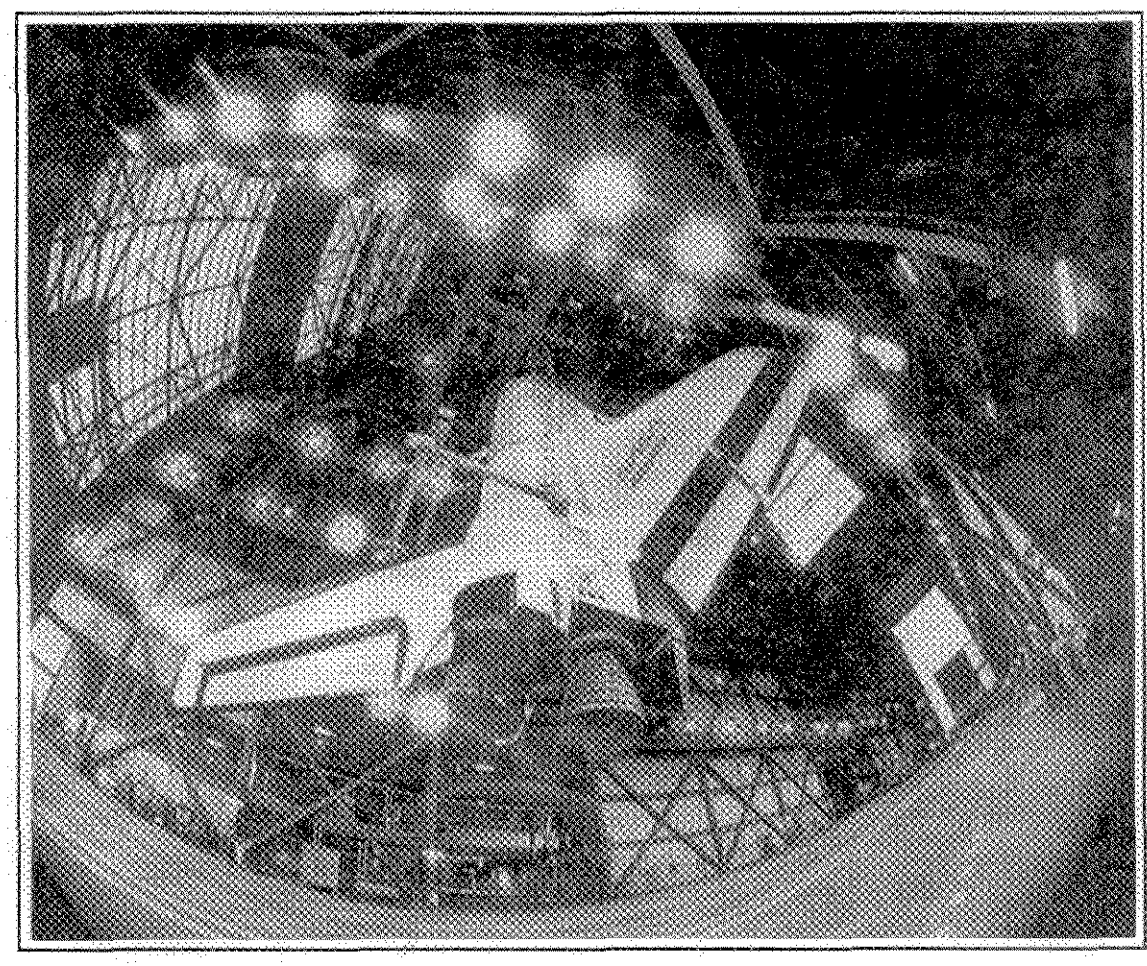
The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 116, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

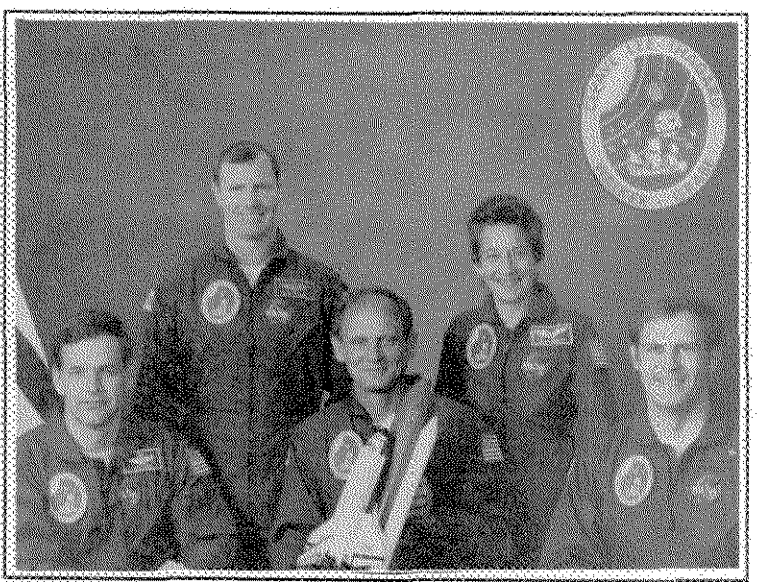
Managing Editor . . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

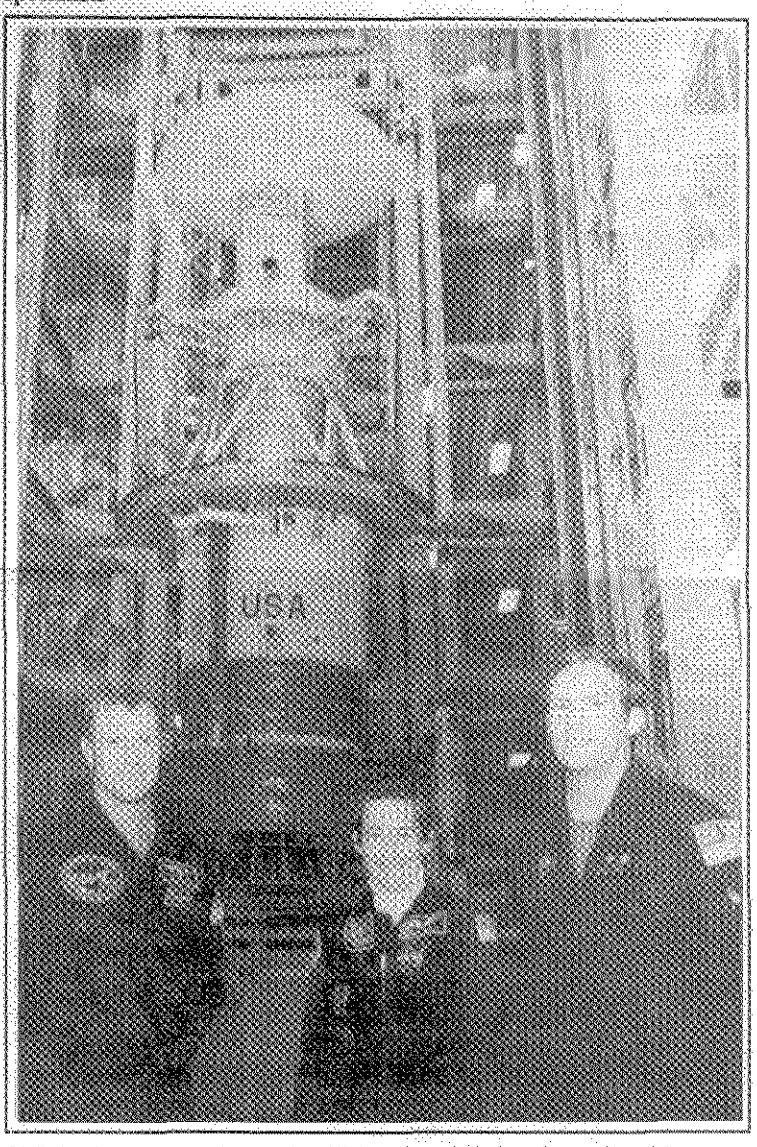
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.





STS-30 CREW. Astronaut David M. Walker, standing at left, is mission commander. Others are (L to R) Astronauts Ronald J. Grabe, pilot; Norman E. Thagard, Mary L. Cleave and Mark C. Lee, all mission specialists



STS-30 Commander David M. Walker and Mission Specialists Mary Cleave and Norman Thagard stand in front of the spacecraft Magellan and the mated Inertial Upper Stage as preparations were begun to install the spacecraft into the payload canister in KSC's Vertical Processing Facility. Magellan will be the first U.S. planetary mission in ten years and the first launched by the Shuttle. Magellan will make the 15-month long journey to the planet Venus and perform radar mapping operations, transmitting the information back to NASA's Jet Propulsion Laboratory in California.

Magellan to Map Venus

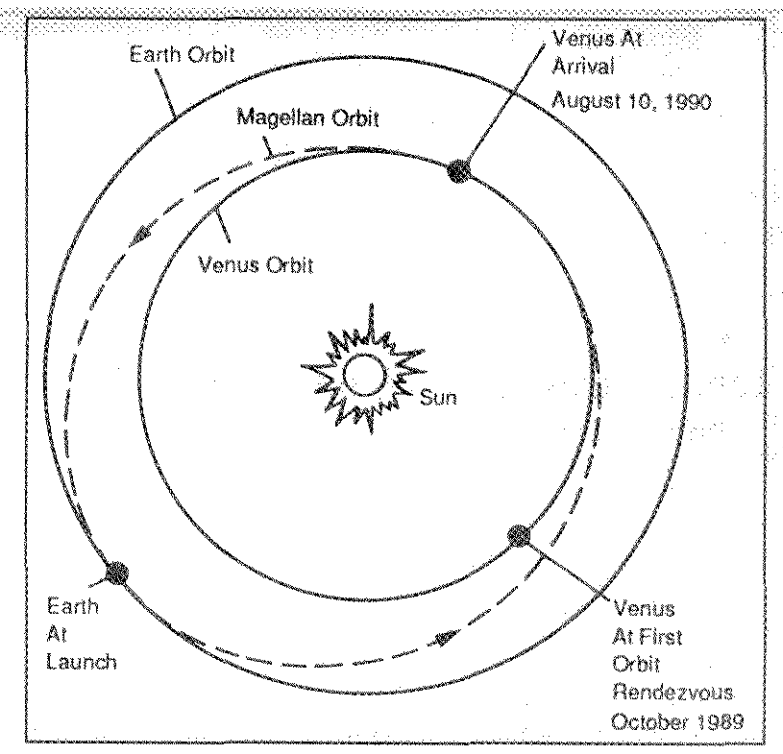
Shuttle to Deploy Planetary Science Mission

Space Shuttle mission STS-30 will deploy the Magellan Venus-exploration spacecraft into low-Earth orbit, the first U.S. planetary science mission launched since 1978 and the first planetary probe to be deployed from the Shuttle.

Following deployment, Magellan will be propelled from Earth orbit in to its Venus trajectory by an Air Force-developed, Inertial Upper Stage (IUS) booster. The spacecraft will cruise through space for some 15 months, including flying around the Sun, before reaching its Venus destination in August 1990.

Magellan's orbit insertion rockets will be fired to slow the explorer into a highly eliptical orbit around planet Venus. Magellan will complete one orbit of Venus every 189 minutes. During its 243-day orbital mission, the spacecraft will acquire surface imaging, radiometry, altimetry and gravitational data.

Magellan will map up to 90 percent of the surface of planet Venus for the first time using a synthetic aperture radar instrument to gather high resolution, mapping data.



The Crew, the Mission, the Window . . .

Commander of the 29th Space Shuttle mission is David M. Walker, captain, USN. Ronald J. Grabe, colonel, USAF, is pilot. Walker flew as the pilot aboard Discovery on mission STS-51A in November 1984, and Grabe was pilot of Atlantis on mission STS-51J in October 1985.

Mission specialists are Norman E. Thagard, M.D.; Mary L. Cleave, Ph.D.; and Mark C. Lee, major, USAF. Thagard previously flew as a mission specialist on STS-7 in June 1983 and STS-51B in April 1985. Cleave previously flew on STS-61B in November 1985. Lee is making his first Space Shuttle flight.

Liftoff of the fourth flight of the orbiter Atlantis is scheduled for 2:24 p.m. EDT, April 28, from Kennedy Space Center, Fla., launch complex 39-B, into a 160-nautical-mile, 28.85-degree orbit. Nominal mission duration is 4 days, 56 minutes. Deorbit is planned on orbit 64, with landing scheduled for 3:20 p.m. EDT on May 2 at Edwards Air Force Base, Calif.

Liftoff on April 28 could occur during an 18-minute period beginning at 2:24 p.m. EDT. The launch window will grow each day by six to eight minutes, reaching a maximum of 121 minutes on May 13. From May 13 until the close of the window on May 28, the launch window each day would remain at 121 minutes to protect a Transatlantic Abort Landing (TAL) abort capability. The launch window increase is dictated by the need for a daylight landing opportunity at the TAL sites.

Atlantis also will carry secondary payloads involving fluid research in general liquid chemistry and electrical storm studies. After landing, Atlantis will be towed to the NASA Ames-Dryden Flight Research Facility, Edwards, Calif., hoisted atop the Shuttle Carrier Aircraft and ferried back to the Kennedy Space Center to begin processing for its next flight.

STS-30 countdown milestones

T- 11:00:00.....Retract Rotating Service Structure
T- 09:00:00.....Activate orbiter's fuel cells
T- 08:00:00.....Configure Mission Control communications for launch
T- 06:00:00.....Begin loading external tank
T- 03:00:00.....Wake crew
T- 02:30:00.....Crew begins boarding
T- 01:00:00.....*Atlantis'* hatch sealed
T- 00:09:00.....Mission Management Team polled
T- 00:07:30.....Orbiter access arm retracted
T- 00:03:30.....*Atlantis* switches to internal power
T- 00:00:31.....Onboard computers get "go" for liftoff
T- 00:00:06.....Main engines start
T- 00:00:03.....Main engines reach 90 percent thrust
T- 00:00:00.....Solid rocket motors ignite

Satellite Aids Understanding

If You Could Talk to an Astronaut . . .

If you had the opportunity to talk to an astronaut, what would you ask? What if you could speak to both a U.S. astronaut and a Soviet cosmonaut? This was the opportunity presented to students on Tuesday, April 4, when the crews of the Apollo-Soyuz mission participated in a televised teleconference with American and Soviet students.

Several groups of area students gathered at the Visitor Center to participate in the space program. Schaan Baker, a sixth grader from Syms Middle School, dialed a number of times hoping to get to ask any member of the crew: "Do you think a future joint mission will help with world peace?" Bryan Soriano, also from Syms, wanted to ask mission pilot Vance Brand if he felt the Apollo-Soyuz mission accomplished cooperation in space. Both students are members of the school's Young Astronaut club.

Chanel Mathis, an eighth grader from Eaton Fundamental School and a CHROME member, intended to direct her question jointly to cosmonaut Valeriy Kubasov and astronaut commander Thomas P. Stafford. But Mathis never got to ask "What reaction did you have when the tunnel was opened between the spacecraft and you saw each other?" Cooperating Hampton Roads Organization for Minorities in Engineering (CHROME) students joined the Syms Young Astronauts taking turns on the phone during the one and one-half hour presentation.

One student from the Peninsula--Robby Edenfield, Carver Middle School--was luckier than the group assembled at NASA. His call got through to La Jolla, California. On hold for close to an hour, Edenfield finally posed his question to General Stafford asking what the Earth looked like from thousands of miles away.

"About the size of an orange," replied Stafford. "It's so small, it seems people should be able to put aside their differences." The July 1975 Apollo-Soyuz mission featured a rendezvous between an American and Soviet spacecraft. The crew exchanged the first international handshake in space, swapped gifts and shared experiments.

Students from around the nation wanted to know what languages were spoken during the mission, how scientific experiments have changed over the years and what problems are unique to long-term space flight.

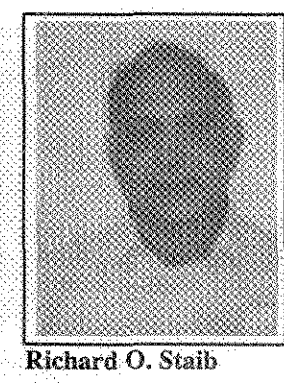
Back at the Visitor Center, a group from the Explore Center representing five elementary schools in Gloucester watched with interest as the astronauts/cosmonauts discussed the similarities in the two countries' space programs. Philip Varner, a fourth grader from Achilles Elementary, impressed with the notion of top secret programs, never got a chance to ask and probably still wonders, "Was it difficult to work closely with the Soviets and not share all the information?"

The purpose of the teleconference, sponsored by a dozen corporations, was to give students the chance to talk about the past, present and future of Soviet and U.S. space programs and joint missions to space.

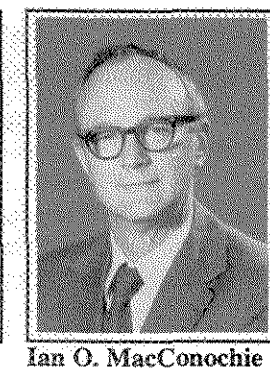
-photo by Bob Reynolds

Syms Middle School sixth grader Schaan Baker dials La Jolla, California, in hopes of speaking with Apollo-Soyuz astronauts/cosmonauts. Soviet and American students were given the opportunity to discuss the 1975 cooperative space mission with members of the crew. Waiting to pose the next question are Bryan Soriano (center), also from Syms, and Chanel Mathis, an eight grader from Eaton Fundamental School. Syms Young Astronaut club sponsors Randy Carmine and Linda Hunt watch.

Anna J. Lockard



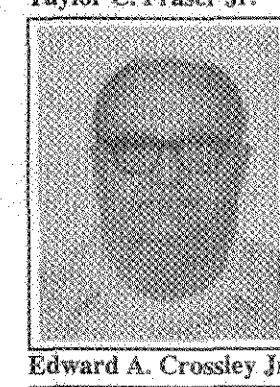
Richard O. Staib



Ian O. MacConochie

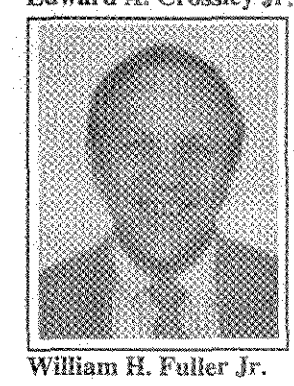
Taylor C. Fraser Jr.

John A. Walker



Edward A. Crossley Jr.

Philip E. Everhart



William H. Fuller Jr.

Athena T. Markos, Analysis and Computation Division, retired January 3.

Anna J. Lockard, Management Support Division, retired January 27.

Richard O. Staib, Analysis and Computation Division, retired January 31.

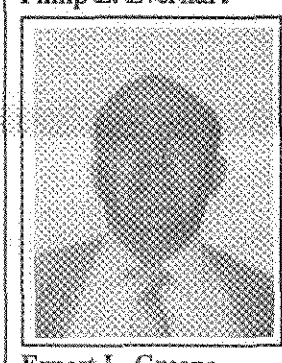
Ian O. MacConochie, Space Systems Division, retired February 1.

Taylor C. Fraser Jr., Research Information and Applications Division, retired February 28.

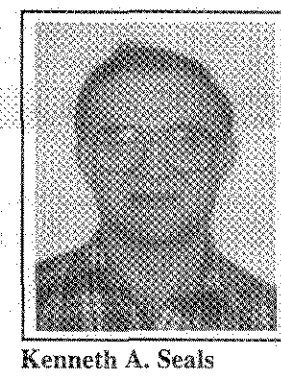
John A. Walker, Facilities Engineering Division, retired March 3.

Edward A. Crossley Jr., Systems Engineering Division, retired March 24.

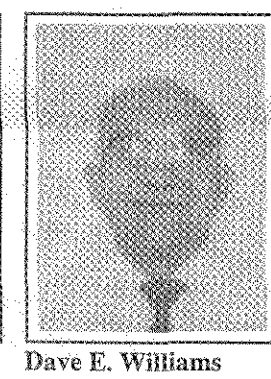
Philip E. Everhart, Projects Division, **William H. Fuller Jr.**, Atmospheric Sciences Division, **Ernest L. Greene**, Analysis and Computation Division, **Kenneth A. Seals** and **Dave E. Williams**, Systems Engineering Division, and **George H. Veneris**, Fabrication Division, retired March 31.



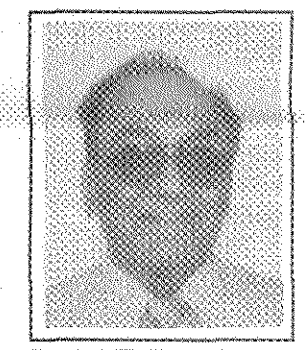
Ernest L. Greene



Kenneth A. Seals



Dave E. Williams



George H. Veneris

Sports News

Tennis Team Gears Up for Spring Tournaments

The NASA Langley Tennis Team will be holding spring ladder tournaments in April to establish player positions for challenge matches throughout the summer. There are nine additional tournaments scheduled between May and October which are open to club members. Membership application forms can be picked up at the LAA office, the sign-up board by tennis court #2, or by contacting the club president, George Lawrence, ext. 41961.

Runners Club Winds Up Intercenter Competition

Final races for the NASA Intercenter competition include 2-Mile races on April 27 and May 1. Also, 10-KM races will be held on April 24 and May 3. All races start at 5 p.m. on Doolittle Road. Walkers are welcome in all races. All NASA employees, retirees, on-site contractors and co-ops at work earn points for Langley by participating. For more information, call Richard Shearer, ext. 47033

Bowling Stats

The NASA Bowling League bowls each Tuesday evening at Victory Lanes in Grafton. Current standings are:

	March 7		March 14		March 21	
Team High Game	969	Ballers	966	Strikers	923	Thunderbolts
Team High Series	2754	Ballers	2768	Strikers	2667	Thunderbolts
Male High Game	244	R. Shearer	244	O. J. Cole	253	K. Gough
Male High Series	645	D. Jones	669	O. J. Cole	620	B. Beasley
Female High Game	191	P. Walker	189	R. Frizzell	211	M. Aldrich
Female High Series	522	R. Frizzell	532	R Frizzell\	581	M. Aldrich
Most Pins	+75	R. Shearer	+69	F. Kern	+80	K. Gough
over Average	+68	D. Rieger	+69	G. Brauckman	+78	H. Davis

	March 28		April 4		April 11	
Team High Game	963	Strike Force	928	Strike Force	975	DTSV
Team High Series	2678	Strike Force	2699	Strikers	2718	Ballers
Male High Game	231	R. Rubrecht	234	R. Russell	244	M. Frye
Male High Series	632	F. Kern	609	D. Gates	615	O. J. Cole
Female High Game	197	F. Boninu	193	L. Heath	237	S. Moran
Female High Series	650	K. Wagner	494	F. Boninu	564	M. Aldrich
Most Pins	+63	P. Edwards	+68	T. Moen	+96	S. Moran
over Average	+59	B. Gould	+56	R. Russell	+85	P. Edwards

People & Places

Health Corner

April is Cancer Awareness Month

The American Cancer Society estimates there have been more than 45 million cancer deaths, 9 million new cancer cases and some 15 million people under medical care for cancer in the 1980s. About 76 million Americans now living will eventually have cancer; this is about 30 percent of the current population.

This year the emphasis for Cancer Awareness Month is on how good nutrition will help reduce the risk of cancer. American Cancer Society funded researchers are stepping up efforts to confirm the links between diet, lifestyle and cancer. Extensive research is underway to clarify the role diet plays in the development of cancer. Even though no direct cause-effect relationship has been proven, it is known that certain substances may increase or decrease the risk of certain types of cancer.

Cancer screening for NASA employees and contractors is provided at the Health Clinic during yearly physical exams. Cancer screening includes breast exams; Pap smears; prostate, testicular, procto-sigmoid exams; and hemocult testing for bowel cancer. Know the danger signals for cancer so you can do your part in the fight!

Cancer Preventative Guidelines

- o Avoid obesity
- o Cut down on total fat intake
- o Eat more high fiber foods
- o Include foods rich in Vitamins A and C in your daily diet
- o Include cruciferous vegetables in your diet (cabbage, broccoli)
- o Eat salt-cured, smoked and nitrite-cured foods in moderation
- o Moderate alcohol consumption, if you drink at all

Travel Advisory

All individuals traveling on diplomatic or official passports must have a valid visa before entry into Spain, regardless of the purpose of travel.

The U.S. Embassy in Madrid, Spain, has informed the U.S. State Department that many travelers holding official or diplomatic passports continue to arrive in Spain without first having obtained required Spanish visas. In many instances, these travelers, hoping for a pleasant stopover in Space, spend their time in a police official's office attempting to secure passage on the next flight out!

Apollo Reunion

An Apollo Spacecraft Program Office (ASPO) reunion commemorating the twentieth anniversary of the first lunar landing is currently being planned for July 22, 1989, at the Johnson Space Center. A search is on for all former employees of the program office. If you or someone you know was assigned to JSC's ASPO during this historic period, please contact Sharon Martin (FTS: 525-1432/ JSC Mail Code VN2) with names and addresses so all can be included on the mailing list.

Photocopiers for Sale

NASA Langley Research Center will be conducting a sealed bid sale on photocopiers previously used on Center.

Inspection hours: 8 a.m.-- 5 p.m. Date: May 6

For additional information, contact Dollie McCown, 864-3561, Building 1206T, Room 104, between 7 a.m. and 3:30 p.m.

Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The awards committee convened on March 2 and selected Crew #4, as Crew of the Month for February. This crew obtained a score of 94.28 out of a possible 95 points. They also received letters of commendation for the excellemnt manner in which they consistently maintain all areas of Buildings 1200 and 1208. Crew members are (L to R) Gloria Martin, Silvia Debroux, Annie Mason, Gracie Dunston and Early Walker.

APOLLO 11 VIEW OF THE MOON. This outstanding view of a full moon was photographed from the Apollo 11 spacecraft during its transearth journey homeward. When this picture was taken in July 1969, the spacecraft was already 10,000 nautical miles away from the moon.

Looking back

Apollo Success Built on Mercury, Gemini

"I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon, and returning him safely to Earth."

President John F. Kennedy
May 25, 1961

The challenge was thus issued. The destination was the moon and the cargo was man. For President Kennedy, Apollo was to be a symbolic undertaking, intended to demonstrate to the world continued U.S. superiority. The lunar goal was also a means of restoring American pride and self-confidence, badly shaken by demonstrations of Soviet space capabilities.

Fortunately, NASA was prepared. In fact, Kennedy's announcement brought into sharp focus developments already underway.

Langley historian James Hansen credits Robert Gilruth with the forethought that put the agency ahead of the game. "In the mid-1950s Robert R. Gilruth, more than anyone else at Langley, began to push the idea that manned space flight was the next great challenge for aeronautical engineers." As head of the Space Task Group (STG) located at Langley Field, he was responsible for planning and carrying out Project Mercury, the country's first manned space flight program.

Langley assumed much of the direct responsibility for getting Project Mercury off the ground The Mercury space capsule was tested in the Center's Full-Scale Tunnel. The Little Joe launch vehicle was conceived by Langley engineers Max Faget and Paul Purser even before the STG was organized.

"There was so much to do," recalls Gilruth during an interview on the occasion of Langley's seventieth anniversary. "We had to design spacecraft, find and train astronauts, build a world-wide tracking network, choose the rockets that would launch the spacecraft, and we had to provide a way to rescue the crew and bring them back safely to Earth should any of these plans go awry. And we had to do it in a hurry!

"But it was such a challenge that very good people wanted to work on the project. And we made rapid progress. Within six months we had the vehicle designed, we had selected the Atlas missile as the launch device, we had the world tracking net and we were training astronauts. By the way," continued Gilruth, "the term astronauts hadn't even been coined at this time. It was Hugh Dryden that came up with the name; he said, 'I guess we'll have to call them astronauts.'"

It becomes clear that the Apollo program was built on the foundations laid by Project Mercury and it profited from the techniques perfected in Project Gemini. Mercury took two astronauts on suborbital rides and four into earth orbit. Life support and reentry technology were developed. Problems of communications, Earth-station tracking and sea-recovery systems were identified and solved. The Saturn family of large rockets was built and tested. Trajectory studies resulted in the decision to use the lunar orbit rendezvous technique. Additional astronauts were selected and trained.

Ten two-man Project Gemini flights were flown in the short period between March 1965 and November 1966. The Apollo spacecraft--command, service and lunar modules--were designed, developed and tested. Gemini developed the vital techniques of orbital rendezvous and docking, essential to the Apollo 11 mission. Gemini also demonstrated the practicality of extravehicular activity (EVA) and led to the development of necessary onboard electric power, medical monitoring and other critical components of a manned mission with intent to land on the moon.

The lunar experience clearly demonstrates that, given a great enough priority and a significant amount of funding, seemingly insurmountable tasks can be accomplished. A mammoth effort, involving hundreds of thousands of people, was required to put a man on the moon .

"The country was ready for it. We did not want to be the second nation. We wanted to be first," said Gilruth. "It all grew up out of Langley Field and the old rocket work at Wallops Island. The beginning of the space program was a combining of rocketry with aviation."

Editor's note: It would be impossible to mention all of the members of the Langley family who contributed to the success of the lunar landing. In subsequent issues of the Researcher News we will investigate areas of significant Langley contributions through the memories and impressions of current, former and retired Langley employees.

Happenings

LAA SOCIAL will be held Friday, April 28, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, May 8, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222. Concerns to be brought before the Board should be addressed to the appropriate chairperson.

NASA TOASTMASTERS will meet Wednesday, April 26, at 11:30 a.m. in Building 1218, the Executive Conference Center. The club meets monthly on the second and fourth Wednesdays; guests are always welcome. For additional information, call Steve Yaros, ext. 43050.

ROBERT McCALL signed, unframed posters on sale at the Visitor Center Souvenir Counter during May. Sale price: $10! Limited supply.

SOCCER. Anyone interested in playing soccer is welcome to attend Thursday afternoon sessions at 4:45 p.m. on the grounds adjacent to the Credit Union building. For additional information, call Kevin Shepherd, ext. 43583, or Barry Smith, ext. 44790.

AIAA MEETING will be held Monday, May 8, in the H.J.E. Reid Conference Center, Building 1222. Rear Admiral Millard Firebaugh will discuss "Seawolf--Submarine for the 21st Century." Meeting is from 5 to 6 p.m.; snacks will be served at 4:30 p.m.

VA. TECH RECEPTION. Virginia Tech Alumni will host a reception for high school students and parents at the Sheraton Inn-Coliseum, Monday, May 15 from 6 to 8 p.m. A video introduction to the college will be shown. Please call 591-2806 for reservations or additional information.

MARCH OF DIMES TEAMWALK. AFGE 2755 is sponsoring a NASA Teamwalk for the March of Dimes Teamwalk America. The walk will be Sunday, April 30, on the trails in Newport News Park. It is a 25 kilometer (16 miles) walk from 9 a.m. to 3 p.m. There will be periodic rest stops offering free doughnuts, soft drinks, water, popsicles and free hamburgers and drinks at the end. Portable bathroom facilities will be placed at each rest stop. The walk is open to all NASA and contractor personnel and their families. Special T-shirts are being considered for the occasion. Those interested should call Janice McCollum, ext. 43067, to sign up and receive a sponsor sheet.

PIG PICK'N sponsored by Virginia Tech Alumni Chapter and Hokie Club will be held Saturday, May 6, at Mariners' Museum Park. Call Dave Conner, ext. 45276, or Joe Drewery, ext. 45842, for information or reservations.

FOUND: DIAMOND RING. Discovered in the parking lot of Building 1268A. Contact Security Office, 864-3416, to identify and claim.

WANTED: CARPOOL. Mate wanted to carpool between Colonial Place area in Norfolk to the NASA West Area, 8 a.m. shift. Contact Dan Giesy, ext. 44006 or 625-7558.

Retirement Parties

George "The Greek" Veneris will be honored at a retirement party Friday, May 19, from 6:30 to 9 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $8/person; $15/couple including gift. Donations for gift only are also welcome. Respond by sending a check to Beckie Williams or Ben Wilson, Mail Stop 386, by May 12.

Carl G. Baab, will be honored at a retirement dinner, Monday, May 22, in the H.J.E. Reid Conference Center, Building 1222. Cost is $12/person; $23/couple including gift. Contributions of $2 for gift only are also welcome. Cash bar opens at 6 p.m. Dinner is at 7. Contact Gloria Evans, ext. 44570, Mail Stop 387, for reservations by May 16.

Note of Thanks

D. Eugene Hicks writes: "I would like to thank my friends and associates of the past forty-eight years for the fine retirement dinner, for the gifts, but most of all for your association, the greatest gift of all. Together we have taken part in many of the challenging aeronautical and space projects LaRC has undertaken. Special thanks to those who worked so hard to put the festivities together."

Free Seminar

ORACLE Corporation will present a free seminar Monday, May 15, in the Langley Room of the H.J.E. Reid Conference Center, Building 1222.

ORACLE has been selected for the Space Station Freedom program. It was selected for its capacity to develop portable applications across multiple hardware platforms.

ORACLE will also present a NASA Tracking System demonstration which defines the history and anomalies for specific parts in a NASA bill of material. The system was developed for Johnson Space Center's Power Propulsion Division to reduce mission risks due to scattered information regarding specific components.

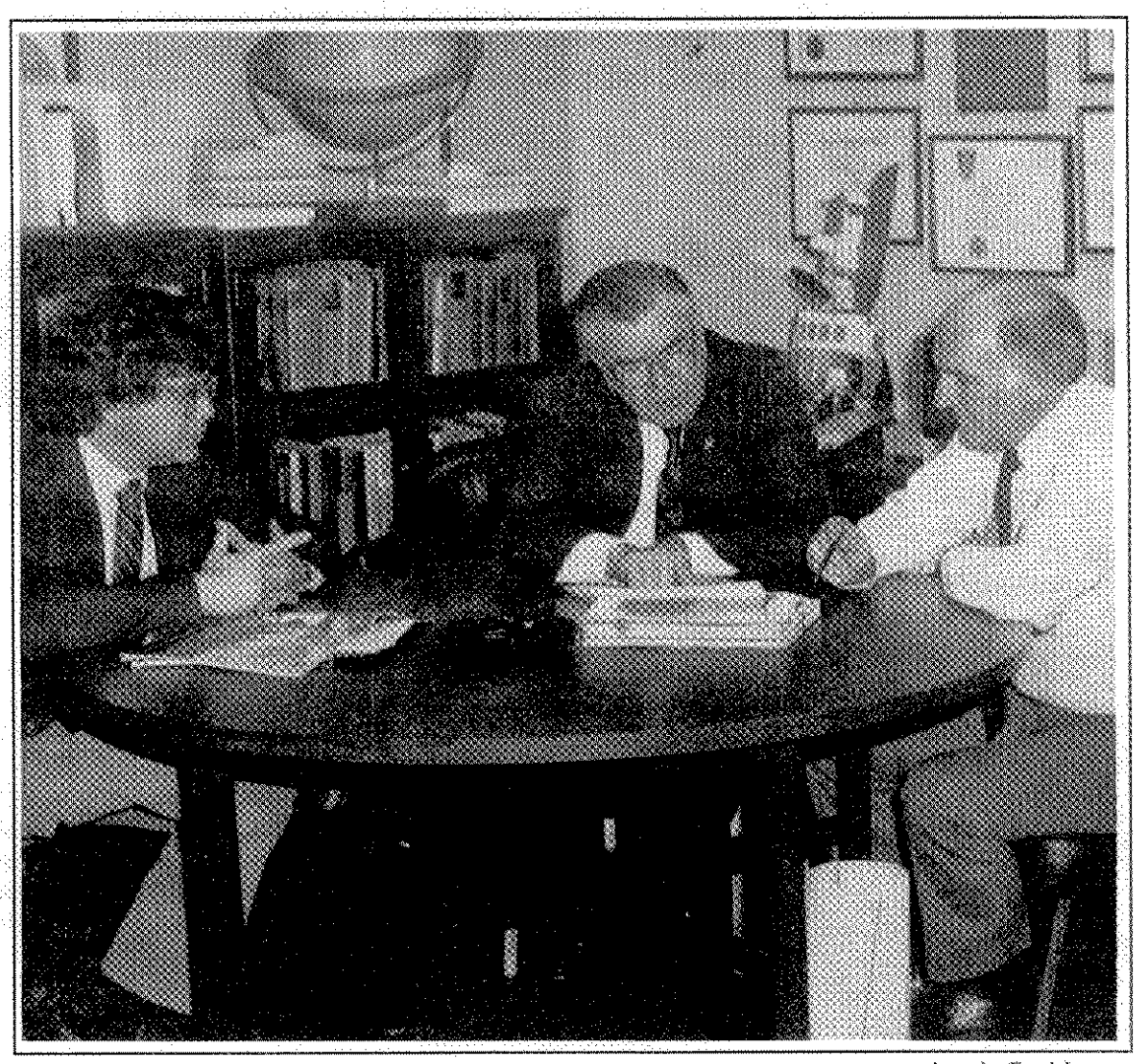
Reservations for the seminar can be made by dialing 1-800-345-DBMS, extension 114. Inform the operator that your Priority Code is Z4D1FS.

Corrections:

Vickie S. Parsons has been selected AST, Technical Resources Management/Program Analysis Officer, **Technical Programs Support Branch.**

David A. Wineman been selected AST, **Experimental Facilities Techniques**, 8-Foot Tunnel Project Office.

Harriet A. Coombs has been named Administrative Assistant, **Systems Engineering Division.**



-photo by Fred Jones

LANGLEY ATMOSPHERIC SCIENTISTS BRIEF CONGRESSMAN. Dr. Joel Levine (left) and Ed Harrison (right) meet with U.S. Congressman Herbert H. Bateman (center) to acquaint the Representative from Virginia with the processes and factors that control the climate of our planet. Harrison, head of the Radiation Sciences Branch, spoke on the cooling effect clouds have on the climate. Levine, senior research scientist, Theoretical Studies Branch, discussed how greenhouse gases, produced during the burning of forests and vegetation, lead to an increase in global temperature.

Researcher News

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News Researcher

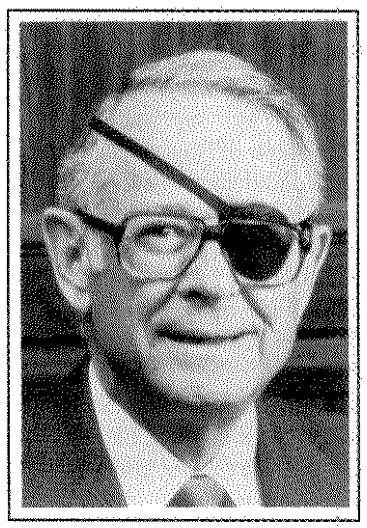
Volume 3, Issue 9 May 5, 1989
Bi-weekly Employee and Contractor Publication

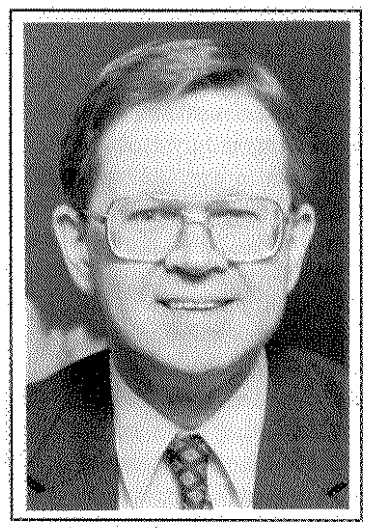
Acting Administrator, Associate Deputy Resign

Dale D. Myers, the acting NASA adinistrator, has announced his plans to resign effective May 13. Dr. Noel W. Hinners, third ranking official of NASA , will resign from the agency effective May 14.

Myers, acting administrator since April 8, served as the NASA deputy administrator from October 6, 1986, when he was called back to NASA by President Reagan. During this tenure, Myers was instrumental in guiding NASA through the period of recovery following the Challenger accident.

Some major accomplishments during this period were the substantial redesign of the Space Shuttle system including the solid rocket motor and the subsequent return to manned space flight in September 1988; reorganizing the Space Shuttle management structure and centralizing the Space Station management; and the reinstitution of a mixed fleet strategy using commercial expendable launch vehicles in addition to the Shuttle.


Dale D. Myers


Dr. Noel W. Hinners

Myers has served two tours at NASA Headquarters--his present position and earlier as the associate administrator for manned space flight from 1970 to 1974.

Hinners serves as the NASA chief scientist and oversees the institutional management of the agency. As chief scientist, he is the principal adviser to senior management on agency-wide aspects of NASA's scientific activities.

Before his appointment to senior headquarters management in June 1987, Hinners served five years as director of the Goddard Space Flight Center, Greenbelt, Md., From 1979 to 1982, he was director of the Smithsonian Institution's National Air and Space Museum. From 1974 to 1979, he served as NASA associate administrator for space science. Hinners joined NASA in 1972 as deputy director of lunar programs, Office of Space Science.

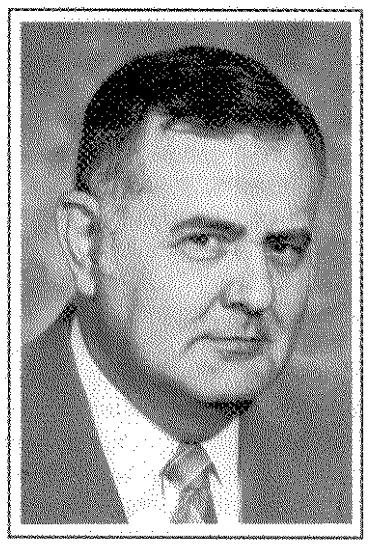
Hoggard Attends Carnegie Mellon

Walter C. Hoggard, chief of Langley's Systems Safety, Quality and Reliability Division, has been selected to attend the Senior Executive Seminar at Carnegie Mellon University, Pittsburgh, May 31 through June 16. Hoggard was selected for the seminar in a NASA-wide competition.

The seminar is an intensive graduate-level program for a select group of men and women in policy-making positions in the government, corporations and other organizations concerned with the interaction between the public and private sectors.

The three weeks at the School of Urban and Public Affairs involves the participants in an integrated sequence of classes, practical work and discussions of key issues in political economy, management sciences and other disciplines relevant to policy-making and administration in large organizations.

"After serving 15 years as a senior level manager in a research/development environment managing multi-disciplined technical personnel, there have been many situations in which it has been necessary to integrate programmatic efforts to meet critical organizational needs. It has also been necessary to factor the social and economic changes of society in the implementation of a viable safety and health policy."



At Langley, Hoggard is responsible for the development and management of a comprehensive safety, reliability and quality assurance program.

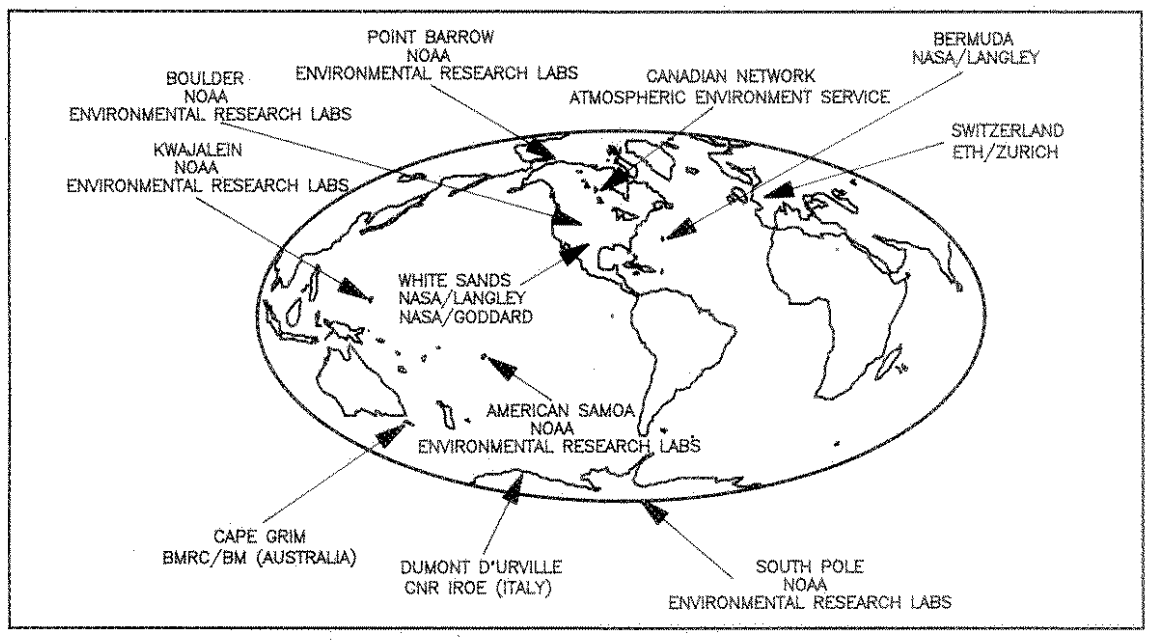
NASA Conducts Global Surface Radiation Budget Experiment

-by Jean Drummond Clough

NASA conducted the first Global Surface Radiation Budget (SRB) satellite data validation experiment to measure solar and thermal radiation reaching the ocean and land surfaces under all types of clouds. The purpose of the experiment, part of the World Climate Research Program, was to obtain a special set of high-quality data from a number of ground-based verification sites, known as ground-truth sites, during the month of April. Each of these sites made local measurements from horizon to horizon.

Since approximately 70 percent of the globe is ocean, it is essential that ground-truth data at several ocean sites be obtained. These measurements were collected by NASA, the National Oceanic and Atmospheric Administration (NOAA), U.S. Army, Canadian Atmospheric Environmental Service, and environmental agencies in Italy, Australia and Switzerland at sites shown on illustration.

Langley Research Center has the lead role in NASA's Earth's radiation budget program and is responsible for the United States' part of the global SRB experiment. Langley elected to conduct an SRB ground-truth experiment at the NASA tracking station on Bermuda because cloud climatology over the island is expected to be identical to that of the surrounding deep ocean during April.



The experiment involved launching approximately 120 small weather balloons from the U.S. Naval Air Station Annex on Bermuda, locating solar/thermal instrument packages at the Naval Air Station Annex and the NASA tracking station, and locating two lidar (light detection and ranging) systems at the NASA tracking station.

Up to four standard Vaisala weather balloons were launched each day to obtain vertical profiles of temperature and humidity. Launch times coincided with overpasses of the NOAA polar orbiter satellite at approximately 2 and 7 each morning and afternoon local standard time.

Three solar/thermal instrument packages were used in the Bermuda experiment. The packages, about 1-foot square, weighed about 40 pounds and were attached to a standard personal computer for instrument monitoring and data storage. These devices were passive and did not transmit any radio signals.

According to Dr. Charles H. Whitlock, principal investigator for the experiment, "Langley's instruments should obtain the most accurate open-ocean SRB and cloud measurements that have ever been made. These data are expected to play a significant role in the validation methods to determine the global SRB.

"Clouds in any portion of the sky have an influence on both the solar and thermal measurements," explained Whitlock, "so measurements are required to diagnose causes of inaccuracies which may exist in the satellite SRB determination." Whitlock said cloud heights were measured by two devices: Low-altitude clouds (less than 12,000 feet) were measured using a Vaisala ceilometer, which was operated 24 hours a day by the National Weather Service. High-altitude clouds (up to 50,000 feet) were observed using a custom-built lidar

Langley has established a Satellite Data Analysis Center (SDAC) as part of the World Climate Research Program. The satellite and ground-truth data received during the global SRB experiment will be synthesized and analyzed by the SDAC and distributed to investigators for regional validation studies. Regional studies will be conducted for each of the surface data sets around the globe. The ultimate goal of the experiment is to publish global maps showing the balance of the surface radiation energy coming from the sun and emitted from the earth.

Langley engineers associated with the experiment in Bermuda were Whitlock, Dr. John T. Suttles, Gerald C. Purgold, Jose M. Alvarez and Bill M. Rouse of the Atmospheric Sciences Division. They were supported by personnel from the Planning Research Corp. and ST Corp., both of Hampton, Va.

Goddard Marks 30th Anniversary

NASA's Goddard Space Flight Center, Greenbelt, Md., celebrated its 30th anniversary on May 1.

The center, NASA's first major scientific laboratory, has built and tested more than 40 satellites, managed about 160 satellite projects, laundhed 171 payload-carrying Delta rockets, and flown more than 2,500 sounding rockets and 550 scientific balloons.

Congratulations to our Goddard colleagues!

News Briefs

JOHNSON SPACE CENTER, Houston, Texas --- Applications received by NASA on or before June 30, 1989, will be considered in the next astronaut candidate selection, now planned for early 1990. The selection will be the first in the regular two-year selection cycle announced last year. After six months of screening, medical evaluations and interviews, the astronaut candidate class of 1990 will be announced in January, and candidates will report to the Johnson Space Center, Houston, in July. NASA will continue to accept and review applications from the general public on an ongoing basis.

KENNEDY SPACE CENTER, Fla. --- NASA's KSC has selected the Harris Corp., Melbourne, Fla., for negotiations leading to the award of a contract to provide new computer systems for processing and launch activities involving NASA's Space Station Freedom and Space Transportation System. The proposed cost and fee for the basic contract is approximately $171 million, and with all options, approximately $200 million. The period of performance for the cost-plus-award-fee contract is July 1, 1989, to Sept. 30, 1996. Under contract terms, Harris Corp. will provide management; engineering; and hardware and software for new state-of-the-art, real-time computer systems for processing flight hardware.

HEADQUARTERS, Washington, D.C. --- An asteroid, a half-mile or more in diameter, passed within a half million miles of Earth--about twice the distance to the moon--on March 23. "On the cosmic scale of things, that was a close call," said Dr. Henry Holt. Holt is a University of Arizona astronomer who discovered the asteroid while working on a U.S. Geological Survey project, funded by NASA, to detect and track unknown asteroids that cross the orbit of the Earth. If the asteroid had collided with the Earth, the impact would have been equivalent to the explosion of 20,000 hydrogen bombs creating a crater 5 to 10 miles in diameter--enough to destroy a good-sized city. Landing in the ocean could have been worse since huge tidal waves could have been created that would sweep over coastal regions.

GODDARD/WALLOPS FLIGHT FACILITY, Wallops Island, Va. --- NASA's highly instrumented, remote sensing aircraft will participate in an international oceanographic experiment, called the Global Ocean Flux Study (GOFS), to determine the capacity of the world's oceans to assimilate and store excess carbon dioxide (CO2) from Earth's atmosphere. The study results are critical to predicting potential temperature increases in world climate due to the large increase in atmospheric CO2 caused by the burning of fossil fuels. The increased atmospheric carbon dioxide may lead to a warmer Earth through the "greenhouse effect."

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA has announced the selection of Lockheed Missile Systems Division, Sunnyvale, Calif., for final negotiations leading to the award of a contract to design, develop, test and evaluate a Space Shuttle advanced solid rocket motor (ASRM) and a contract for construction of facilities for production and testing of the ASRM hardware. Lockheed is teamed with Aerojet Space Booster Co., Sacramento, Calif., as its principal subcontractor on the ASRM program, and Rust International, Birmingham, Ala., as its facility coordinator.

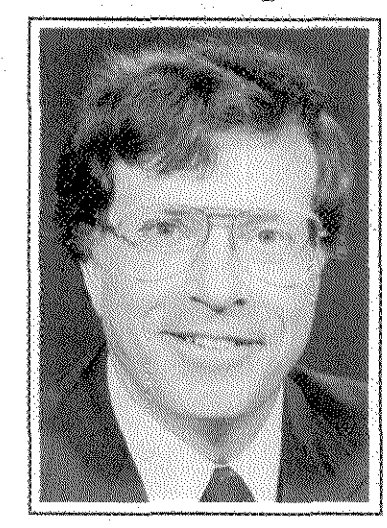
GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA Goddard has selected the Martin Marietta Space Systems Co., Denver, Colo., to negotitate a cost-plus-award-fee contract for the flight telerobotic servicer (FTS) for use in the assembly and maintenance of Space Station Freedom, schedule to be deployed in the mid-1990s. The contract, expected to be effective on July 1, will consist of the delivery of flight hardware and software for three missions which consist of two demonstration test flights aboard the Space Shuttle and an operational system for Space Station Freedom. In addition, the contract will contain an option for engineering support during the life of the contract.

HEADQUARTERS, Washington, D.C. --- NASA has announced support for a series of commercial sounding rocket flights that will provide opportunities for the exploration of industrial space applications by NASA-sponsored Centers for Commercial Development of Space (CCDS). Following the successful flight of Consort 1, a package of materials science investigations launched March 29 atop a commercially-provided rocket at White Sands Missile Range, N.M., NASA's Office of Commercial Programs has decided to extend funding support for a series of similar flights.

JET PROPULSION LABORATORY, Pasedena, Calif. --- A two-way digital voice terminal for land, aeronautical or maritime mobile communications has been demonstrated in the field for the first time by researchers from NASA's JPL. The trial, which took place in late March 1989, is believed to be the first-ever field test of a state-of-the-art, low-bit-rate voice coder over an on-orbit satellite in a commercial application. During the tests, researchers used a voice terminal on a Boeing 727 to communicate with a ground station in Southbury, Conn. Signals were relayed between the plane and ground by an orbiting satellite operated by the International Maritime Satellite (Inmarsat) organization.

Langley Colloquuium

Heyman to Address Nondestructive Evaluation of Materials in Aerospace



On Friday, November 18, 1988, Langley added a new research laboratory to its list of unique facilities, dedicating its Nondestructive Evaluation (NDE) Laboratory.

On Monday, May 8, 1989, Dr. Joseph S. Heyman, head of the Nondestructive Measurement Science Branch, will review aspects of aerospace NDE conducted in the laboratory and discuss recent advances in the field. His lecture, "NDE in Aerospace: Requirements for Science, Sensors and Sense," will be held in the H.J.E. Reid Conference Center, Building 1222, at 2 p.m.

Nondestructive evaluation is the technology of measurement, analysis and prediction of the state of material systems, for safety, reliability and mission assurance. "It is an old technology yet still in its infancy. The opportunities for research and application are great and the need demands national attention," explained Heyman. "Those of us in the field are witnessing an awakening of the engineering and management awareness to the importance of NDE. This is an exciting and dynamic time."

Although conventional NDE has been successful, it is generally based on correlative relationships which can be complex and multifaceted, according to Heyman. He said modern NDE depends on four factors--quantitative measurement science, physical models for computational analysis, realistic interfacing with engineering decisions, and direct access to management priorities. "Quantitative relationships, the direction of advanced NDE, often lead to benefits such as reliable standards, prediction capability, and enhanced reliability with smart systems," Heyman noted.

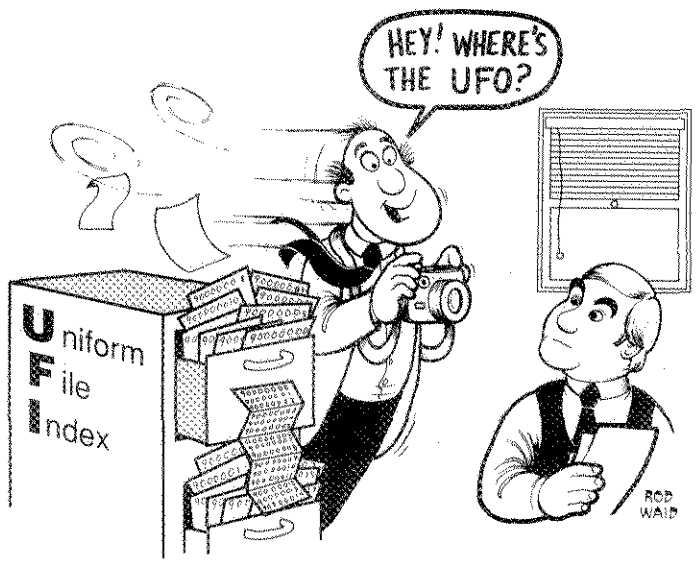
In his talk, Heyman will focus on ultrasonics, with generous case examples, and problem solutions, such as critical stress in fasteners, residual stress in steel and NDE in laminated composites. One example Heyman will address is a physical ultrasonics model of a Space Shuttle solid rocket motor (SRM) and how the buried bondlines in the model can be examined.

Heyman, who began his NASA career in 1964 as a co-op student, specializes in solid state physics, ultrasonics, advanced sensor research and materials science. In 1971, he started the NASA Laboratory for Ultrasonics which has grown to a major NDE research center.

The recipient of numerous awards, including the IR-100 award presented by Industrial Research and Development magazine for each of the 100 most significant technical developments each year, Heyman is the first person to receive four IR-100 awards. He was named NASA Inventor of the Year in 1982 for inventing an ultrasonic instrument called a pulsed-phase, locked-loop strain monitor.

His most recent award was the coveted "Silver Snoopy," presented by astronaut Frederick "Rick" Hauck, commander of Space Shuttle Discovery STS-26. Heyman was cited for innovative advances in NDE that permitted informed return-to-flight decisions for STS-26.

Lankley



Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-48.....NASA Conducts First Global Radiation Budget Experiment
89-49.....Acting NASA Administrator to Resign
89-50.....Deadline Set for Next Astronaut Selection
89-51.....Harris Corp. Selected to Negotiate Major KSC Computer Upgrade
89-52.....NASA Astronomer Discovers 'Near Miss' Asteroid that Passed Earth
89-53.....NASA Aircraft to Support International Global Ocean Study.
89-54.....Multi-Colored, Artificial Cloud to be Visible along East Coast
89-55.....Mobile Satellite System Proven in Airborne Test
89-57.....NASA Selects Contractor to Develop Advanced Solid Rocket Motor
89-58.....NASA to Support Commercial Development Sounding Rocket Flights
89-59.....NASA to Fly One Shuttle Mission Between Magellan and Galileo

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Employee Involvement Assures Productivity

They are called LITEs (Langley Improvement TEams) but the tasks assigned have been hefty indeed and the teams assembled are heavily weighted by their collective expertise.

The method is called participatory management--a 50-cent term for employee involvement in identifying and solving problems encountered in the work environment. An outgrowth of the success of Langley's Quality Circle (QC) program, LITEs are seen as a method to resolve specific problems, not "brush fires" but concerns with long range effects.

"Quality Circles have proven to be a very successful tool in enhancing quality and improving productivity at the Center. Becoming involved in this program allows each of you to have a more active part in Langley's future," notes Langley Director Richard H. Petersen. "We are now moving into another phase--employee task teams. Whether QC or task teams, I encourage your participation; your support and input will help Langley increase its outstanding reputation into the nineties and beyond."

LITEs, task teams, are groups of employees (open to all staff members, including managers and supervisors) who meet on a regular basis to analyze and resolve quality concerns and other problems encountered in the work area. LITEs differ from quality circles in that the problems studied are generally identified by management and the team members are assembled because of their functional expertise. Task team membership is interdisciplinary and crosses organizational lines.

Both QC and LITEs are governed by the Productivity Steering Council who review their activities and provide guidance and assistance on policy or procedural matters. John F. Stokes, director for Management Operations, is the Steering Council chairperson; William D. Mace and Dr. Robert T. Wingate Jr. are Council members.

Langley's Productivity Review Committee, headed by William L. Williams, sees employee involvement as an integral part of the Center's overall mission to improve quality and lower costs. "LITEs have naturally progressed from our Quality Circles, expanding the problems studied and the team recruiting confines," explains Williams. "In some private-sector companies, the next level of employee involvement is the self-managed work team. This could be a long range goal for the Langley program."

Bob Feldhousen, chairperson of the Employee Involvement Committee, adds that experiences with employee involvement programs in both government and industry have resulted in substantial productivity and quality improvements. "However,"says Feldhousen, "such programs succeed only when they have involvement and contributions from both management and staff." Employees at all levels working together not only solve interdisciplinary problems, they achieve a better understanding of the other's point of view. "At Langley, we are accustomed to working special problems with teams, but usually on a crash basis. Some problems should be worked with a more systematic approach where enough time is allotted to study the problem and obtain input from co-workers," adds Feldhousen.

The Employee Involvement Committee was established to help identify teams, train team members and recognize achievements of the participants. To date, problems tackled by QCs and LITEs have involved administrative and operational problems. "In the next year, we would like to develop teams in the research and contractor communities to focus on problems identified by management that could be solved via a team approach," concludes Feldhousen.

Quality Circles	Task Teams
Membership	
o Voluntary	o Assigned by management
o Ongoing--members free to leave circle and return	o Members disband when problem is solved
o Five to eleven members	o Five to eleven members
o Line management determines number of members per circle in the area	o Size determined by expertise needed
Problem Selection	
o Determined by members	o Determined by management
Length of Operation	
o Indefinite	o Until assigned project is completed

Employee Involvement Committee

Chairperson:	**Robert W. Feldhousen**	47288
Secretary:	**Clarence M. Cole**	43288
Members:	**William L. Derby**	44561
	Boyce E. Lavender, Jr.*	41108
	Sandra S. Ray**	42430
	Glenn Taylor	41837
	Archer V. Vann, Jr.	42456
	William L. Williams	41982

**QC Team Member
**LITEs Leader

Teams, Tasks Differ; But Aim to 'Work Smarter' Prevails

Two task teams have made presentations to management within the past two weeks. The teams are vastly different both in number and makeup, but the concentrated effort to make the working environment at Langley more pleasant and highly productive is the main thrust of each.

One team, composed of 13 members--men and women, from both research and administrative areas, across directorate lines--have gathered to address a NASA Headquarters directive that affects nearly every employee at Langley. This LITE team will help all of us implement the NASA Uniform Files Index (UFI), the agency-wide standardized classification filing system for all official files. Dubbed the Uniform File Organizers (UFOs), their goal is to accomplish the file implementation within 90 days.

To do this, the team has studied the UFI structure within Langley and have come to an understanding of what is meant by the term "official files."

"The need to locate and retrieve Agency records in a timely and accurate manner was highlighted after the Challenger accident," explains Barbara Newton, team chairperson. "Three years later, we're still trying to pull together all of the records. The UFI provides maximum uniformity and simplicity of maintaining and using Agency records." After ten weeks of consideration, the team made their recommendations to the Productivity Steering Committee on April 27.

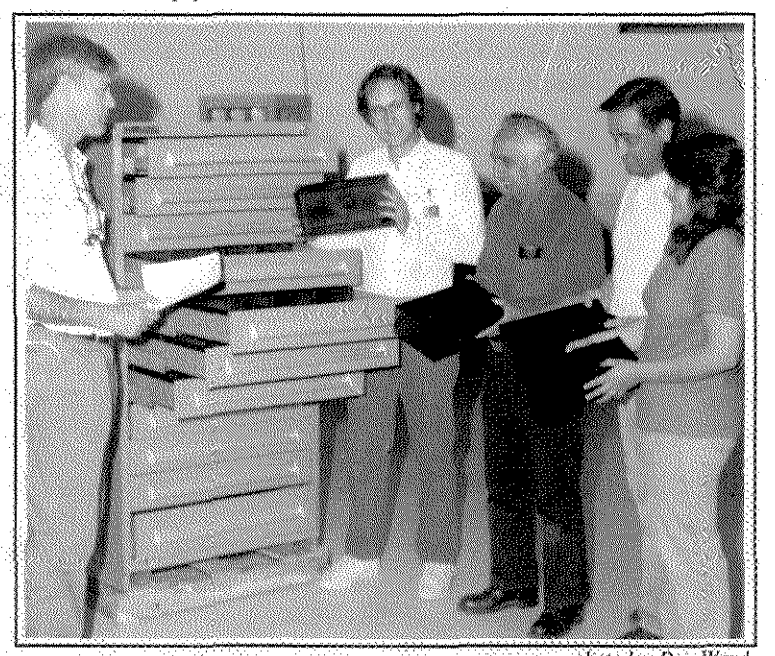
In contrast to the Langley-wide scope of some teams, the "Empty Bins" tackled a problem focused in their own work area. Made up of six engineering technicians stationed on the East Side in the 30- by 60-Foot Full Scale Tunnel, this LITEs group was tasked by their supervisor Boyce Lavender to solve the problem of keeping a good inventory of stock on hand. Working with the same tools and materials, workers on different shifts were often stymied trying to find supplies kept in a variety of locations.. Precious time was lost gathering the tools and materials needed for the job.

The "Empty Bins" team presented their recommendations to Ramon Barr, head of the Tunnels Operation Branch, and George Palko, head of the Work Control and Contracted Services Branch. The team's suggestion to construct a secured equipment storage area was enthusiastically accepted. As soon as construction is completed and the common area organized, the Empty Bins will disband and, so too, will the problem.

At present, there are six LITEs in different stages of involvement at Langley Research Center.

-photo by Peggy Pancoast

UFOs cross directorate lines. Shown attacking the problem of the Uniform Filing Index are (L to R) Jackie Smith, Louise Baker, Brenda Harris, Colon McMath, Carlie Johanson, Barbara Newton, Patricia Whitehead, Lorenzo Clark, Kay Bales, Charlene Gleaton, Joe Haggerty and Paula Rawles. Not pictured is Carolyn Wilt.



-photo by Don Ward

Empty Bins demonstrate their plight. Team members are (L to R) Earl Conkling, Bobby Bryant, Jim Chiaramida, Randy Culotta and Tammy Jo Harris. Not pictured is team member David Brooks.

Top NASA Officials Resign

James B. Odom, associate administrator for the Space Station Freedom program, retired April 30. Astronaut Jon A. McBride (Capt., USN) has announced plans to retire from NASA effective May 12.

Odom was appointed associate administrator for the space station program in April 1988. He came to Washington, D.C., from the Marshall Space Flight Center, Huntsville, Ala., where he had served in a number of key posiitions over the past 30 years. Tom Moser, deputy associate administrator for the Freedom program, will serve as acting associate administrator until Odom's successor is named.

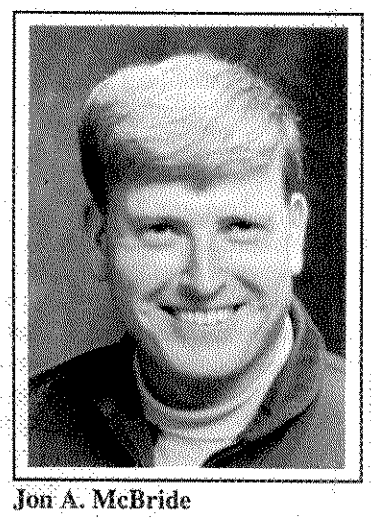
McBride was named last year to command the STS-35 (ASTRO-1) mission, scheduled for launch in March 1990. He will be succeeded as STS-35 commander by Vance D. Brand.

McBride was selected as an astronaut in August 1978. He was the lead T-38 chase pilot for STS-1, the maiden voyage of Columbia in April 1981, and a Capsule Communicator (CAPCOM) in the Mission Control Center for Shuttle flights STS-5, STS-6 and STS-7.

He flew in space as pilot aboard Challenger on STS-41G in October 1984. McBride was scheduled to fly in March 1986 as the commander of STS-61E. This flight was one of several deferred by NASA in the wake of the Challenger accident.

McBride recently completed an assignment at NASA Headquarters as the acting assistant administrator for Congressional Relations, a post he held since September 1987.

James B. Odom



Jon A. McBride

Lee Receives National Award

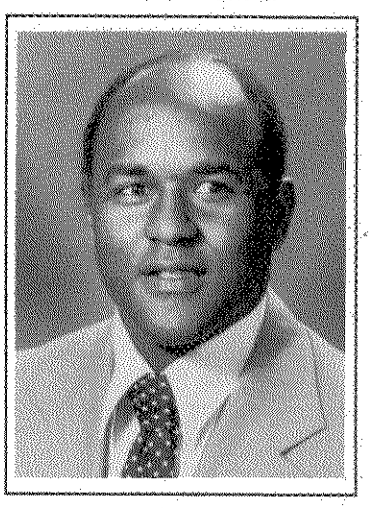
Robert B. Lee, senior research scientist in the Radiation Sciences Branch, has been awarded the 1989 Research Achievement Award by the National Association for Equal Opportunity in Higher Education (NAFEO). The award is NAFEO's highest honor in research. Lee accepted the presentation Saturday, April 22, in Washington, D.C., at the 14th National Conference on Blacks in Higher Education.

NAFEO, founded in 1969, consists of the 117 Historically Black Colleges and Universities. Lee was nominated by Norfolk State University.

Lee is a member of the Earth Radiation Budget Experiment (ERBE) science team. An international expert on the variability of the Sun's radiative energy, Lee is a member of science teams for two Earth Observing System (Eos) climate experiments proposed for Space Station Freedom and polar orbiting spacecraft platforms, scheduled for launches in the 1990s.

Long term decreases in the Sun's radiative output are considered to be one of the major factors which may have caused the Earth's climate to plunge into ice ages. It has been estimated that a decrease as small as one percent can trigger an ice age in as short a time period as a century. Using measurements from two different spacecraft upon which he has experiments, Lee has confirmed a decreasing trend of approximately 0.1 percent per decade. His more recent work, presented at international meetings in England and Finland, focused on a sudden upward trend in the Sun's radiative output and possible indications upon future climate. As a result of his solar work, he has served on the National Academy of Science instrument working group on solar radiative output variability and on the National Oceanic and Atmospheric Administration's Eos spacecraft platform instrument working group.

Lee began his NASA career at Langley as a cooperative training student from Norfolk State University.



Retirement Parties

Billie Jean Neil will be honored at a retirement luncheon, 11:30 a.m., May 11, in the H.J.E. Reid Conference Center. Cost is $8/person which includes gift. A $2 contribution to gift only will be graciously accepted. Respond to Donna Speller, Mail Stop 157, by May 5.

Chuck West will be honored at a retirement social from 6:30 to 10 p.m., May 16, in the H.J.E. Reid Conference Center. Cost is $6.50/person and includes $1 gift contribution. Additional gift contributions are welcome. Contact Mickey Gardner, Mail Stop 188F, ext. 43481, for researvations.

Ernest L. Greene will be honored at a retirement picnic, Wednesday, May 17, from 4:30 to 6:30 p.m. on the grounds of the H.J.E. Reid Conference Center. Cost is $6.50 including gift. Contributions of $2 for gift only are welcome. Respond by May 8 to Tanya Mercer, Mail Stop 157D.

Dave E. Williams will be honored at a retirement luncheon Monday, May 22, from 11:30 to 1:30 p.m. in the H.J.E. Reid Conference Center. Cost is $8/person. Contributions of $2 for gift only are also welcome. Contact J. F. Rogers, ext. 47182, or D. H. Butler, ext. 47178, by May 17 for reservations.

Philip E. Everhart will be honored at a retirement social Friday, June 2, from 6:30 to 9 p.m. in the H.J.E. Reid Conference Center. Cost is $8.50/person or $15/couple. Contributions of $2 for gift only are also accepted. Contact Grace Girton, Mail Stop 358, ext. 41105, for reservations by May 26.

NASA Suspends Implementation of Drug Program

NASA, in coordination with the Department of Justice, will suspend implementation of the random testing portion of its drug-free workplace program at all of its installations.

The action has been taken in response to a lawsuit filed against NASA on April 4, 1989, in the District Court for the District of Columbia by the Goddard Engineers, Scientists and Technicians Association; the Marshall Engineers and Scientists Association--three locals of the International Federation of Professional and Technical Engineers (IFPTE).

A motion of preliminary injunction was filed to stop the implementation of the drug program which had been announced by Dr. James C. Fletcher in a special notice to all employees on January 26, 1989. In their complaint, the plaintiffs allege that the program violates various Constitutional and statutory rights of their members.

NASA will continue to develop and implement general educational programs on the problems and effects of drug abuse. Once the court rules on the preliminary injunction motion, NASA will determine the next course of action.

Langley employees will continue to be provided up-to-date information on the Drug-Free Workplace Program as it occurs.

Awards Ceremony

Langley's Honor Awards Ceremony will be held Tuesday, May 16, at 1 p.m. in the H.J.E. Reid Conference Center. At that time, NASA's and Langley's most prestigious honor awards will be presented to a number of selected individuals and/or groups who have distinguished themselves by their outstanding contributions. Dr. James C. Fletcher, former administrator, will be the guest speaker.

Can You Help?

Housing is needed for professors, graduate students, and undergraduate students who will be working at Langley from June 5 through August 11, 1989. The program participants are involved in the following University Affairs' programs: the American Society for Engineering Education Summer Faculty Fellowship Program, the Langley Aerospace Research Summer Scholars Program, and the Graduate Student Researchers Program.

In addition, baby cribs are also needed. If you have a crib to loan for the summer or if you have rooms available for rent, please contact Debbie Young, ext. 45215, Mail Stop 105A.

CryogenicSociety of America (CSA) will meet May 10 in the H.J.E. Reid Conference Center. Call Pierce Lawing, ext. 45127, or Tom Popernack, ext. 46922.

W&M Operations Research Program

The College of William and Mary has established an Advanced Studies Program in operations research for civil service employees in the Hampton Roads area. The advanced program includes training in three areas: operations research/mathematics, operations research/cost and management analysis, and operations research/computer science.

This graduate program offers both the M.A. and M.S. degrees in operations research. Candidates for the M.S. degree must complete a total of 32 semester hours of course work; candidates for M.A. degree need 24 credit hours and must also write a master's thesis. A wide range of courses is offered including: probability and statistics; linear, nonlinear, integer, dynamic and geometric programming; network flows; stochastic processes; statistical decision theory; simulation; and computational methods.

For details, contact George Allison, ext. 42594.

Upcoming Conferences

LDEF Investigators Conference will be held May 23-25 in Williamsburg, Va. Contact Bill Kinard, ext. 43796, for additional information.

International Space Station Freedom Technical Symposium will be held June 20-22 at the Sheraton Premiere, Tysons Corner, Vienna, Va. Attendance is limited. Respond by June 3 to AIAA Management Seminars, 370 L'Enfant Promenade SW, Washington, D.C., 20024.

Senior Management Research Review

The Senior Management Research Review will be held Monday, May 15, from 9 to 11 a.m. in Building 1219, Room 225. The following Langley scientists will give program accomplishments:

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	Rarefied Flows Over the AFE Vehicle	James Moss (Space/SSD)
9:45	Polar Stratospheric Cloud Microphysics and Heterogeneous Chemical Processes: Implications from the 1989 Airborne Arctic Stratospheric Expedition (AASE)	Lamont Poole (Space/ASD)
10:00	A High Resolution Electro-Optical Displacement Measurement System	Timothy Scott (Electronics/IRD)
10:15	Laminar Flow Control on a Flat Plate Using Localized Heating	Lucio Maestrello (Aeronautics/FLDMD)
10:30	High-Aspect-Ratio Configuration Optimized for Aeroelastically-Tailored Wingbox	Mark Shuart (Structures/SMD)
10:45	Pilot Preference and Performance Results Indicated Superiority of New Engine-Monitoring and Control System (E-MACS) Display Concept	Terrence Abbott (Flight Systems/FLMD)

People & Places

Alumni News and Views

Alumni Choose Executive Board

The LaRC Alumni Association announces its 1989 Executive Board: William J. Boyer, president; Donald H. Ward, vice president; Edward A. Brummer, treasurer; Betty P. Joyner, secretary; Clarence A. Brown Jr., chairman, Finance Committee; Mary J. Mesic, chairman, Membership Committee; Abraham Leiss, chairman, Social Committee; Donald H. Ward, chairman, Program Committee; Kitty B. Brand, chairman, Communications Committee; and Joyce M. Wright, chairman, Nominating and Publicity Committees. Any members who wish to work on any of these committees should call Bill Boyer, 722-0443, or contact the committee chairman.

The Alumni Association Annual Dance/Social will be held Saturday, May 13, at 8 p.m. in the H.J.E. Reid Conference Center. Music will be by Charlie Johnson's band and refreshments will be provided by the Langley Exchange Council. A cash bar will also be available. Some "old timers" will warm to the theme--"The Noble Order of the Green Cow Lives." Come out to dance or just to enjoy the fellowship.

The next meeting of the Association will be held May 9 at 11:30 a.m. in the NASA Cafeteria. A. Gary Price, head of the Office of External Affairs, will update the membership on the plans and progress of the Virginia Air and Space Center/ Hampton Roads History Center. Current plans call for groundbreaking to take place May 26. As always, guests and prospective members are welcome at alumni programs; so come on out on the 9th and bring a friend.

This new meeting format allows the alumni to gather once a month for a informal lunch, no advance reservations required. Just go through the cafeteria line and assemble in the Executive Dining Room. A speaker on topical items of interest to the members will highlight the meeting.

Employees Support Bloodmobile

The American Red Cross Bloodmobile visited Langley on March 22. A total of 271 units of blood were donated by Langley employees, retirees and contractors.

Achieving gallon status were:

9 gallons---Harvey Murray;

8 gallons---John Haines, James Phillip and Marcella Hogge;

6 gallons---Edward Medford, James McMillan and Carl Larsen;

5 gallons---Otto Ripley;

4 gallons---Linda Devol and Mark WynKoop;

2 gallons---Vincent Cruz and Russel Tatum;

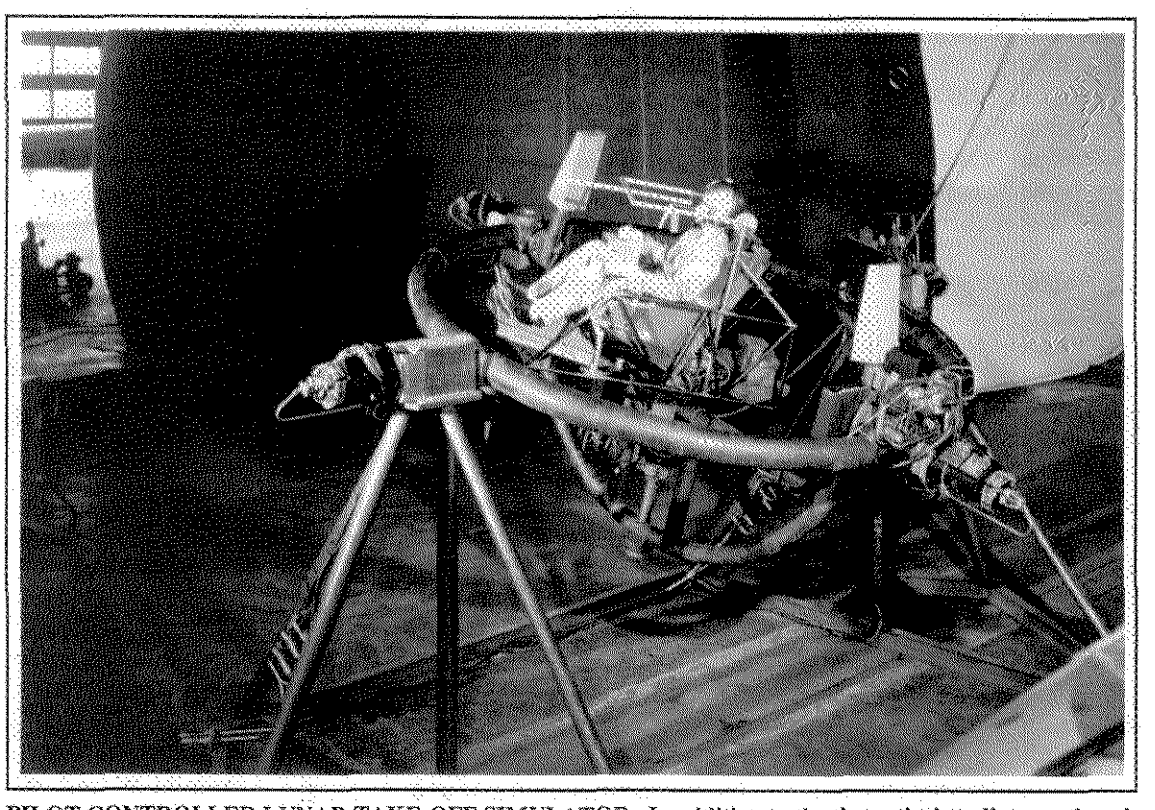
1 gallon---Brain McGrath, Brian Jensen, Thomas Bess and Charles Mercer;

First Timers---Robert Noblin, Jose Vega, Jesse Midgett, Vincenzo LeBoffe, Keith Woodman, Patricia Gottschall, Laura McGee and Kevin Breneman.

NASA coordinator for the Bloodmobile visit was Annette Forrest; Red Cross coordinator was Dorothy Hudgins.

The next Red Cross Bloodmobile at Langley will be Wednesday, May 24. Plan to participate; donate the gift of life.

Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The awards committee convened on April 4 and selected Crew #1 for the Crew of the Month Award for March. This crew obtained a score of 94.44 out of a possible 95 points. Crew members are (front row, L to R) Joe Ann Foster, Linda Woodyear and Daisy Brown; (back row) Alfonzo Poston, James Hill and Thelma Kirby. Not pictured is crew member Barbara Morton.



PILOT CONTROLLED LUNAR TAKE-OFF SIMULATOR. In addition to the theoretical studies mentioned below, a simulation study of a lunar take-off, midcourse guidance and rendezvous was undertaken at Langley. Located in the hangar, this simulator provided motion cues supplied by rotational accelerations of the 3-axis chair. Visual presentation of the stars were displayed by projectors.

Destination: the Moon; Route Stirs Debate

President Kennedy in his 1961 address to a joint session of Congress placed the United States on course to the moon. Kennedy proposed a manned lunar landing "before this decade is out. . . ." This was a dynamic, daring challenge that took the general public by surprise. But work on lunar exploration had been progressing at NASA Langley for a number of years.

Clinton E. Brown, head of Langley's Theoretical Mechanics Division, had assembled a group of engineers who were studying lunar exploration as early as the late 1950s. The Lunar Trajectory Group was headed by William Michael and included Jack Crenshaw, John Gapcynski, Wilbur Mayo and Bob Tolson.

William Michael remembers Clint Brown as "the guy that got us at Langley excited about lunar exploration. He was the impetus, in my opinion. It was a situation of a person exercising leadership that made good things happen," reminisces Michael.

Michael returned to Langley in March 1958 to work for Brown. "If you're going to the moon, you have to figure out how to get there," Michael notes. "There were no textbooks on the subject. We taught ourselves celestial mechanics from a book written by F. R. Moulton in 1914. By that means we were able to write up equations governing space flight."

One Monday morning in December 1959, Michael slipped calculations for flight to the moon via lunar orbit on Brown's desk. Brown was interested and excited about the preliminary results. The first written discussion within NASA of what was later to be known as the lunar orbit rendezvous (LOR) concept was contained in a paper written by Michael and published in May 1960, a full year before Kennedy's announcement. Michael's paper, Weight Advantages of Use of a Parking Orbit for Lunar Soft Landing Mission, pointed out the "considerable savings in fuel weight" that would result from leaving "that portion of the weight in parking orbit which is not essential for the lunar landing part of the mission." Michael espoused leaving the reentry vehicle, the massive heat shield and the great volume of fuel needed for the return to Earth in parking orbit around the moon.

The President's announcement, then, fell on confident ears at Langley. Not only had an optimum route to the moon been studied, theoretical lunar vehicles to carry man to the moon's surface had also been explored. John Bird, Ralph Stone and others worked out detailed designs for landing modules, called lunar bugs, to take man to the moon's surface and accomplish rendezvous with the craft left in parking orbit.

"We were really surprised there was any problem (about the method to be used to carry out Kennedy's directive and land men on the moon.) We thought we had the problems solved!" said Michael. The mode of travel was not just a technical problem, but a political problem as well. Each NASA installation had their own method. NASA Headquarters favored direct ascent; the Marshall Space Flight Center and the von Braun team were leaning toward Earth orbit rendezvous. It looked as though the Langley choice--lunar orbit rendezvous--was not being given consideration due to the complexity of rendezvous in lunar orbit where a miscalculation would be tragic for the crew.

It wasn't until the chairman of the rendezvous committee, John Houbolt, heard the approach described by those who had been working with Clint Brown that LOR had an advocate. "It was clear that LOR offered a chain reaction of simplifications," said Houbolt. "This is it. If there is any idea we must push, it is this one." And push it he did--all the way to the NASA Associate Administrator. His tactics have been called unorthodox, but without his intervention it is doubtful that man would have landed on the moon within Kennedy's time frame.

Michael and Houbolt have been recognized recently for the part each played in the success of Apollo 11. In 1987, Michael was awarded the New York Academy of Sciences I. B. Laskowitz Award for his studies related to lunar and planetary missions. He was recognized for his contributions to the concept of the lunar orbiter rendezvous, vital to the success of the Apollo moon landing.

Houbolt was recently named Peninsula Engineer of the Year. This honor was bestowed on him for his contributions to the field of engineering during a professional career which spans 48 years.

Langley contributions to the success of Apollo 11 continue to unfold. Michael in his acceptance address to the New York Academy of Sciences remarked, "Engineering must proceed pioneering. There are some hefty, near-term engineering problems that must be overcome before we can expect to do much pioneering." That comment was Michael's reaction to the direction of America's space program as advocated by the National Commission on Space. In retrospect, that very philosophy most probably lead to the success of Apollo.

Happenings

LAA SPECIAL SOCIAL will be held Friday, May 12, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. This "Spring Fling" will feature the Permanent Vacation Band. Cover charge is $1.

LAA BOARD MEETING. The Langley Activities Association Board of Directors will meet Tuesday, May 8, at 2 p.m. in the H.J.E. Reid Conference Center. Concerns to be brought before the Board should be addressed to the appropriate chairperson.

OS/2 SUPPORT GROUP is being formed for those interested in exchanging information and ideas on OS/2. Topics will range from available hardware and software products to making system calls. For more information, contact Howard Hinnant, ext. 41227, or Steve Humphrey, ext. 42342.

AIAA AWARDS BANQUET will be held Tuesday, May 23, beginning at 6 p.m. in the H.J.E. Reid Conference Center. Alan Ludwig, Office of Exploration, NASA HQ, will speak on "Beyond Earth's Boundaries." Cost is $11/members; $7/student members; $13/non-members. Contact Karen Credeur, ext. 46852, or Ferd Grosveld, ext. 43586, for reservations.

AFGE LOCAL 2755 will meet Wednesday, May 17, at 4:38 p.m. in the Union Office, Building 1232B. The union meets the third Wednesday of every month; active, retired and prospective members are welcome. For further details, call Sandra Zumbrun, ext. 44548

MEDITATION: A weekly, noontime meditation group is forming. All beliefs are encouraged. Beginners are welcome. Call Karen, ext. 41492.

GARDEN PLOTS are available. Cost is $5 for a 20' x 40' plot. Call Martha Norman, ext. 45225, for more information.

PHOTOCOPIERS for sale. LaRC will conduct a sealed bid sale of used photocopiers. Inspection hours are 8 a.m. to 5 p.m. May 6. For details, call Dollie McCown, 864-3561, Building 1206T, Room 104.

VA. TECH ALUMNI will host a reception for high school students and parents at Sheraton Inn-Coliseum, Monday, May 15, from 6 to 8 p.m. Refreshments will be served and a video introduction to the university will be shown. School representatives will be available. Please call 591-2806 for reservations or for additional information.

LOST: NECKLACE. Opal pendant lost on Center April 24. Sentimental value. Please contact Linda Jones, ext. 42094.

LOST: GLOVE. Right hand, stretch knit burgundy glove, size small with leather trim. Please call Sandra, ext. 44548.

FOUND: CAR KEYS with Bahamas key ring found near Building 1247 on April 20. Call Security Office, ext. 43416.

FOR SALE: STOVE. 30-in. gas stove, never used. Paid $325, will sell for $275 (OBRO); also 10-speed Azuki bike with accessories, $100. Call Youngblood, 588-8617.

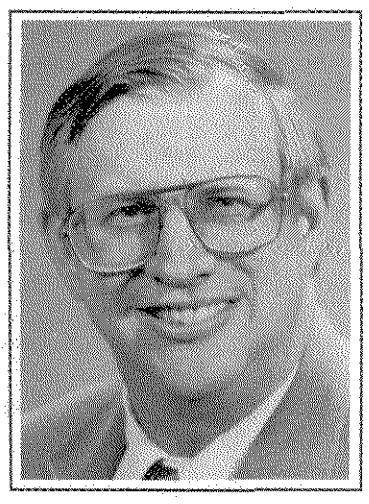
FOR SALE: BIKE. Boy's 10-speed bicycle. $25. Call 898-3768.

FOR SALE: CHINA CABINET, 2-pc., oak, excellent condition, $150; also Milford Noritake chine, 10 complete place settings plus serving pieces, $500 or BRO. Call Luthie, 868-8865.

FOR RENT: CONDO, Myrtle Beach ocean front. $775/week Memorial Day to Labor Day. Spring and fall rates, $505/week. Call Joe Drewery, ext. 45842, or 722-4443 after 5 p.m.

At the VC during May

ALDF Research: An Overview

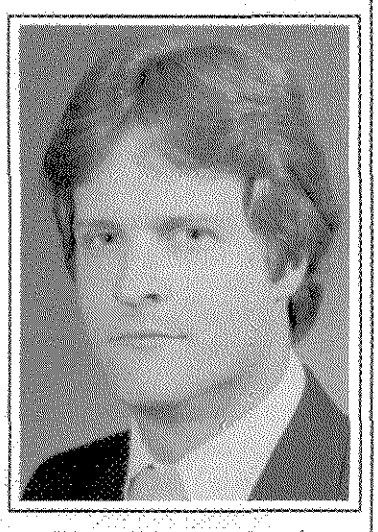


Langley's Aircraft Landing Dynamics Facility (ALDF) has played a significant role in investigating the landing gear system of the Shuttle Orbiter, enhancing the safety of Shuttle landing operations.

On Wednesday, May 10, at noon in the Visitor Center theater, John A. Tanner will present an overview of Space Shuttle landing gear studies conducted at Langley.

Tanner is head of the Impact Dynamics Branch of Langley's Structural Dynamics Division.

Microgravity: An Industrial Revolution



The high-tech environment of microgravity is where the next generation of science breakthroughs, our next Industrial Revolution, will occur.

NASA researcher Glenn Woodell will discuss "Microgravity Research" on Thursday, May 11, at 7:30 p.m. in the Visitor Center theater.

Space Station Freedom will have a unique microgravity environment where researchers can produce new medicines and more efficient semiconductors for integrated circuits used as the brains of computers, calculators and the microprocessors which regulate the efficient operation of your car.

Woodell is an engineering technician in the Microgravity Sciences Laboratory.

-photos by Steve Earley

U.S. Congressman Tim Valentine (above, left), chairman of the House Subcommittee on Transportation, Aviation and Materials, and his staff director Tony Taylor (center) are shown some of the work in progress in the Structures and Materials Research Laboratory by Dr. Darrel Tenney, chief of Langley's Materials Division. Valentine, representative from North Carolina, toured the Center April 24 and was briefed on a number of projects including the National Aero-Space Plane, Heavy Rain, Aircraft Landing Dynamics and High Speed Research.

At right, Congressman Valentine tries on a display helmet while on board Langley's 737.

Researcher News

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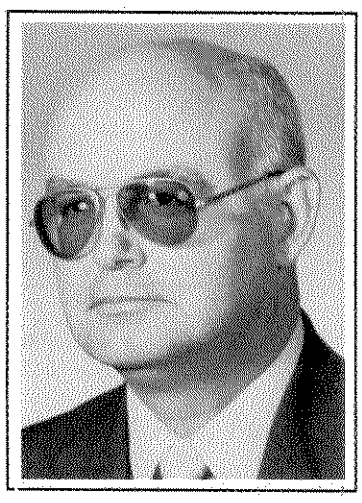
NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 10 May 19, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

Chambers Selected to Head Flight Applications Division



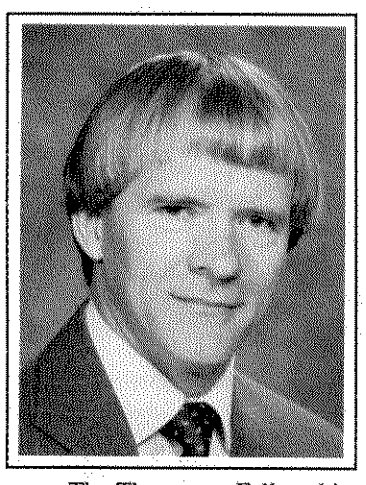
Joseph R. Chambers has been chosen as chief of the Flight Applications Division, Aeronautics Directorate. He replaces Joseph W. Stickle, who is now Langley's chief engineer.

Pending approval from the Office of Personnel Management, Chambers will be responsible for the division that conducts experimental analytical research in aerodynamics, flight dynamics and flight technology, with an emphasis on applications of advanced technology to civil and military aircraft. Facilities managed by the division include the 30- by 60-Foot Wind Tunnel, the 20-Foot Vertical Spin Tunnel, the Plum Tree Drop Model Facility, and the center's 15 research and support aircraft. The division also uses piloted simulators at Langley and is extremely active in cooperative programs with industry, the Department of Defense and other government agencies.

Chambers joined the Langley staff in 1962 as an aerospace engineer specializing in the dynamic stability and control characteristics of reentry vehicles, supersonic transports and vertical takeoff and landing (V/STOL) aircraft. He was appointed head of the Simulation and Analysis Section in 1971 and became head of the Dynamic Stability Branch in 1974. In January 1981, he was named assistant chief of the Low-Speed Aerodynamics Division, now the Flight Applications Division.

Adams Is Thompson Fellow

William M. Adams Jr., senior research engineer in the Guidance and Control Division, is the 1989-90 recipient of the Floyd L. Thompson Fellowship. Adams will spend a year at the Massachusetts Institute of Technology.



The Thompson Fellowship Program was established in 1977 to encourage the development of research potential among the Langley staff. The fellowship allows researchers who have demonstrated continued growth in research to spend up to 12 months at an educational or research institution. It is named in memory of Dr. Floyd L. Thompson, Langley director from 1960 to 1968. Thompson joined the Langley staff in 1926, retired in 1968 and was a consultant to the NASA administrator until January 1973.

Adams will study at MIT's Laboratory for Information and Decision Systems, conducting research in adaptive control theory with emphasis on aeroelastic applications such as flutter suppression. He will study with Michael Athans, professor of electrical engineering.

"The Thompson Fellowship provides me with the opportunity to work with a world renowned expert to gain additional expertise in modern, multivariable and adaptive control theory," said Adams. "It is my hope that this research can be directly applied to the suppression of flutter of a maneuvering, scaled aeroelastic wind tunnel model of an advanced fighter aircraft currently scheduled to be tested in the Transonic Dynamics Tunnel in 1990.

"The aeroelastic model scheduled for this test is the Active Flexible Wing (AFW) built by Rockwell. Thus, the technology developed in the Thompson Fellowship research will also find immediate transfer to industry as a result of the NASA/Rockwell collaboration on the AFW."

Adams began his NASA career in 1962. He has done research in orbit determination; dynamics of tethered spacecraft; analytic prediction of aircraft spin characteristics; utilization of constrained optimization techniques for design of aircraft control laws; and development and application of tools for aeroservoelastic analysis and control law design.

Replacement Orbiter Named 'Endeavour'

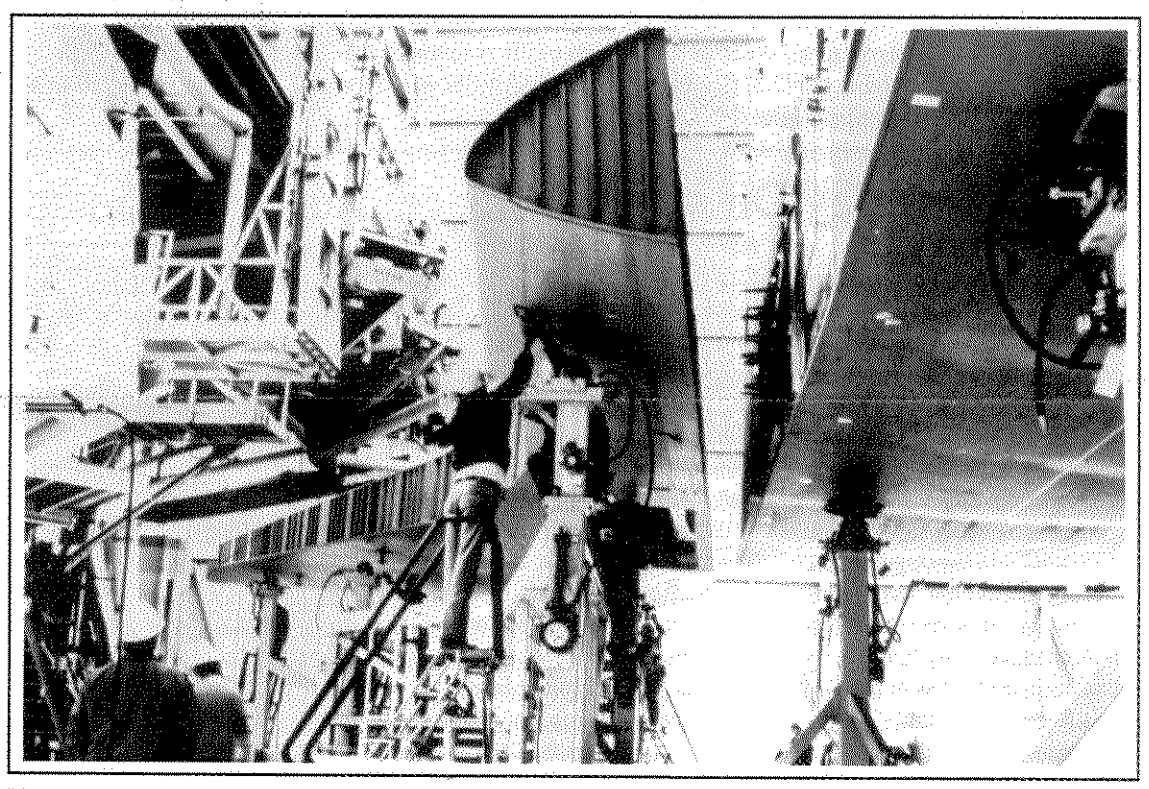
President Bush has chosen the name "Endeavour" for the new Space Shuttle orbiter, currently under construction.

The name "Endeavour" resulted from a nationwide orbiter-naming competition supported by educational projects created by student teams in elementary and secondary schools.

In the nationwide competition, involving over 71,000 students, the national winner in Division I (kindergarten through grade 6) is the fifth graders from Senatobia Middle School, Senatobia, Miss. The team created a space camp simulation, where they taught lower elementary students facts about space through hands-on activities. The nine activities ranged from packaging payload experiments, wireless communication, working a manipulator arm to trying on a team-made spacesuit.

In the Division II category (grades 7 through 12), the winning team is from the Tallulah Falls School, Inc., Tallulah Falls, Ga. The nine-member team was composed of math students in grades 8-12. The team project was two-fold. They developed a math magazine, "Math Exploration with James Cook," written on three educational levels, and they created a play, "Where on Earth?...," comparing Cook's 18th-century sea exploration to the Space Shuttle "Endeavour's" 20th-century space exploration.

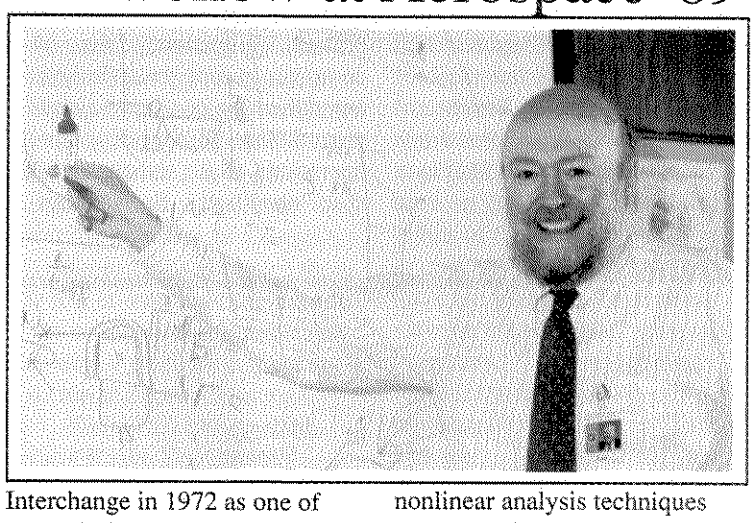
These two national winning teams were selected from over 6,100 entries. The judging criteria was: 80 percent for the quality and creativity of the educational project to support and justify the name; 20 percent for the name's pronounceability for transmission and the ability to capture the spirit of the American pioneer. The name had to be that of a seafaring vessel used in research or exploration. Both winning teams proposed the name "Endeavour."



Workers at Rockwell International, Downey, Calif., position the wing on the new orbiter, "Endeavour."

Card Named AIAA Fellow at Aerospace '89

Dr. Michael F. Card, chief of the Structural Mechanics Division, has been selected a Fellow by the American Institute of Aeronautics and Astronautics. This honor was bestowed on him at the Honors Banquet which culminated the AIAA Annual Meeting and International Aerospace Exhibit, May 4, in Crystal City, Virginia.



Individuals are selected to the rank of Fellow by the AIAA in recognition of professional standing and outstanding contributions to arts, sciences or technology of aeronautics and astronautics. Card was cited "for outstanding leadership and sustained technical and managerial contributions in the fields of composite structures, minimum-weight design, thermal buckling and general shell behavior under load."

Card joined the Langley staff in 1958 and was appointed head of the Structural Evaluation Section in 1970. He was selected by the President's Commission on Personnel Interchange in 1972 as one of three NASA employees to participate in the Executive Interchange Program, where he worked at TRW Systems Corp. for one year.

He became head of the Structural Mechanics Branch in 1974 and head of the Structural Dynamics Branch in 1979. He was team leader for interdisciplinary research in large space systems technology and has done research on advanced aircraft and spacecraft structures, dynamics of space payloads, nonlinear analysis techniques and dynamics of the Space Shuttle system. In his present position since 1980, Card manages the division that conducts research in structural mechanics, thermal structures, structural concepts and aerothermal loads. From October 1988 to September 1989, he worked at the Marshall Space Flight Center, Huntsville, Ala., on the Space Shuttle as assistant to the director of the Structures and Dynamics Laboratory.

News Briefs

HEADQUARTERS, Washington, D.C. --- America's planetary exploration program reassumes world leadership with the launch of the Magellan spacecraft to Venus. Dr. Leonard Fisk, head of NASA's space science program said Magellan will mark the beginning of a "new golden age of space science" with 36 major missions in the next five years. "The Magellan mission alone will return more data than all previous planetary missions combined."

HEADQUARTERS, Washington, D.C. --- Eight finalists have been selected for the NASA Excellence Award for Quality and Productivity for 1988-89. The award recognizes NASA prime contractors, subcontractors and suppliers for outstanding achievement in quality and productivity improvement. Finalists were chosen after a review by the award evaluation committee. The process now advances to a the third phase---validation team visits to finalists' facilities to verify performance achievements and process attainments.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- A one-of-a-kind aircraft has been gathering attention in Cleveland skies for the past few months. The airplane is the propfan test assessment (PTA) aircraft, a modified Gulfstream II equipped with an eight-bladed, single-rotation, advanced turboprop (propfan) on its left wing. Tests show that advanced turboprop propulsion systems can reduce fuel usage by 25 to 30 percent compared to future turbofan engines with equivalent levels of advanced technology. Lewis and the NASA/Industry Advanced Turboprop Team were awarded the Collier Trophy in May 1988 for developing the technology and testing advanced turboprop porpulsion systems.

AMES/DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- In the first flight in a joint NASA/USAF program that promises self-repairing flight controls and lower maintenance costs in future aircraft, computers aboard the Ames/Dryden F-15 Flight Research Aircraft were able to correctly identify and isolate in flight a simulated failure in the flight control system. With the new expert system technology, failures can be identified and isolated before landing and be fixed immediately.

HEADQUARTERS, Washington, D.C. --- A group of engineering students at Virginia Tech has spent the last five months designing and building a mock-up of the National Aero-Space Plane (NASP). The mock-up will be displayed at the U.S. pavilion at the Paris Air Show in June and is slated for exhibition at the Dayton Air and Trade Show later this summer.

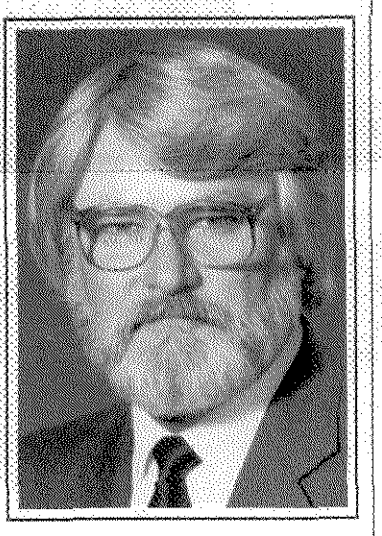
Former Langley Director for Space Dies in Colorado

Robert R. "Skip" Nunamaker, retired director for Space and former resident of York County, died unexpectedly Monday, May 1, in Boulder, Colorado. At the time of his death, he was director for program integration at Ball Space Systems Division, Ball Corporation, Boulder, where he was responsible for upgrading and reorganizing the aerospace programs in the corporate office.

Nunamaker began his NASA career in 1958 at the Lewis Research Center, Cleveland, Ohio. In 1963, he transferred to the Ames Research Center, Moffett Field, Calif. He came to Langley in 1985 as head of the Space Directorate.

Nunamaker is survived by his wife Linda; four children: Mark Lutz, Albany, Ga.; Steven Nunamaker and Dawn Ballard, San Jose, Calif., and Dana Wilkinson, Santa Cruz, Calif. The family will be at 5547 Baca Circle, Boulder, Colo. 80301.

A memorial service was held Thursday, May 4, in Boulder. Burial took place Saturday, May 6, in San Bruno, Calif.



NASM Opens Computer Age Flight Exhibit

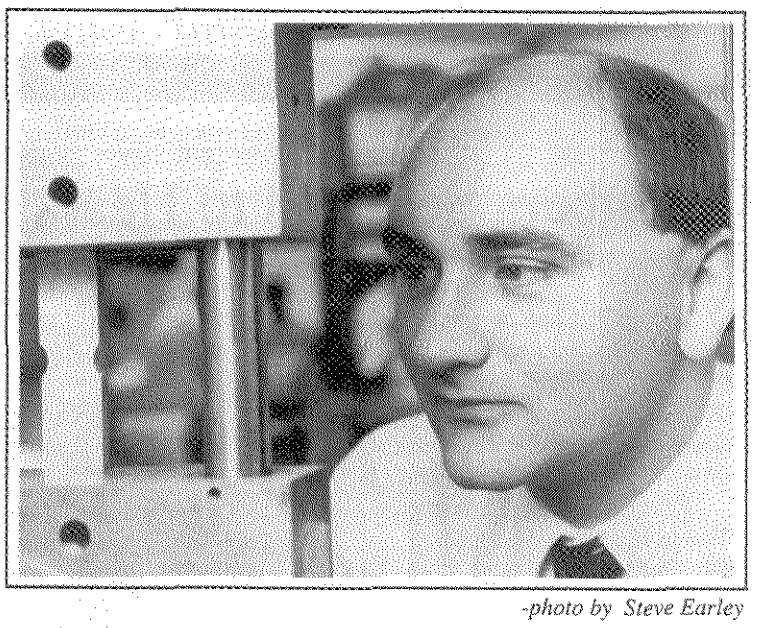
The "Computer revolution" in aerospace is the subject of a major new gallery, "Beyond the Limits: Flight Enters the Computer Age," at the Smithsonian Institution's National Air and Space Museum (NASM) in Washington, D. C.

Organized in seven exhibit areas, the gallery illustrates the primary applications of the computer in aerospace: design, aerodynamics, computer-aided manufacture, flight testing, air operations, flight simulators and space operations. Each exhibit includes at least one "hands-on" interactive computer terminal so that visitors can see for themselves the kinds of tasks that computers perform.

"Beyond the Limits" traces the development of the computer and aerospce industries from the 1940s when the typical "computer system" was a room full of people working with slide rules, pencils and paper.

Lankley

"We're in an unexpected hold due to conditions beyond our control!"



-photo by Steve Earley

Dr. Michael Birt examines an aluminum composite test coupon in a MTS load frame to ascertain the fatigue life of the composite.

NRC Associateship Brings National, International Researchers to Langley

The National Research Council (NRC) Resident Research Associateship Program is just one of the opportunities available to national and international researchers through Langley's University Affairs Office.

The program provides postdoctoral scientists and engineers, who show unusual promise and ability, with research opportunities concerning problems largely of their own choosing. And conversely, the program contributes to the research effort of Federal laboratories.

Dr. Michael Birt is one of 13 NRC associates presently conducting research at Langley in areas related to LaRC's mission. Birt, a resident of Leicestershire, England, is studying the fatigue of discontinuous metal matrix composites. He is working under the direction of Dr. Steve Johnson, senior research engineer in the Mechanics of Materials Branch.

The goal of Birt's research at Langley is to apply the technology currently known about aluminum to titanium composites giving additional insight into the fatigue lives of these materials. Birt began his Langley research in June 1988 and has recently applied for and received an extension of his NRC associateship. He expects to conclude his study in June 1990.

Asian Pacific Americans Remembered

Asian Pacific American Heritage Week was observed nationwide May 7-13. The theme of this year's observance was "Asian Pacific Americans: Participation--Partnership--Progress."

Asian Pacific Americans are a valued part of the ethnic diversity that enhances our culture and is so essential to America's strength and vitality. Through their talents and contributions, they have enriched the American experience. Today, 49 Asian Pacific Americans are employed at Langley, contributing their talents in all occupations.

The Office of Equal Opportunity Programs has a limited supply of Asian Pacific American Heritage Kits available to interested employees. To receive a kit, call ext. 43290.

Current News Releases

To obtain a a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-63.....U.S. Launches Most Ambitious Space Science Period

89-64.....NASA Final Propfan Program Flight Tests Conducted

89-65.....Eight Firms Named NASA Excellence Award Finalists

89-66.....Va. Tech. Students Build NASP Mock-up

89-67.....Apollo 11 Crew 20th Anniversary Press Conference Scheduled

89-68.....Logo Selected for Space Station Freedom

89-69.....NASA Flies First Aircraft Self-Diagnosis System

Researcher News

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

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Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

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Program to Provide Resources for NASA, the Nation into the 21st Century

Statistic:* ***The number of PhD degrees earned by white males between 1977 and 1987 has fallen from 17,011 to 12,116.*

Statistic:* ***The number of PhD degrees earned by white females has climbed from 6,054 to 8,245 for the same period.*

Statistic:* ***The number of PhD degrees earned by black males has fallen from 684 to 317--a 50 per cent reduction.*

***National Research Council**

"These figures point out the acute problem that this country is faced with in terms of having the skills available to conduct research and teach at the turn of the century, the year 2000," says Dr. Samuel E. Massenberg. "In addition, fully one half of the PhD candidates in this country at the present time are non-U.S. citizens."

Massenberg sees as part of his mission to enhance the production of new PhDs and new Masters recipients in aerospace disciplines. As Langley's University Affairs officer, he is responsible for coordinating all of the university-related programs on Center; he is also the principle liaison between the Center and the nation's higher education community.

Langley Research Center has an almost $30 million research relationship with institutions of higher learning throughout the country. That includes well over 300 principal investigators at over 100 colleges and universities. "It is our best estimate that we fund approximately 500 graduate and undergraduate students, either directly or indirectly," cites Massenberg.

Langley's University Affairs program is carried out through grants, cooperative agreements and contracts. The program caters to both students and faculty and supports a NASA-wide effort to speed and broaden the transfer of aerospace technology. "There's no doubt that the program at Langley develops technologies on which the future economy, environment and energy sources of our nation depend," says Dr. Richard Barnwell, chief scientist.

For instance, the **Graduate Program in Aeronautics** at Langley incorporates 12 grants that are specifically designed to fund graduate students who are doing research in disciplines directly related to Langley's research objectives. Massenberg calls it a very viable program. "We are producing a large number of PhDs, roughly 15 per year, as well as a little larger number of master degree recipients.

"In the **Graduate Student Research Program** at any given time," continues Massenberg, "we have approximately 40 students working on graduate degrees." Each of these programs is a valuable avenue through which are produced the PhD and master's degrees needed in the particular research areas Langley espouses. "All these graduates don't come to Langley, or even to other NASA centers," he freely admits, "but they do go out to aerospace industries or to higher education to make an invaluable contribution."

-photo by Steve Earley

Langley's University Affairs Officer Dr. Samuel E. Massenberg coordinates the Center's $30 million research relationship with institutions of higher learning throughout the country.

While the University Affairs program is a valuable recruiting tool, the main thrust of the program is the enhancement of research relationships between Langley and the academic community as well as producing new graduates. In view of the statistics already quoted, Massenberg feels that minorities--the Hispanics, the Blacks--who have the mental skills but lack motivation and interest are populations that need to be captured, in an intellectual sense, and guided into the mainstream.

To this end NASA has initiated a new **Minority Graduate Student Research Program**, specifically designed to attract high quality minorities who are capable of earning the PhD in engineering and science. Langley has been monitoring over 20 minority graduate student candidates since the start of the program last year. "That's about equal to the total of all the other NASA centers combined," reports Massenberg.

Also related to minority education, Langley has a large **Historically Black Colleges and Universities (HBCU) Program**--over 33 grants with nine institutions throughout the country at an investment of $3 million per year. "It's our way of speaking to the problem posed in *Workforce 2000*, a recent study which outlines the educational profile and job demands for the 21st century.

On the faculty side of the endeavor, the **American Society of Engineering Education (ASEE) Summer Faculty Fellowship** program brings educators to Langley Research Center. In its 25th year, the program involves about 40 faculty members each year who conduct research for Langley and then take the expertise and enthusiasm gained back to the classroom. As a spin off, many are also awarded grants to continue research for Langley back on the university campus. In addition, the **National Research Council Resident Research Associateship Program** is designed as a post doctoral research experience for faculty members.

A more recent program is the **Langley Aerospace Research Summer Scholars** (LARSS) program. Started three years ago, the program has grown from a modest beginning of 25 high quality graduate and advanced undergraduate students to 80 students for this summer's session. "Primary reasons for bringing these students on board is to give them a look at a federal research lab, to give them a research assignment under the guidance of a mentor, and, moreover, to convince them that it is in their best interest and in the country's best interest that they earn a graduate degree, not just stop at the baccalaureate."

Endeavors like the **University Space Engineering Research Center** program, funded by NASA Headquarters, put the emphasis on aerospace-related disciplines back into the university classroom. This program also acts as a tremendous draw for students in the graduate arena. The case of North Carolina State University, which Langley monitors, is classic, says Massenberg. "Once the announcement was made that NC State had been named a NASA University Space Engineering Research Center for Mars mission research, the inquiries from graduate and potential graduate students increased tenfold."

Massenberg is excited about a program that begins in the fall of 1989. The **Space Grant College Program** will fund 12 universities as Space Grant Universities. Massenberg cites an interesting analogy: "Back in the 19th century we had Land Grant colleges; a decade ago it was Sea Grant universities; now, for this first time, we'll have Space Grant universities." This program will promote new relationships between the designated university, smaller colleges around it, industry and NASA.

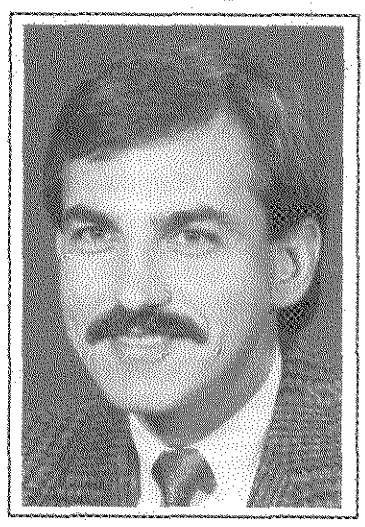
Put all of these programs together and it's clear that Langley is involved in a massive effort. "We continually emphasize the need to increase the quality and quantity of our relationships with universities, professors, graduate students and undergrads," concludes Massenberg. "In turn, our researchers at Langley act as mentors to hundreds of students throughout the country, providing motivation, supervision, information and new knowledge to these students. I can't think of one research division here at Langley that isn't involved with dozens of students and faculty members from many universities. That says something about our researchers and the impact they have on the educational programs of this country."

Langley senior management has taken a philosophical view on the subject of university programs. "We're all going to retire someday. Where will our replacements come from?" asks Massenberg. "Our Center Director and senior staff agree they are generally going to come from these students that we're funding or the students of the students we're supporting now."

Langley Research Center feels a responsibility to the nation, to the aerospace industry and to higher education to continue training young people to meet the needs of the nation in the 21st century. "Sam Massenberg has developed a University Affairs program that is a model for the Agency," boasts Barnwell.

'A valuable recruiting tool, the main thrust of the University Affairs Program is the enhancement of research relationships between Langley and the academic community as well as producing new graduates.'

Avery Detailed to NASA Headquarters



Don E. Avery, technical assistant to the director for Space, has been temporarily assigned to NASA Headquarters, Washington, D.C., as program manager of Space Station Utilization.

For the next five months, Avery will support the acting assistant director of Large Space Structures in coordinating space station evolution and operations technology needs with the Office of Space Station, defining technology payload requirements, developing a program plan for the evolutionary space station technology-focused program, and preparing budget and congressional presentations.

As a technical assistant at Langley since April 1987, Avery assists the director for Space in planning and developing research programs with emphasis on strategic planning and programmatic objectives.

Incentives Offered to Technician Co-ops

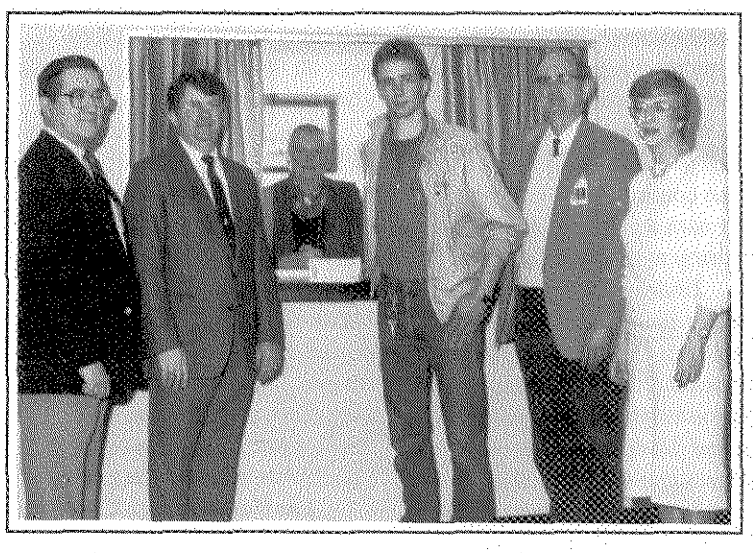
Langley's technician co-op program provides the opportunity for an individual to complete schooling and gain training in a chosen career at the same time. Now the program is even more attractive to its applicants. For the first time, the Center pays tuition for successful technician co-ops as an incentive to consider a career as a Langley technician

Tuition reimbursement was initiated last year and paid after successful completion of the semester's work. Now, reimbursement is made within several weeks of tuition payment for the first semester and tuition is paid by the Center directly to the academic institution for additional semesters. In addition, co-ops who complete the program are given first consideration to enter the Langley apprentice program.

Fred Thompson, apprentice school coordinator, feels the tuition program is a valuable recruiting device for the Center. Through Thompson's efforts, not only has payment been approved but the reimbursement process has been streamlined. "Our students received their checks in two to three weeks after application, a remarkable time frame in the government system."

The technician program is divided into two main areas--mechanical and electronics technology. Co-ops enjoy the same benefits as other government employees, including insurance coverage, annual and sick leave, and retirement program. Under the contractual agreement, students must maintain a 2.0 scholastic average and must reimburse NASA for any grade less than a 'C.'

The technician co-op program is coordinated through Thomas Nelson and Tidewater Community Colleges. Individuals are selected to enter the program after completion of one semester of the required curriculum in either mechanical or electronics technology. For additional information, contact Fred Thompson, ext. 42595.



CO-OP REIMBURSED FOR TUITION COSTS. Technician co-op Keith Knight is the first to receive tuition reimbursement prior to course completion. As an incentive, Langley Research Center has committed to underwriting tuition cost for participants in the technician co-op program. Gathered for the occasion are Joseph Struhar, head of the Financial Management Division; Fred Thompson, apprentice school coordinator; Peggy Langford, accounting technician responsible for disbursement of funds; Knight; Robert L. Swain, director for Systems Engineering and Operations and chairman of the Apprentice Advisory Committee; and Jackie Kallick, staff assistant, SE&O.

NASA Langley to Honor Inventors at Luncheon

Thirty-seven Langley Research Center inventors who received United States patents in 1988 and recipients of Langley's Technology Transfer awards will be honored at the annual Inventors' Luncheon Friday, May 26, at the Sheraton Inn-Coliseum.

J.R. Thompson Jr., director of NASA's Marshall Space Flight Center, Huntsville, Ala., and currently awaiting Congressional confirmation as the new associate administrator of NASA, will be the guest speaker for the occasion.

Langley employees are recognized annually for inventions which have been determined to be a significant value in the advancement of the aerospace technology program of NASA.

Inventors receiving awards will be Dr. John H. Crews Jr., Dwight G. McSmith (retired), Bradley D. Leighty, Dr. Bruce J. Holmes, Debra L. Carraway, Harlan K. Holmes, Thomas C. Moore, Richard M. Wood, Allan H. Taylor, Ian O. MacConochie (retired), Dr. Martin M. Mikulas Jr., Jack E. Pennington, Charles F. Bryan Jr. (retired), Dr. Jag J. Singh, Danny R. Sprinkle;

Richard L. Puster, Dr. Leonard M. Weinstein, Timothy D. Schott, Robert L. Fox, Dr. John D. Buckley, Dr. Randall C. Davis, L. Robert Jackson, Elizabeth B. Plentovich, Blair B. Gloss, John W. Eves, John P. Stack, Dr. Allan J. Zuckerwar, Paul M. Hergenrother, Dr. John W. Connell, Kevin W. Noonan, George C. Ashby Jr., William J. Debnam, Ivan O. Clark, Daniel G. Murri, James F. Meyers, William T. Davis (retired), and Adolphus B. Blair Jr.

Since a large number of researchers participate in technology transfer activities at the Langley Research Center, seven employees will be honored with Technology Transfer awards for their accomplishments during 1988.

A plaque will be presented as the top award to Dr. Joseph S. Heyman, Instrument Research Division, "for outstanding initiative and achievement in the transfer of NASA technology to the industrial, biomedical and public sectors."

Certificates will be awarded to Dr. Terry L. St. Clair and Paul M. Hergenrother, Materials Division; Dr. William T. Yost, Thomas C. Moore and Harlan K. Holmes, Instrument Research Division; and Dr. Bruce J. Holmes, Flight Applications Division, "for excellence in promoting the transfer of NASA technology to the industrial, biomedical and public sectors."

In addition, the following 16 Langley contractor employees had patents issued in 1988: Rebecca L. Kinkead, David S. Mazel, Patrick S. McAuliffe, Robert G. Bass, Mark S. Sinsky, Dhanvada M. Rao, John W. Stoughton, Sharad V. Kanetkar, Andreas E. Savakis, Stephen J. Havens, Frank W. Harris, Gerhard E. Seidel, Dan Botez, Donald E. Ackley, Anil R. Dholakia and Cornelis P. van Dam.

Center Director Richard H. Petersen (left) presented Speakers Bureau awards to (L to R) Frank Quinto, Lance Bush, Lenwood Clark, Bruce Fisher, Les Rose, Brian Pritchard and Joel Levine.

Speakers Bureau Spreads NASA Story; Members Honored

Eleven of Langley Research Center's most vocal "ambassadors" were recognized in a recent ceremony. Center Director Richard H. Petersen presented Speakers Bureau awards; he noted, "Never has there been a more urgent need for NASA to tell its story far and wide."

For the second consecutive year, Lenwood Clark was named Speaker of the Year. Clark, Space Station Freedom Technology Office, is dedicated to spreading the NASA story.

Also honored for their outstanding service to the Speakers Bureau were Roger Breckenridge, Lester Rose and Frank Quinto. Each was presented an autographed copy of *Engineer in Charge*, written by Dr. James R. Hansen.

The following received recognition pins for presenting at least three programs during 1988: Lance Bush, Bruce Fisher, Delma Freeman, Bob Kilgore, Joel Levine, Gary Price and Brian Pritchard.

The LaRC Speakers Bureau is a most effective means of informing the public about NASA programs and sharing the accomplishments of the Agency with the communities in the five-state region Langley serves. Over 100 Langley employees volunteer their time, addressing topics as wide-ranging as space station, women pioneers in science and technology and depletion of the ozone layer.

Videoconference

On June 2, from 1 to 2 p.m., the Virginia Department of Education and NASA Langley, will present an interactive video teleconference for middle and high school students. The theme is a salute to Apollo, the first landing of humans on the surface of the moon. Program participants include astronaut John Yound, Ray Tanner, James T. Rose and Dr. Carl Pilcher.

Langley Presents A Salute to Apollo

Langley is developing several programs to celebrate the 20th anniversary of man's first landing on the moon. One program, available in the Teacher Resource Center, is a slide presentation called "A Salute to Apollo."

This half-hour presentation reviews the Apollo program from start to finish with a focus on Apollo 11. From blastoff to landing, the Apollo 11 story is retold complete with dramatic surface-level photos of the moon. Langley's contributions to Apollo are also included.

The presentation package includes slides, narration, background notes, photo listings and a bibliography. To borrow, call or visit the Teacher Resource Center, Building 1152, room 115, ext. 43293.

People & Places

-photo by Don Ward

Red Saul checks the cable that supported the lunar lander test vehicle.

Active Old-Timer Remembers Apollo

Clarence E. "Red" Saul is going strong at 83; in fact, he's in his second career at Langley.

An employee of the Old Dominion Elevator Company, Saul makes his rounds maintaining and trouble shooting problems associated with the numerous elevators and cranes on center. "I have a regular maintenance schedule to be sure all the components and safety features are working properly. In addition to trouble calls, each facility is checked once a month to perform preventative maintenance."

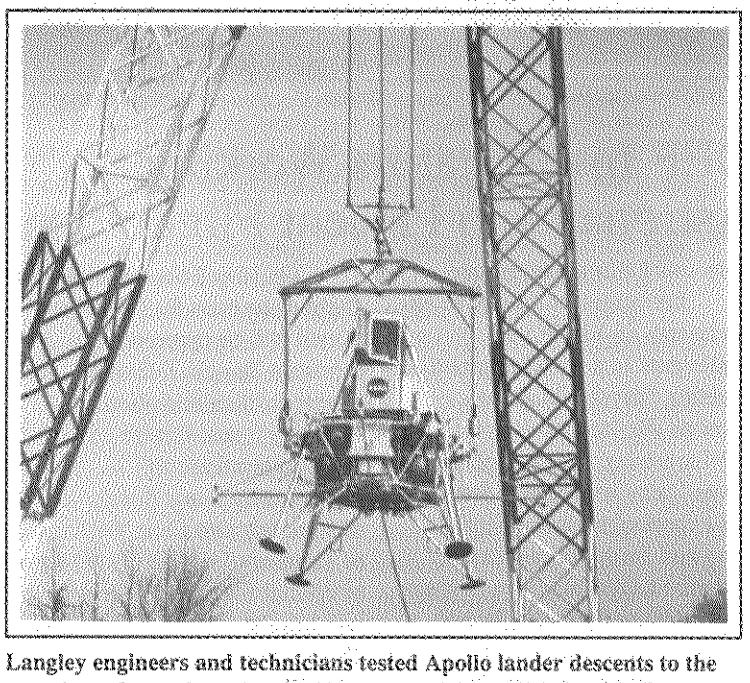
Saul retired from NASA in 1970 after 28 years of service. As a civil servant, he worked in the Operations Support Division for Vince Foretich and was in charge of all elevators and cranes.

He remembers re-cabling the crane in the 16-Foot Tunnel in 1968. That piece of equipment picks up the test section of the tunnel--180 tons. "It was quite an involved process. We poured the end sockets and installed the cables at the right location," Saul reminisces.

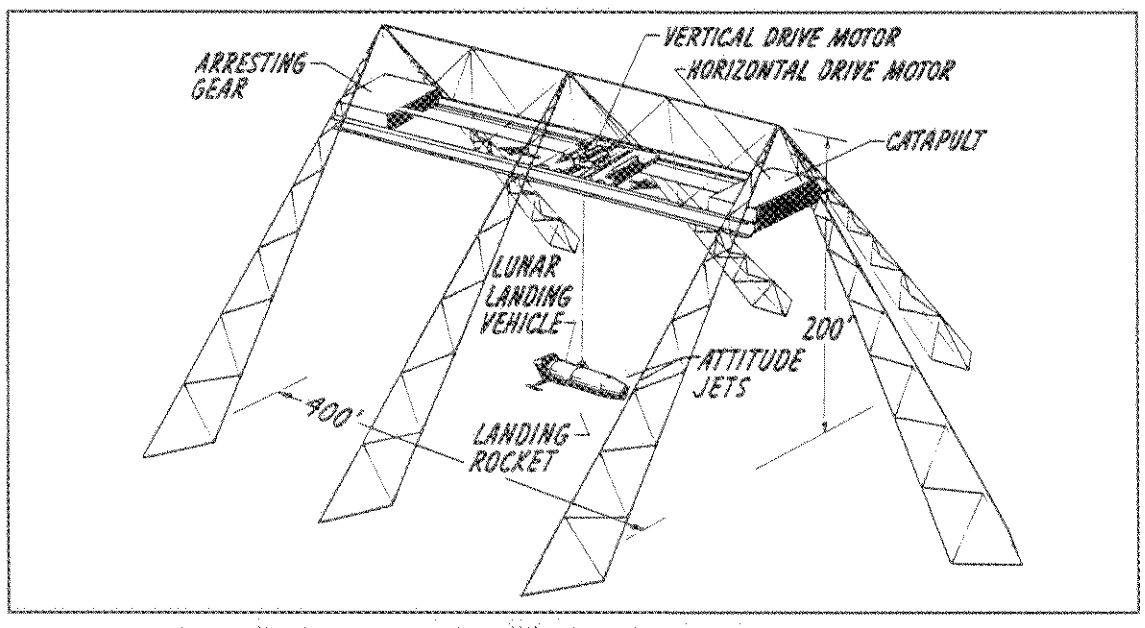
He also remembers the Apollo days. He was in charge of the crane operation at the Lunar Landing Research Facility. "I inspected the cables and the equipment used to train the astronauts. The elevator system was very important; they were working day and night at the time."

He vividly remembers the cold weather and how it affected the operation. "In winter, before we had covers, I had to crawl to the top of the gantry and pick the ice out of the works," he admits. "We had to use a certain type of oil, because in cold weather oil got just like glue. I was in charge of lubrication. Can you believe a quart of oil could cost $200?"

Saul concludes, "You have to be so careful. There have been incidents that could have been real serious if it weren't for constant maintenance. It's an education for us every day." Red Saul brings 35 years of expertise to his job, but he's still learning about elevators and cranes.



Langley engineers and technicians tested Apollo lander descents to the moon's surface, where gravity is only one-sixth that on Earth. Cables from a traveling bridge, located on a 250-foot-high steel structure, supported five-sixths of the weight of the training module.



An early concept of the Lunar Landing Research Facility didn't allow the vehicle much lateral movement.

Next Step: Practice for a Perfect Landing

Lunar orbit rendezvous (LOR), was the route chosen, after much debate, to "land Americans on the moon and return them safely to Earth." But the concern remained, what would it be like to **land** on the moon?

Proposed, approved and built at Langley was the Lunar Landing Research Facility. Later utilized to crash test aircraft, this unique and imposing erector-set structure originally provided the capability to perform simulated lunar landings with a manned, rocket-powered vehicle.

"At Langley we were simulating various phases of the lunar mission," reminisces Hewitt Phillips, now a Langley distinguished research associate. "But there was the need to simulate the final phase of the landing."

Questions arose regarding how a pilot should control the vehicle during this critical phase of the mission. Would the astronaut be able to properly control both the angle and altitude of the vehicle without the benefit of aerodynamic resisting forces and make a sufficiently gently touchdown? How much rocket thrust would be enough to give the precise control of vertical velocity necessary to make a soft landing? What effects would the rocket blast have on visibility and on the landing surface?

"It was known that the landing would be manually controlled by the astronaut," Phillips continued, "so we needed some simulation that would allow the astronaut to actually control the vehicle. We also needed to simulate the conditions on the lunar surface."

Complicating the simulation was the fact that the gravitational force on the surface of the moon is only one-sixth of that on Earth. A free flying vehicle on Earth would not provide a realistic simulation since it would require six times more rocket thrust than would be needed to hover a lunar vehicle.

"The idea I had was to construct this overhead structure, what they usually call the gantry, to support the vehicle with a force equal to five-sixths of its weight. The remaining one-sixth "g," or one-sixth the weight of the vehicle, would be supplied by the vehicle's own rockets just as on the lunar surface," explains Phillips, who was then head of the Guidance and Control Branch and later chief of the Aero-Space Mechanics Division.

The facility is essentially an overhead crane structure 400 feet long and 250 feet high. The test vehicle was supported by a cable from a carriage which traveled along the gantry. The test vehicle was a rocket-propelled vehicle which weighed about 10,000 pounds and contained a pilot's cockpit and the necessary controls and rockets to perform the landing.

The purpose of the overhead suspension system was to support five-sixths of the weight of the vehicle. At the same time it provided a fail-safe capability to restrain the vehicle in case of equipment failure or pilot error. The weight was maintained constant by servo systems in the carriage. The remaining one-sixth of the weight, therefore, pulled the vehicle down with a force equal to that which would be encountered on the surface of the moon.

During a test run, the drive systems automatically positioned the overhead carriage to maintain the cable vertical, so that it did not influence the horizontal motion of the vehicle. The suspension system provided angular freedom of the vehicle so that, from the standpoint of the pilot, there was no restraint on his motions due to the support system. As a result, the motion of the vehicle in the test situation was the same as that which would exist during an actual lunar landing.

"There was considerable question at first as to whether this kind of a suspension system could be made," admits Phillips. "In order to test it out, we made a pilot model in the return passage of the Full Scale Tunnel. The vehicle was suspended from the overhead girders; it didn't move about but just went up and down. But this test demonstrated that the servo system would work."

This next step was funding. Phillips approached Larry Loftin who was convinced it would work. Both went to NASA Headquarters to see Ira Abbott, director of Advanced Research Programs and a former Langley employee. Presentations were also made to Robert Seamans, NASA associate administrator. Funding was approved.

Jackson and Moreland, a Boston contracting firm, was selected to build the overhead gantry structure and a small company built the flight vehicle, "which was the biggest bargain that NASA ever got!" adds Phillips. "They only charged $250,000. Later we considered getting a more sophisticated vehicle made, and I think Rockwell gave us a quote of $7 million. All in all, the whole thing was done in a very economical way to get the kind of data we wanted."

Max Kurbjun had a lot to do with the original design of the structure and he monitored the contracts. Don Hewes was put in charge of the operation of the facility and he pushed for a more life-like simulation.

After the initial shake down tests the surface under the gantry was modified to simulate the lunar terrain. Tests were made at night with floodlights simulating the lighting on the lunar surface.

Thomas O'Bryan and Hewes, in the concluding remarks of their paper Operational Features of the Langley Lunar Landing Research Facility, noted: "By October 1966, nine pilots, including three astronauts, participated in nearly one hundred flight tests at the lunar landing research facility. Their observations indicate that the facility is a practical research tool for assessing the flight behavior and handling characteristics of space vehicles proposed for operation in sub-gravity environments."

Happenings

LAA SOCIAL will be held Friday, May 26, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

COMING: LAA CARNIVAL. If you are interested in donating your time and talent at the LAA Carnival, Aug. 18-19, please call Frankie Ward, LAA Office, ext. 46369.

ARTS & CRAFTS. Anyone interested in displaying arts and craft at the LAA Carnival, Aug. 18-19, please call Betty Hughes, ext. 42537.

BI-THE-BAY BIATHLON will be held June 3 at the fitness center on Langley AFB. The event consists of an 8 K run, a 15 K bicycle trek and a 5 K run. Entry fee is $15 before May 29; $17 race day. To register, contact Lt. Wesselmann, ext. 45960, Mail Stop 413.

BUCKROE BEACH DAZE sand sculpture competition, June 17, 10 a.m. to 5 p.m. Entry fee of $10 per team must be submitted to Hampton Recreation Department by Wednesday, June 14. Cash prizes awarded. For further information and registration, call 727-6483.

WANTED: CAR POOL MATE A car pool operating between the Colonial Place neighborhood of Norfolk and the west area of NASA on the 8 a.m. shift needs one more member. Call Dan Giesy at ext. 44006 or 625-7558.

LOST: WATCH. Man's silver Seiko watch was found in Building 1194 on April 28. Call Susan Hurd, ext. 42344.

FOUND: PENDANT. Ladies pendant/pin found in parking lot between Buildings 1195 and 1225. Call S. Ketchum at ext. 42404.

FOR RENT: TOWNHOUSE in Poquoson. 3 BR, 2 1/2 B, FP, deck, fenced backyard, kitchen appliances, pool. $700/mo. Year lease required. Available June. Call 898-8463.

FOR SALE: LOT in Ford's Colony. Cul-de-sac, half-acre, near golf course, $65,000. Call Norfolk, 588-8617.

FOR SALE OR RENT: Brick rancher in Bayberry, 3 BR, FR w/ fireplace, DR, eat-in kitchen and more; .5 acre lot, ten minutes from NASA. $92,000. Assumable loan. Call 596-5595.

Retirement Parties

Bill Fuller will be honored at a retirement dinner Wednesday, May 31, at the Ft. Monroe Officers' Club. Cocktails at 5:30 p.m.; dinner at 6:30. Cost is $10/person; $18/couple including gift. Contributions of $2 for gift only are welcome. Make check payable to David C. Woods, Mail Stop 475.

Lynn Purkiss will be honored at an informal going-away party Monday, June 5, from 4:30 to 6:30 p.m. in the H.J.E. Reid Conference Center. Cost is $9/person, including gift. Additional gift contributions are welcome. Reservations by May 31 to Valerie Mahaffey, Mail Stop 429.

William D. Mace will be honored at a retirement dinner Saturday, June 10, in the H.J.E. Reid Conference Center. Cost is $12/person, including gift. Contributions of $2 for gift only are also welcome. Cash bar opens at 6 p.m.; dinner is at 7. Respond by sending a check to Richard R. Antcliff, Mail Stop 117, by June 1.

Center Implements New Training Assessment Process

The Training and Education Section (TES) of the Employee Development and Services Branch, Personnel Division, strives to provide quality programs for Center employees. The quality of these services is related to the thoroughness of the assessment process conducted to determine the training and education needs.

On May 24, TES, in conjunction with the Center's division chiefs and training coordinators, will begin the process of determining the education and training needs of the Center for the coming year. On this date, training coordinators will be briefed on the new needs assessment procedures.

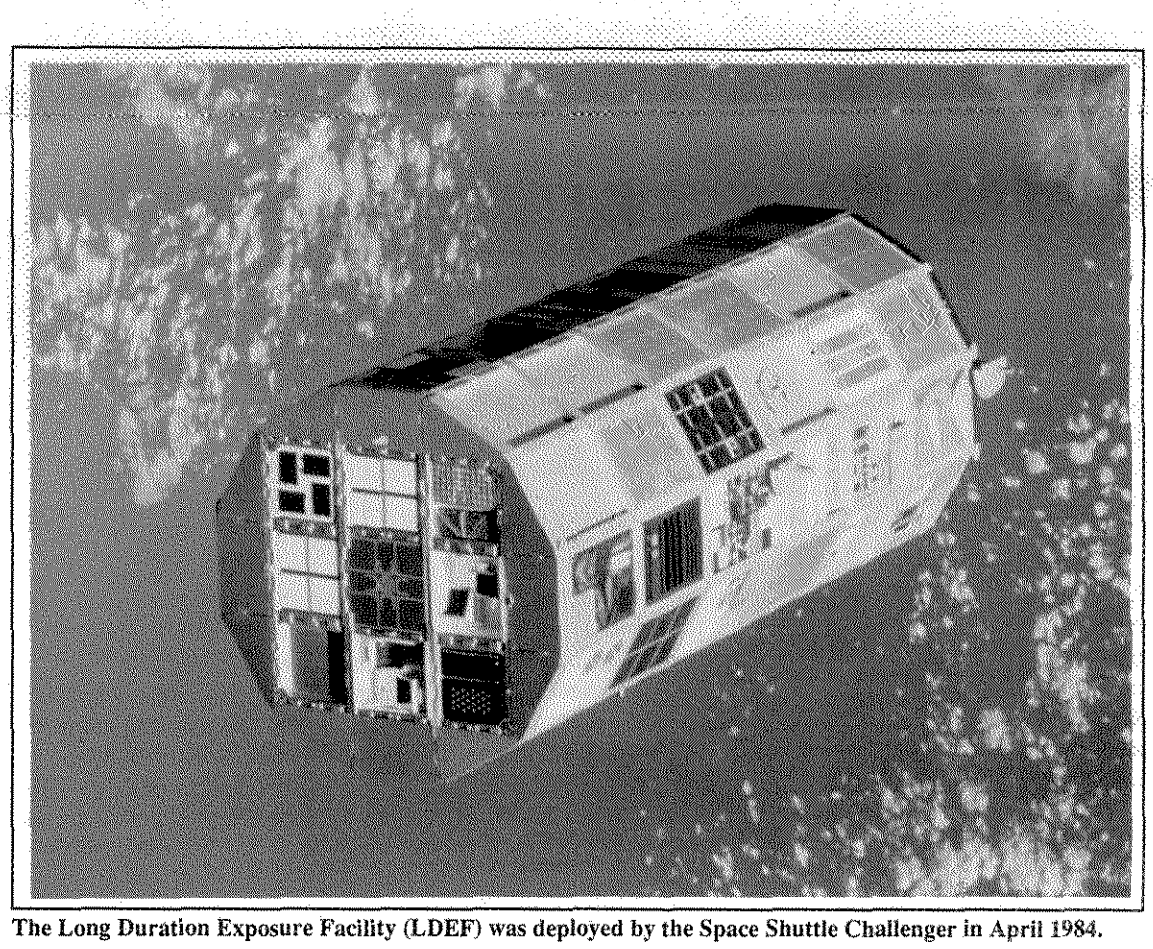
On June 2, a needs assessment survey form will be forwarded to division chiefs through the program directors. It is requested that all division chiefs complete the survey form after consultation with their branch heads, training coordinators and employees.

During July, TES will validate the data from the survey during meetings with program directors and division chiefs. Upon completion of the validation process, the course announcement publication will be developed and distributed to each employee on or about August 15.

Registration for courses should be completed by September 15. Program directors and division chiefs will be consulted early in October to prioritize requests for training within budgetary parameters, and courses will be scheduled accordingly.

This needs assessment process will be evaluated in November and December by an outside consultant. The FY 1991 needs assessment process will begin in January 1990.

TES requests the cooperation of all employees, supervisors, managers and executives in implementing the needs assessment process. If there are any questions, please contact your training coordinator or any staff member of the Training and Education Section.



The Long Duration Exposure Facility (LDEF) was deployed by the Space Shuttle Challenger in April 1984.

NASA to Hold LDEF Investigators Working Group Meeting; Astronauts to Present Flight Plan

The Long Duration Exposure Facility (LDEF) carrying 56 experiments on board was placed in Earth's orbit by the Space Shuttle Challenger in April 1984 during STS 41-C. It was to have been retrieved approximately one year later; however, the Challenger accident in 1986 delayed the retrieval more than four years. The LDEF retrieval is now manifested for STS-32 aboard Space Shuttle Columbia in November 1989; this manifest is being reviewed and the retrieval date could slip to December.

Investigators who have experiments on LDEF will participate in a working group meeting May 23-25 at the George Washington Inn in Williamsburg. Each principal investigator will briefly describe his experiment, data analysis plan and the results expected. Because LDEF has been in space longer than originally planned, a wealth of technology and science can be obtained that was not originally intended for data analysis.

On May 24 an overview of flight operations for LDEF retrieval will be presented by astronaut Bonnie J. Dunbar, mission specialist; and plans for Kennedy Space Center post retrieval operations will be presented by Dean Zimmerman of Kennedy and Leon Williams of Langley. In addition, leaders of special investigation groups will briefly describe their plans. That evening, commander of the STS-32 mission, Capt. Daniel C. Brandenstein (USN), will be the guest speaker at the dinner.

Researcher News

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Researcher News

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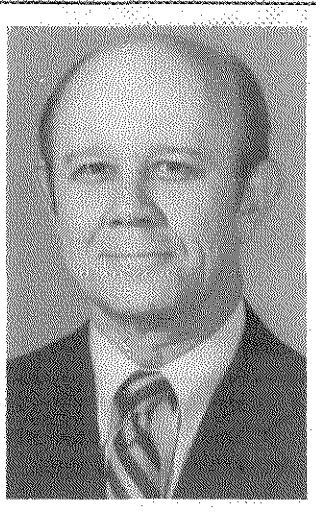
Bi-weekly Employee and Contractor Publication

Walberg, Langley Deputy Director For Space, Retires



Dr. Gerald D. Walberg, deputy director for Space at NASA's Langley Research Center, will retire June 2 with more than 30 years of federal service. He has assisted the director for Space since October 1988 in managing Langley's research in advanced space transportation, planetary entry, Space Station Freedom, large space antenna, and atmospheric sciences programs.

Walberg began his NASA career in 1957 as an aerospace engineer in the 8-Foot Transonic Tunnel Branch, conducting research on the problems of supersonic aircraft in the transonic speed range and specializing in aerodynamic flutter. He transferred to the High-Temperature Materials Branch of the Applied Materials and Physics Division in 1961 to study ablation materials for re-entry vehicle heat shields.

He has been head of the Thermodynamics and Combustion Section, Gas Radiation Section, Aerothermal Branch and the Aerothermodynamics Branch. From January to November 1979, he participated in the NASA Executive Development Program at NASA Headquarters, Washington, D.C. From February 1980 until he was selected to his present position, he was chief of the Space Systems Division, responsible for aerothermodynamics of advanced space vehicles, research on advanced space energy concepts and systems analysis of integrated spacecraft and space transportation concepts for future NASA missions.

Walberg was born in Victoria, Texas. He received bachelor and master of science degrees in aeronautical engineering from Virginia Polytechnic Institute and State University in 1956 and 1963, respectively. He received a doctor of philosophy degree in mechanical and aerospace engineering from North Carolina State University in 1974.

The author or co-author of 27 technical publications, Walberg is a fellow in the American Institute of Aeronautics and Astronautics; past chairman of the Hampton Roads Section, AIAA; and associate editor of the AIAA's Journal of Spacecraft and Rockets.

He received the Minta Martin Award in 1956 and is featured in Who's Who of Scientists and Engineers in the Southeastern United States. He was presented with a NASA Outstanding Leadership Medal in 1983 "in recognition of outstanding leadership in achieving significant advances in entry technology which have directly contributed to the success of the nation's planetary probe and manned space missions." He received the 1988 Presidential Rank of Meritorious Executive Award for exceptional career achievements.

Adams Chosen Sloan Fellow

Dr. Belinda H. Adams, chief of the Programs and Resources Division at NASA's Langley Research Center, has been selected an Alfred P. Sloan Fellow for 1989-90. She will

enter a 12-month course of study leading to a Master of Science degree at the Massachusetts Institute of Technology, Cambridge.

MIT has selected 56 mid-career executives from the United States and abroad as Sloan Fellows. This will be the 58th year of the Program, the first Executive Education Program in the world. "The program is designed to broaden and develop outstanding, but typically specialized, mid-career managers for more general and senior management responsibilities in the future," said Alan F. White, associate dean for executive education and director of the Sloan Fellows Program.

"I believe the Sloan Program opportunity will greatly enhance my understanding of the issues of concern to the major corporations with which NASA interacts and will provide an updated understanding of the international economic environment in which NASA and aerospace corporations now operate," said Ada

Adams joined the Langley staff as an aerospace technologist in the Analysis and Computation Division in July 1963. She was an operations research analyst from 1970 to 1973, working first in the Programs and Resources Division and then in the Business Data Systems Division, planning and coordinating a training program for Langley's transition to a new generation of business computers.

She became head of the Institutional Programs Branch in April 1975. She was named assistant chief, Programs and Resources Division, in March 1981 and chief in May 1984.

In her present position, she is a member of the management team responsible for planning and advocating Langley research and development programs and the institutional support required to carry them out. Adams is responsible for preparation of center budgets and operating plans and for budget execution. She serves as liaison with NASA Headquarters and other centers and provides advice to all levels of center management in matters of resource policy and procedure.

A native of Mississippi, Adams received an associate degree from Hinds Junior College, graduating with honors in 1961, and a bachelor of science degree in mathematics from the University of Mississippi in 1963. She received a doctorate in business administration, with a specialty in quantitative methods, from the University of North Carolina in 1972.

She and her husband, William M. Adams Jr., live in Yorktown, Va., They have two daughters.

Bobbitt Announces Retirement

Percy J. Bobbitt, chief of the Applied Aerodynamics Division, will retire June 2 with more than 40 years of government service.

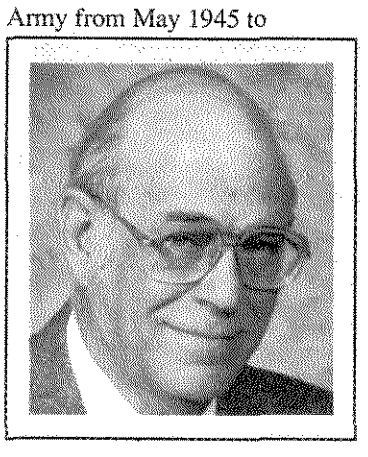
As chief, he has been responsible for the conduct of aeronautical research in fundamental fluid flows and configuration aerodynamics, including stability and control, propulsion system integration and related aerodynamic phenomena.

Bobbitt began his Langley career in January 1950 as a research engineer. He was named acting head of the Applied Mechanics Branch in 1966, head of the Applied Loads Branch in 1970 and head of the Theoretical Aerodynamics Branch in 1973, where he worked until appointed to his present job in 1977.

He has specialized in supersonic flow theory, aircraft aerodynamics, aircraft store loads, rarefield gas flows, entry body aerodynamics, high-temperature gas physics, parachute aerodynamics, transonic flow theory, aeroelastic loads, aerothermodynamics and laminar flow control.

He was a key member of the shuttle certification committee with responsibility for certifying the aerothermodynamic and aerodynamic loads data prior to first flight. He initiated and expedited first-flight-critical tests on several arrays of shuttle thermal protection tiles to prove their structural integrity under simulated flight lead conditions.

Prior to joining Langley, he was assistant inspector of materials for the Department of Highways in Washington, D.C., from October 1949 to January 1950. He served in the U.S. Army from May 1945 to



November 1946.

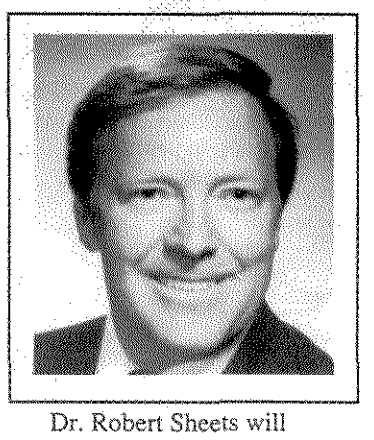
A native of Petersburg, Va., Bobbitt graduated from Eastern High School in Washington, D.C., in 1944. He attended Lehigh University and Clemson University in 1944 and 1945 and received a bachelor of science degree in aeronautical engineering from Catholic University in 1949. He has done extensive graduate study at the University of Virginia, George Washington University and Virginia Polytechnic Institute and State University.

The author or co-author of more than 40 technical publications, Bobbitt received the 1987 Presidential Rank of Meritorious Service Award "for sustained superior accomplishment in management of programs of the U.S. Government and for noteworthy achievement of quality and efficiency in the public service." He has also received a NASA Exceptional Service Medal, NASA Exceptional Engineering Achievement Medal, several Langley Special Achievement Awards, and a number of Outstanding Performance Awards.

He is an associate fellow of the American Institute of Aeronautics and Astronautics and served as chairman of its Aerodynamic Deceleration Systems Committee and as a member of its Fluid Dynamics Committee. He founded the SAE Aerodynamics Committee and received its William McFarland Award for outstanding contributions to the society.

Bobbitt and his wife, Jeanne, live in Newport News, Va. They have two children and one grand child.

Sheets to Give Colloquium



Dr. Robert Sheets will discuss "The 1988 Atlantic Hurricane Season" at a Langley colloquium Monday, June 12, at 2 p.m. in the H.J.E. Reid Conferenceence Center, Building 1222. In his lecture, he will present simulations of the impact of a Gilbert-type storm on southeast Florida.

Sheets, the director of The National Hurricane Center, claims that the damage of a hurricane as strong as 1988's Gilbert which struck southeast Florida would be catastrophic, costing several billion dollars with the potential for severe loss of life.

Sheets has published more than 50 scientific articles on hurricanes and tropical meteorology.

News Briefs

HEADQUARTERS, Washington, D.C. --- Tomas L. Moser, acting associate administrator for the Space Station Freedom program, left NASA on May 13. Moser, who was appointed deputy associate administrator for the Freedom program last December, served as the acting associate administrator since April 30.

HEADQUARTERS, Washington, D. C. --- Acting NASA Administrator Richard H. Truly on May 16 named Samuel W. Keller to be associate deputy administrator, the third-ranking position at NASA. Truly called Keller "One of NASA's best professionals. He has a depth of experience and is just the kind of leader and decision-maker that NASA needs." The televised announcement is Truly's first official address as head of NASA.

HEADQUARTERS, Washington, D.C. --- Acting NASA Administrator Richard H. Truly named Dr. William B. Lenoir as associate administrator of the Space Station Program, effective June 1, 1989. Lenoir will develop a plan for the consolidation of the Offices of Space Flight and Space Station. Appointed also was Richard Kohrs as director of Space Station Freedom. Kohrs is currently program director of the National Space Transportation System. Ray Tanner becomes the deputy director of the Space Station Freedom Program and Operations, located in Reston, Va.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Al. --- G. Porter Bridwell , director of the Institutional and Program Support Directorate at the Marshall Space Flight Center, has been appointed manager of the Shuttle Projects Office at the Center. He succeeds William R. Marshall, who has retired. His duties include industry performance in planning, design, engineering, integration, development, production, testing, delivery and operations of Shuttle elements to be furnished to the Marshall Center.

HEADQUARTERS, Washington, D.C. --- The Hubble Space Telescope (HST) will highlight the NASA exhibit at the 38th Paris Air Show, June 9-18. Housed in the United States National Pavilion, the exhibit will focus on astronomy in general and the HST in particular. The HST to be launched in early 1990 will allow astronomers to observe stars, planets and other objects 10 times more clearly than Earth-bound observatories.

HEADQUARTERS, Washingto, D.C. --- Shuttle crew members have been named for two Department of Defense-dedicated Shuttle missions schecduled for mid-1990. USAF Col. Richard O. Covey will command STS-38, a classified DOD mission aboard the Space Shuttle Atlantis scheduled for launch in May 1990. Covey's pilot will be USN Cmdr. Frank L. Culbertson. Mission specialists are USMC Col. Robert C. Springer, USAF Maj. Carl J. Meade and USA Capt. Charles D. "Sam" Gemar. Mission specialists for Shuttle mission STS-39, an unclassified DOD mission aboard Space Shuttle Discovery scheduled for launch in July 1990, are USAF Col. Guion S. Bluford Jr., Richard J. Hieb and Charles Lacy Veach.

HEADQUARTERS, Washington, D.C. --- NASA announced the upcoming Shuttle Flight Sequence between the Galileo mission to Jupiter and the Astro Spacelab mission. After the Galileo mission, currently manifested for October 12, 1989, the sequence of flights will be: the DOD mission, previously delayed to "protect" the Galileo launch window: the Syncom IV deployment/LDEF retrieval mission; a DOD mission; the Hubble Space Telescope mission; and the Astro mission.

Blankenship To Give Opening Address

Director of Structures at Langley , Charles Blankenship, will give the opening address at the second annual conference on "Composites in Virginia" on June 13 in Richmond. The conference is co-sponsored by Virginia's Center for Innovative Technology (CIT) and Virginia Tech.

Research at Langley in composites is funded at about $7 million per year with 60 professionals and 40 technicians engaged in projects such as advanced composites for future supersonic aircraft.

Advanced composites range from high performance fiber reinforced epoxy resin laminates to sheet molding compounds and chopped fiberglass polyester resins composites. These materials are used whenever strong, durable and lightweight materials are required.

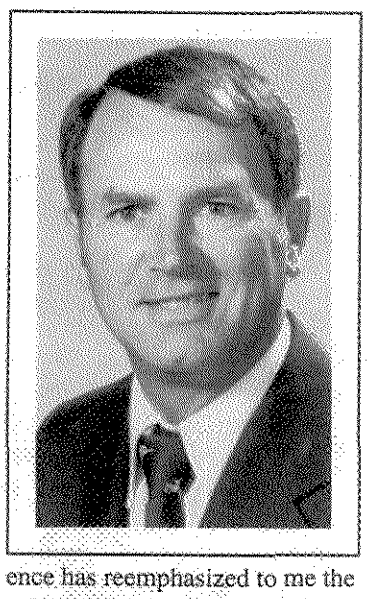
Composites, according to estimates from the Department of Economic Development, are more than a $100 million industry in Virginia which includes 400 companies and 8,000 employees.

The conference which will run from June 12 to 13 is at the Marriott Hotel, 500 East Broad Street in Richmond. There is no charge, but attendees are required to register in advance. To register or for more information, call Keith Burton at (703) 689-3016.

Editorials

Langley

Headquarters Forum



Several months ago the American Institute of Aeronautics and Astronuatics (AIAA) invited me to be its Wright Brothers Lecturer for 1989. The Lectureship obligates me to prepare a paper for publication in one of the journals and to present the lecture to AIAA Sections throughout the country. It will first be presented at the AIAA Aircraft Design Meeting on July 31, 1989, in Seattle, Washington. With the invitation came the opportunity for me to take some time off from my regular duties to research my topic and prepare the written version of the lecture. Now that the paper has gone to the printer, I would like to take this opportunity to reflect on the experience.

The topic given to me by the AIAA is supersonic and hypersonic aircraft. The thesis of my lecture is that we are on the threshold of a new era of supersonic and hypersonic aviation. The new generation of aircraft that I envision will not replace the need for large numbers of subsonic aircraft, but will be needed for new, very long-range commercial markets and military missions that are now emerging.

In the lecture, I briefly review our past experiences with supersonic and hypersonic aircraft, make some projections about what kind of flight vehicles might be next on the horizon, and describe the technical challenges that must be met in order to bring in the new era of supersonic and hypersonic flight. (You'll have to read the paper to get the details.)

It has been a long time since I last prepared a technical paper for publiction, and this experience has reemphasized to me the value of the support people here at Langley who help us in the publication process. Few places in the world offer the support services that we at Langley often take for granted. I certainly owe a debt of gratitude to the many people who helped me with library services, in preparing figures, in typing, and in editing the manuscript.

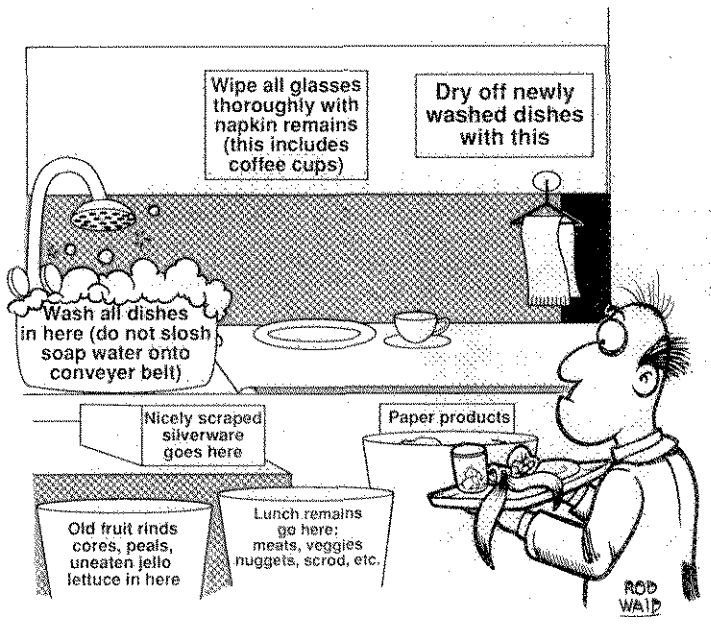
I also came out of the experience with a renewed conviction that the aeronautics program here at Langley is moving in the right direction. It is a dynamic program that is providing national leadership in all of the technical disciplines required for future aeronautical vehicles.

I believe that we have a good balance between subsonic and high-speed vehicle research and that exciting technical challenges are ahead for aeronautics.

I believe that these challenges can be met and that the payoff to U.S. competitiveness in aeronautics will be enormous. As in the past, Langley will continue to be on the cutting edge of these new aeronautical developments.

Roy V. Harris Jr.
Director for Aeronautics

Lankley



AIAA Announces Professional Study Series

The AIAA Hampton Roads Section is welcoming participants in the AIAA Professional Study Series on Solar System Exploration which it has organized. The Study Series is being held at the H.J.E. Reid Conference Center June 6 through 8. For more information contact Lindy Perkes at ext. 41594.

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-70.....President Bush Names Replacement Orbiter "Endeavour"
89-71.....Astronauts Named To Two DOD Missions Scheduled For 1990
89-72.....Moser To Leave NASA May 13
89-73.....NASA Announces Upcoming Shuttle Flight Sequence
89-74.....NASA To Test Space Shuttle Landing Gear
89-75.....Truly Selects Keller As Associate Deputy Administrator
89-76.....NASA To Feature Hubble Space Telescope At Paris Air Show
89-77.....Space Station Program Leadership Selected By Truly
89-78.....Bridwell To Manage Shuttle Projects Office At Marshall

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Annual Honor Awards

H.J.E. Reid Award

Richard H. Petersen, Langley Director, presents the H.J.E. Reid Award to Allen J. Zuckerwar, electronics engineer in the Instrument Research Division of Langley. Zuckerwar and Roger Meredith, who is not pictured, received the award for their outstanding paper titled Low Frequency Absorption of Sound in Air. Meredith works in the Naval Oceanic Research and Development Activity at NASA Stennis Space Center. The H.J.E. Reid Award recognizes the outstanding scientific or engineering paper written by a Langley Research Center employee or group of employees.

NASA Honor Awards - Outstanding Leadership Medal

Richard Petersen, Langley Director, presents the Outstanding Leadership Medal Award to Frank Allario. Allario received the award for outstanding leadership in the establishment of NASA's solid state laser research program. Allario stands to the right of Petersen.

Annual Honor Awards Ceremony

Employees Recognized for Outstanding Achievements

Langley employees, who have made outstanding contributions in aeronautics and aerospace research during the past year, were recognized for their accomplishments at the Annual Honor Awards Ceremony held in the H.J.E. Reid Auditorium May 15.

Dr. James C. Fletcher, former Administrator and Richard H. Petersen, Langley Director, presented the NASA medals and Langley awards. They were assisted by Paul F. Holloway, Deputy Director, who read the citations.

Langley Group Achievement Awards

Special Achievement awards for Group Accomplishments recognize groups and individuals for performance substantially beyond expectations on specific assignments or job function. The service must be in the public interest and connected with, or related to, official employment. Receiving group awards were:

Acoustic Sensing Research Team, "For outstanding technical contributions in the field of aeroacoustics and signal processing related to design of future aircraft."

Advanced Processing of High Performance Composites Team, "For meeting a national need in development of advanced composite material systems and innovative processes for future advancd transport and fighter aircraft."

Aeroassist Flight Experiment Aerodynamic/Aerothermodynamic Data Base Team, "For development of a comprehensive experimental/computational aerodynamic/aerothermodynamic data base crucial to development of the Aeroassist Flight Experiment vehicle."

Automated Structural Assembly Laboratory Development Team, "For exceptional contributions toward development of the Automated Structural Assembly Laboratory."

HALOE Instrument Refurbishment Team, "For technical excellence in providing design solutions for improved performance and precise workmanship in reassembling the HALOE Flight Instrument that is capable of meeting all scientific objectives."

Evaluation Information Center Team, "For outstanding service in support of the application of personal computing at NASA Langley Research Center."

Earth Observing System (Eos) Announcement of Opportunity (AO) Proposal Evaluation Team, "For significant accomplishments and outstanding contributions to the Agency's mission in the technical and management evaluation of proposals received in response to the Earth Observing System Announcement of Opportunity."

8-Foot Transonic Pressure Tunnel Reconfiguration Team, "For exceptional accomplishment in reconfiguration of the 8-Foot Transonic Pressure Tunnel to restore its original test capability upon completion of the Laminar Flow Control Experiment."

HALOE Instrument Design, Development, and Performance Verification Team, "For outstanding efforts in design, development, and verification of the flightworthy performance of the HALOE Instrument."

Hypersonic Boundary-Layer Transition Team, "For significantly enhancing understanding of hypersonic transition flow physics and for developing and demonstrating hypersonic transition boundary-layer prediction capability for design of hypersonic airbreathing vehicles, in particular, the National Aero-Space Plane."

Integrated Multidisciplinary Analysis Team, "For outstanding accomplishment in developing a unique, integrated analysis capability and for applying the Integrated Multidisciplinary Analysis Tool capability to a number of major NASA space programs."

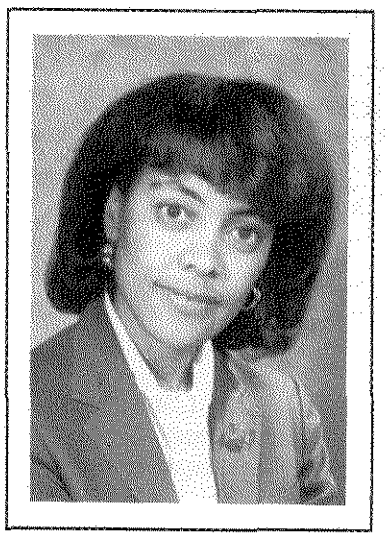
LaRC Supercomputer Augmentation Team, "For establishing the contract for an advanced Supercomputer Augmentation ahead of schedule, $6 million below the originally proposed price, and without vendor protests in a highly competitive environment."

Langley Research Center Telecommunications System (LaTS) Project Team, "For exceptional performance and technical excellen ce in planning and implementing the Langley Research Center Telecommunications Systems within budget and schedule. "

Awards

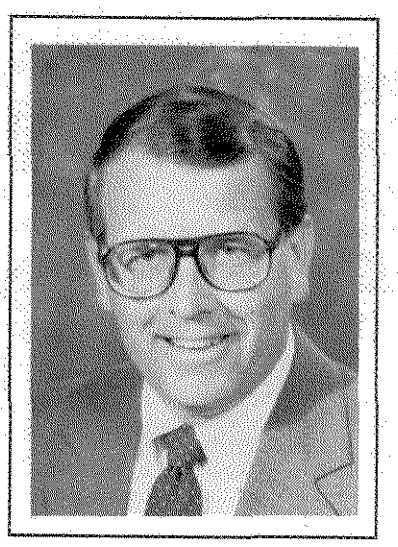
NASA Hon

Equal Opportunity Medal

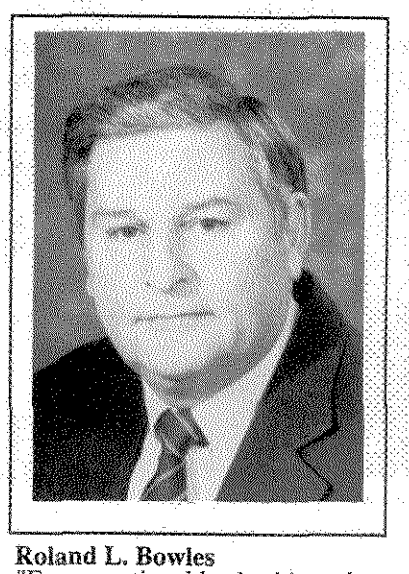


Rosa C. Webster
"For personal dedication and effective implementation of the Equal Opportunity Program at Langley Research Center."

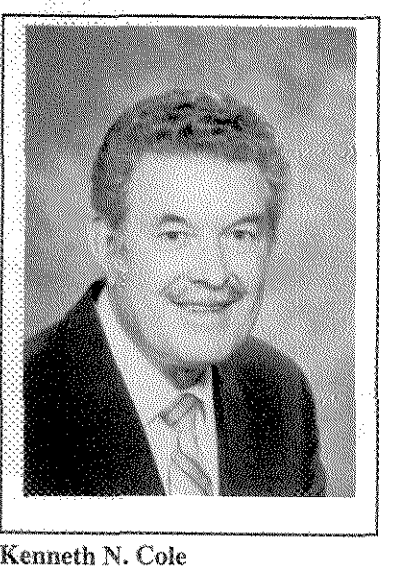
Exceptional Service Medal



H. Lee Beach Jr.
"For significant contributions and outstanding leadership in the field of high-speed propulsion technology."

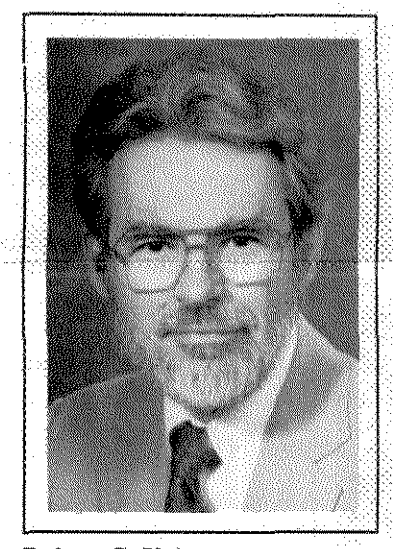


Roland L. Bowles
"For exceptional leadership and technical contributions in development and conduct of the Airborne Wind Shear Program. "

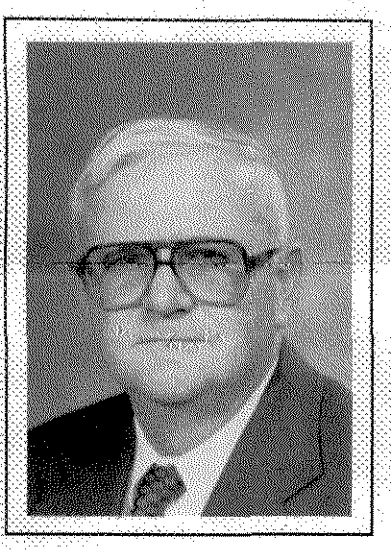


Kenneth N. Cole
"For dedicated service and demonstrated excellence in providing operational support and facility maintenance necessary to effective accomplishment of the Center's research programs."

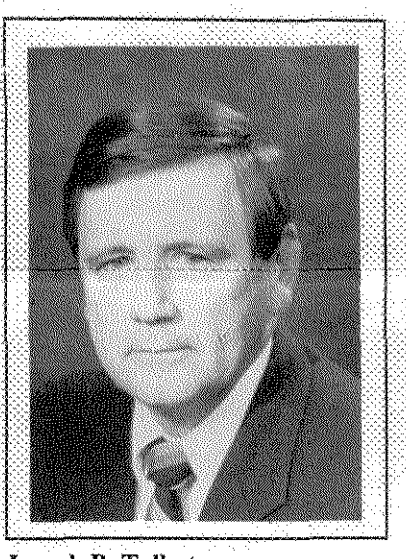
Public Service Medal



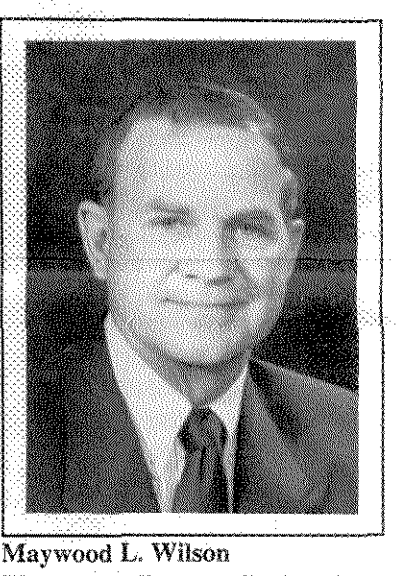
Robert G. Voigt
"In recognition of leadership in developing and fostering the creative scientific environment in Applied Mathematics and Computer Science."



Delma C. Freeman Jr.
"For directing a systems analysis activity supporting the National Space Transportation Program with results that have had significant impact on future direction of this national activity.

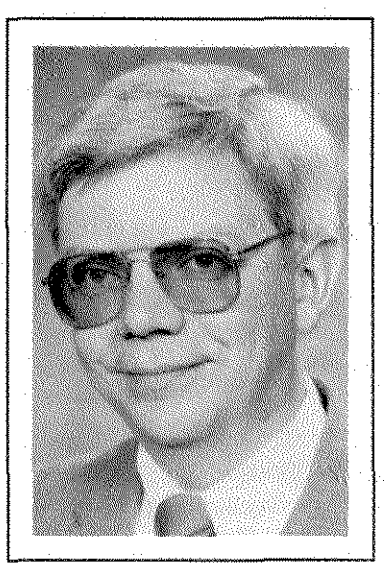


Joseph B. Talbot
"For leading the Space Station Phased Program Task Force and the Space Station Heavy-Lift Lauch Vehicle Impact Task Force which resulted in significant advances in definition of the space station at the systems level."

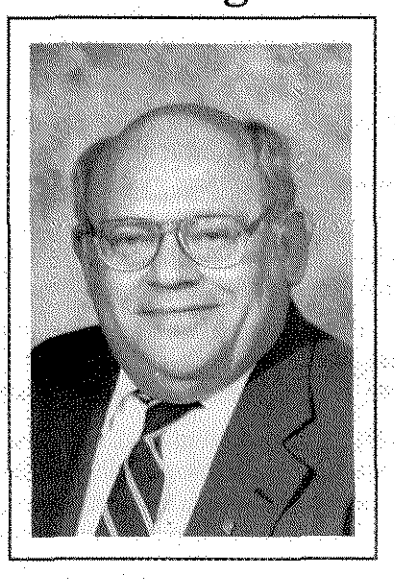


Maywood L. Wilson
"For outstanding contributions in materials processing, development and applications of advanced pultrusion techniques."

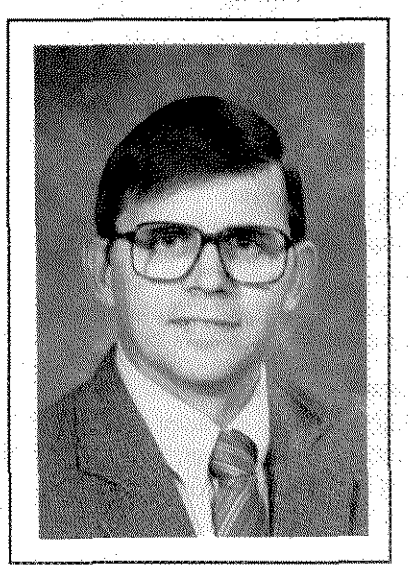
Exceptional Engineering Achievement Medal



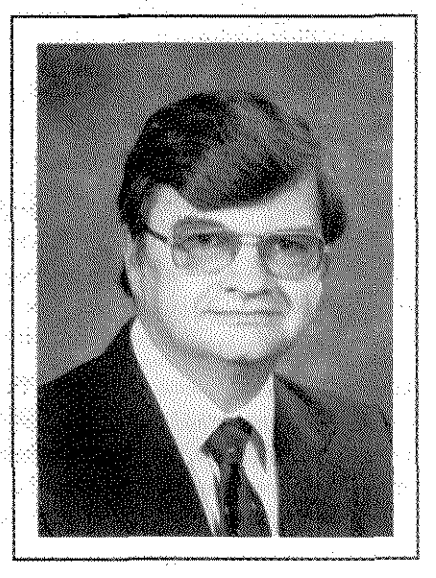
Glen W. Sachse
"For outstanding engineering-science achievements, proven excellence in the development of a highly sensitive airborne tunable diode laser trace gas measurement technique resulting in significant contributions to both the international instrumentation and atmospheric science communities."



Felix L. Pitts
"For conceiving, fabricating and operating instrumentation which results in high quality direct-strike lightning data for aircraft flying in and around thunderstorms, interpreting the data and being instrumental in defining significant upgrades to the national standards which qualify critical aircraft systems for flight."



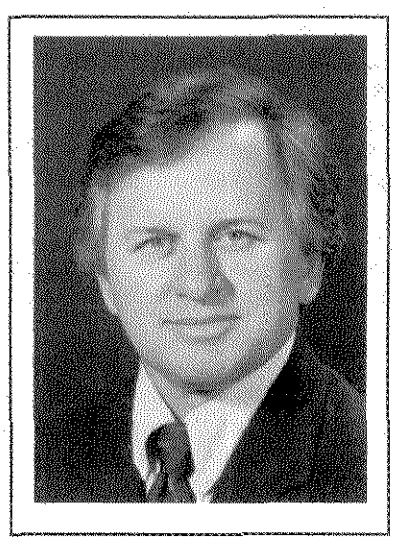
James L. Thomas
"For major contributions in computational aerodynamics research leading to significant improvements in the ability to predict flow fields about complex aerospace configurations of importance to the Nation's civil and military aeronautics programs."



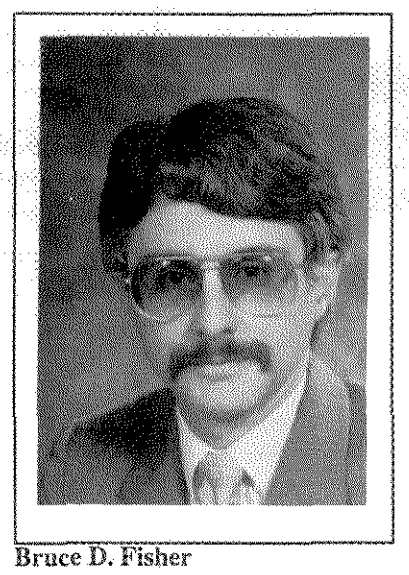
Leo D. Staton
"For fundamental, theoretical and experimental sustained advocacy for the need of a national radar technology program for avoidance of wind shear air hazard effects."

Awards

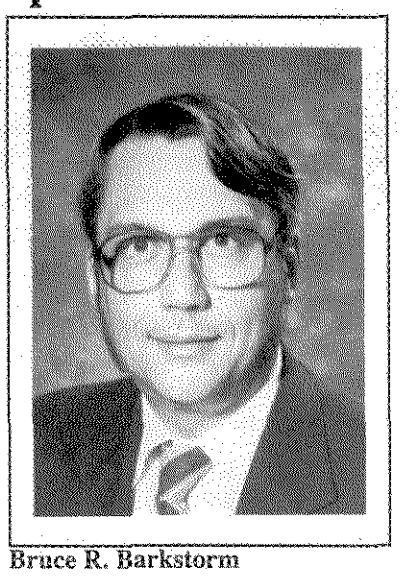
Exceptional ScientificAchievement Medal



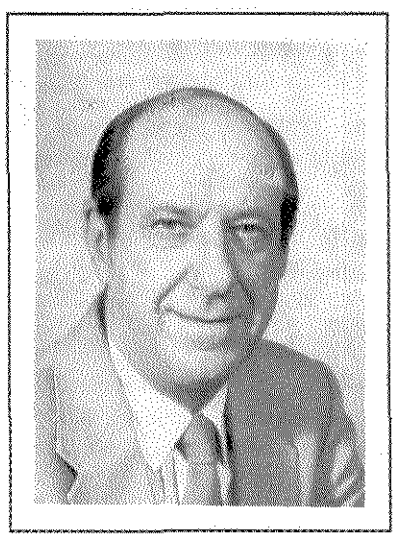
Allen R. Wieting
"For development of an integrated fluid-thermal structural analysis capability with application to the structural design of hypersonic vehicles."



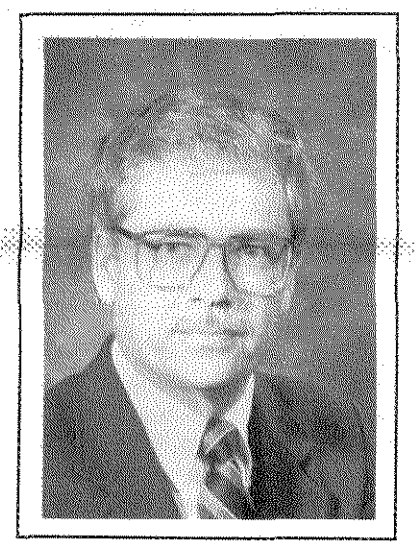
Bruce D. Fisher
"For outstanding project engineering and team leadership contributions to identification of severe storm hazards, including lightning, to the operation of aircraft and space launch vehicles."



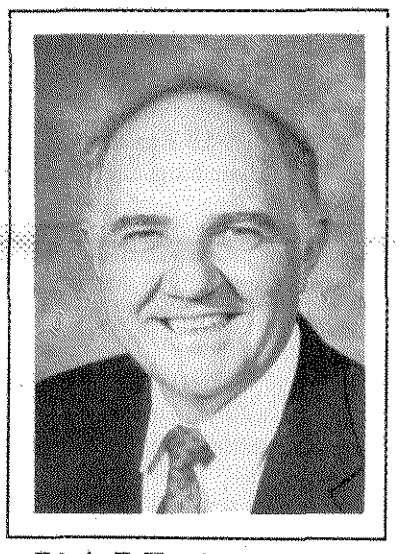
Bruce R. Barkstorm
"For outstanding contributions to atmospheric science through developments in radiative transfer theory and through analysis of data from the Earth Radiation Budget Experiment."



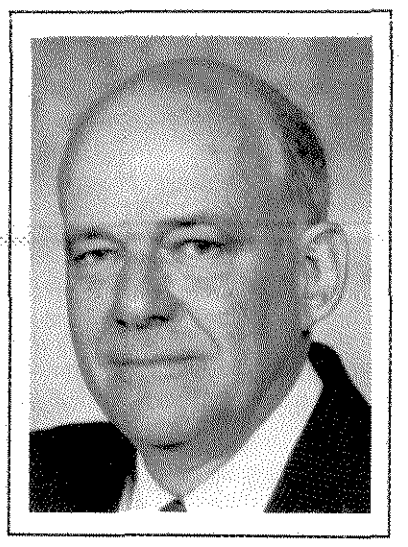
Robert D. Cress
"For outstanding contributions to understanding the Earth's climate system through development of climate theories and application of satellite radiation budget measurements."



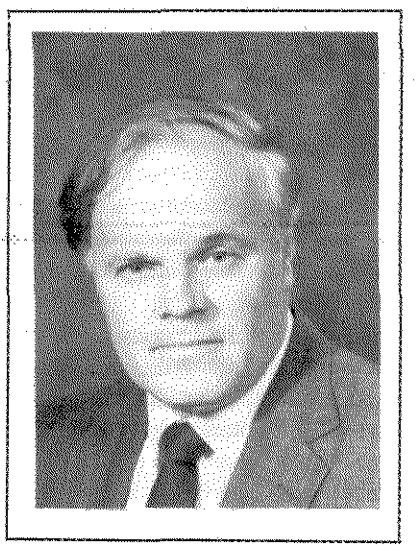
Richard N. Green
"For outstanding contributions in development of mathematical methods for satellite data inversion and application of those methods to increase understanding of the Earth's radiation budget."



Edwin F. Harrison
"For outstanding contributions to understanding of the diurnal variability through analysis and interpretation of satellite data."

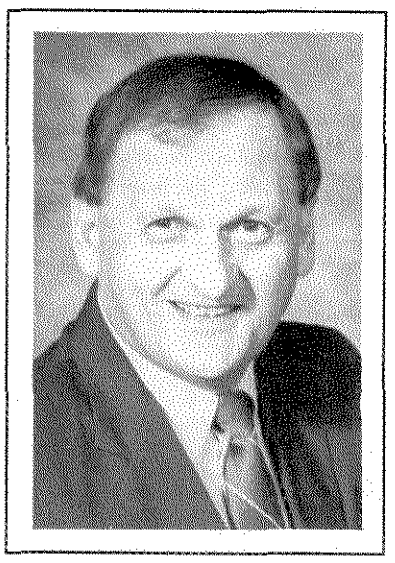


Frederick B. House
"For outstanding contributions in the use of satellite remote sensing to advance knowledge of the Earth's radiation budget and the stratosphere."

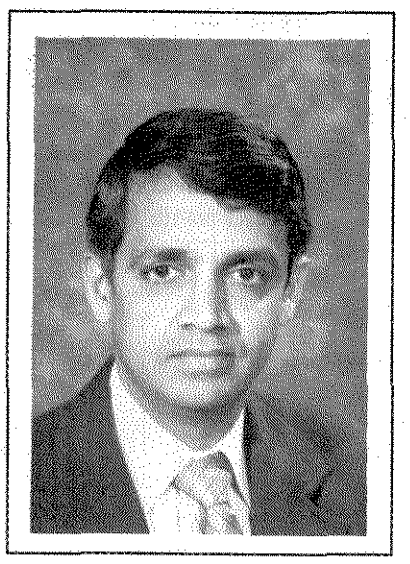


John M. Seiner
"For fundamental contributions to the understanding of supersonic jet aerodynamics and acoustics."

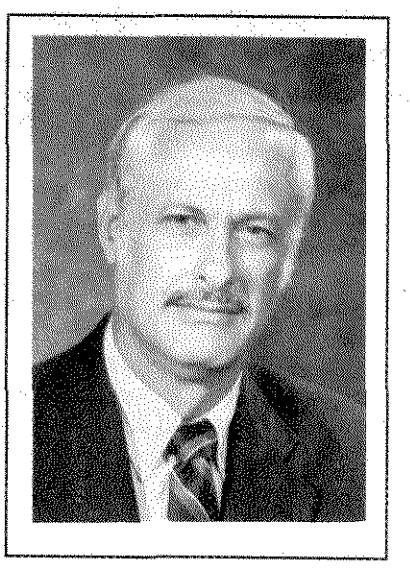
Outstanding Leadership Medal



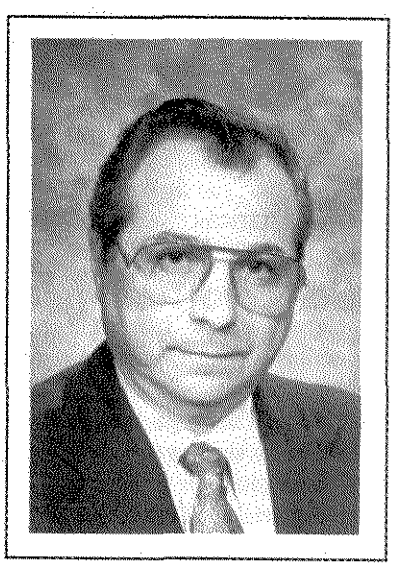
Casimir J. Jachimowski
"For achieving a scientific breakthrough in the area of atmospheric and combustion chemistry of major national significance."



Veerabhadran Ramanathan
"For outstanding contributions to understanding of clouds in the Earth's climate system through development of the concept of cloud forcing and validation of Earth Radiation Budget Experiment data."



G. Louis Smith
"For outstanding contributions to the understanding of Earth's radiation budget and its impact on climate."



Frank Allario
"NASA's solid state laser research program, which has resulted in substantial technology contributions in a shorter period of time than is usually required."

Awards

Langley, NASA Recognize Group Accomplishment

continued from page 3

Modifications to Aircraft Landing Dynamics Facility for Full-Scale Testing of Airfoil Performance in Simulated Rain Team, "For exceptional contributions to aeronautical research through design, construction and checkout of the Aircraft Landing Dynamics Facility for full-scale testing of airfoil performances in simulated rain."

National Transonic Facility Enhancement Team, "For design, implementation and checkout of enhancements to the National Transonic Facility, which greatly improved data quality and tunnel operating efficiency."

Ozone Trends Study Group, "For outstanding achievement in the use of Stratospheric Aerosol and Gas Experiment 1-11 ozone data to investigate global trends and for major contributions to the NASA/World Meteorological Organization Ozone Trends study."

Shock-On-Lip Interference Heating Team, "For development of an experimental and analytical data base for design of the cowl leading edges for the National Aero-Space Plane subjected to shock/shock interference heating."

SILTS Anomaly Resolution and Data Retrieval Team, "For outstanding, investigative assessment of SILTS experiment operation on STS 61-C, resulting in full understanding of hardware operation anomalies and generation of the first in situ infrared imagery of the Shuttle Orbiter in flight."

SMART Geometry System Development Team, "For development and implementation of the Solid Modeling Aerospace Research Tool providing a link between the space transportation systems analysis capability and state-of-art structural analysis and computational fluid dynamics analysis techniques."

Supercomputing Network Subsystem (SNS) Implementation Team, "For outstanding achievement in implementing a new Supercomputing Facility in record time."

Supersonic-Wing Leading-Edge Vortex Flow Research Team, "For highly innovative and dedicated research, combining both experimental and computational studies, which significantly enhanced understanding of and ability to predict supersonic-wing leading-edge vortex flows."

Test Technique Demonstrator Aerothermodynamic Team, "For development of unique, national experimental/computational aerothermodynamic testing techniques for slender, airbreathing transatmospheric vehicle concepts."

Transonic Wall Interference Assessment/Correction Methodology Team, "For outstanding contributions to understanding of transonic wind-tunnel-wall interference and the provision of computer codes that permit accurate assessment and corrrection of wind-tunnel data for wall interference effects."

Wing Modifications for Spin Resistance Research Team, "For outstanding contributions in development of a wing leading-edge configuration which significan tly increases the inherent spin resistance of general aviation aircraft and for development of criteria for evaluaton of spin resistance."

Langley Volunteer Service Awards

A number of our employees are engaged in numerous voluntary efforts in the local communities, serving with community organizatons and providing leadership to various projects aimed at improving the quality of life for all. These Federal employees, who devote their off-duty time and talents to such voluntary efforts, deserve recognition and appreciation for their exemplary community service.

E. Thomas Hall Jr., "For outstanding volunteer service in supporting the Hampton area fire and rescue squads and local community medical and youth activities."

James S. Harvey, "For distinguished community service in sharing of time, talents and knowledge with youth and adults on local and state levels."

Carl E. Horne, "For dedicated and unselfish giving of time in a tireless manner and for being a steadfast friend to all who work for youth development through Scouting."

Langley Public Service Awards

An award given to non-NASA citizens and organizations to show appreciation for contributions made to Langley Research Center in the accomplishments of its missions, services or operations as a public service.

P. Stephen Barna, P.S. Barna and Associates, "For outstanding service to Langley Research Center in development of facilities having high quality flow and acoustical characteristics."

Walter L. Darden, TRESP Associates, Inc., "For outstanding performance of NASA's Summer High School Apprenticeship Research Program at Langley Research Center."

Gary G. Gibson, Planning Research Corporation (PRC) Systems Services, "For development and timely implementation of innovative analytical techniques to optimize orbit characteristics, sampling strategies and mission designs for achieving scientific objectives of NASA's Earth observation satellite experiments."

William H. Hunt, Wyle Laboratories, "For outstanding scientific achievement in development of long-term stratospheric aerosol climatology using the LaRC 48-inch ground-based and 14-inch airborne lidar systems."

NASA Group Achievement Awards

The National Aeronautics and Space Administration bestows singular honor in recognition of achievements by the following groups and individuals:

Advanced Aircraft Technology Aerodynamic Design Team, "For outstanding technical contributions in the field of aerodynamics related to the design of future advanced aircraft technology."

B-1B Engine Nozzle Sonic Fatigue Team, "For identification of the origin of sonic fatigue related to the B-1B aircraft twin-engine installation and development of methods for acoustic loads reduction.."

CAP-TSD Development Team, "For development and validation of a computational method for the transonic aeroelastic analysis of complete aircraft configurations."

F-106B Vortex Flap Design and Fabrication Team, "For outstanding efforts in mechanical design, fabrication, quality assurance, instrumentation installation/integration and flight testing of the F-106B Vortex Flap System."

High-Speed Transition/Quiet Tunnel Team, "For exceptional contributions to development of a unique, low-noise wind tunnel and to understanding and prediction of high-speed boundary-layer transition phenomena."

Mobile Transporter Space Station Truss Assembly Team, "For design, development and evaluation of a Mobile Transporter for assembly of the Space Station truss structure."

Scout Project Team, "For successful processing and launch of four Scout vehicles within a 6-month period from two remote launch sites."

Space Station Systems Engineering Analysis Team, "For exceptional performance in development of computer-aided, multidisciplinary systems analysis techniques and innovative application of these techniques to key Agency studies."

NASA Public Service Awards

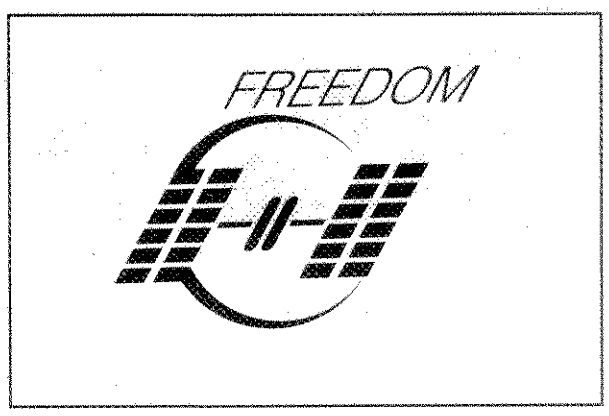
Scout Project Team LTV Missiles and Electronics Group Missiles Division, Dallas, Texas, "For successful processing and launch of four Scout vehicles within a 6-month period from two remote launch sites."

Logo Selected for Space Station Freedom Program

NASA's office responsible for the development of the permanently manned space station, called Freedom, today issued its official logo. The logo was designed by Justin Associates of Washington, D.C. "With the adoption of the logo, the Freedom program has a symbol that will distinguish it from all others," said Tom Moser, the former acting associate administrator for the space station program, in announcing the new logo.

The logo depicts a stylized version of the Freedom program's manned base featuring two of its most dominant features --- the pressurized modules where space station crew members will work and live and the large solar panels. The circular shape in the background represents both the Earth and other planets.

Space Station Freedom will be an international space complex used for fundamental research in the materials and life sciences, and to explore the Earth and outer space. Ultimately, Freedom will be an orbital stepping stone for extending human presence beyond Earth orbit and out into the solar system. An important element of the logo is the name, Freedom, which was announced last year by former President Ronald Reagan.



People & Places

At the VC during April

NASA Spinoffs

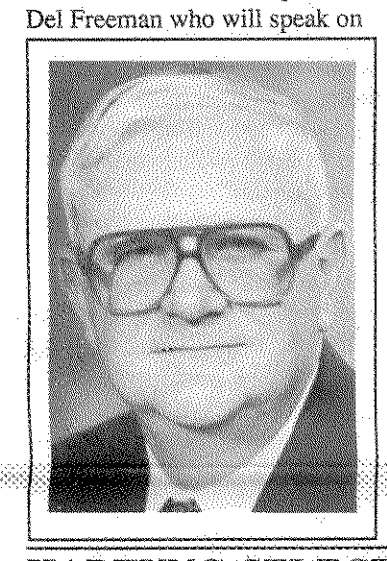
One of NASA's congressionally mandated responsibilities is to promote economic and productivity benefits to the nation by the transfer of earo-space-generated technology to the public domain.

Les Rose, assistant head of the Technology Utilization and Applications Office, will speak on NASA Spinoffs" Thursday, June 8, at 7:30 p.m. in the Visitor Center.

Since 1977, Rose has been responsible for planning, implementing and managing technology applications projects. He also acts as liaison with local communities helping them with problems amenable to NASA technology.

Crew Emergency Return Vehicle

The AIAA-Hampton Roads Section Student Branch presents Del Freeman who will speak on "Crew Emergency Return Vehicle," Wednesday, June 21, at noon in the Visitor Center.



The emergency return vehicle will serve as a "lifeboat" for the Space Station crew in the advent of an emergency occurring when the Space Shuttle is unavailable.

Freeman currently serves as the head of the Vehicle Analysis Branch of the Space Systems Division. He works on Space Shuttle development and performs configuration assessments of advanced space transportation concepts.

HARTUNG SELECTED

Lin Hartung, Aerospace Engineer in the Space Systems Division, has been selected as Langley's representative to the International Space University 1989 summer session.

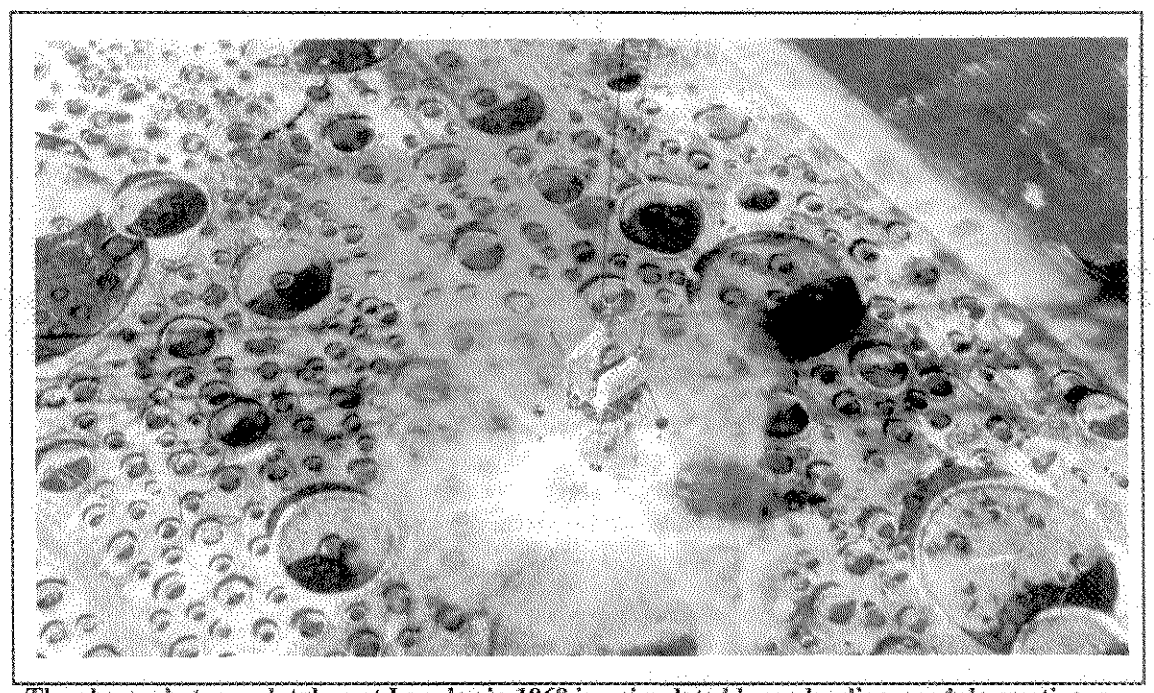
The International Space University (ISU) was founded in 1987 to provide graduate-level students, who demonstrated academic excellence and leadership qualities, with an annual Summer Session embracing eight concentrations of study in a multidisciplinary approach to space and policy.

The intensive summer course, over 240 hours of lectures and 280 hours of design work, compresses a full year of study into two months.

The ISU '89 program will be held at the Universite Louis Pasture in Strasborg, France. ISU expects 120 students from 25 nations will comprise the 1989 student body.

Hartung's selection was based on her outstanding academic record, outstanding work performance and leadership ability.

Harveys's Janitorial Service, Inc., recognizes Crew #12 as the Crew of the Month for April 1989. They obtained a perfect score of 95 through their outstanding efforts and have been selected to receive the Crew of the Month Award. From left to right are: Jean Bond, Mary Jackson, Patricia Coats, Joyce Snow, Annie Melton and William Clinton.



The above photograph taken at Langley in 1969 is a simulated lunar landing module meeting a simulated moonscape in a lunar landing test. The tests were made during night with floodlights on to reproduce lighting on the lunar surface, and the terrain under the gantry was modified as a replication of the moon's surface. The simulated moonscape was "picture perfect," acurately reproduced from photographs obtained through the Lunar Orbiter Project.

The Lunar Orbiter Project

by Allan Hanrahan

Man stepping onto the moon; what an exhilarating and adventuresome goal that was in the Sixties. But first had to come the reconnaissance projects: the hard-landing Ranger, the soft-landing Surveyor and the all-seeing Lunar Orbiter, a Langley-managed project.

As Isral Taback, Chief Engineer and Spacecraft Manager introduces it in his publication, " A Description of the Lunar Orbiter Spacecra ft," the U. S. Lunar Orbiter Spacecraft Program was conceived to search out potential Apollo landing sites and to return detailed photographic coverage of the lunar surface for scientific study .

An outsider, Zdenik Kopal at the time the Professor of Astronomy at the University of Manchester in England, was more subjective in his assessment. He said, "When one considers the relatively short lead time of the experiment ... much credit goes to NASA Langley Research Center, as well as the Aerospace Division of the Boeing Company." Boeing was the prime contractor. Later Professor Kopal would comment that some of the Lunar Orbiter photographs..."have been rightly hailed by the scientific public as the 'pictures of the Century."

It was late in August 1963 when the fledgling Lunar Orbiter Project Office (LOPO), Clifford H. Nelson managing, settled into the Langley Research Center's sixteen-foot wind tunnel facility in the West area. The members of the original LOPO nucleus included Isral Taback, Robert Girouard, William I. Watson, Gerald Brewer, John B. Graham, Edmund A. Brummer, Robert Fairbairn and Anna Plott. William J. Boyer joined the group soon after its formation, serving as Operations Director.

Boyer, now retired and president of the Langley Research Center Alumni Association, recently reminisced about the project. He said, "The cost was relativiely inexpensive, $65 million. That was for five flights. Our objectives were all met on the first three flights, so the last two were bonuses -- both for pictures and for scientific studies."

"The Center has always been a phenomenal place for finding one or two guys that know something that no one else knows. The Lunar Orbiter formed a base for the Viking Project," concluded Boyer, reflecting on the success of the Project.

The Apollo Program provided the Lunar Orbiter with its raison d'etre, as did the Ranger and Surveyor Programs.

The Ranger Program crash-landed three high-speed-camera-equipped probes on the moon showing that a lunar landing was possible.

The Surveyor Program, through its soft landings and photographic data, showed that the lunar surface could easily support impact of a small lander.

" After Surveyor there was an intense interest in the Orbiter mission," said Brummer who served as Communications and Tracking Systems Manager and Head Mission Advisor. Called the "Voice of Lunar Orbiter," Brummer felt that there was a feeling of excitement about the Orbiter Program. "Things were being done for the first time that we would think about for years to come." said Brummer.

While the Lunar Orbiter also had as its objectives the answers to such scientific inquiries as the quantitative definition of the gravitational field of the moon and the measurement of the micrometeoroid and radiation flux in the lunar environment, it essentially was a 850 pound platform for the special Eastmean-Kodak Co. dual-frame camera . Lunar Orbiter 2 launched November 2, 1966 and Orbiter 3 launched February 4, 1967 located eight sites.

Of the eight sites, one became the exact spot in the Sea of Tranquility chosen for Apollo 11.

"Launched May 4, 1967, flight four of the Orbiter resulted in photography which covered the entire front face of the moon at resolutions of at least one order of magnitude greater that previously available from Earth-based cameras. The fifth flight covered more than 40 sites of particular scientfic interest at a resolution of a few meters. The final result was that 99percent of the moon was mapped," said Taback.

The film was developed aboard the spacecraft, scanned electronically and the results telemetered to Earth where the images were reconstructed in strips.

"The potential for disaster was real," remembers Don Ward, then the head of the Launch Operations for Lunar Orbiter.

" You had fuels -- rocket fuel, high pressure gasses for the control jets--up to two thousand psi and explosive bolts. We got them all off on time and nothing blew up, but we had hangups. For instance, there was the time it was on the pad and the camera started taking pictures! We worked around the clock and found that the problem was a piece of groud equipment. We had a good time, pioneering, on the cutting edge. We felt that the nation watched us...we had this feeling of history."

Happenings

LAA SOCIAL will be held Friday, June 9, from 4 to 6:30 p.m., in the H.J.E. Reid Conference Center, Building 1222.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, June 13, at 2 p.m. in the H.J.E. Reid Conference Center.

NASA TOASTMASTERS will meet Wednesday, June 14, at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are welcome. For additional information, call Steve Yaros, ext. 43050.

BUCKROE BEACH DAZE is scheduled for Saturday, June 17, from 10 a.m. to 5 p.m. Live entertainment beach games, 5K run, sand sculpture competition, arts and crafts, food concessions, windsurfing, scuba diving and a fashion show are planned. For further information, call the Hampton Recreation Department at 727-6197.

ALUMNI ASSOCIATION drop-in luncheon will be held June 13 at 11:30 a.m. in the NASA cafeteria. Dr. John S. Buckley will speak on "New Fabrication Techniques."

LAA is seeking contestants to run for the 1989 Carnival Monarch. The contestant selling the most Carnival raffle tickets will be crowned Carnival Monarch on Friday evening, August 18. NASA and Contract employees are invited to become contestants. Submit names to Paula Ware, Mail Stop 285, no later than June 23. Carnival is August 18 and 19

AIAA cordially invites members and non-members to the tenth anniversary picnic to be held at the H.J.E. Reid Conference Center picnic grounds. Food and games for all. Cost is $5 for members and guests, #7 for non-members, $3 for student members, $2 for children (6-12), free for under 6. Call Fred Grosveld at 850-3896 or 43586 or Jim Youngblood at 44509. Deadline to reserve is 12 p.m. June 5.

PENINSULA CONTACT is sponsoring a fundraising dinner Saturday, June 10, at 7 p.m., at the Hellenic Community Center, Traverse Road, Newport News. Entertainment will be by the Virginia Choral Society's Opus II. Tickets are $10 per person; call 244-0594.

FOR SALE OR RENT brick rancher in Bayberry, 3 BR, FR with FP, DR, .5 acrea lot, 10 minutes from NASA. Assumable loan, $89,000. Contact agent Betty Walls at 595-6300.

DENBIGH SOUTH 3BR rancher, 1 bath, recently remodeled kitchen all appliances, central air/gas, attached garage, storage shed, ceiling fans and well on a large landscaped lot, fenced backyard. $74,000. Call 874-7454.

FOR SALE time share condo on intercoastal waterway. Completely furnished, 2 BR, sleeps six. 51st week at beautiful Oyster Bay Resort, Sebastian, Fld. on the Indian River. $5,000. Call (407) 396-4657 after 5 p.m. or on weekends.

GARAGE SALE starting at 8 a.m. until 4 p.m., Saturday, June 3, Hollymead Subdivision in the Tabb area of York County . On RT 171, across from the Heathlea Subdivision. Waterbed, tupperware, Avon, antiques, crafts, clothing, and much more. Call 44548 for details.

RETIREMENT PARTIES

Dave Johnson will be honored at a keg party on June 20 at the H.J.E. Reid Conference Center , 4 to 6 p.m. Please RSVP to Miriam Hall or Nita Langford at Mail Stop 235, ext. 44755 by June 13.

PERCY "BUD" J. BOBBITT will be honored at a retirement dinner Friday, June 23, at the Chamberlain Hotel.. A cash bar will begin the social at 6 p.m. followed by a buffet at 7 p.m. Call Paula Ware, ext. 43520 for additional information.

EARL GERMAN will be honored at a retirement dinner on Wednesday, June 28, at the Fort Monroe Officer's Club. Cocktails (cash bar) at 5:30 p.m. and dinner at 6:30 p.m. Cost is $11 per person and $20 per couple. Gift contributions are welcome. Make check payable to: Jane T. Everett, Mail Stop 233, send by June 23. Call ext. 44839 for additional information.

Note of Thanks

Billie Jean Neil writes: "My dear friends, thank you. What a 'finale' you put on to honor me! Words cannot express my appreciation for my recent retirement party.
It was a day that my family and I will always remember. It was great, too, seeing my retiree friends; you all looked so good. The gifts will always be a remembrance of you and my career at NACA/NASA, especially the anniversary clock. When it chimes, I will remember you. God bless you, love and best wishes to all."

Linda Nunamaker writes: "Thanks so much for all your kind words of support through your cards, letters and phone calls. They were most sincerely-needed and appreciated during this most difficult time. Knowing Skip was liked and appreciated so much really helps. Thanks again."

If you will complete the requirements for your graduate degree program during Fiscal Year 1989, and have not notified the Training and Education Section, call George Allison at ext. 42594.

Visitors glance into the cockpit and into the future of flight in the Aeronautics Gallery of the Visitor Center.

Visitor Center Aeronautics Gallery Focuses on Flight

With the push of a button, the cockpit of a Boeing 727 fades into the streamlined, computerized "Flight Deck for the Future." The NASA Langley Visitor Center has finalized modifications to the Center's Aeronautics Gallery. The gallery features 24 aeronautics exhibits.

The "Flight Deck For the Future" exhibit simulates a complex computer flight system which will be used by commercial airlines in the next fifteen years. It is a full-scale model of the Advanced Concept Flight Station Simulator, the forerunner of future flight decks, now being tested by NASA.

With this future flight deck, color video screens will continuously display flight data. The pilot will be able to select information by a touch to the screen. Similarly, the Center's new exhibit allows visitors to call up flight information on a video screen: primary flight and navigation, warnings and traffic, engine status and the copilot's electronic checklist.

These fully-automated systems will increase the pilot's awareness of every aspect of flight status. They are designed to reduce pilot workload, increase operating efficiency and improve safety.

The "New Shapes in Tomorrow's Skies" exhibit illustrates the radically different designs now being tested for future aircraft. When visitors step into the dark room of this exhibit, lights give the illusion of stars in space and an infrared switch activates the program. A narrator explains these new designs, some of which may fly by the end of this century.

The National Aero-Space Plane exhibit provides information on a research program that is presently receiving strong technical support from NASA Langley. As envisioned, this plane will take off horizontally from conventional jet airports and fly into space at speeds of up to 25 times the speed of sound. Another vehicle which might evolve from this technology is a hypersonic transport capable of flying from the United States to Tokyo in two hours.

Researcher News

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

NASA
National Aeronautics and Space Administration
Langley Research Center

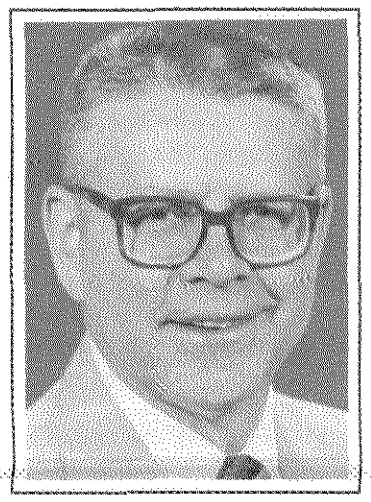
Volume 3, Issue 12 June 16, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

NASA/AHS Rotorcraft Noise Reduction Program Receives Hughes Award

Robert J. Huston accepted the American Helicopter Society (AHS) Howard Hughes Award for the efforts of the NASA/AHS National Rotorcraft Noise Reduction Program toward decreasing helicopter noise. The award, established in 1977 by Hughes Helicopter to honor the memory of Howard Hughes and his pioneering accomplishments in aviation, was presented at the 45th Annual AHS Honors Banquet in Boston, Massachusetts on May 23.



NASA Langley Research Center manager of Rotorcraft Research and Technology and executive director of the NASA/AHS Noise Program, Huston had responsibility for the overall direction of the Langley program. This responsibility included contracted efforts by the four major helicopter companies and coordination of the program with experiments and analysis by NASA Ames and the Federal Aviation Administration. Huston devised a government program to meet the long term needs of the helicopter industry for accurate noise prediction and for cost effective noise reduction methods. The program, which included in-house fundamental noise research and system noise prediction efforts by the Langley Acoustics Division, focused both government- and industry-sponsored noise research on a set of common objectives. Huston also served as Chairman of the Government-Industry Working Group on Rotorcraft Noise, the steering group for government and industry rotorcraft noise research.

Huston, in his acceptance address, acknowledged that the award was earned by many individuals from several organizations. "The program evolved from the 1980 objective of the Federal Aviation Administration to limit helicopter noise," explained Huston.

Ron Schlegel of Sikorsky spearheaded an effort to put together a helicopter industry proposal to respond to that need. With the encouragement and assistance of John Zugschwert of the American Helicopter Society, a unique government-industry program concept was outlined and proposed to NASA by the AHS.

John Ward, former director of NASA Rotorcraft Research, accepted the proposal and assigned Huston to develop a government program that met the needs of both the public for helicopter noise reduction and of the industry for advanced acoustic technology.

"The program involved a unique parallel contract approach with the leading helicopter manufacturers. Langley's Otis Childress played a key role in defining the contracts and then in harnessing the four horses of industry into a workable team," explained Huston.

Huston also acknowledged the industry team, citing the outstanding leadership of Harry Sternfeld of Boeing Helicopter, Raj Shenoy of Sikorsky Aircraft, Charlie Cox of Bell Helicopter, and Ram JanakiRam of McDonnell Douglas Helicopter while working under the Langley contracts.

Langley's Huston concluded, "The success of the program was due to the support of many individuals, from a variety of research organizations in both the private and public sector, working together as a team to research, discover, and develop the meaningful acoustic technology that will result in quieter rotorcraft of the future."

Langley Dependent Awarded NASA Scholarship

Michael L. Fripp, a senior at Bruton High School in Williamsburg, Va., has been awarded a scholarship by the NASA College Scholarship Fund, Inc., a non-profit organization established to aid qualified dependents of NASA and former NASA employees, agency-wide. Michael is the son of Dr. Archibald L. Fripp, senior scientist, Informations Systems Division.

A National Merit Scholarship Finalist and salutatorian of Bruton's Class of 1989, Michael plans to attend Virginia Tech as a Presidential Scholar and major in engineering science and mechanics. He also plans to attend graduate school, studying in the field of medical research.

Michael was a member of the Westinghouse Science Talent Search Honors Group and the "USA Today" All-Academic Team. He has been a class officer throughout high school, president of the Key Club and captain of the Academic Challenge Team.

He worked as an apprentice physicist at CEBAF in 1987-89, attended the Governor's School for Science and Technology in 1988, was an exchange student to West Germany in the summer of 1987 and attended the Johns Hopkins Summer Program in chemistry in 1986.

Deputy Director Paul F. Holloway commented, "Michael's qualifications show how deserving he is of this recognition." Holloway, who is on the selection committee, said that the applicants are evaluated anonmously. "I was totally surprised and delighted that one of the three scholarships awarded for 1988-89 was a Langley dependent."

Deputy Director Paul F. Holloway greets NASA scholarship winner Michael L. Fripp (center) and his father Dr. Archibald L. Fripp (right).

NASA Celebrates Flight of X-15, First Hypersonic Research Aircraft

Thirty years ago NASA's famed rocket-powered X-15 knifed through the clear desert sky over California to become the world's first hypersonic research aircraft, eventually flying at over six times the speed of sound.

North American Aviation pilot A. Scott Crossfield was at the controls on June 8, 1959, for the first flight. X-15s flew until October 24, 1968, when NASA's William H. Dana, now chief test pilot at Ames-Dryden, made the last flight of the program.

The three X-15 research aircraft flew a total of 199 flights in what is widely regarded as one of the most successful aeronautical research programs ever conducted. The X-15 flew to altitudes in excess of 67 miles, making it the first "spaceplane."

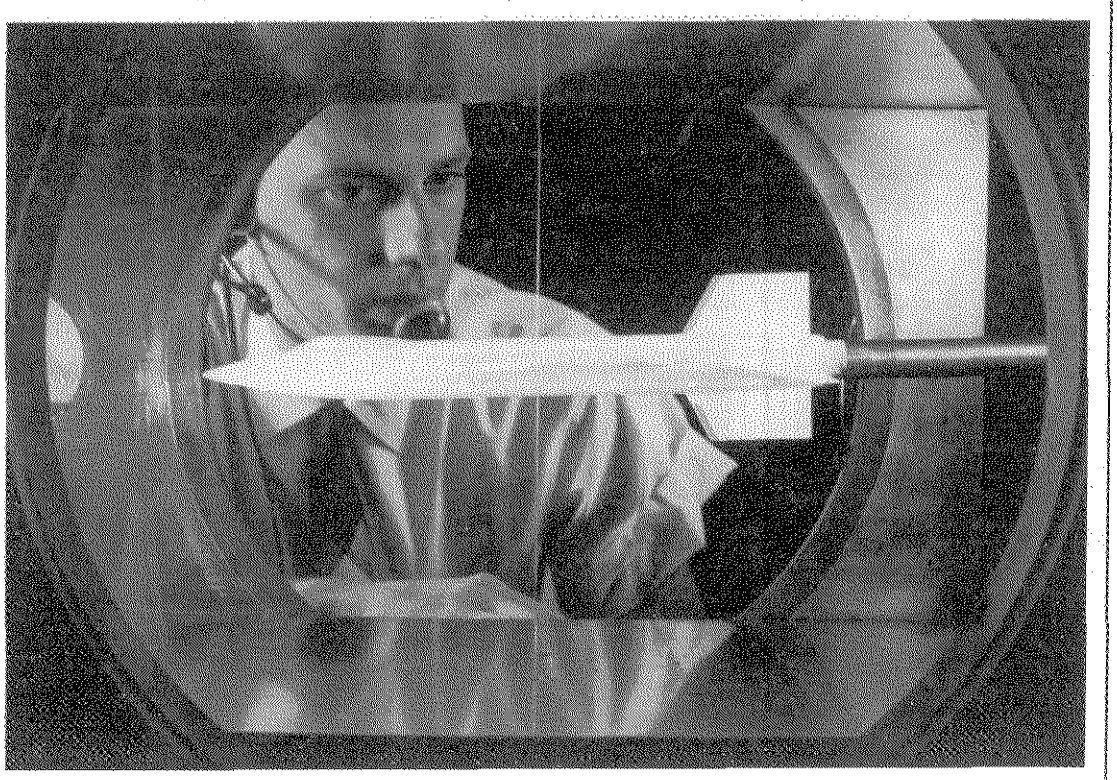
The X-15 was developed to provide research data on aerothermodynamics, aerodynamics, structures, flight controls and the physiological aspects of high-speed, high-altitude flight. While the original design goal was 4,000 miles per hour, 4,520 miles per hour was achieved. The highest altitude flown--354,200 feet--far exceeded the original goal of 250,000 feet.

Since the X-15 flew to the edge of space, researchers were able to fly many experiments on a repeated basis that aided in developing space technology. The capabilities and limitations of the human pilot in flying space trajectories and reentry maneuvers were thoroughly explored.

Over 700 technical documents were created through the course of the program, greatly increasing information available to the then-blossoming space industry. Based on the success of the X-15 design, development and flight program, the Mercury, Gemini and Apollo spaceflight programs were accelerated.

"The result of the focusing and stimulating effects of the program was to generate aerospace vehicle technology at a highly accelerated rate compared to the more leisurely rate that existed prior to the X-15," said X-15 program official John V. Becker of Langley. "Thus when it became clear the the Space Age was upon us and the need to put a human into Earth orbit became a matter of national urgency, a massive backlog of aerospace technology was already at hand in the X-15 program."

Twelve military and civilian test pilots flew the aircraft during the joint NASA-USAF-Navy program. Of the twelve, Neil A. Armstrong went on to become the first man to set foot on the moon.



A scale model of the X-15 is tested in Langley's supersonic tunnel.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA has announced the selection of 36 universities as recipients of three-year grants to design advanced aeronautics and space mission concepts as topics for senior engineering design courses. The University Advanced Design Program grant recipients will study topics in space and aeronautics missions, in the post-Space Station era, such as manned Mars aircraft and delivery system, long-term space habitat, lunar launch and landing facilities and operations and trans-Pacific, high-speed civil transport.

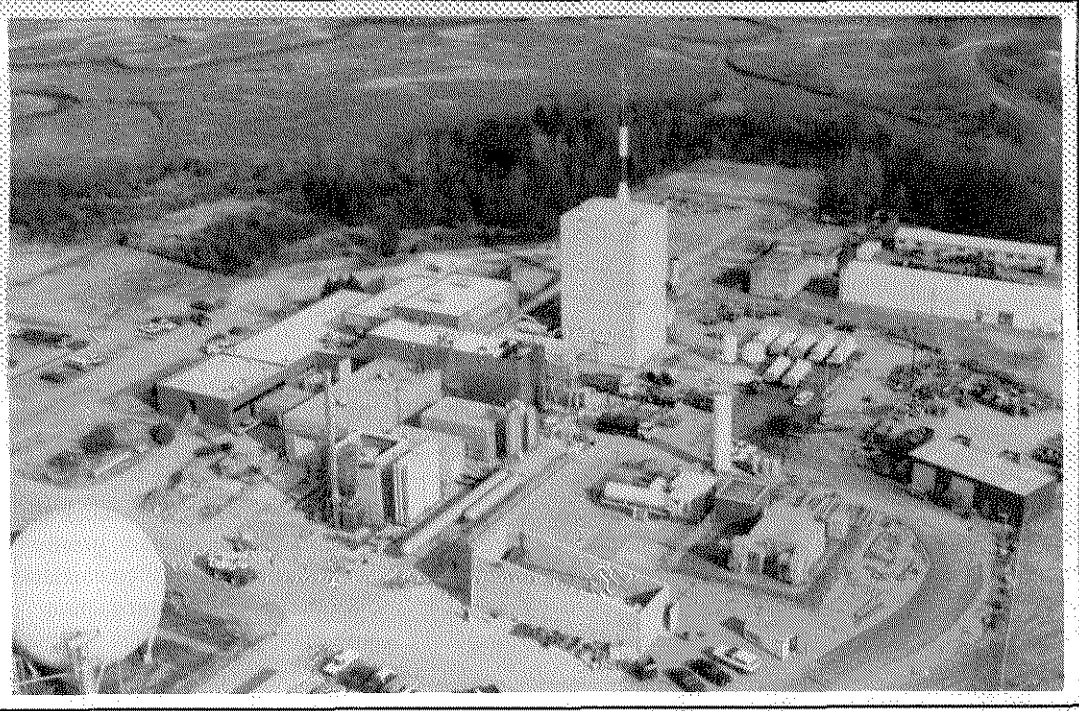
AMES RESEARCH CENTER, Mountain View, Calif. --- NASA Ames and the Defense Advanced Research Projects Agency (DARPA), Washington, D.C., have announced the successful demonstration of a low-cost parallel-processing computer with the potential of producing capabilities equivalent to today's most advanced supercomputers. General Microelectronics, Inc., San Diego, Calif., developed the system called Configurable Architecture Parallel Processsing System (CAPPS).

HEADQUARTERS, Washington, D.C. --- An exhibit featuring the cooperative efforts of NASA and U.S. industry to commercially develop space is being displayed in the United States National Pavilion at the 38th Paris Air Show, June 9-18. The exhibit highlights the development of commercial applications, and focuses on current research activities underway by NASA and U.S. companies through programs such as Joint Endeavor Agreements and the Centers for the Commercial Development of Space.

HEADQUARTERS, Wasington, D.C. --- U.S. and Soviet physicians are at the halfway point in a two-month-long telemedicine spacebridge set up to provide medical assistance to the victims of the earthquake that devastated parts of the Soviet republic of Armenia in December 1988. NASA initiated the idea immediately after the earthquake to help Armenian physicians with diagnosis and treatment.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA's Tracking and Data Relay Satellite-4 (TDRS-4) became operational Saturday, June 3. The 5,000-pound communications satellite assumed satellite communications responsibilities that had been maintained by TDRS-1 since April 1983. TDRS-1 has been moved to a new location where it serves as a back-up to TDRS-4 and TDRS-3, also known as TDRS-East and TDRS-West, respectively. This switchover represents the completion of the three-satellite TDRS constellation.

HEADQUARTERS, Washington, D.C. --- Alphonso V. Diaz has been named NASA's deputy associate administrator for Space Science and Applications, effective July 2. Diaz leaves the position of division vice president for Space and Aeronautics Services, General Electric Government Services, Cherry Hill, N.J. Diaz began his NASA career at Langley in 1964 as a cooperative education student. Later he worked on the technical development of the Viking organic analysis experiment.

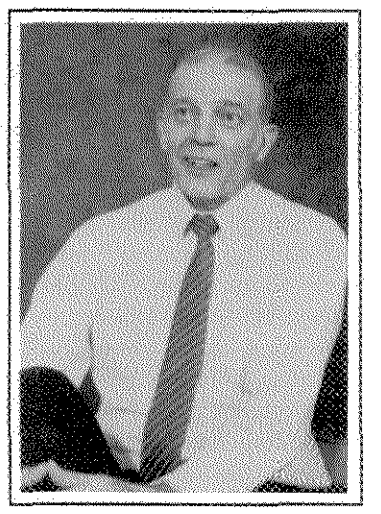


THIS AERIAL VIEW OF THE MODIFIED 8-FOOT HIGH TEMPERATURE TUNNEL shows the nation's premier research facility for hypersonic air-breathing propulsion systems and for performing aerothermal structural research. See editorial at right and modification update on page 3.

Editorials

Langley

Headquarters Forum



In 1986, we initiated one of the more complex facility modifications undertaken in recent times. This venture features modification of the 8-Foot High Temperature Tunnel (8'HTT) to provide the capability to test scramjet engines--both full-scale and scale models--in a realistic operating environment at hypersonic flow conditions of Mach 4, 5 and 7. Completion of this $23M venture will add another world-class, one-of-a-kind facility to Langley's assets.

Before the modification, the 8'HTT was used primarily for aerothermal loads and hot structures research. Methane was burnedin air and the resulting hot gas expanded through a water-cooled nozzle to achieve Mach 7 flow at enthalpies up to 1300 Btu/lb. Test conditions can be maintained for up to two minutes in this blow-down tunnel. Oxygen enrichment of the 8'HTT is required for scramjet engine testing since the methane/air combustion gas is oxygen deficient and would not support combustion in an engine. Also, a hydrogen system is being added to provide the engine fuel and to cool the engine structure.

You may have noticed the new barber-pole colored stack at Building 1265. This stack, which resembles a Scout rocket, is for venting the hydrogen system. A new liquid-oxygen tank and oxygen vent stack are also in place along with lots of new plumbing. Handling methane, oxygen and hydrogen in one facility has received high priority attention from every aspect of system design and operational safety.

A new Mach 7 nozzle has provided one of the more challenging design and engineering tasks. The old, water-cooled nozzle had seen better days and the Fab shop had run out of sound metal areas to weld-repair. The new nozzle is transpiration cooled. Over 6,800 platelets, some only 0.030 inch thick, were photo-etched with the proper cooling passages and then diffusion-bonded to complete the nozzle configuration.

The completed nozzle assembly is over seven feet long, weighs 15,000 pounds and costs over $3M. No one had ever made a transpiration cooled structure of this size before. Of course, we used the latest CFD codes to provide the aerodynamic flow-lines for the nozzle contour. Only two months of computation time on the VPS-32 (our fastest computer at the time) was required. We learned an important history lesson. The Langley engineers who designed the original Mach 7 nozzle 25 years ago using slide rules and mechanical calculators were good--their contours were within one percent of the latest analysis codes.

Mixing oxygen in the combustor that is burning methane turns out not to be a trivial matter. We do have a redesigned methane spray bar to handle this task, but the 8'HTT is the only place we can test the concept. This will provide an added challenge to the tunnel "shake-down" testing that will begin later this year.

Operation of the 8'HTT will be a research effort comparable to many of the research tests planned for this unique facility.

Charles P. Blankenship
Director for Structures

Lankley

Introducing the Moonraker, the cutting-hedge of technology.

Current News Releases

To obtain a acopy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

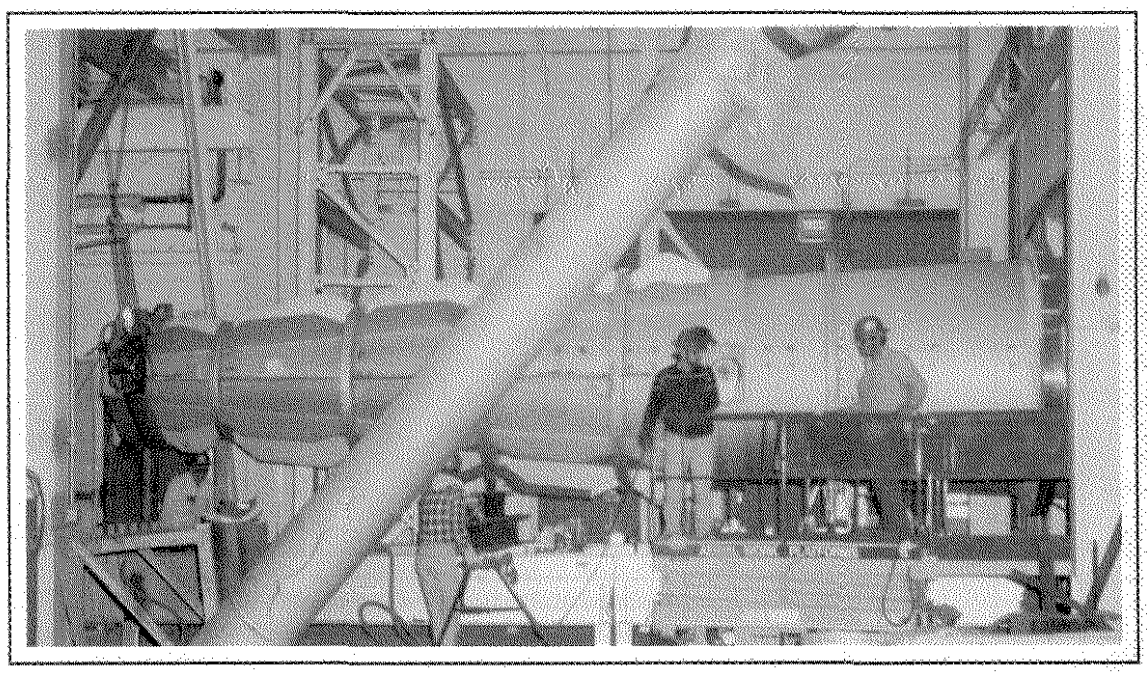
89-80.....NASA/DARPA Low Cost Computer Demonstrated
89-81.....NASA Commercial Programs to Exhibit at Paris Air Show
89-82.....NASA Celebrates Flight of First Hypersonic Research Aircraft
89-83.....U.S./U.S.S.R. Spacebridge Helping Armenian Eqrth quake Victims
89-84.....NASA Selects Universities for Advanced Engineering Design Grants
89-85.....Smith Appointed Deputy Director, NASA Stennis Space Center
89-86.....Tracking and Data Relay Satellite-4 Declared Opera tional
89-87.....Al Diaz Selected as Deputy Associate Administrator for Science

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.



THIS SECTION OF THE MACH 7 TUNNEL DIFFUSER is mounted on an air-bearing system for easy removal so that the Mach 4 or 5 nozzle in conjunction with the mixer can be installed.

Modifications to 8-Foot Tunnel Nearly Complete

Modifications to the 8-Foot High Temperature Tunnel have changed Langley's landscape significantly. More importantly, when completed, Langley will have a unique national facility for conducting research on hypersonic air-breathing propulsion systems as well as for aerothermal structural research.

The next generation of spaceflight vehicles will takeoff horizontally like today's airplanes and will employ an integration of three engines--turbojet, ramjet and scramjet--for propulsion . To date, no existing facility can accommodate full-scale ramjet and scramjet live engine testing. Langley's modified facility will provide true-temperature, high-Mach-number and large scale testing capabilities.

Robert Basford, 8-Foot HTT project manager, reports construction of the $23.2 million project is more than 90 percent complete. The major components of the modification include testing capability at Mach 4, 5 and 7 by interchanging nozzle sections of the tunnel in conjunction with a mixer; a liquid oxygen system that will provide a 21 percent oxygen concentration in the test cell for live engine testing; a hydrogen fuel system; and a totally integrated control system.

Of special interest is the unique design of the quick actuating closure and handling system for which three Langley engineers have recently been awarded a patent. "The old configuration took hours of disassembly; the new "closure plug" locks the combustor in a matter of minutes. It's truly an engineering accomplishment," notes Basford. The closure system, designed by Dorsey White, the late Benjamin Updike and John Allred, is adaptable to many applications, such as autoclaves, vacuum chambers and a wide variety of specialized vessels which require frequent entry and closure. Employing the new design, the disassembly process that previously required 82 man-hours can now be accomplished in 9.5 minutes after disconnenction of the methane system. The closure system features simplicity in design and operation, time savings, and safety considerations.

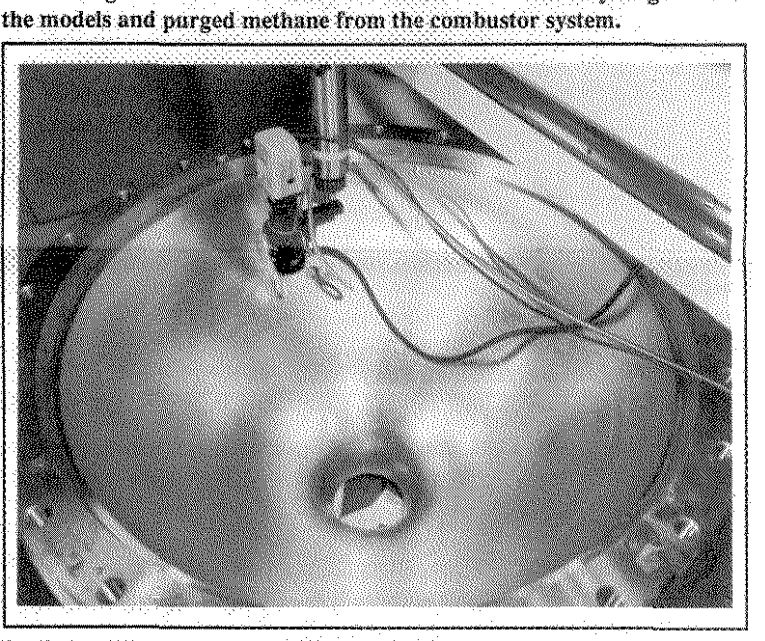
The transpiration cooled Mach 7 nozzle was installed the week of May 15. Air transpiration cooling using a platelet concept, pioneered by the Aerojet Techsystems Co. of Sacramento, Calif., replaces the water-cooled convergent section and the film-cooled throat section of the present Mach 7 nozzle. The nozzle, composed of 6,800 platelets, will allow very precise distribution of the coolant , will eliminate persistant problems with leakage and will significantly reduce the nozzle cooling air requirements.

A dual throat/mixer concept with interchangeable nozzle inserts for Mach 4 and 5 expands the test capability of the facility. The mixer provides the high dynamic pressure and Mach number capability necessary for ramjet testing. For operation at Mach 4 and 5, nozzle sections will be interchanged and the mixer flow rates adjusted to obtain the desired conditions. For operation at Mach 7, the entire mixer section is removed and a portion of the original nozzle reinstalled. Configuration changes are facilitated because components are "floated" on air bearings. "The Mach 7 nozzle components and the Mach 5 nozzle with the mixer have been aligned and fitted into the existing tunnel section utilizing this system. All indications are that this type of handling system will work successfully," states John Wilson, project construction manager.

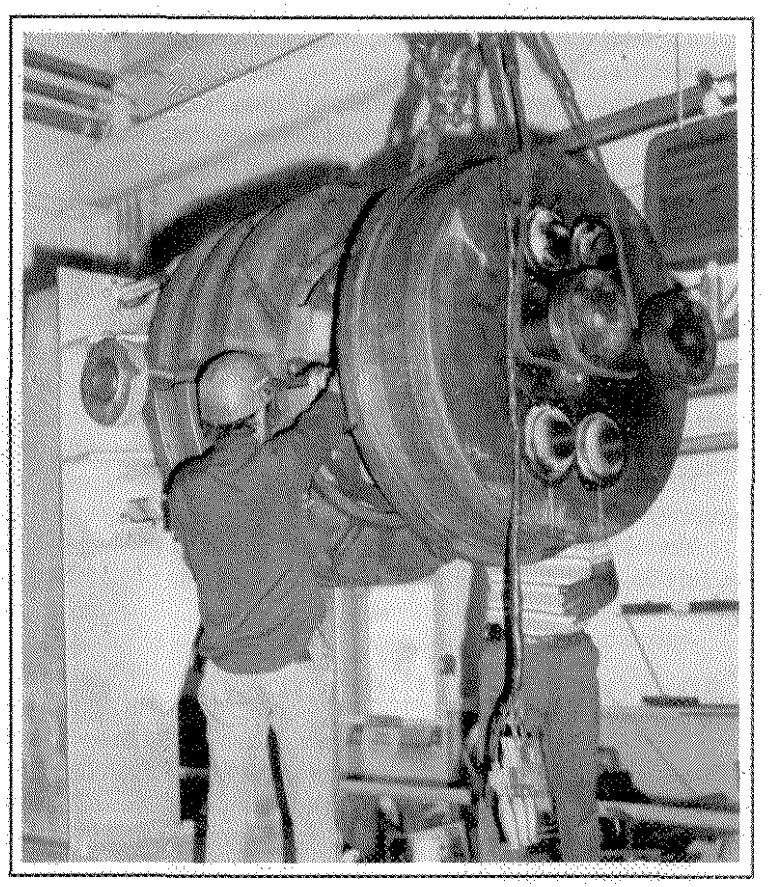
Following completion of construction, a period of approximately one year will be required for shake-down followed by tunnel calibration. The facility is targeted to be ready for propulsion testing by mid-1991.

-photos by Hubert Lloyd

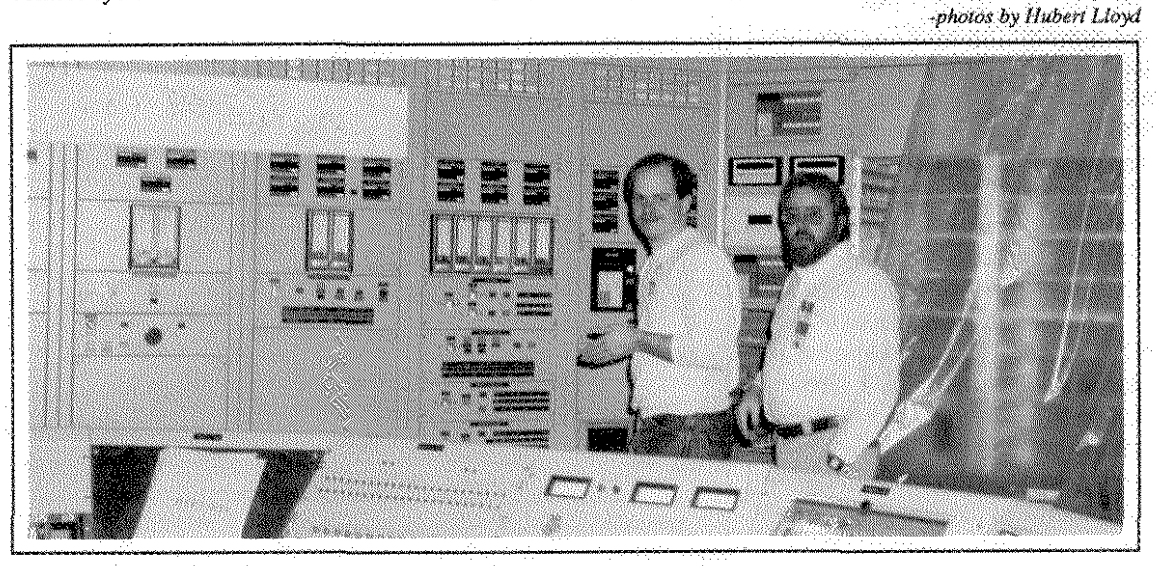
A LANDMARK OF THE NEW FACILITY is the 140-ft. hydrogen flare stack being raised here. The stack is used to burn excess hydrogen from the models and purged methane from the combustor system.



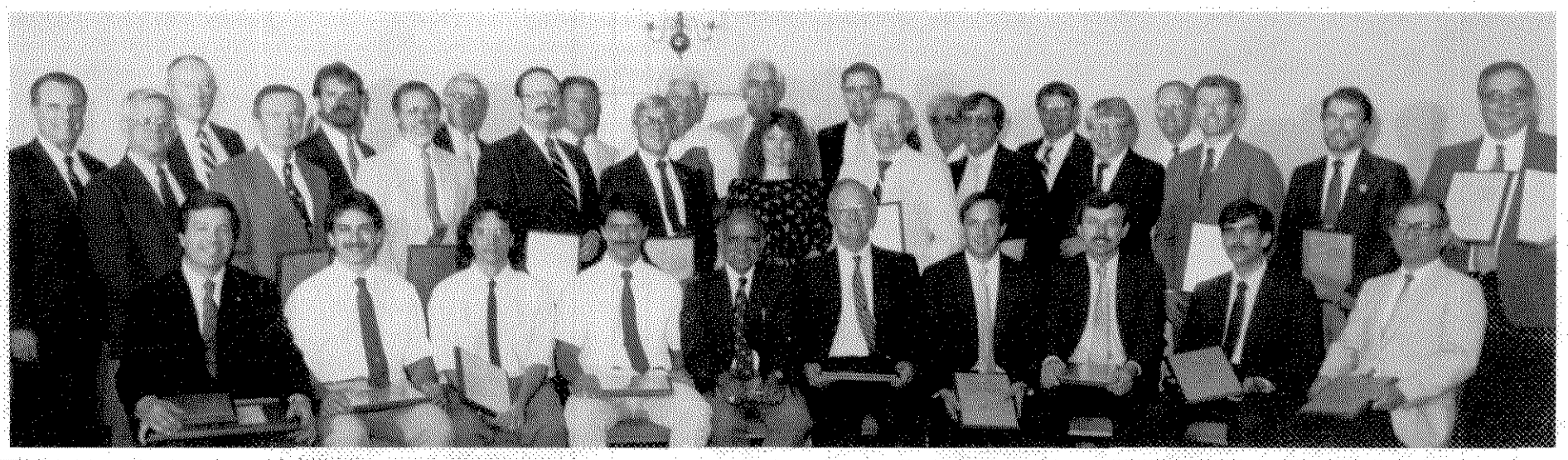
THE CONTRACTION SECTION OF THE TRANSPIRATION COOLED MACH 7 NOZZLE is composed of 6,800 platelets ranging in dimension from .006 to .060 inches thick. Video imaging of the surface, performed by Langley's fabrication quality control personnel, verified that the slots, which distribute the coolant, are open.



A PATENT WAS AWARDED April 25, 1989, to Dorsey White, John Allred and the late Benny Updike for their design of this closure plug which facilitates access to the high pressure combustor.

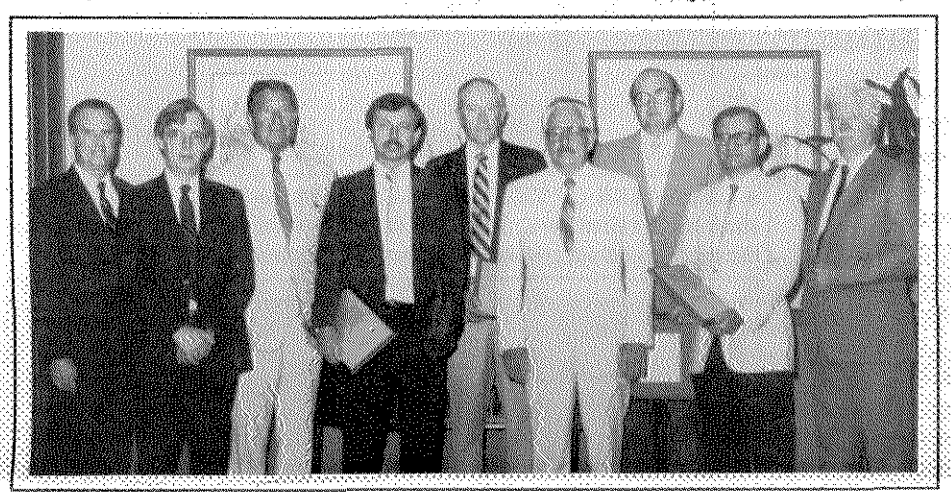


LAB AND PLANT ELECTRICAL SECTION EMPLOYEES Mike Carr (left) and Mike Crawford examine the facility's new control room. The safety of the facility is maintained here by an advanced fail safe system.



Thirty-seven Langley Research Center inventors who received U.S. patents in 1988 were honored at the annual Inventors' Luncheon held May 26. Honorees include (first row, L to R) Dr. Bruce J. Homes, Dr. John W. Connell, Danny R. Sprinkle, Timothy D. Schott, Dr. Jag J. Singh, Ian O. MacConochie, Bradley D. Leighty, Robert L. Fox, Daniel G. Murri, James I. Clemmons Jr.; (second row, L to R) Dr. John H. Crews Jr., John P. Stack, Jack E. Pennington, Ivan O. Clark, William J. Debnam, Debra L. Carraway, Harlan K. Holmes, James F. Meyers, L. Robert Jackson, Kevin W. Noonan, Thomas C. Moore, Dr. Leonard M. Weinstein; (third row, L to R) Dr. George F. Helfrich, patent counsel; Dr. John D. Buckley, Richard M. Wood, George C. Ashby Jr., Dr. Harold W. Adams, Dwight C. McSmith, Dr. Martin M. Mikulas Jr., Alan M. Taylor, Charles F. Bryan Jr., Dr. Randall C. Davis and Adolphus B. Blair Jr.

-photos by Sandie Horsey



Amendments to the Technology Innovation Act allows Langley patent holders to receive royalties for their inventions. Royalties are generated when patents are licensed to private industry. Shown are (L to R) Dr. George F. Helfrich, patent counsel; Robert J. Swaim; Dr. Harold W. Adams, patent attorney; Robert L. Fox; Dr. John D. Buckley; Dr. Vernon L. Bell; Dr. Terry L. St. Clair; James I. Clemmons Jr. and Ernest W. Miller.

Seven Langley researchers received Technology Transfer awards for their accomplishments during 1988. Shown (L to R) are Dr. William T. Yost; Dr. Bruce J. Holmes; Leonard Ault, NASA Headquarters Technology Utilization Division; Harlan K. Holmes; Dr. Joseph S. Heyman; Thomas C. Moore; Dr. Terry L. St. Clair and John Samos, head of the Langley TU Office.

Employees Support Bloodmobile

The American Red Cross Bloodmobile visited Langley on Wednesday, May 24. A total of 292 units of blood were donated by Langley employees, retirees and contractors.

Achieving gallon status were:

19 gallons---James J. Fay;

8 gallons---James H. Monteith;

7 gallons---Paul W. Kidder, Linda A. Hunt, Charles A. Davidson, Robert J. Wallis, E. Ann Bare and Benjamin F. Guenther;

4 gallons---Alan E. Stockwell, Mark S. Wampler, Brian S. Luoto and Ronald G. Hermansderfer;

3 gallons---Bradley L. Crawford and James H. Hurst;

2 gallons---Paul A. Garn, Julian R. Roberson, John Covington, Kurt N. Detweiler and Thomas J. Burns;

1 gallon---Sandra K. Nolan, David E. Watkins, Susan O. Palmer, Lynne W. Eklund and Stephen B. Jones;

First timers---Regina L. Spellman, Lynda J. Foernsler, Donald F. Kepley, William C. Edwards, Jeffrey S. Brady, Brian R. Sears, James T. Berry, Harry E. Stotler III, Lloyd L. Smith, Michael D. Venking, Joseph C. Havens, Dennis R. Williams, Jeffrey A. Collins, John G. Fabejamic, Laura L. Eure, Penny Lee Hudson, Raymond A. Moats and Rodney J. Barr.

Special congratulations to James Fay for his continued support.

NASA Coordinator for the Bloodmobile visit was Annette L. Forrest; Red Cross coordinator was Nancy Simon.

The next Red Cross Bloodmobile at Langley will be Wednesday, July 26. Give the precious gift of life; give blood.

Can You Spare the Time?

Big Brothers/Big Sisters of the Peninsula need caring adult volunteers willing to spend four to five hours a week with a single-parent child, aged six through twelve.

The children are average kids from all ethnic, racial and economic levels who have suffered the loss of a parent. If you have time and love to share, and if you want to make a dramatic difference in a child's life, consider Big Brothers or Big Sisters. Call 827-0110 for more information.

Visitor Center Recognizes Volunteers

-by Kay Ely

Aerospace enthusiasts at the NASA Langley Visitor Center have logged nearly 3,000 hours of volunteer service in a single year. These volunteers travel from all over the Peninsula and as far away as Norfolk and Virginia Beach to help tell the NASA story.

Volunteers received recognition during an awards ceremony. Special presentations were given to three volunteers who had donated the greatest number of hours during the year period.

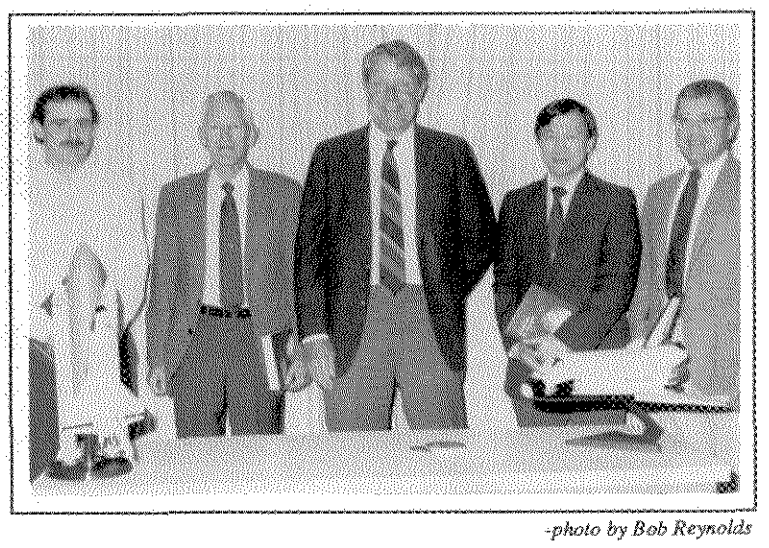
Volunteering a total of 827 hours, Ray Grasso, Frank Quinto and John F. Slack received autographed copies of *Engineer in Charge, A History of Langley Aeronautical Laboratory, 1917--1958* by James Hansen. Presenting the awards were Lindy Perkes, NASA Visitor Center programs manager, and A. Gary Price, head of the Office of External Affairs.

Grasso, a pipefitter at Newport News Shipbuilding, donated 400 hours at the Visitor Center. Before going to his second-shift job, Grasso welcomes visitors and assists in the preparation of displays. Slack, a retired electronic engineer from Bendix, volunteers in the Teacher Resource Center and has amassed 342 hours. He assists in the dubbing of video tapes. Quinto, an aerospace technologist in Langley's 14-by 22-Foot Subsonic Tunnel, volunteers on weekends and has donated 87 hours at the Visitor Center.

All volunteers received certificates of appreciation. Active volunteers are Neil Bates, Ray Grasso, Peggy Hewes, John Slack, Robert Winger and Shirl Wrenn from Newport News; William Beczkalo, Maxine Copeland, Judith Curtis, Carol Farrant, Dean Floyd, Michael Fremaux, Susie Himes, Suellen Lansell, Shirley Sherman and David Veazey from Hampton.

Volunteers from Norfolk are Kathryn Barclay, Frank Quinto and Jerry Wells; from Virginia Beach are Hilary Benoit, Margaret Grey, Nancy Korpela, John Martin, Mark Walker and Diane Warrell. Betty H. Brummer from Grafton, Richard Hart from Poquoson and Carl Stephen Kosch from Tabb also donate their time to the Center.

Anyone interested in volunteering at the Visitor Center should call 864-6000.

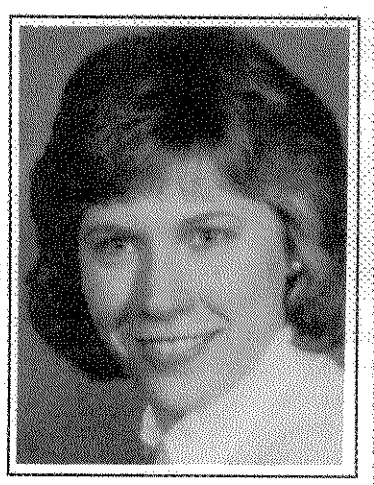


-photo by Bob Reynolds

Langley Director Richard H. Petersen (center) and A. Gary Price, head of the Office of External Affairs (right), congratulate outstanding Visitor Center volunteers (from left) Ray Grasso, John Slack and Frank Quinto.

People & Places

Abbot to Attend Smith Program



Kathy Abbott, aerospace technologist in the Flight Management Division at NASA's Langley Research Center, has been selected to attend the Smith Management Program, Smith College, Northampton, Massachusetts. Abbott was selected in a NASA-wide competition.

The Smith Program is an intensive, practical, three-stage management education program for high-potential women who are rising managers. The two three-week summer sessions on the college campus are linked by a management project completed on the job during the interim year. This integrated curriculum, reinforced by an on-the-job project, balances theory with practice in the setting of one's own job.

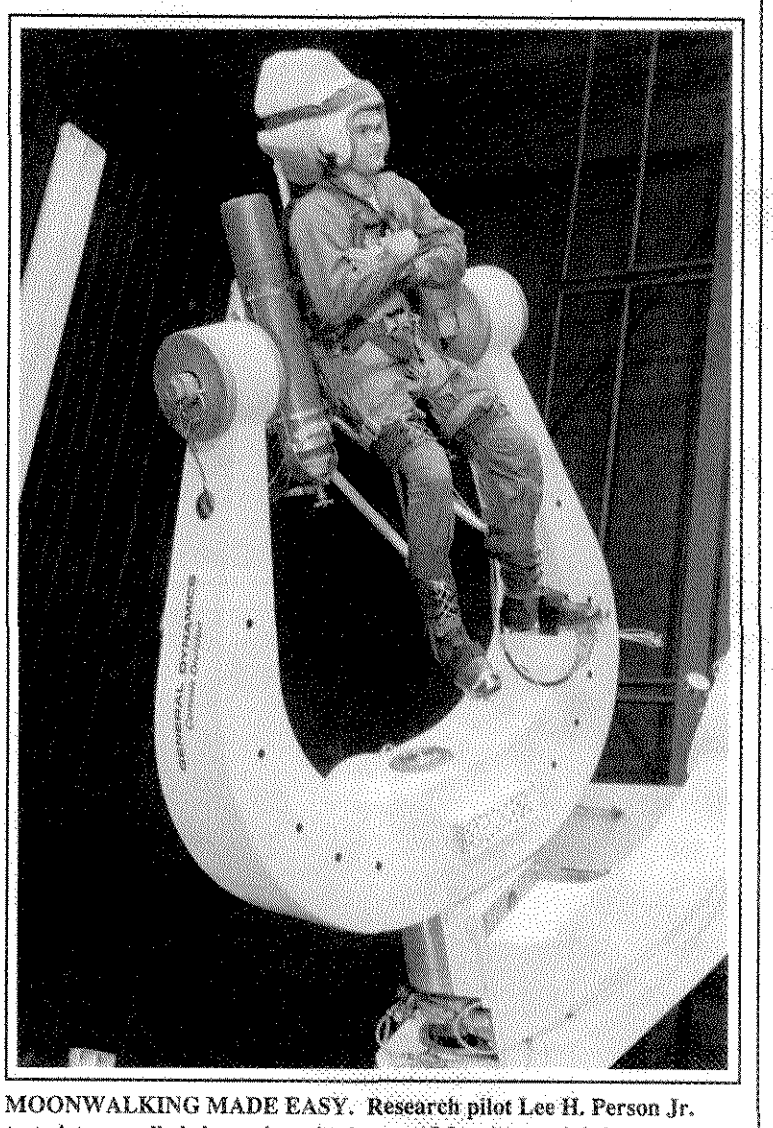
"My overall goal in participating in this program is to improve my job effectiveness," said Abbott. "I believe the program will broaden my perspective through the courses offered; enhance my leadership skills, especially in team building and decision making; and improve my skills in strategic planning."

Abbott began her career at Langley as a support services contractor in December 1977. She joined the NASA organization in September 1980. In her current position, she serves as technical leader of a five-person team exploring the application of artificial intelligence to flight management for improved aviation safety and efficiency.

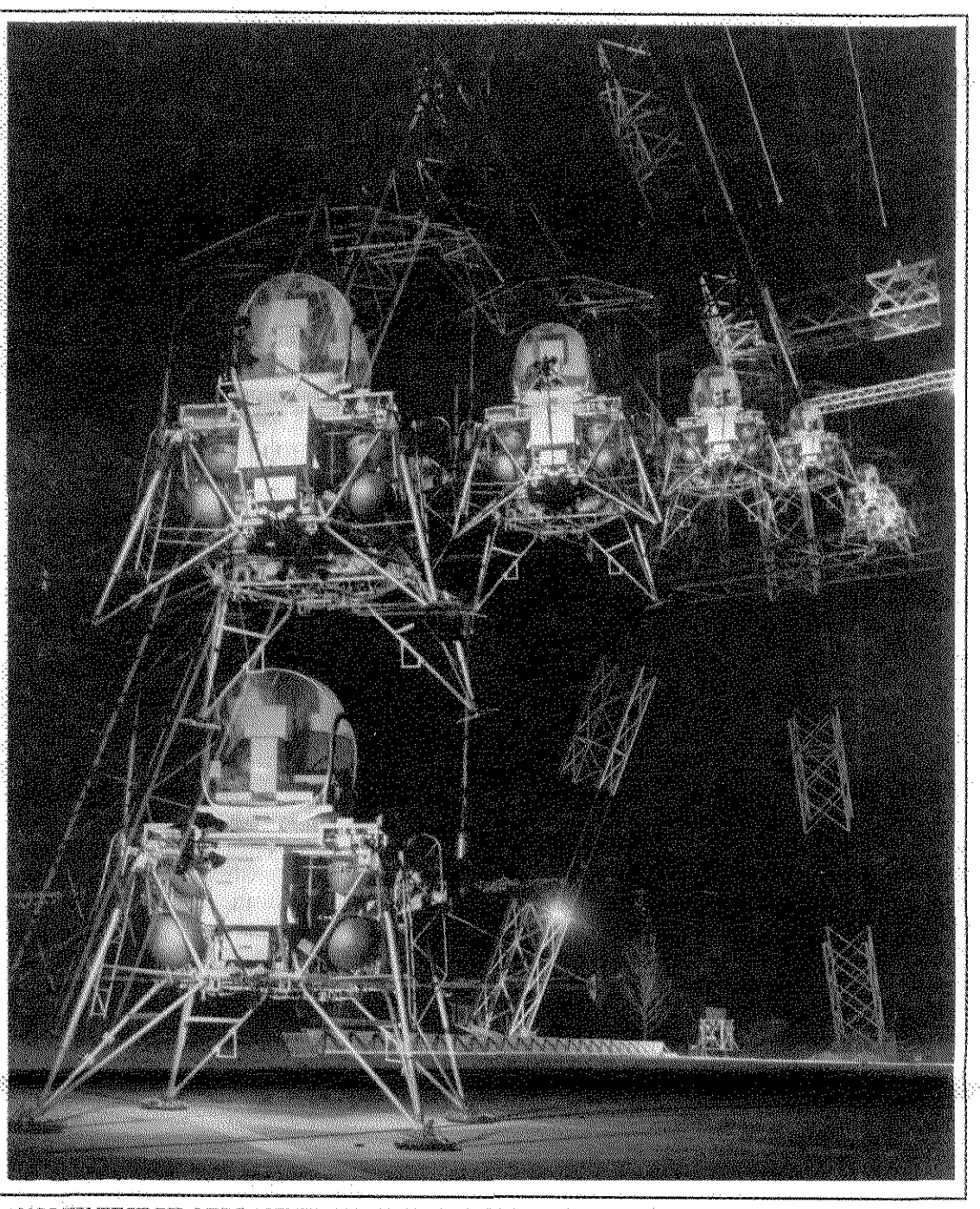
Notes of Thanks

Carl G. Baab writes: "My family and I would like to express our deep appreciation for a memorahle evening on the occasion of my retirement party. The only thing to surpass the excellent dinner, the wonderful gift and the kind words, was association with the finest people I know and their expression of best wishes. My sincere thanks to all for a night that will be long remembered."

The **Pizzeck and Silver Families** would like to thank everyone who donated blood on May 24 in the name of Julie Silver.



MOONWALKING MADE EASY. Research pilot Lee H. Person Jr. tests jet-propelled shoes via a six-degree-of-freedom weightlessness simulator. Mounted on the botton of each shoe are four-pound thrust jets that are operated independently by downward flexing of the toes. The simulator tests were conducted at the Convair Division of General Dynamics. This is but one of several methods of moving about on the lunar surface which were tested by Langley research pilots prior to the Apollo 11 moon landing.



LANGLEY TEST PILOTS LANDED ON THE MOON MORE TIMES THAN ANYONE IN THE WORLD. This multiple-exposure image shows a practice moon landing in progress at Langley in 1967. The helicopter-style crew cabin atop the lunar landing module was replaced with a stand-up, rectangular cabin.

Langley Team Experienced at Lunar Landings Long Before the Historic Event

Every astronaut who set foot on the moon trained for that experience at the Langley Research Center. Langley's Lunar Landing Research Facility (LLRF) provided the capability for flying a piloted, rocket-powered vehicle in a simulated lunar gravity field.

The principal purpose of this training was to familiarize the Apollo astronauts with the handling characteristics of a lunar-landing type vehicle in preparation for more extensive training in the Lunar Landing Research Vehicle (LLRV) at the Manned Spacecraft Center in Houston.

Randy Harris, of the Crew/Vehicle Interface Research Branch, started his career at Langley as a test conductor in the Spacecraft Research Branch. In that capacity, he coordinated the action of the ground crew and the crew on the gantry. He also held the abort button during tests of the lunar research module; should the research pilot or astronaut get into trouble, he could stop the motion of the vehicle immediately.

Before any of the astronauts began their training here, Langley pilots had thoroughly tested the lunar module and the simulations systems that mirrored a landing on the moon. Research pilot Lee Person reminisces, "We spent a lot of time at the LLRF. I think I had close to two hundred flights in that vehicle. Flights weren't very long, maybe 90 seconds; but it took an hour or an hour and a half to set up each test."

To simulate lunar gravity, five-sixths of the weight of the vehicle was supported by the overhead cables and the remaining one-sixth of the thrust was provided by a large rocket engine. "The attitudes required to get the vehicle moving in the simulation were the same attitudes required on the moon," says Person. "So it was a very valid simulation."

"I think I've made more landings on the moon than anyone in the world," reports fellow research pilot Dick Yenni. "Often, I spent day and night in that simulator. . . . And it was hot."

"The simulation at Langley was taken even one step further," interjects Harris. An exact reproduction of a portion of the lunar surface was constructed on the concrete pad under the gantry. "Don Hewes brought his portable paint sprayer from home and put in dark shadows around the craters." Next floodlights were erected at the proper angle to simulate lunar light and a black screen was installed at the far end of the gantry. "It was amazing the amount of realism these extras gave the simulation," concludes Harris.

On July 20, 1969, as the Eagle was landing on the moon, Apollo astronaut Neil Armstrong reported, "I see my shadow," exactly as he had during the Langley tests. Armstrong returned to Langley following his historic flight and piloted the lunar module once more. He verified that it was a very valid simulation of the actual experience.

Happenings

LAA SPECIAL SOCIAL will be held Friday, June 23, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. This "Summer Vacation" get-together will feature Gator Almond and "Spice of Life". There will be a $1 cover charge.

AFGE LOCAL 2755 will meet Wednesday, June 21, at 4:38 p.m. in the Union Office, Building 1232B. Call Sandra Zumbrun, ext. 44548, for details.

COUNTRY-WESTERN DANCE Club will hold a dance Saturday, June 17, at 7:30 p.m. in the H.J.E. Reid Conference Center. Guests are always welcome. Call Sam Sokol, ext. 41863, for information.

AUDIOPHILES. Anyone interested in forming a NASA Audiophile Club, contact Robert Baals, ext. 43644, Mail Stop 464

CARNIVAL MONARCH. LAA is seeking contestants to run for the 1989 Carnival Monarch. The contestant selling the most Carnival raffle tickets will be crowned Carnival Monarch on Friday evening, August 18. NASA and contract employees are invited to submit their names as contestants to Paula Ware, Mail Stop 285, no later than June 23.

CAR POOL MEMBER needed for car pool operating between Colonial Place in Norfolk and the West area on the 8 a.m. shift. Call Dan Giesy, ext. 44006 or in Norfolk 625-7558.

CAR POOL NEEDED. Interested in forming or joining a car pool from the Williamsburg area. Hours of departure are flexible. Contact Michael Scott, Mail Stop 230.

FOR SALE: AUTO. 1976 Lt Camaro, 350/400 with 780 Quad. New rear end and transmission. Needs driver's side body work. $1,000 or best offer. Call Keith at ext. 43158 or 851-2538.

WANTED TO BUY: SOFA. Camelback sofa, preferrably with Chippendale legs. Structurally sound but condition of covering not a consideration; want to reupholster. Call Marny at ext. 46126 or 868-6245.

TICKETS AVAILABLE for local attractions--Busch Gardens, Kings Dominion, Water Country, Colonial Williamsburg, etc.--at discount prices. Contact Frankie Ward, Langley Activities Association, ext. 46369 for additional information and prices. Never pay full price--see your LAA.

Senior Management Research Review

The Senior Management Research Review will be held Monday, June19, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	Effect of Fiber/Matrix Interface Strength on the Mechanical Properties of a Silicon Carbide/Titanium Metal Matrix Composites	William Johnson (Structures/MD)
9:45	Superagility Controls Technology--Tactical Guidance Research and Evaluation System (TGRES)	Douglas Arbuckle (Flight Systems/GCD)
10:00	New Stereo 3-D Computational Algorithms Provide Increased Control of Depth-Viewing Volume	Steven Williams (Flight Systems/FLMD)
10:15	Airborne Lidar Observations of Ozone and Polar Stratospheric Clouds During the 1989 Airborne Arctic Strotospheric Experiment	Edward Browell (Space/ASD)
10:30	Leading-Edge Cooling Experiment (Aeronautics/FLDMD)	Burton Northam
10:45	A Parametric CFD Study of Incipient Leading-Edge Separation	Naomi McMillan (Aeronautics/AAD)

Correction: Apologies to Timothy Schott, Instrument Research Division, who spoke at the previous SMRR. Schott's named was incorrectly spelled in the May 5 issue of the **Researcher News.**

Retirement Parties

James R. Kelly will be honored at a retirement picnic Tuesday, June 27, at shelter 2, Activities Picnic Grounds, from 4:30 to 7 p.m. Cost is $8/person, including gift. Contributions to gift only are also welcome. Please make check payable to Marcella Hogge, Mail Stop 265.

Walter C. Whitt will be honored at a retirement luncheon at the Langley Officers' Club on Thursday, June 29, at 11:30 a.m. Those interested in attending or donating towards the gift, please contact Bill Presson, ext. 45712, or Ray Scholz, ext. 45538.

Dr. Manuel Stein will be honored at a retirement dinner Wednesday, July 5, in the H.J.E. Reid Conference Center. Cost for the buffet dinner and gift is $16/person. Contribution of $2 for gift only are welcome. Cash bar social begins at 5 p.m.; dinner is at 6. Checks may be made payable to Jeff Stroud and mailed to Sherry Garzon, Mail Stop 190, by June 27.

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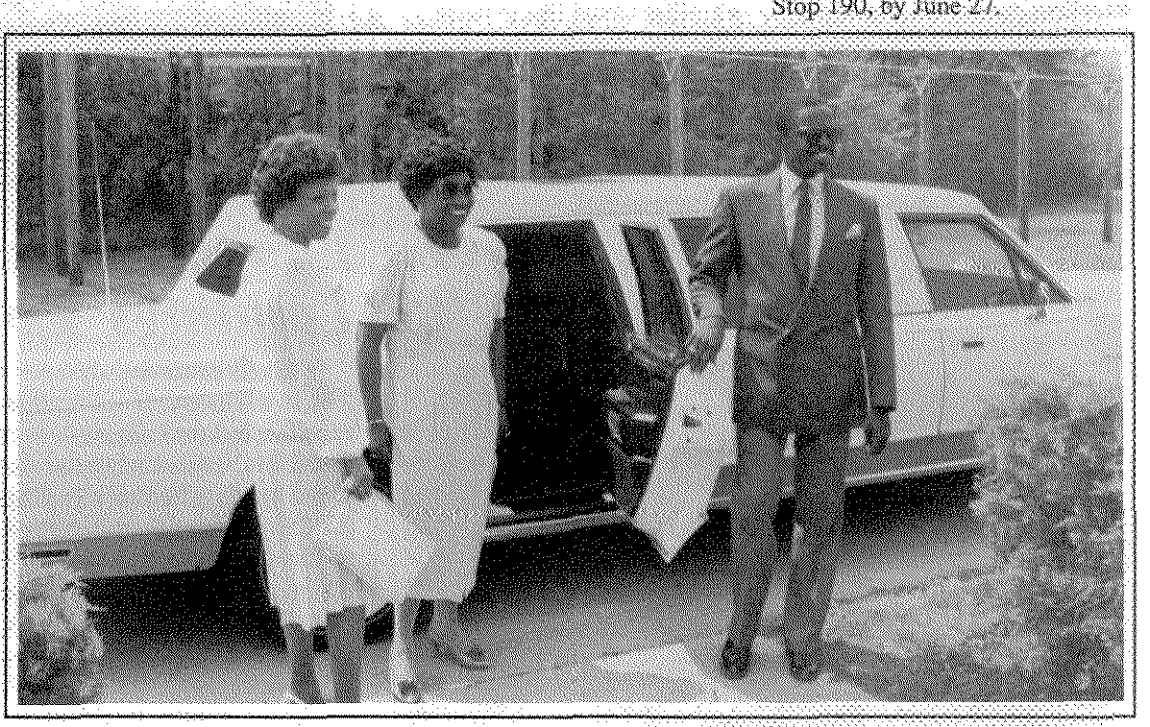


OUT TO LUNCH IN STYLE. Queenella Perrin (center) and Margaret Foster are chauffered to lunch courtesy of radio station WPEX

Perrin Selected 'Secretary of the Day' by Radio Station

Queenella Perrin, secretary of the Safety Engineering Branch, SSQRD, was selected "Secretary of the Day" by radio station WPEX in Hampton. She was nominated by Weldon Staton, also of SEB.

She was greeted with a lovely flower arrangement. At noon, she and a companion were treated to lunch at Mountain Jack's. To top off her royal treatment, Perrin and Margaret Foster, Systems Assurance Branch, were taken to lunch via an elegant white limousine.

Queenella Perrrin shows off her flowers. She was treated royally by radio station WPEX after being named "Secretary of the Day."

NASA
National Aeronautics and
Space Administration

Langley Research Center

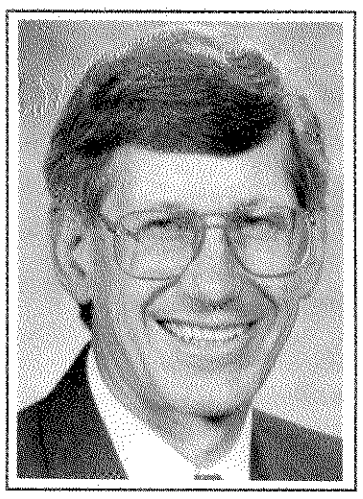
Volume 3, Issue 13 June 30, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

Wingate Selected for Harvard Management Program

Dr. Robert T. Wingate has been selected to attend the Program for Senior Managers in Government at Harvard University's John F. Kennedy School of Government.



The program is an intensive three-week educational activity directed to experienced executives in the public sector who shape strategic decisions or implement major policies. Now in its fourteenth year, the program is noted for the expertise, diversity and high level of responsibility of its participants; it offers admission to a strong, continuing network of participants concerned with the formulation and implementation of public policy.

Wingate, deputy director of Systems, Engineering and Operations at NASA's Langley Research Center, feels that the Harvard program will provide him with a greater understanding of how NASA programs and goals are impacted by political and social environments and the realities of the governmental process. "I look forward to the dynamics of a group that promises to include all management styles. I am sure to benefit from interaction with executives from other agencies and exposure to their problems and perspectives."

Wingate began his NASA career in September 1959 as a mechanical equipment design engineer. He was named head of the Flight Dynamics Section, Flight Vehicles and Systems Division, in June 1968, and head of the Engineering Analysis Branch, Systems Engineering Division, in March 1971.

He became assistant chief, Systems Engineering Division, in September 1979 and was named chief in November 1981. In March 1985 he was named assistant director for Systems Engineering and Operations. In his present position as deputy director since March 1986, he provides general direction to the overall technical operations and activities of the directorate consisting of 1,000 engineers and engineering technicians which provides highly specialized support service to Langley's research programs.

Langley Colloquium and The Sigma Series

Buzz Aldrin Remembers First Lunar Landing

"...Houston, Tranquility Base here. The Eagle has landed."

"Roger, Tranquility. We copy you on the ground...."

More than 500 million people heard astronauts Neil Armstrong in the lunar module and Charles Duke at mission control exchange these words July 20, 1969, following the historic journey to the moon. Armstrong, Edwin "Buzz" Aldrin and Michael Collins made the first lunar landing at 4:17 p.m. EDT, four days after the Apollo 11 launch from Cape Canaveral on Wednesday, July 16, 1969.

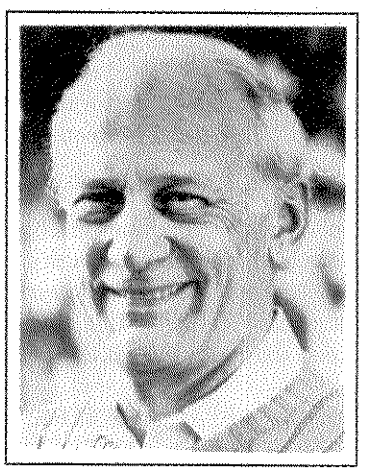
Electing not to take the four-hour rest period scheduled in the flight plan after landing, the astronauts went through the arduous process of donning their spacesuits. At 10:59 p.m., EDT, Armstrong took the first step on the surface of the moon, proclaiming "One small step for man, one giant leap for mankind." Aldrin followed shortly behind Armstrong and placed an American flag on the lunar surface.

On Tuesday, July 18, Buzz Aldrin will relive the historic flight of Apollo 11 and discuss future plans for manned space programs. At 1 p.m., Aldrin will present "Manned Space Programs--The Apollo, the Soviet and the Future" to NASA Langley employees, contractors and retirees during a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 8 p.m., he will present the same lecture at the Radisson Hotel Hampton as part of The Sigma Series, sponsored by the Daily Press, the City of Hampton and NASA.

In his lectures, Aldrin will review the historic flight of Apollo 11 and his role in that event as a member of the lunar landing team. The lectures will also review the general development of both the U.S. and Soviet manned space programs and will include his views on how manned space flight should proceed in the future.

Aldrin was educated at West Point. As a USAF jet fighter pilot in the Korean War, he shot down two MIG-15s. He earned his doctorate in astronautics from the Massachusets Institute of Technology in manned space rendezvous. The space rendezvous techniques he devised were used on all U.S. rendezvous missions, including the space docking with Russian cosmonauts.

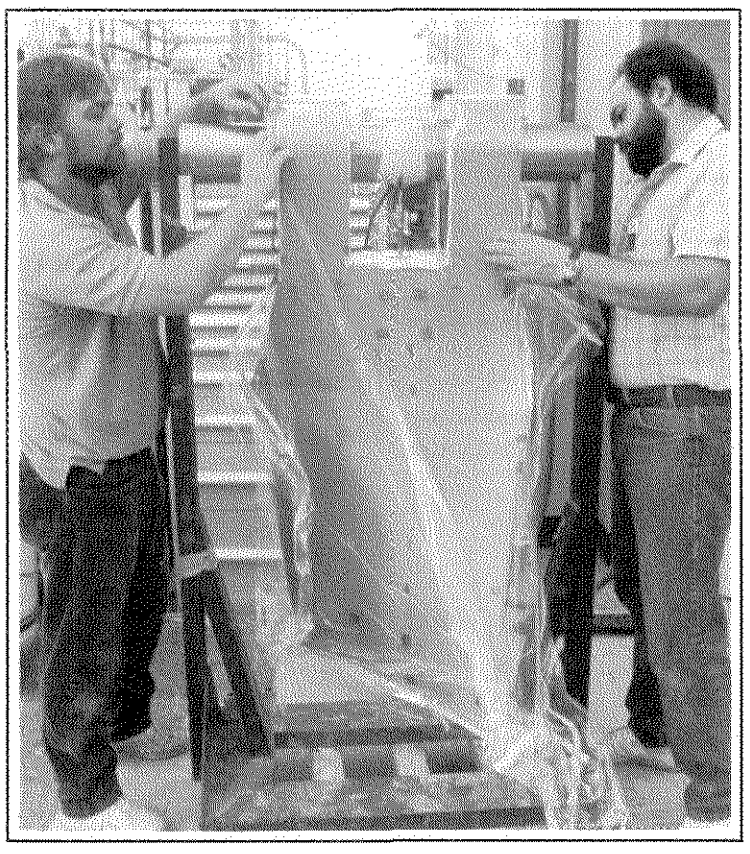
In October 1963, Aldrin was selected by NASA as one of the early group of astronauts. In November 1966, he established a new record for extravehicular activity in space during his mission on the Gemini 12 orbital flight.



Following his historic Apollo 11 moon landing and moon walk, Aldrin returned to a round-the-world good will tour. He was presented the Presidential Medal of Freedom, a NASA Distinguished and Exceptional Service Medal, an Air Force Distinguished Service Medal with Oak Leaf Cluster and the Legion of Merit.

Since retiring from NASA, the Air Force and his position as Commander of the Test Pilot School, Aldrin has remained at the forefront of efforts to ensure a continued leading role for America in manned space exploration. To advance his lifelong commitment to venturing outward in space, he is creating a master plan of evolving missions for sustained exploration. He lectures througout the world on America's future in space.

1, 2, 3 ... 25 New NTF Fan Blades



Paul Custis (left) and Bob D'Agostino, machinist model makers, work on sealing the thin film vacuum bag over the final full blade laminates, making ready for the final autoclave cure cycle. All 25 fan blades in the National Transonic Facility (NTF) were damaged in a mishap during a routine test run of the tunnel January 18. A full-scale effort, involving 55 employees working three shifts on a seven day work week, has resulted in the fabrication of new blades. See feature story of page 3.

State of Virginia, NASA, CIT Join Together to Promote Technology Transfer

Two NASA centers and the Center for Innovative Technology (CIT), in Herndon, Va., have signed a memorandum of agreement with the Commonwealth of Virginia to promote the transfer of NASA-derived technology to the state's private sector.

On hand for the signing of the agreement in Richmond at the opening ceremonies of a conference on "Composites in Virginia" were Langley's Director Richard H. Petersen, Goddard's Director Dr. John W. Townsend Jr., CIT President and former Governor of Virginia Linwood Holton; and Governor of Virginia Gerald L. Baliles.

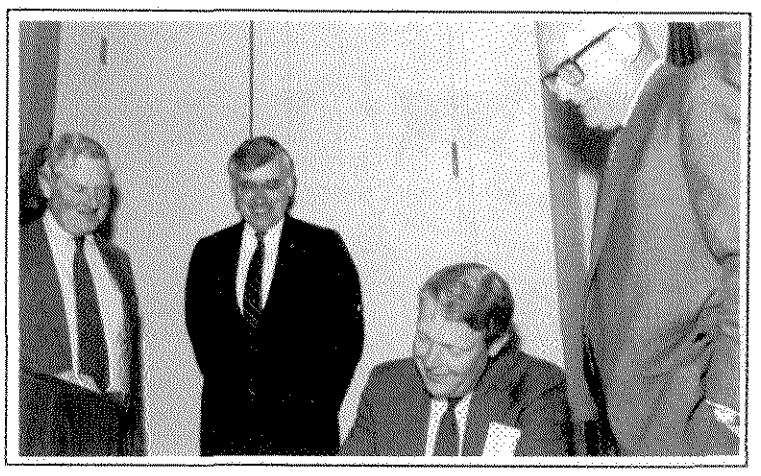
"This agreement will help improve the transfer of technologies and further the flow of information among business, government and university research centers," said Baliles at the signing. "The tie between NASA-derived technology and the private sector will be strengthened and, in the process, so will Virginia's future."

As part of the agreement, each NASA center named a representative to coordinate technology transfer activities and serve as an official point of contact. These representatives are John Samos, Langley; Donald S. Friedman, Goddard; Dr. Dennis Barnes, Governor Baliles' Space Business Advocate; and Michael W. Miller, program director for CIT.

Goddard and Langley are two of NASA's nine centers devoted to research in space and the development of spacecraft, Earth sciences and aeronautics.

The CIT is a non-profit corporation created by the Commonwealth of Virginia to invest in high-quality research with market potential at state colleges and universities, assist in commercializing that research, and to help create and support technological companies across Virginia.

-photo by Steve Earley



Langley Director Richard H. Petersen signs a memorandum of understanding as (L to R) CIT President Linwood Holton, Governor Baliles and Goddard Director Dr. John W. Townsend Jr. look on.

News Briefs

JOHNSON SPACE CENTER, Houston, Texas --- Veteran astronaut Henry Hartsfield has been assigned temporary duty in the Office of Space Flight, NASA Headquarters, Washington, D.C. Hartsfield will serve as director of the Space Flight/Space Station Integration Office, reporting directly to the associate administrator for space flight. He replaces astronaut Robert Parker who has returned to Johnson Space Center to begin training for his mission specialist assignment on Space Shuttle mission STS-35, scheduled for launch in the spring of 1990.

HEADQUARTERS, Washington, D.C. --- Under a recent agreement between NASA and the American Rocket Company (AMROC), Camarillo, Calif., NASA has provided a critical chemical to the company for its scheduled launch of a commercial Single Module Launch Vehicle (SMLV) from Vandenberg Air Force Base, Calif., in July. AMROC's supply of hydrogen peroxide, used in the reaction control systrem of the SMLV, was found to be unusable upon delivery. Replacement by the overseas manufacturer could not be delivered in time for the launch date. AMROC turned to NASA after exhausting attempts to acquire the chemical from other commercial sources.

JET PROPULSION LABORATORY, Pasadena, California --- Ancient oracle bones, once believed to foretell day-to-day events in China, have been used by researchers at JPL and their colleagues to help determine how much the Earth's rotation is slowing down. Based on inscriptions on the oracle bones--actually, tortoise shell--the researchers have fixed the exact date and path of a solar eclipse seen in China in the year 1302 B.C. That, in turn, led them to conclude that the length of each day was 47/1,000ths of a second shorter in 1302 B.C. than it is now.

JOHNSON SPACE CENTER, Houston, Texas --- Three-time space flight veteran George D. "Pinky" Nelson, Ph.D., leaves NASA today to accept academic and administrative positions at the University of Washington, Seattle. Nelson has been named assistant provost at the university as well as an associate professor of astronomy. Nelson has a total of 411 hours in space aboard three different Shuttle orbiters, including ten hours of spacewalk.

HEADQUARTERS, Washington, D.C. --- NASA has released the solicitation package to organizations that have expressed interest in using the C-band capacity on two Tracking and Data Relay Satellites (TDRS) for international telecommunications purposes. Eleven organizations have expressed interest in bidding for use of TDRS C-band services. The price of the C-band capacity will be established competitively. The deadline for bids is July 7.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- Goddard opened its new state-of-the-art robotics facility with a ribbon cutting ceremony June 20. The facility will play an important role in developing a space robot to do things never before done in space. The highly sophisticated facility will be used by Goddard's robotics team to create, test and evaluate new robotic technologies to support Space Station Freedom.

HEADQUARTERS, Washington, D.C. --- NASA's Life Sciences Division, Washington, D.C., has announced that the Spacebridge project with Armenia, USSR, will be extended to Moscow and Ufa to assist the victims of a recent accident involving two trains destroyed by a gas explosion outside the Soviet city of Ufa in the Ural Mountains. Spacebridge currently links medical facilities and doctors in Yerevaon, Armenia, with U.S. doctors in Bethesda and Baltimore, Md., Houston, Texas, and Salt Lake City, Utah.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- Scientists at Marshall have solved a mystery that may help in the design of new or improved disease-fighting drugs. Using a technique known as X-ray crystallography, a team of scientists and technicians has successfully determined the three-dimensional structure of human serum albumin, the most abundant plasma protein in the human circulatory system. Knowing the molecule's structure may allow pharmaceutical companies to design new drugs or alter existing drugs to allow them to be more efficiently carried by the protein molecule through the body.

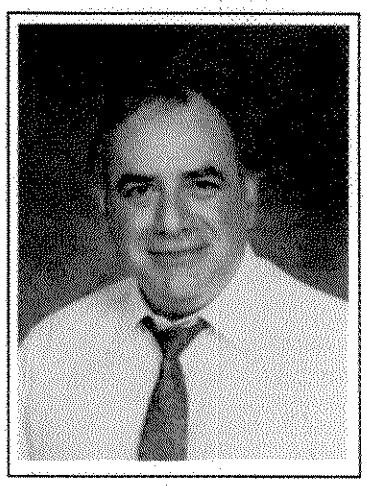
STENNIS SPACE CENTER, Miss. --- NASA has selected Pan Am World Services, Inc., Cape Canaveral, Fla., for final negotiations for a contract to provide facility operating support services at the John C. Stennis Space Center, Hancock County, Miss. The proposed cost-plus-award-fee contract consists of a basic period of one year and priced options for seven additional one-year periods. Total estimated value of the contract is $360 million.

Lankley

Editorials

Langley

Headquarters Forum



The most impressive images from the space program continue to be those looking homeward at Earth floating in the void of space. These images have become symbolic of the unity of our world and have made us realize that our global environment is a precious thing which cannot be replaced.

Langley scientists and engineers have made significant contributions in the last dozen years to the understanding of our planet using Earth-viewing satellite instrument experiments. Recent research has highlighted the need to study the Earth as a unified system of atmosphere, oceans and land linked together by energy, hydrologic and biogeochemical processes.

NASA is actively considering a new initiative for an extensive, integrated set of measurements to be obtained by an Earth Observing System (Eos). Major components of the system would be polar-orbiting satellites equipped with instrument packages capable of monitoring in detail atmospheric, oceanic and terrestrial phenomena. Eos will build on the foundation laid by past and present Earth remote sensing missions.

The first Eos platform is a key early step in the NASA-conceived "Mission to Planet Earth." The space agencies of 20 nations are mobilizing a fleet of advanced satellite instruments for this international mission which will make coordinated assessments of the complex interactions between the atmosphere, oceans and land.

Langley scientists and engineers have successfully proposed four flight experiments and two analytical investigations in the first round of the competition for participation in the Eos missions. Our researchers are now at work on definition phase studies that are a prerequisite to selection for the execution phase of Eos.

We have proposed the Clouds and the Earth's Radiant Energy System (CERES) experiment, which has both an instrument investigation and an analytical investigation proposal. It is intended to provide data that will allow us to vastly expand our knowledge of radiative effects of cloud processes and their interaction with the Earth's climate. Our Spectroscopy of the Atmosphere Using Far Infrared Emission (SAFIRE) instrument investigation will give us the opportunity to determine simultaneously the effect on the ozone layer of all major chemical families.

The Stratospheric Aerosol and Gas Experiment proposed a third-generation instrument, SAGE III. It will provide global profiles of aerosols, trace gases, cloud top height and air density in the middle atmosphere. The Tropospheric Radiometer for Atmospheric Chemistry and Environmental Research (TRACER) investigation will provide multi-level global distributions of carbon monoxide to give us the first global view of this highly important chemical species.

We presently have a model--data comparison experiment using Upper Atmospheric Research Satellite data. These studies will be continued with our analytical investigation titled "Observational and Modeling Studies of Radiative, Chemical and Dynamical Interactions in the Earth's Atmosphere."

We see exciting and challenging opportunities for Langley scientists and engineers to make a contribution to our understanding of the Earth system using our experience in looking at our planet from the vantage point of space. The first Eos instruments will be operational in the late-1990s and we will continue to collect, analyze and apply the new information to critical environmental issues well into the next century.

Dr. Lennard Fisk, associate administrator for the Office of Space Sciences and Applications, has been quoted as saying the goal of Eos is to save our planet. Langley intends to be a strong contributor.

Paul F. Holloway
Deputy Director

Deadline/Distribution Dates Announced

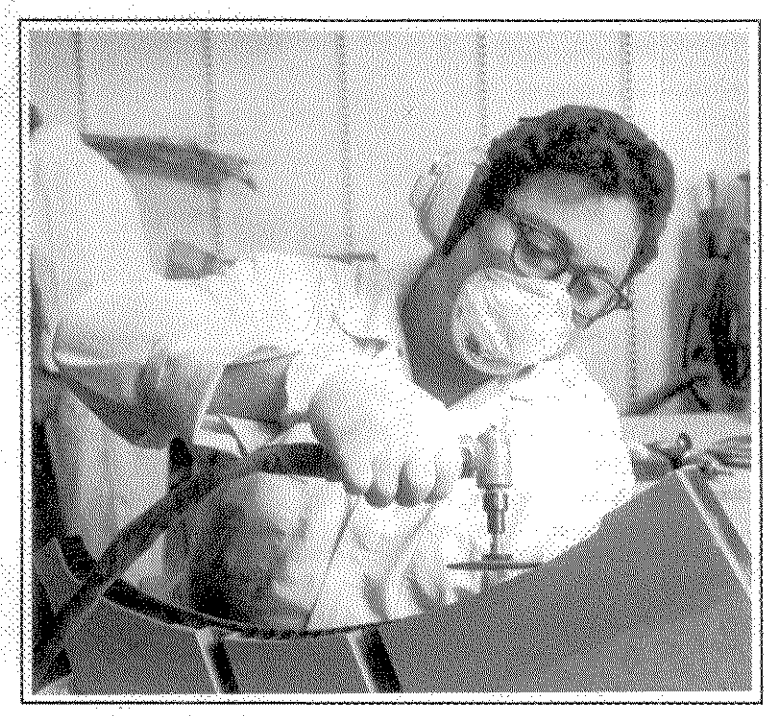
For your convenience, **Reseacher News** deadline and distribution dates for the second half of 1989 are listed below. Please clip and save.

Deadline	Distribution Date
July 3	July 14
July 18	July 28
August 1	August 11
August 15	August 25
August 29	September 8
September 12	September 22
September 26	October 6
October 10	October 20
October 24	November 3
November 7	November 17
November 21	December 1
December 5	December 15*

*Remember, the December 15 issue of the **Researcher News** is the last publication for 1989. Be sure to prepare holiday notices early.

-photos by by Steve Earley

At left, George Link, machinist model maker, performs final inspection of a vacuum pick-up part before the autoclave cure cycle.



Model Maker David Giltinan hand grinds the blade platform to achieve a near perfect fit with the blade airfoil surface.

Rebuilding for the Future

Fab Team Works Non-Stop to Produce NTF Blades

There is a vital lifeline between Building 647 and the National Transonic Facility (NTF).

Building 647 in the East area was geared up to fabricate five more blades as spares for Langley's NTF; ten blades, previously layed up as spares, were 90 percent complete. Work began as scheduled that Monday morning, January 23, but the task had been greatly expanded. The number of blades needed had significantly increased. All 25 NTF fan blades had been damaged in the January 18 accident during a routine test run of Langley's newest wind tunnel.

"The whole picture had changed over the weekend. As a result of the mishap, the number of people needed and the time allocated had changed drastically," said George Whitehurst, project manager.

Will Rollins, Fabrication Division, expected to schedule 14 people to build five blades and use up the 3,000 yards of fiberglass material he had on hand. Instead the workforce expanded to approximately 55 technicians working three shifts and a seven-day work week to fabricate 15 fan blades from scratch and complete the ten previously in the works.

"Most of the workforce was recruited on a voluntary basis," said Whitehurst. "It was an opportunity to work on a very important, extremely complex and visible project. The group has developed a lot of camaraderie; they've become a real team."

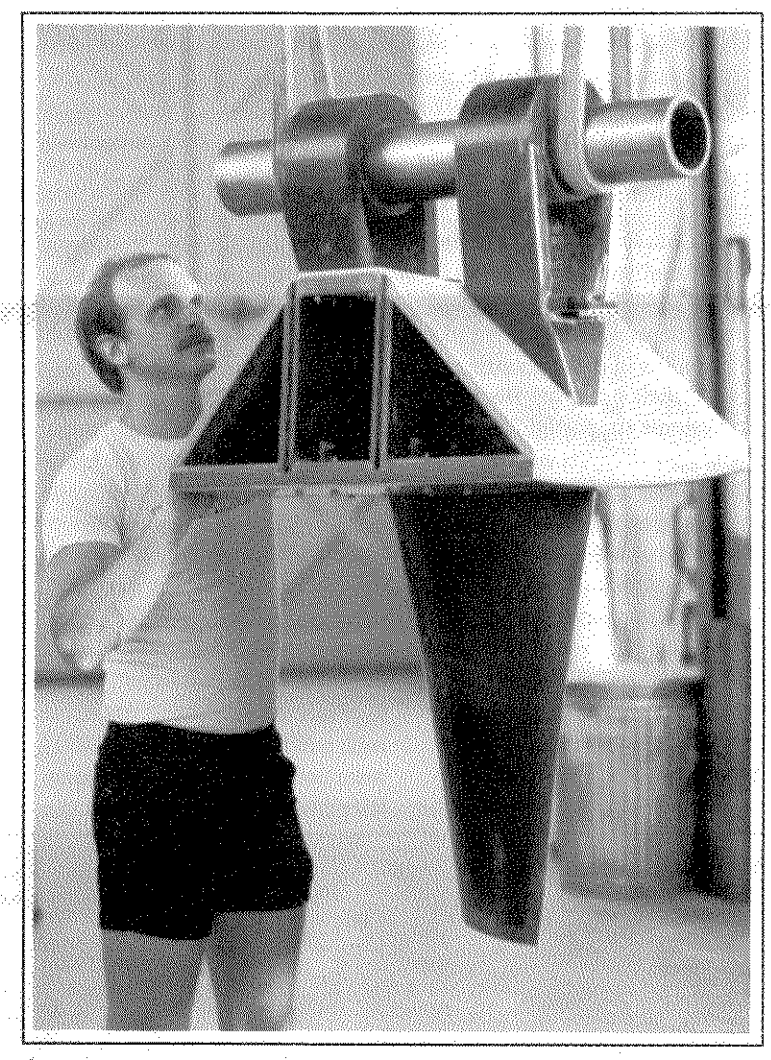
Fabrication Division employees from the Quality Assurance and Inspection Office, the Metals Applications Technology Branch, the Models and Materials Technology Branch and the Electronics Technology Branch made up the NTF blade fabrication team.

Blade fabrication is a complex endeavor. There are 41 parts or processes that comprise each blade and 40 operations that must be completed and checked for every one of the 25 blades that make up the NTF assembly. It is both a time consuming and time intensive process. Once begun, each blade must be layed up according to detailed specifications which include complicated bonding and machining processes. Each blade has been fabricated out of glass fiber in Building 647 and machined at Dynamic Engineering Incorporated. Center of gravity and modal testing is performed in Building 1250. Aluminum fairings are produced by Advex Corporation and fitted by hand to each blade back in Building 1250.

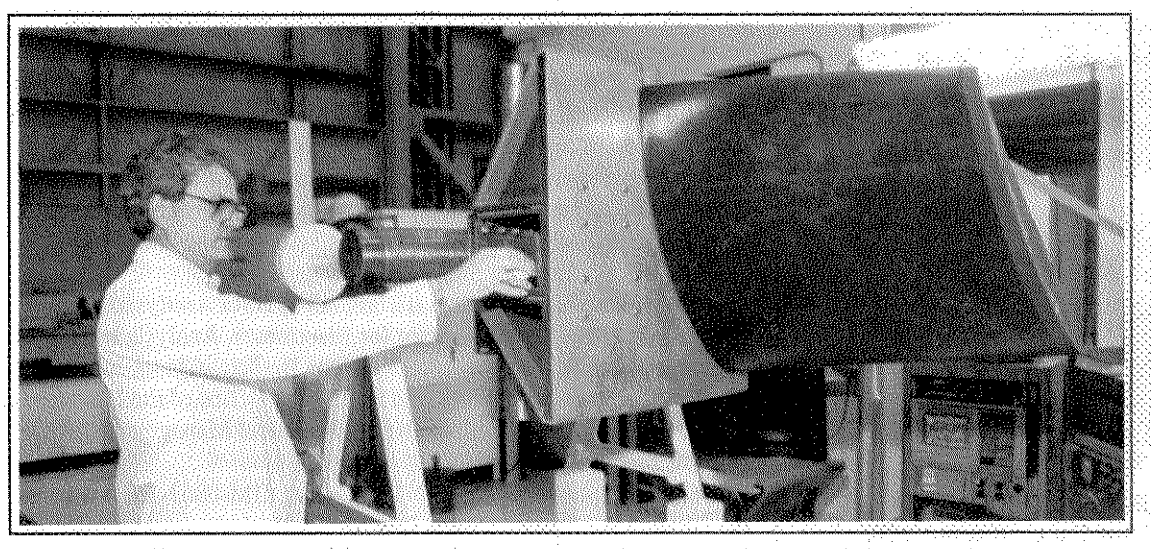
As of June 14, all 25 of the blades have been completed, center of gravity and modal tests have been completed on ten blades and the fitting of the aluminum fairings has begun.

"It's been a monumental task," said Whitehurst. "We began in January, worked through the February snowstorms during which we lost a little time, and, at present, we're about a month ahead of schedule. I estimate the team has logged approximately 53,000 man hours to fabricate the blades, 7,000 hours at Advex to manufacture the aluminum fairings, and will need 5,000 hours to fit the fairings and complete CG tests and balancing."

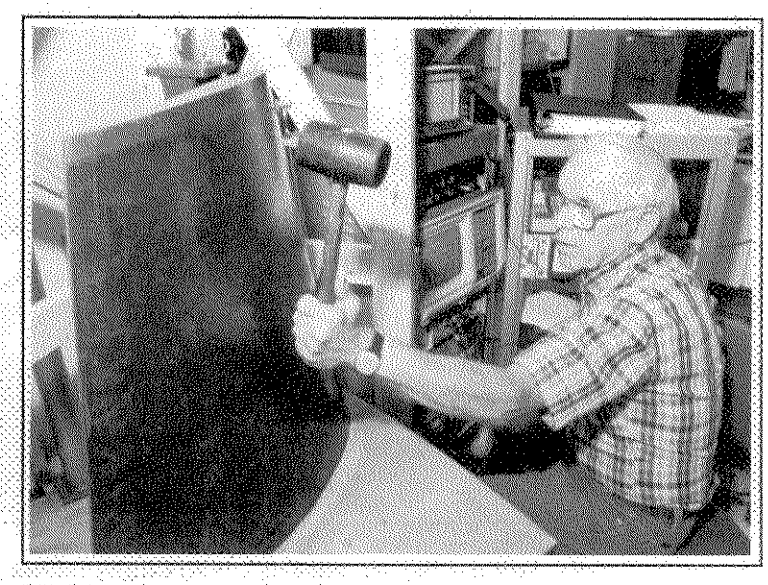
The fan blades are expected to be installed the week of August 7. Initial facility checkout and testing is planned for September and resumption of research testing in the NTF is scheduled for November 1989.



Gary Johnson, Material Processes and Development Section, inspects a fully completed NTF fan blade, before delivery for balancing.



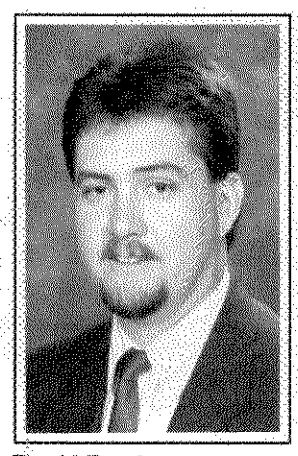
Charlie Folwell conducts a radial center of gravity test. All 25 blades have 3-axis CG tests performed to dynamically balance the blade/hub system.

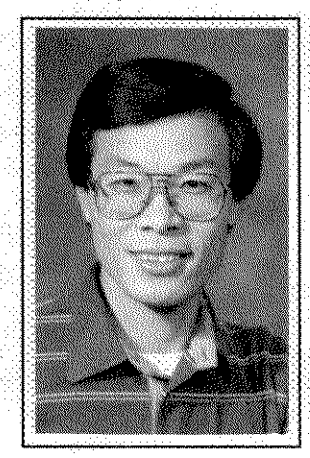


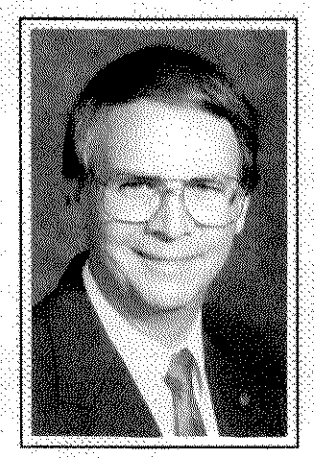
Bill Schwartz conducts free vibration decay measurements as part of a test program to define the baseline modal properties--natural frequencies, damping factors and mode shapes--for each of the 25 blades.

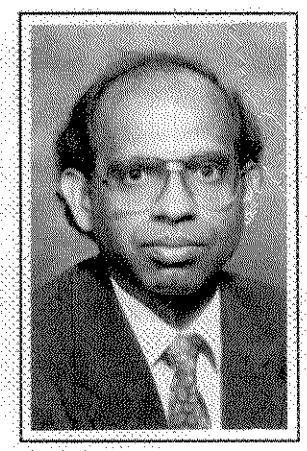
Langley Papers Judged Best

Dr. Philip R. Young


David Bowles


James Shen


Dr. J. Philip Drummond


Dr. Ajay Kumar

Dr. Philip R. Young, David Bowles, James Shen, Dr. J. Philip Drummond and Dr. Ajay Kumar have recently been recognized as authors of "Best Papers."

Young, a chemical engineer in the Polymeric Materials Branch, received the "Best Paper by a SAMPE Member Award" from the Society for the Advancement of Material and Process Engineering (SAMPE). His paper was titled "In Situ Composite Cure Monitoring Using Infrared Transmitting Optical Fibers" and was co-authored by Mark Druy and W. A. Stevenson, of Foster Miller, Inc., and David Compton of Biorad-Digilab. The paper was presented in September 1988 at the 20th International SAMPE Technical Conference held in Minneapolis, Minnesota.

Bowles, a research engineer in the Applied Materials Branch, and Shen, Planning Research Corporation, won the 1989 Frye-Parry Award for the best paper on composite materials given at the 1988 International SAMPE Symposium and Exhibition. The paper was titled "Thermal Cycling Effects on the Dimensional Stability of P75 and P75-T300 (Fabric) Hybrid Graphite/Epoxy Laminates."

The SAMPE is an international society providing continuing education in new materials technology and processing as well as technical forums in which engineers and scientists can exchange ideas. Young, Bowles and Shen, members of the Old Dominion Chapter, received the awards at the 34th International SAMPE Symposium and Exhibition held in Reno, Nevada.

Drummond, senior research scientist, and Kumar, head of the Computational Methods Branch, were selected winners of the "Outstanding Paper in the Category of Unclassified Refereed Development Publication" by the Johns Hopkins University Applied Physics Laboratory. Their paper, "Evolution and Application of CFD Techniques for Scramjet Engine Analysis," was co-authored by Michael E. White of Johns Hopkins. It was published in the September-October AIAA Journal of Propulsion and Power.

ACD Brings Era to An End; Retires Data System

June 9, 1989, was dubbed Beckman Day in Langley's Analysis and Computation Division. On this date, the Center's Beckman Central Digital Data Recording Systems were officially retired after 30 years of service. Employees and retirees gathered to celebrate the end of an era in data recording.

At their peak, the Beckman systems supported 22 ground test facilities concurrently; in all, 25 different facilities have been supported. The systems recorded 2,334,500,000 test data points in 131,200 hours of production usage. From 1963 to 1989, the Beckmans logged 743 hours of full capacity production, with a five-system capacity during 19 of those years.

The first of the Beckman systems, built to specifications developed by Arley Helfer, Paul Vavra, Lisle Taylor and Paul Fuhrmeister, was delivered in 1959. The machine was not a computer but a digital recorder; however, it represented the state-of-the-art as it was the first solid-state (no vacuum tubes) data acquisition system delivered in the U.S.

The first system was to be installed in the 9 x 6 Blowdown tunnel, but, as the result of work done by Dick Morris, Milner Eskew and others in IRD, it was installed in 1247B as a central recorder for four facilities. Through special grounding techniques developed by this group, four more Beckman Systems, each costing $150,000-$200,000, were connected by underground telephone lines at the central site where they could be shared by additional test facilities.

This centralized location greatly reduced the expense of the equipment and was especially cost effective from a maintenance standpoint. During the 1960s and early 70s, Jim Holt and W. H. "Bronco" Lane, with some engineering support, provided for installation and maintenance at the central site. Jack Kayton, supported by contract personnel, handled installation and maintenance of tunnel-end equipment.

Technology developments have so miniaturized computers and electronic equipment, data acquisition has come full circle. The facilities previously served by the Beckman systems now have their own computer and data acquisition capabilities.

-photo by Steve Earley

Gathered to celebrate Beckman Day are (standing L to R) Langley retirees Jim Holt, Richard Morris, and Milner Eskew; Bobby Earnest, Computer Management Branch (CMB); and Roy Dunkum, head, CMB; (seated L to R) W. H. "Bronco" Lane, Computer Systems Branch (CSB); Richard D. Hofler, head, CSB; and retiree Lisle Taylor.

Policy Provides for Hearing Impaired

On July 1, Langley initiates a policy through which state-certified "signers" may be contracted to aid the hearing impaired on Center. Interpretative service will be available for general assemblies and job-related events, such as performance appraisals and training opportunities.

Employees may request this service through their immediate supervisor, who will coordinate the action through the Personnel Division. While the Center hopes to honor all requests, there may be some restrictions due to budgetary constraints.

Irwin J. Schauer, chief of Personnel, explains that "This new initiative is a simple yet effective way to accommodate the hearing impaired on the job as well as at major Center functions."

An interpreter has been arranged for the July 18 colloquium at which Apollo 11 astronaut Buzz Aldrin will address Langley employees and retirees. Seating near the interpreter will be reserved at the front of the H.J.E. Reid Conference Center, near the Langley Room, for individuals who wish to use the service at this and subsequent assemblies .

For further information about the program, contact Venita Smith, special emphasis coordinator, at ext. 42578.

The Personnel Division is establishing a list of Center employees who would like to volunteer as interpreters on an as-needed basis. Volunteers must be skilled in American sign language. Employees are encouraged to contact Smith for information on the volunteer program.

Competitive Placement Positions Open

89-36: AST, Project Management (CERES) (Term) GM-08011-15, Office of the Director for Electronics, Projects Division, Space Experiments Office. Closes July 5.

89-37: AST, Project Management (MAPS/TRACER) (Term) GM - 0801-15; Office of the Director for Electronics, Projects Division, Space Experiments Office. Closes July 5.

89-38: AST, Project Management (SAGE III) (Term) GM-0801-15; Office of the Director for Electronics, Projects Division, Space Experiments Office. Closes July 5.

89-39: AST, Project Management (SAFIRE) (Term) Gm-0801-15; Office of the Director for Electronics, Projects Division, Space Experiments Office. Closes July 5.

89-41: Supervisory Operating Accountant, GS-0510-12 or 13; Office of the Director for Management Operations, Financial Management Division, Accounting Branch, Fund Accounting and Control Section. Closes July 5.

89-43: Supervisory Mathematician, AST, Data Analysis, GM-1520-14 or 15; Office of Director for Electronics, Analysis and Computation Division, Computer Applications Branch. Closes July 10.

89-45: Program Analyst, GS-345-12 or 13; Office of the Director for Space, Space Station Freedom Office, Technical Managment Information Office. Closes July 5.

89-46: Aerospace Engineer (NTE: 1 year), GM-0861-15, Office of the Director for Space. Closes July 5.

89-47: Administrative Officer, GS-341-11 or 12, Office of the Director for Electronics. Closes July 5.

People & Places

Attention Apollo Alumni

The **Researcher News** has, since April, been publishing a series of articles dealing with Langley contributions to the Apollo moon landing. Although numerous Center employees and retirees have been interviewed, countless other contributors have not been reached.

This is a call for comments from those who worked at Langley on any phase of the historic manned lunar landing or events which impacted this success.

Employees, retirees, and sons or daughters of former Apollo employees now working on Center are urged to respond. Kindly submit memories to Editor, NASA Langley Research Center, Mail Stop 115, Hampton, Va., 23665, by Thursday, July 8. Be sure to include your name and Apollo affiliation.

Submission or excerpts from submissions will be published in the Apollo issue, July 17. Comments selected for publication may be edited.

Apollo: From a Different Angle

In a 1974 autobiography *Return to Earth*, Apollo astronaut Edwin "Buzz" Aldrin describes his difficult mid-life transition from having reached the pinnacle in man's space exploration to dealing with a profession which was being "shelved until further notice." One effect of this difficult transition was his struggle combating substance abuse.

Aldrin's new book, *Men from Earth*, focuses on the events of the race for the moon--both in the U.S. and the Soviet Union. In addition, the book brings to life the leaders of the Apollo program, like Tom Paine, Sam Philios, George Low and Wernher von Braun and his German rocket team. The book profiles the Soviet rocketeers and cosmonauts as well as Aldrin's fellow astronauts. Aldrin also recalls the behind-the-scenes intrigues surrounding flight assignments.

Aldrin will speak to Center employees, contractors and retirees July 18 at a colloquium at 1 p.m. in the H.J.E. Reid Conference Center. The title of Aldrin's address will be "Manned Space Programs--The Apollo, the Soviet and the Future."

Aldrin's latest book, *Men from Earth*, is available for sale at the NASA Langley Visitor Center Souvenir Counter. A limited number of copies are stocked and will be sold for $19.95

Special Apollo LAA Social

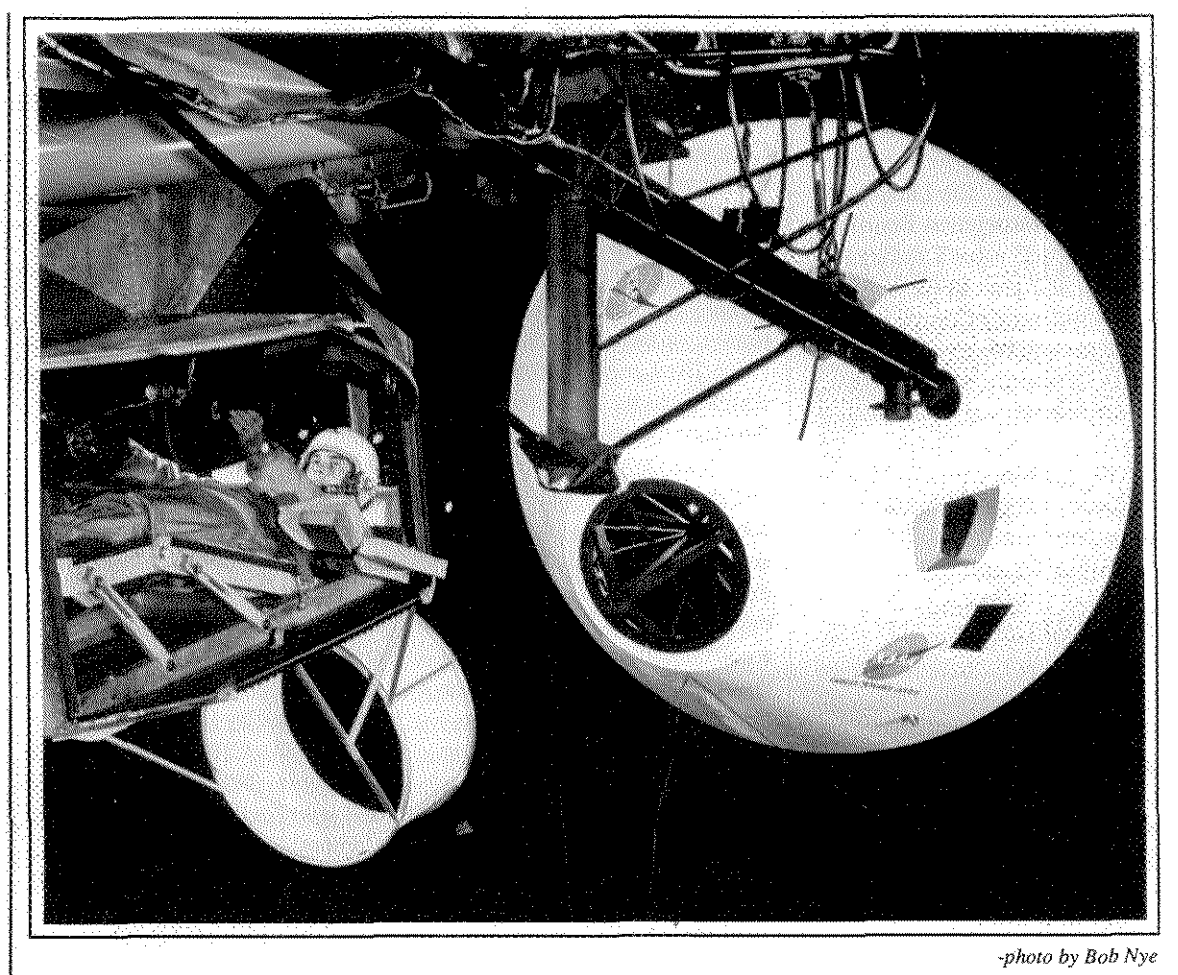
The Langley Activities Association will sponsor a special Apollo celebration Friday, July 21, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222.

Live entertainment will be provided by Langley's own Charlie Johnson and the NASA Combo. Admission is free and complimentary hors d'oeuvres will be served.

Join your co-workers and celebrate the 20th anniversary of the first lunar landing at this special LAA social.

Apollo Calendar of Events

July 12	"Langley Contributions to the Apollo Program" panel discussion lead by Dr. James Hansen, 7:30 p.m., H.J.E. Reid Conference Center
July 18	Langley Colloquium featuring Apollo 11 Astronaut Buzz Aldrin, 1 p.m., H.J.E. Reid Conference Center
July 18	Employee reception honoring Buzz Aldrin, sponsored by Langley Federal Credit Union, 3:30 p.m., H.J.E. Reid Conference Center
July 18	Sigma Series Lecture featuring Buzz Aldrin, sponsored by NASA, the City of Hampton and the Daily Press, 7:30 p.m., Radisson Hotel Hampton
July 19	Virginia Science Museum, Richmond, colloquium and reception for Buzz Aldrin, 11:30 a.m.
July 19	AIAA Luncheon Lecture Program featuring James J. Buglia, sponsored by Visitor Center and AIAA Student Chapter, noon, Visitor Center theater
July 20	Virginia Living Museum, Newport News, lecture featuring Lee Person, 8 p.m., reservations needed
July 21	Apollo Social sponsored by Langley Activities Assoc., H.J.E. Reid Conference Center, 4 p.m. free admission, entertainment, hors d'oeuvres



-photo by Bob Nye

READY, SET, DOCK. Langley's Rendezvous Docking Simulator enabled scientists to determine man's ability to complete a final docking during the last 200 feet of a lunar orbit rendezvous. The full-scale model at left simulates the Project Apollo Lunar Excursion Module (LEM) crew section. The LEM model, which is capable of all six degrees of freedom of mechanical motion, and the Apollo target vehcile (right), which can move vertically and laterally, are supported by an overhead cable system. The LEM has a forward landing window, shown here, and a small overhead docking window facing the Apollo target. In operating the simulated LEM crew section, the research pilot reclines on an astronaut couch and peers through the small overhead window which provides visibility for maneuvering toward the Apollo target.

Rendezvous and Docking Maneuvers: Critical to Apollo Flight Plan

-by Allan C. Hanrahan

One of the most crucial elements of the Apollo 11 mission to land a man on the moon and return him safely to Earth was the lunar-orbit rendezvous (LOR).

In 1962, Roy R. Brissenden, retired Langley engineer, briefly but prophetically explained LOR: "This technique permits separation of the Lunar Excursion Module (LEM) from the Apollo Command and Service Module (CSM) in lunar orbit for descent to the lunar surface. After the excursion to the surface, the two landing astronauts return to orbit in the ascent stage of the LEM for rendezvous and docking with the CSM."

Obviously these maneuvers were going to require a great deal of rendezvous and docking simulation and training, so a crack Langley team was formed--and later awarded--"for the analysis and development of visual rendezvous and docking procedures, the experimentation and development of suitable docking visual aids, and the training of astronauts for the Gemini and Apollo programs."

The team included Arthur W. Vogeley and Max C. Kurbjun, head and assistant head, respectively, of the Guidance and Control Branch of the Space Mechanics Division, as well as Brissenden, Alfred J. Meintel, Jr., Jack E. Pennington and Marvin C. Waller. The latter three are still on duty at Langley and seem prone to pass on credit to others.

While Vogeley invented the concept, "Brissenden 'honcho'd' the construction and Kurbjun, being the mechanical engineer that he was, had some input. Jack Pennington was responsible for the majority of studies done (on the facility)," related Meintel. Pennington reported that "The idea for the docking, which used a unique suspension system, was Kurbjun's and Vogeley's."

The pilot-controlled, dynamic simulation used a full-scale facility to present three-dimensional, real-world visual information to the pilot. The facility also imparted all six degrees of motion freedom to the pilot's compartment. The full-scale LEM crew compartment, which represented about a third of the LEM ascent stage, occupied the moving gimbal system. The full-scale Apollo mockup was suspended at the end of a 210-foot-long track. Located inside a large hangar, this facility permitted studies of docking maneuvers to be made under dark as well as daylight conditions. The facility operated in a closed loop that included a general-purpose analog computer for programming realistic vehicle characteristics and motion variation and compensation.

Throughout the sixties, NASA astronauts and test pilots made a number of simulator flights in this program involving close cooperation between Langley and the Manned Spacecraft Center in Houston, Texas.

"There were a number of astronauts who came through here," said Meintel. "In fact, we have a picture (of the simulator) that was signed by all the people who ever used it, with one exception," said Pennington. "One of the astronauts who was here twice, and whose autograph we missed getting, was Ed White. He was just a great guy and everyone liked him." White was killed in a launch pad fire with Gus Grissom and Roger Chaffee--a poignant reminder that no worthy endeavor is without a price.

"We trained an awful lot of astronauts," said Vogeley. "It gave us a lot of satisfaction just to show that you could do that sort of thing (the simulation). It was a unique piece of equipment and only cost about $250,000. I think we got our money's worth."

Happenings

LAA SOCIAL will be held Friday, July 7, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, July 11 at 2 p.m. in the H.J.E. Reid Conference Center. Concerns to be brought before the board should be addressed to the appropriate chairperson.

LOST: Leather cover for T-top. Burgandy with fold-down flap and velcro fasterer. Call 249-2246 after 5 p.m.

Retirement Parties

Robert C. Ingram will be honored at a retirement dinner on Saturday, July 8, in the H.J.E. Reid Conference Center. Cash bar is at 6 p.m., followed by BBQ buffet at 7. Cost is $11/person; $20/couple. Contact Lisa Peckham, ext. 46221, for further information.

Edgar L. Collier will be honored at a retirement party Saturday, July 22, in the H.J.E. Reid Conference Center. Festivities begin with a cash bar at 5:30 p.m.; dinner is at 6:30. Cost is $13.50/person including gift. Donations of $2 for gift only are welcome. Contact Terry Oden, ext. 46294, by July 12.

Carnival Plans Underway

-by Geoffrey Tennille

Preparations are already underway for the 1989 LAA Carnival, which will be held Friday and Saturday, August 18 and 19. Historically, the Carnival has been the largest fund raiser for the LAA. In recent years, it has been the only reason we have not lost money.

The Langley Exchange, which includes the Cafeteria, the Souvenir Counter at the Visitor, the Child Development Center and the LAA, has undertaken some restructuring that allows each branch to utilize the expertise and resources of the other branches. There has been a considerable reduction in duplication of effort which has resulted in substantial savings for the LAA. For the first time in years, the LAA is showing a monthly profit for months other than August.

If this trend toward profitability continues, the Carnival will not be needed as an annual fund raiser. Therefore, this may be the last Carnival under the present format. The goal of the LAA is to make this the biggest and best Carnival yet. We anticipate having numerous free exhibits and activities for children to augment the children's midway.

We still need volunteers and entertainment for the main stage. Call Frankie Ward, ext. 46369, if you can assist. Paula Ware, ext. 45018, is looking for more contestants for the Monarch contest. The Arts and Crafts exhibit is again being coordinated by Betty Hughes, ext. 42537. Call her to reserve your table. We hope to see you and your family at this year's Carnival.

Voluntary Leave Transfer Program

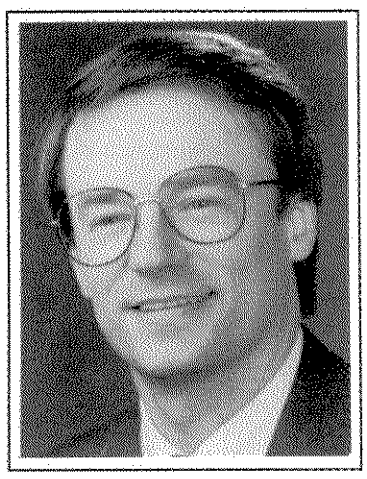
The Voluntary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing a period of unpaid leave as a result of a medical emergency. As a result of such an emergency, the following employees are approved as leave recipients:

- o Robert M. Connell Jr.
- o Twanda L. Copling
- o Randolph F. Culotta
- o Kenneth N. Jones
- o Catherine B. Worth

For additional information, contact Linda Park, ext. 42610.

July VC Programs

The Rendezvous that was Almost Missed: Apollo LOR

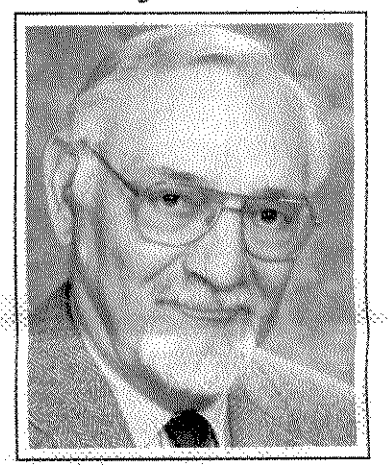


Thousands of factors contributed to the ultimate success of Apollo, but none were more essential--in the estimation of Dr. James R. Hansen--than the concept of lunar-orbit rendezvous (LOR).

Without NASA's adoption of LOR, mankind may still have landed on the moon, but almost certainly not in the time frame established by President Kennedy.

Hansen, Langley's historian will lead a panel discussion on "Langley's Contributions to Apollo" on Wednesday, July 12 at 7:30 p.m. in the H.J.E. Reid Conference Center. Panel members include Clinton E. Brown, Dr. William H. Michael and Arthur W. Vogeley, all key figures in the genesis of the LOR concept.

An Eye on the Moon: The Success of the Lunar Orbiter Project



The Lunar Orbiter Spacecraft Program was conceived to search out potential Apollo landing sites and to return detailed photographic coverage of the lunar surface for scientific study.

"The unparalleled success of the five missions of the Lunar Orbiter Project can be traced to the design concept and test philosophy orginated at Langley as well as to the modular design of the spacecraft and the assignment of mission responsibilities to the design team," contends James J. Buglia.

Buglia, Aerosol Research Branch, will discuss the camera system that provided information on the optimum landing site selection for the Apollo moon landing on Wednesday, July 19, at noon in the Visitor Center theater. The lecture is sponsored by the Visitor Center and the AIAA Student Branch.

Take Note:

July 7 is the deadline date for information for the August edition of the LaRC telephone directory. Personnel listing changes or corrections are to be submitted on Langley Form 41 to REMO, Mail Stop 123.

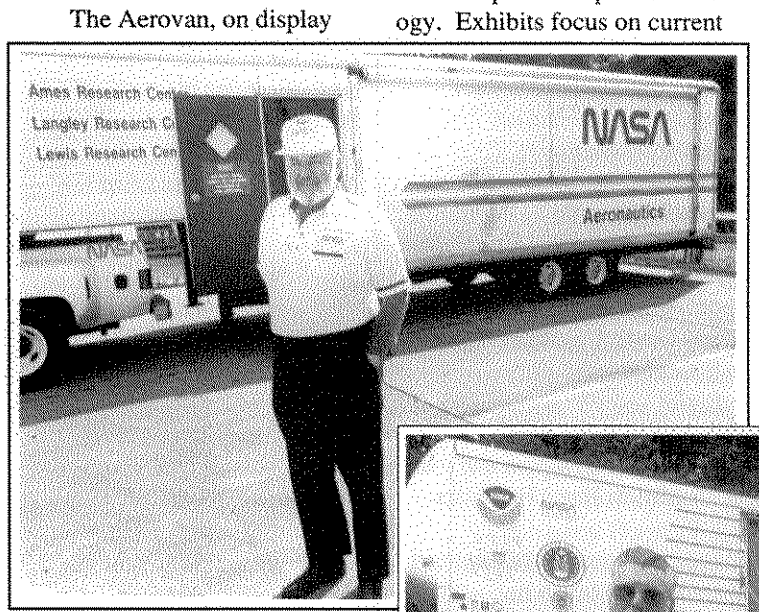
NASA Aerospace Vans to be On Display at Visitor Center

Employees are invited to visit the NASA Aerovan and the SARSAT van, on display at the Visitor Center.

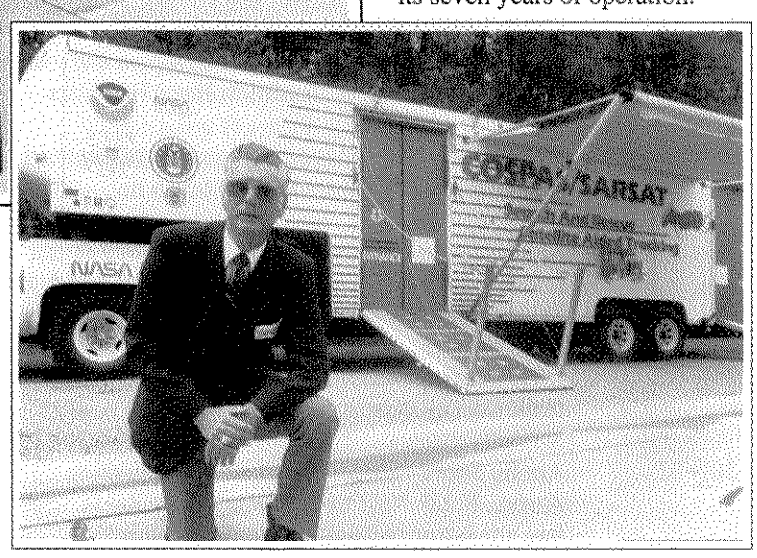
The Aerovan, on display July 14 and 15, from 8:30 a.m. to 5 p.m., outlines NASA's role in maintaining United States' leadership in aerospace technology. Exhibits focus on current NASA research.

The SARSAT van, on display only July 15, from 8:30 a.m. to 5 p.m., describes the COSPAS/SARSAT project. The project is an international rescue program whose principal partners are the United States, Canada, France and the Soviet Union.

The Aerovan program, begun in 1982, vividly proposes why the first A in NASA stands for aeronautics. The SARSAT program describes the project that has saved over 1,100 lives in its seven years of operation.



Dale C. Christensen, Aerovan I lecturer, confirms that the program has taken the NASA message to over one million people.



At right, SARSAT lecturer Bob Buckley poses in front of the SARSAT van viewed by 193,843 visitors last year.

Researcher News

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Researcher News

Volume 3, Issue 14 July 14, 1989
Bi-weekly Employee and Contractor Publication

Calendar of Apollo Events

July 12 Panel Discussion: "Langley Contributions to the Apollo Program" lead by Dr. James Hansen, featuring Clinton E. Brown, William Michael and ArthurVogeley. 7:30 p.m., H.J.E. Reid Conference Center.

July 18 Langley Colloquium featuring Apollo 11 astronaut Buzz Aldrin. 1 p.m., H.J.E. Reid Conference Center. Reception and book signing sponsored by the Langley Federal Credit Union. 3:30 p.m., H.J.E. Reid Conference Center.

July 18 Sigma Series Lecture featuring Buzz Aldrin, sponsored by NASA, the City of Hampton and the Daily Press. 7:30 p.m., Radisson Hotel Hampton.

July 19 Virginia Science Museum colloquium and reception honoring Buzz Aldrin. 11:30 a.m., Richmond.

July 19 AIAA Luncheon Lecture Program featuring James J. Buglia, sponsored by Visitor Center and AIAA Student Chapter. Noon, Visitor Center.

July 20 Virginia Living Museum lecture featuring Lee Person. 8 p.m., Newport News. (see pg. 6)

July 21 Apollo Social sponsored by LAA and featuring Charlie Johnson and the NASA Combo. 4 to 8 p.m., H.J.E. Reid Conference Center.

July 17-21 Apollo films shown during lunch in cafeteria.

July 1-31 Month-long Apollo programming at Visitor Center. (Complete details on page 7.)

You are cordially invited to

Langley Federal Credit Union's

Reception and Book Signing

honoring Apollo 11 Astronaut Edwin E. "Buzz" Aldrin, Jr. and commemorating LRC's role in the U. S. Space Program on the occasion of the twentieth anniversary of the Apollo 11 Moon Landing

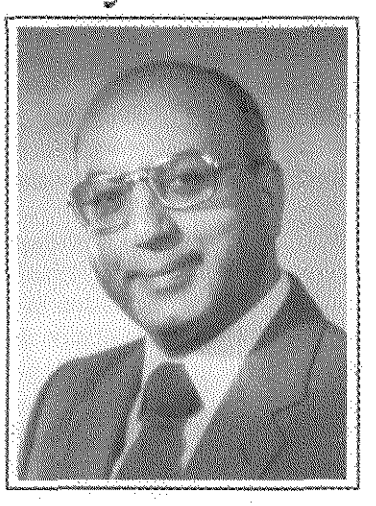
Tuesday, July 18, 1989

3:30 p. m. to 5:30 p. m.

Langley Activities Association Building

THAT WAS THEN. Apollo 11 astronaut Buzz Aldrin made a series of successful landings on a mock-up surface of the moon in this lunar landing module simulator at Langley's Lunar Landing Research Facility in preparation for the historic moon landing twenty years ago. Aldrin will address Center employees, contractors and retirees at a special anniversary colloquium Tuesday, July 18, at 1 p.m. in the H.J.E. Reid Conference Center.

Dr. Noor Honored by Civil Engineering Society



Dr. Ahmed K. Noor, professor of engineering and applied science at George Washington University's Joint Institute for Advancement of Flight Sciences, has been awarded the Aerospace Structures and Materials Award from the American Society of Civil Engineers. Noor was cited for "exceptional contributions to the advancement of aerospace technology in civil engineering." The award was presented at the 30th Structures, Structural Dynamics and Materials Conference held in April, in Mobile, Alabama.

Noor came to Langley in April 1971 as a National Research Council senior research associate. In 1972 he was named head of the Structures and Dynamics Program for GWU's Joint Institute for Advancement of Flight Sciences. Before joining GWU, he had taught at Stanford University, California; Cairo University, Egypt; University of Baghdad, Iraq; and the University of New South Wales, Australia.

Noor received a bachelor of science degree with honors from Cairo University in 1958 and master's and doctoral degrees from the University of Illinois at Urbana-Champaign in 1961 and 1963. He has edited 13 books and is the author of over 180 papers in the fields of structural mechanics, computational mechanics and new computing systems.

NTF Mishap Report Released

The failure of a metal band, securing insulation around the drive shaft, has been cited as the cause of a mishap during a routine test run of the National Transonic Facility (NTF) wind tunnel, January 18.

The mishap caused damage estimated at $3.2 million and a delay of approximately eight months in operations. The mishap resulted from fatigue and fracture failure in the stainless steel metal band of the external thermal barrier retainer on the fan drive shaft. The retainer holds the insulation in place around the drive shaft immediately upstream of the fan blades.

Debris from the failed structures passed through the fan blades causing major damage to all 25 blades and minor damage to other internal tunnel components downstream of the fans.

NASA Selects Science Experiments for Space Station Freedom

NASA's Office of Space Science and Applications has announced the selection of 27 flight experiments, or concept studies leading to experiments, that will fly aboard the Space Station Freedom.

The selections fall into two categories. The flight category is for attached scientific experiments that can be mounted aboard elements of Freedom's structure during its assembly and outfitting phase. The 14 investigations selected in this category will be the first performed aboard Freedom. Flight proposals were solicited that would be limited in weight and make only modest demands on station resources, such as power, cooling and crew availability, during the busy assembly phase.

The concept study category is for studies that may lead to flight experiments after the assembly phase. These proposals were solicited for more advanced ideas that could be implemented after station assembly when additional resources, such as high power and data-handling capabilities, will be available.

Earth science investigations selected for flight include Langley proposals:

Dr. M. Patrick McCormick, Stratospheric Aerosol and Gas Experiment III, flight experiment; W. P. Chu; D. M. Cunnold, Benjamin M. Herman, Alvin J. Miller, Joseph M. Zawodny, Philip B. Russell, David Rind and Jacqueline Lenoble.

Dr. Bruce Barkstrom, Clouds and the Earth's Radiant Energy System, flight experiment; Maurice L. Blackmon and Robert D. Cess.

Some of the 14 flight experiments and 13 concept studies call upon two facilities the Office of Space Science and Applications has indicated would be built for Freedom. These are Astromag, a cryogenically-cooled superconducting electromagnet to measure cosmic rays, and the Cosmic Dust Collection Facility, which will capture and record the direction and velocity of cosmic dust particles for further analysis.

The 27 selections were made from responses to two NASA announcements of opportunity issued in 1988. The first, issued in January, was for the Earth Observing System (Eos) and solicited proposals for both the unmanned NASA Polar Orbiting Platform and the permanently manned Space Station Freedom. The second was issued in July and was specifically for scientific and technological payloads in other scientific disciplines to be attached to Freedom. Eight of the nine Earth science investigations selected as attached payloads involve copies of Eos Polar Platform instruments.

The investigations include participants from about 50 organizations representing NASA and other government and private research center, U.S. universities and five foreign countries. The selected experiments and concepts represent a wide range of scientific disciplines including space physics, Earth and environmental science and communications technology. They involve nearly 130 scientists.

Selection of the flight experiments was predicated on their ability to meet a timetable for the design, development and assembly of Freedom elements. The earliest expected flight date for any of the experiments is 1996. The Freedom Station will provide physical attachment points, power, cooling, data communications and pointing for certain instruments. The Attached Payload Program is managed by the Office of Space Science and Applications, Flight Systems Division. Program manager is Dr. Philip J. Cressy, and program scientist is Dr. Stanley C. Freden, both from NASA Headquarters.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA has issued an updated mixed fleet manifest projecting current planning for primary payloads for Space Shuttle missions and expendable launch vehicles (ELV) through Fiscal Year 1995. In addition to the changes in the Space Shuttle flight sequence through STS-37 announced on May 12, this latest launch schedule continues to reflect NASA's commitment to the various science disciplines.

HEADQUARTERS, Washington, D.C. --- NASA activities generate more than 300,000 full-time jobs across all 50 states, according to a recent study undertaken for the agency by the NASA Alumni League. The study indicates that the money NASA spends for space and aeronautics research has a very significant impact on national employment, both direct and indirect.

JOHNSON SPACE CENTER, Houston, Texas --- JSC has selected two companies to continue the study and design of an unmanned, reusable reentry satellite called LifeSat (Life Science Staellite). General Electric, Reentry Systems Department, Philadelphia, and Science Applications International Corp., Torrance, Calif., were chosen for the two parallel $900,000 contracts.

HEADQUARTERS, Washington, D. C. --- E. Ray Tanner, deputy director, Space Station Freedom Program and Operations, retired from NASA on July 15. Dr. William B. Lenoir, associate administrator for Space Station named Jim Sisson as acting deputy director. Sisson currently serves as deputy program manager for the Space Station Freedom Program Office located in Reston, Va., a position he has held since November 1986.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- MSFC has selected Boeing Co., Seattle, Wash., and Martin Marietta Corp., Denver, Colo., for negotiations leading to award of contracts to study Space Transfer Vehicle (STV) concepts. These studies will investigate a high-performance space vehicle system capable of ferrying large, automated payloads from Space Station Freedom to geosynchronous orbits, the moon or other planets.

JOHNSON SPACE CENTER, Houston, Texas --- USAF Col. John E. Blaha has been named to the flight crew of Shuttle mission STS-33, a Department of Defense dedicated flight targeted for November 19. He replaces USNR Rear Admiral S. David Griggs, who was killed on June 17 when the private plane he was flying crashed in eastern Arkansas. Replacing Blaha as pilot for STS-40, planned for launch in August 1990, is USAF Maj. Sidney M. Gutierrez. In another flight crew assignment, Mary L. Cleave, Ph.D., and Norman E. Thagard, M.D., have been named as mission specialists for STS-42, a nine-day flight aboard Columbia, targeted for a December 1990 launch.

HEADQUARTERS, Washington, D. C. --- Admiral Richard H. Truly was sworn in as NASA Administrator by Dr. C. Howard Robins Jr., associate administrator for Management, at 1 p.m. Saturday, July 1

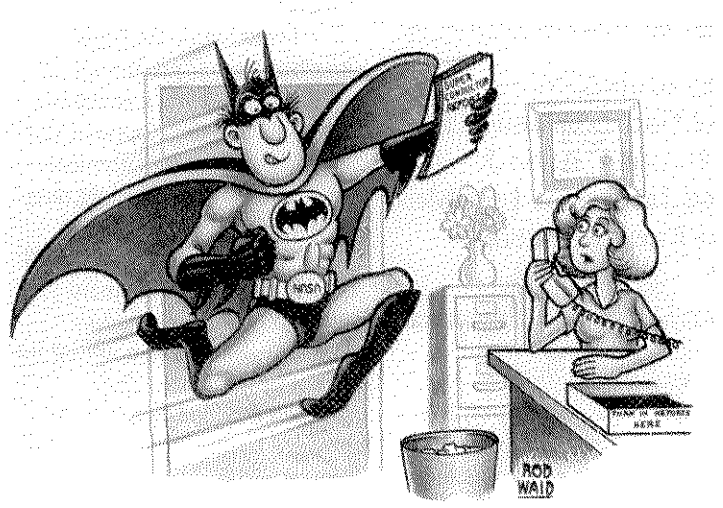
Mall Memorial to Honor Langley Dead

A memorial dedicated to those who have lost their lives while serving the mission of Langley Research Center is currently being constructed on Center grounds. Dedication of the memorial is planned for September 1989. Those to be honored include:

Stevens Bromley, Jr.	**Aeronautical Engineer**	**August 20, 1924**
Thomas Pittman	**Electrical Engineer**	**Summer, 1943**
Herbert Hoover	**Test Pilot**	**August 14, 1952**
Thomas B. Maxwell	**Mechanic**	**June 28, 1954**
William L. Alford	**Test Pilot**	**October 12, 1959**
Dale W. Dalin	**Supervisory Eng. Technician**	**January 7, 1981**
Paul F. Coy	**Aerospace Engineer**	**November 19, 1981**
Wendell W. Kelley	**Test Pilot**	**November 19, 1981**

Early documentation of this type of information is unavailable or incomplete. The above list of honorees is accurate according to existing records. Anyone who has more information---additional honorees or expanded detail; for example, the exact date of the accident that claimed the life of Thomas Pittman--- is encouraged to contact Roger Hathaway, Office of Public Services, ext. 43312.

Lankley



Hello, mental ward, we have an engineer suffering from **BATMANIA** ...

Retirement Party

Duncan McIver, director, National Aerospace Plane, will be honored at a retirement dinner Tuesday, July 25, in Washington. For details, call Margo O'Connor at the NASP Office, Headquarters, 453-2808 (FTS).

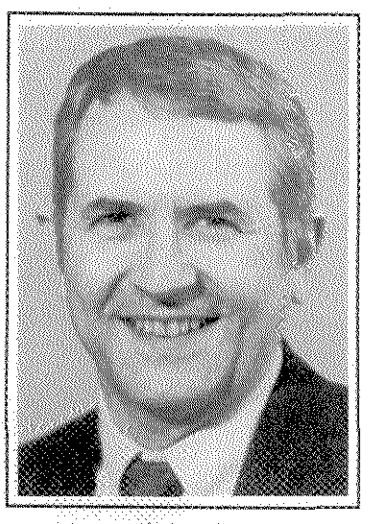
Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-93.....NASA Issues Updated Mixed Fleet Manifest
89-94.....NASA Programs Generate More than 300,000 Jobs, Study Shows
89-101....Two Companies Chosen for Work on Life Science Satellite
89-102....Commercial Launch Services Procurement Symposium
89-103....Tanner to Leave NASA
89-104....NASA Selects Science Experiments for Space Station
89-105....NASA Selects Science Experiments for Shuttle Microgravity Missions
89-106....NASA Space Shuttle Crew Assignments Announced
89-107....Boeing, Martin Marietta to Study Space Transfer Vehicle Concepts

Editorials

Truly Takes an Apollo Perspective; Challenges NASA, America



The Apollo 11 lunar landing will always rank as one of mankind's greatest voyages of discovery . . . along with the journeys of Columbus, Magellan, Captain Cook and Lewis and Clark.

Apollo, at its peak, consumed nearly four percent of the Federal budget. For evey dollar invested in Apollo, the program returned seven to eight dollars to our economy.

Today, many of our most able thinkers believe that budget economies may well have spelled false economies for the nation's space program. They say that, if NASA's budget had been held at about four percent of the Federal budget following Apollo, the United States would have completed a Space Shuttle, a permanently manned Space Station, a manned lunar base, and a manned mission to Mars---all before 1990. That view is bolstered by an analysis included in a plan for the nation's future space program, published by the Presidentially-appointed National Space Task Force in 1969.

I have no way of knowing whether that would indeed be the case today. But the facts speak for themselves.

Fact number one: Six months before the end of the decade of the eighties, the United States has attained only one of those four objectives---the Space Shuttle.

Fact number two: Following peak funding in 1965, the NASA budget gradually dropped to below one percent of the national budget and stayed there from Fiscal Year 1973 to Fiscal Year 1988.

Today, NASA's budget is up to one percent of the national budget. But it will have to increase significantly again when we adopt a specific program of human expoloration of the solar system. Such a program will be the logical extension of both our space policy goals and of our singular nature as humans. That nature drives us ever forward to know the unknown.

At a time of budgetary contraction, and growing concern over domestic problems at home, it would be relatively easy for Americans to let their dream of exploring and expanding the space frontier slip away forever.

Those who would have us become a second or a third rate power in space would slow down or cancel Space Station Freedom. They would slow down or cancel the National Aerospace Plane program. And they would oppose the development of a heavy-lift launch vehicle and the advanced "Pathfinder" technologies so necessary to build our future in space.

To those who ask whether this country can afford to move forward in space, I say: Can we afford not to?

To those who view the awesome challenges we face and turn aside because they fear the future, I say: We can prevail if we work together to rekindle the American spirit.

President Kennedy didn't promise us the moon. He challenged us to get there. We accepted the challenge and rose to greatness.

NASA is poising itself to rise to greatness again.

Richard H. Truly
NASA Administrator

The above comments were excerpted from remarks delivered by Truly at the National Space Outlook Conference, June 20.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Men on the Moon

Langley Research Center Contributed Substantially to the Success of Apollo

After the first manned landing on the moon, President Kennedy's commitment to the lunar mission sounds as bold as it ever did: American astronauts should fly a quarter of a million miles, make a pinpoint landing on a strange planet, blast off it and return home safely after an eight-day voyage through space. When Kennedy challenged the nation to risk this incredible journey, the only United States manned spaceflight up to that time had been Alan B. Shepard's 15-minute suborbital excursion in Mercury capsule, Freedom 7. NASA was not exactly sure how the lunar mission should be made at all, let alone achieved in less than ten years' time.

Answering President Kennedy's challenge and landing men on the moon by 1969 required the most sudden burst of technological creativity, and the largest commitment of resources --$24 billion-- ever made by any nation in peacetime. At its peak, the Apollo program employed 400,000 Americans and required the support of over 20,000 industrial firms and universities.

On the occasion of the twentieth anniversary of the first manned lunar landing, made July 20, 1969, by Apollo 11 astronauts Neil A. Armstrong, commander; Michael Collins, Command Module pilot; and Edwin E. "Buzz" Aldrin, Lunar Module pilot, it is appropriate to pay tribute to the contributions to Apollo made by Langley Research Center.

The Beginnings

The Langley Memorial Aeronautical Laboratory established in 1917, was the first U.S. national facility devoted to the advancement of the science of flight. Long before the space program, scientists and engineers at Langley incubated the ideas and hatched the technology that made American aviation take off and fly. For over 70 years now, information from the laboratory's wind tunnels and other unique research facilities has played a vital role in advancing American performance in the air.

Langley gave birth to key components of the U.S. space program. As early as 1952, Langley researchers explored seriously the possibilities of manned flight into space. Out of these pioneering studies grew the NASA Space Task Group that conceived and directed Project Mercury, America's original man-in-space program. Langley provided much of the knowledge and know-how basic to the development of the Mercury spacecraft and its related systems, as well as to the creation of the worldwide tracking network that monitored the first space shots. Furthermore, it was at Langley where the original team of NASA astronauts (Alan Shepard, Virgil "Gus" Grissom, John Glenn, Scott Carpenter, Donald "Deke" Slayton, Walter Schirra and Gordon Cooper) received their basic training.

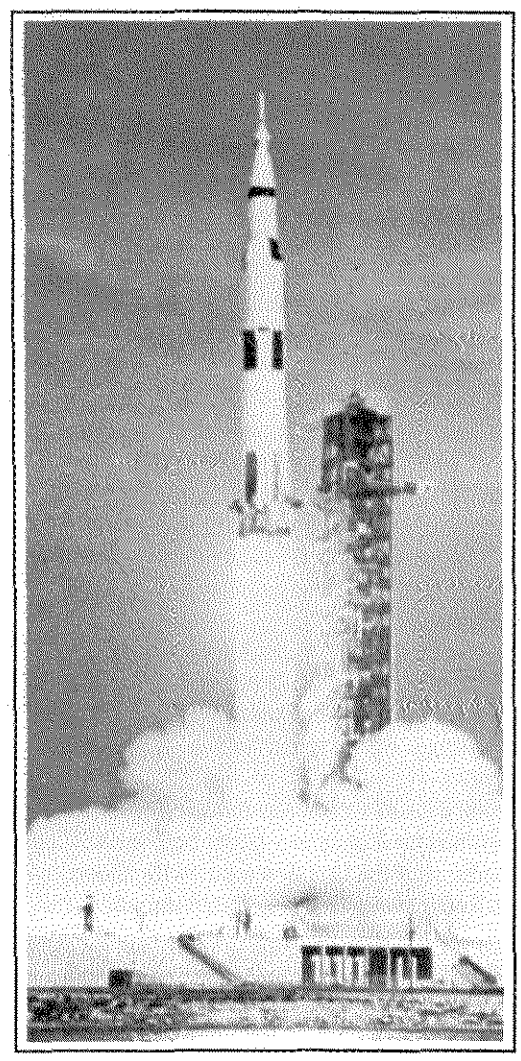
How to Get to the Moon?

When President Kennedy made his historic decision in May 1961, NASA had already studied various ways by which to land men on the moon but the agency was still uncertain which one was best. Mission planners quickly narrowed the options down to three: direct ascent, Earth-orbit rendezvous (EOR) and lunar-orbit rendezvous (LOR).

Of the three, LOR was initially the least popular inside of NASA due to what was then considered its greater complexity and risks.

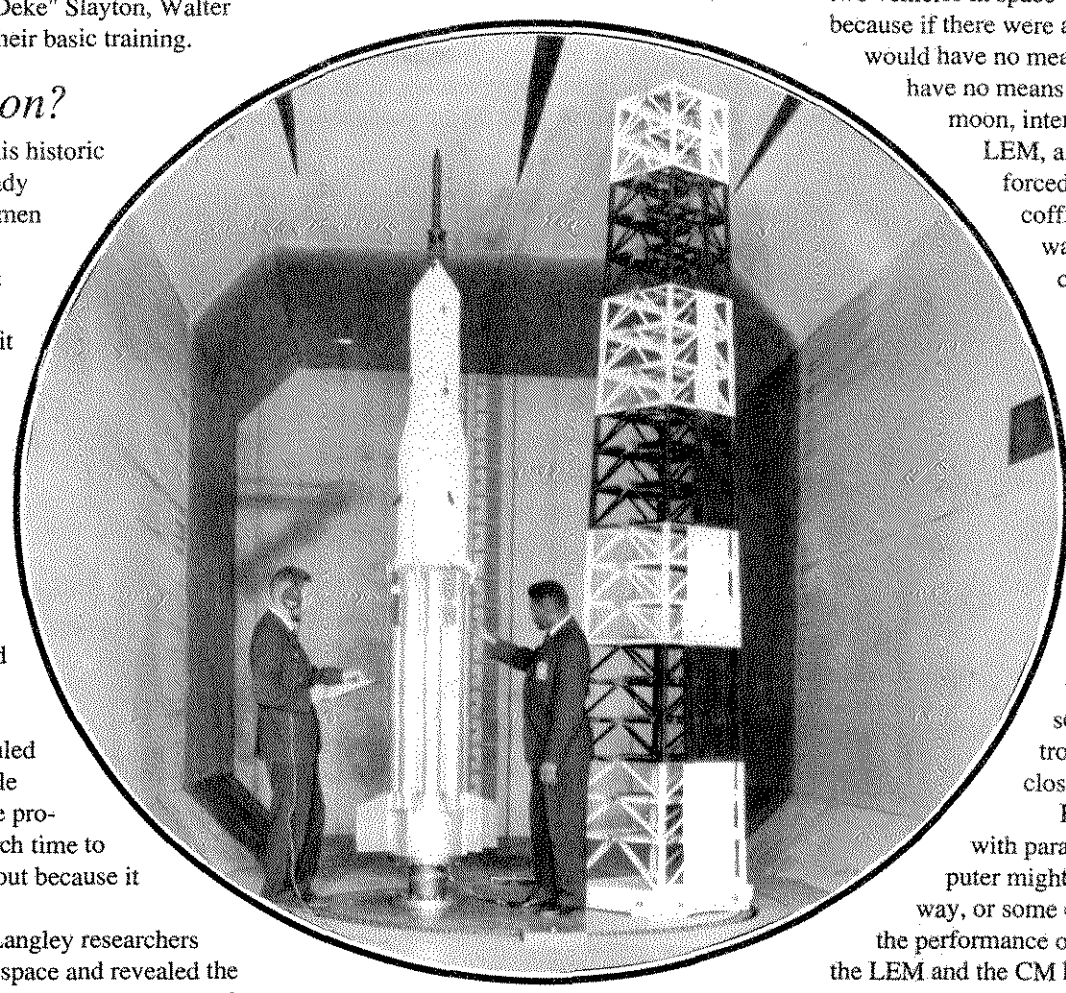
In July 1962, however, after months of evaluation and intense debate, NASA selected LOR as the primary mission mode by which to land Americans on the moon "before the decade is out." Direct ascent, the first choice of many NASA officials, was ruled out because the huge new launch vehicle required to accomplish the mission--the proposed Nova rocket--would take too much time to develop. The EOR concept was ruled out because it required two separate launch vehicles.

NASA selected LOR only after Langley researchers proved the feasibility of rendezvous in space and revealed the important engineering and economic advantages of a manned moon landing through lunar-orbit rendezvous. Advocates of LOR at Langley played vital roles in convincing NASA leadership that LOR was not only as safe as either direct ascent and Earth-orbit rendezvous but also it promised mission success some months earlier.



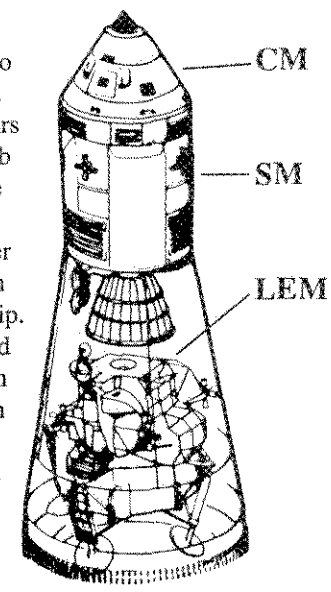
Apollo 11 blasts off from Cape Canaveral on **Wednesday, July 16, 1969.**

Long before liftoff, Langley researchers were delving into space exploration. Comprehensive testing of the aerodymanic forces affecting the performance of the Saturn-Apollo launch configuration was performed in Langley wind tunnels. Below, researchers are studying the ground wind-load effects on the Saturn V rocket and escape tower in the Transonic Dynamics Tunnel



Lunar-Orbit Rendezvous Concept

The brainchild of a few true believers at NASA Langley who had been experimenting with the idea since 1959, the basic premise of LOR was to fire an assembly of three spacecraft into Earth orbit on top of a single powerful rocket (Saturn V). This assembly would include: one, a mother ship or command module (CM); two, a service module (SM) containing the fuel cells, attitude control system and main engine; and, three, a small lunar lander or excursion module. Once in Earth orbit, the last stage of the rocket would fire, boosting the combined Apollo spacecraft into its flight trajectory to the moon. In lunar orbit, two crew members would don space suits and climb into the lunar excursion module (LEM), and take it down to the surface. The third crew member would maintain a lonely vigil in lunar orbit inside the mother ship. After exploring, the LEM would rocket back up and re-dock with the CM. The lander would then be discarded to the vastness of space or crashed into the moon, and the three astronauts in their command ship would head for home.



Langley's bold plan for rendezvous in lunar orbit held out the promise of achieving a manned landing on the moon by 1969, but it presented many technical difficulties. Success depended on NASA's ability to train astronauts to master the techniques of landing the LEM on the lunar surface and returning it to orbit and docking with the mother ship.

Several of the most significant facilities used to develop techniques for LOR and prepare the astronauts for Apollo missions were designed, built and operated by the Langley Research Center.

Rendezvous and Docking Simulator

One of the trickiest yet most essential maneuvers that had to be perfected on the ground before it could be tried in space was the linking of the lunar excursion module and the command module. The ability to rendezvous and dock the two vehicles in space was critical to the success of LOR, because if there were a failure the two astronauts in the LEM would have no means to return to Earth--and NASA would have no means to rescue them. The first men on the moon, international heroes, would die inside the LEM, and the commander of the CM would be forced to leave his buddies in their orbiting coffin and head for home alone. Nothing was secretly more terrifying to the CM commander than this possibility.

NASA had to do everything it could to make sure that this tragedy did not happen.

In the early 1960s, Langley researchers built various simulators to study the feasibility of space rendezvous and orbital docking. The most advanced of these, the Rendezvous Docking Simulator, significantly improved the chances of mission sucess through LOR by giving the astronauts a routine opportunity to pilot dynamically-controlled scale-model vehicles in a safe and controlled three-dimensional environment closely approximating that of space.

Rendezvous in space could turn sour with paralyzing swiftness. An on-board computer might fail, a gyroscope might tilt the wrong way, or some other glitch might occur to complicate the performance of a necessary maneuver. Pilots of both the LEM and the CM had to be ready to make crucial decisions instantaneously. Without Langley's Rendezvous Docking Simulator, the astronauts would not have been nearly as well prepared for handling the pressures of LOR. With the help of this ingenious device, they were able to master all of the necessary rendezvous and docking skills before liftoff.

Lunar Landing Research Facility

Before confronting the serious challenges of rendezvous and docking, the goal of the Apollo astronauts was first to achieve a successful lunar landing. To help solve this part of the overall problem of an LOR mission, Langley engineers constructed the Lunar Landing Research Facility.

NASA needed such a facility in order to explore and develop techniques for landing the rocket-powered LEM on the moon's surface, where the gravity is only one-sixth as strong as on Earth, as well as to determine the limits of human piloting capabilities in the unknown flight medium.

Although NASA Langley did use helicopters in the early 1960s to ascertain some of the problems of vertical descent to a lunar landing, there were no direct parallels between flying an aircraft in the Earth's atmosphere and piloting the LEM in the vacuum of space. If there had been parallels, the LEM would have looked something like a conventional aircraft--which it absolutely did not.

Langley researchers, because they were the early champions of LOR inside of NASA, played the leading role in the original conceptualization of the lunar excursion module, and they knew that the pilot of this vehicle, however its final design turned out, would have to overcome some distinctly unusual problems.

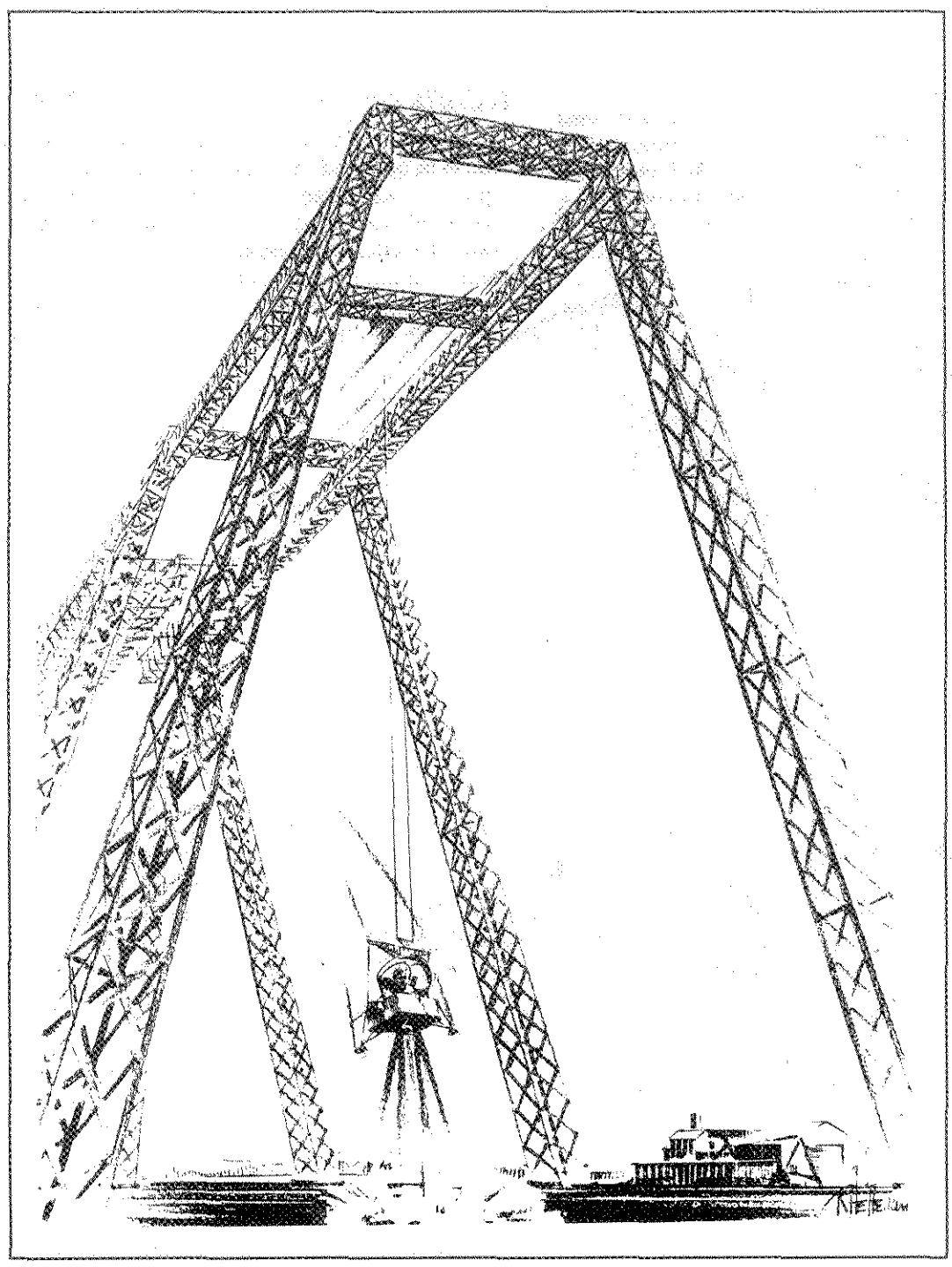
In technical terms, control of the LEM required small rockets that operated in an on-off manner. The firing of these control rockets in space produced abrupt changes in torques--forces that tended to produce rotation or rolling--rather than the smoothly modulated torques of a helicopter.

Furthermore, the LEM would hover in space with only one-sixth of the thrust required for a vehicle of the same weight in Earth's gravity. This meant that the characteristics of the LEM's control system would be significantly different from those of any flight vehicle to which the astronauts were accustomed. They could not simply extrapolate from atmospheric flight to flight in lunar conditions. In key respects, in fact, some of their basic previous experience in flying machines might even confuse them and get in their way.

Langley's Lunar Landing Research Facility, completed in 1965, helped to prepare the Apollo astronauts for the final 150 feet of their lunar landing mission by simulating both the lunar gravity environment and full-scale LEM vehicle dynamics. The builders of this unique facility effectively cancelled all but one-sixth of Earth's gravitational force by using an overhead partial-suspension system that provided a lifting force by means of cables acting through the LEM's center of gravity.

Twenty-four astronauts practiced lunar landings at this facility, the base of which was modeled with fill dirt to resemble the surface of the moon. Neil Armstrong and Buzz Aldrin trained on it for many hours before liftoff of Apollo 11. As was the case with all space missions, the successful landings of the first two men on the moon depended heavily on expert training in ground equipment like Langley's Rendezvous Docking Simulator and Lunar Landing Research Facility.

Langley provided critical information about the lunar landing in other ways as well. A hydraulic analog simulator built at the laboratory in the early 1960s helped researchers determine the ability of a pilot to control vertical braking maneuvers for landings starting from an altitude of about 25 miles above the lunar surface. There was also a special facility using one-sixth scale models of the LEM that looked into the possibility of an impact that could damage or upset the fragile-looking vehicle upon landing. Another laboratory apparatus probed the anticipated and much feared problem that blowing lunar dust caused by the blast of rocket engines might temporarily blind the pilot of the LEM during descent and prevent him from finding a safe spot for landing.



An artist's concept of the "gantry," Langley's Lunar Landing Research Facility.

Extravehicular Activi

Along with comprehensive studi
spacecraft and during "spacewalks," re
understanding of what the Apollo astr
on the lunar surface.

In the Reduced Gravity Simulat
and perform the other tasks required i
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Landing Research Facility.

A number of the Apollo astrona
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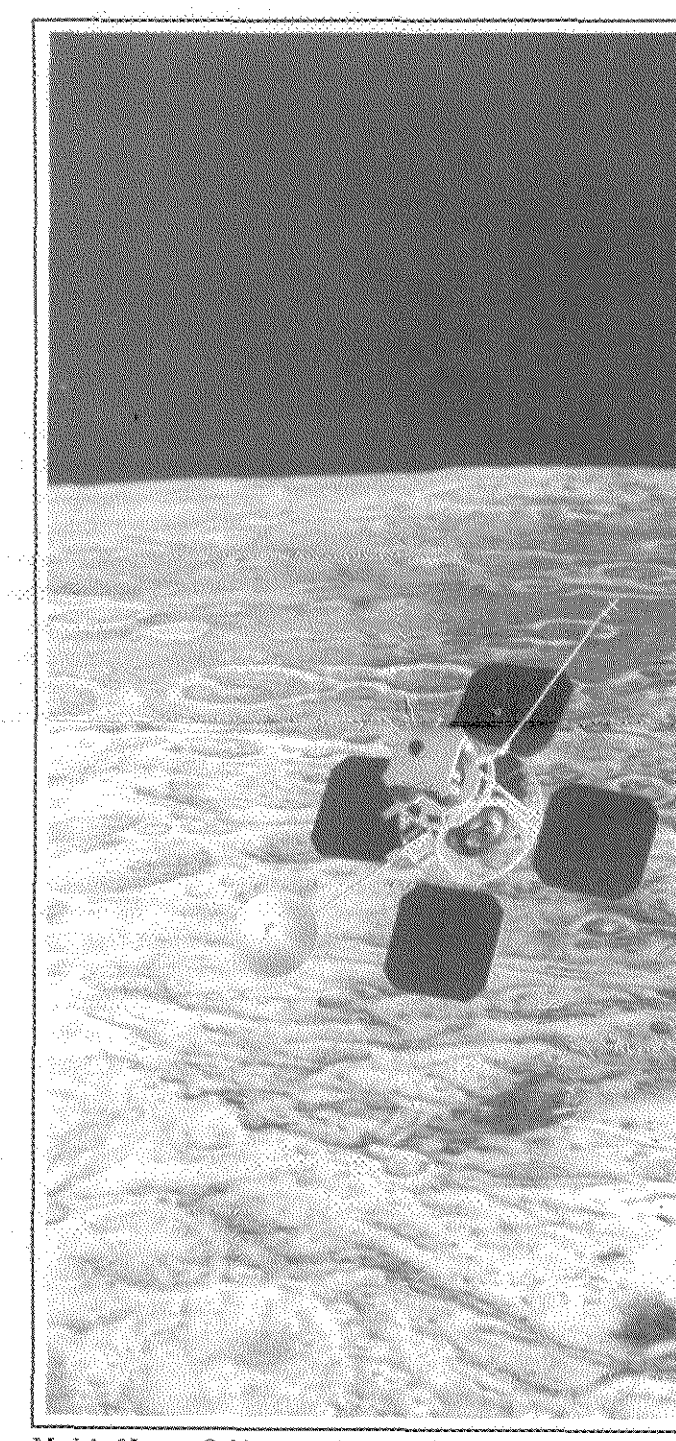


Model of Lunar Orbiter over lunar surface mock-up.

Lunar Orbiter Project

Through its management of the Lunar Orbiter Project, w
phy of the moon's surface by an unmanned spacecraft in lunar
nificant role in the selection of the sites of the Apollo manned

Before NASA could give the go-ahead for a landing atte
about the nature of the destination. Although humankind had
fantasy that it was made of green cheese, there still existed all
moon. One theory said that its surface was covered by a fine l
any type of vehicle attempting to land on it would sink and be

Earth-bound telescopes could not resolve lunar objects s
Apollo mission planners could hardly rely on them for a detail
get this information, and separate fact from fancy, NASA in th
unmanned missions to the moon.

The first of these, Project Ranger, involved the hard land
a high-speed camera. Before crashing to their destruction into
spacecraft showed that a lunar landing was possible--but defin
craters and big boulders had to be avoided.

The second probe, Project Surveyor, through its soft lan
showed that the lunar surface could easily support the weight

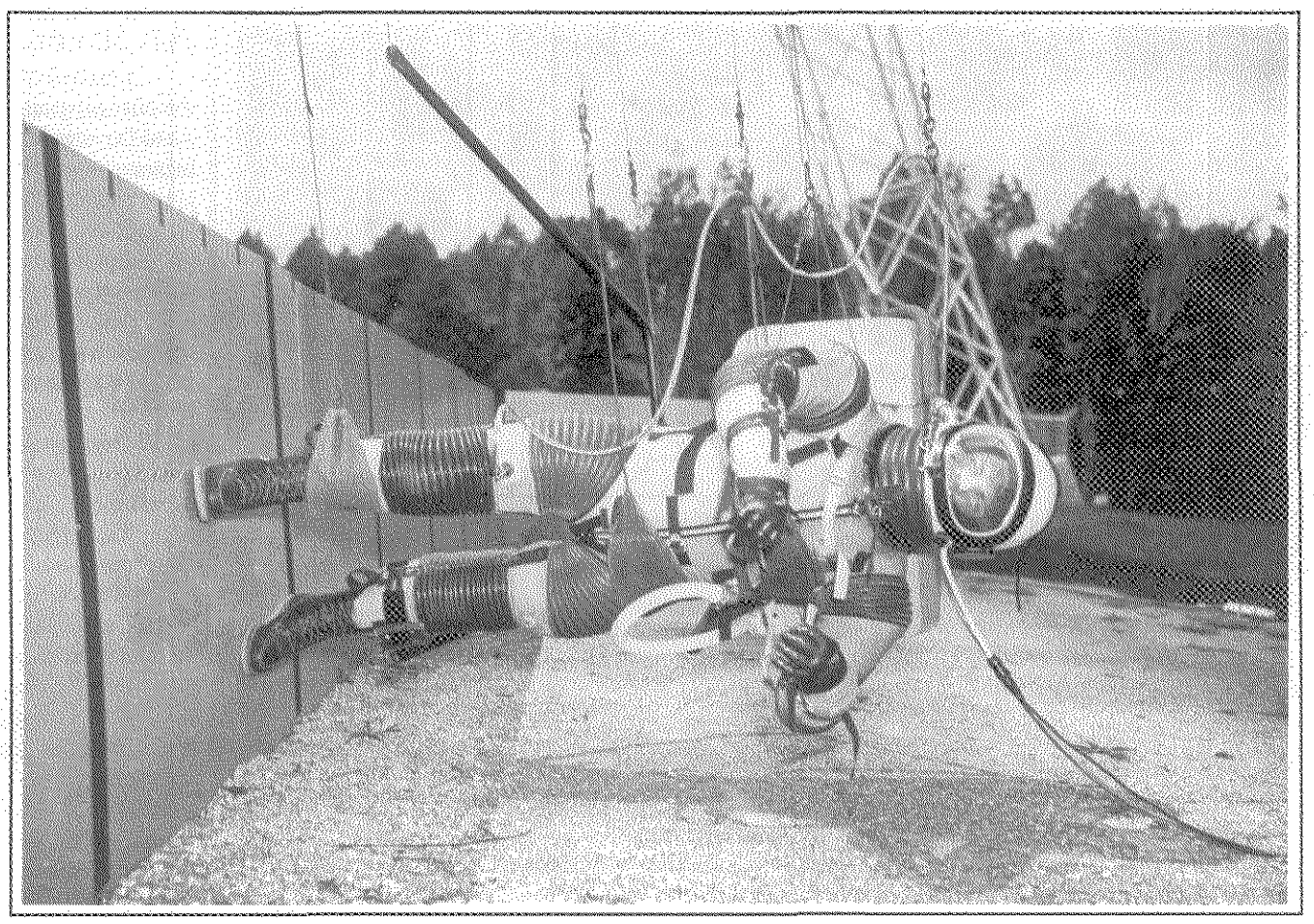
The third, the Lunar Orbiter Project, made photographic
regions. These maps, compiled at Langley, provided NASA w
formation needed to pinpoint the best landing sites--including
Tranquility chosen for Apollo 11.

ey Contributions to Apollo

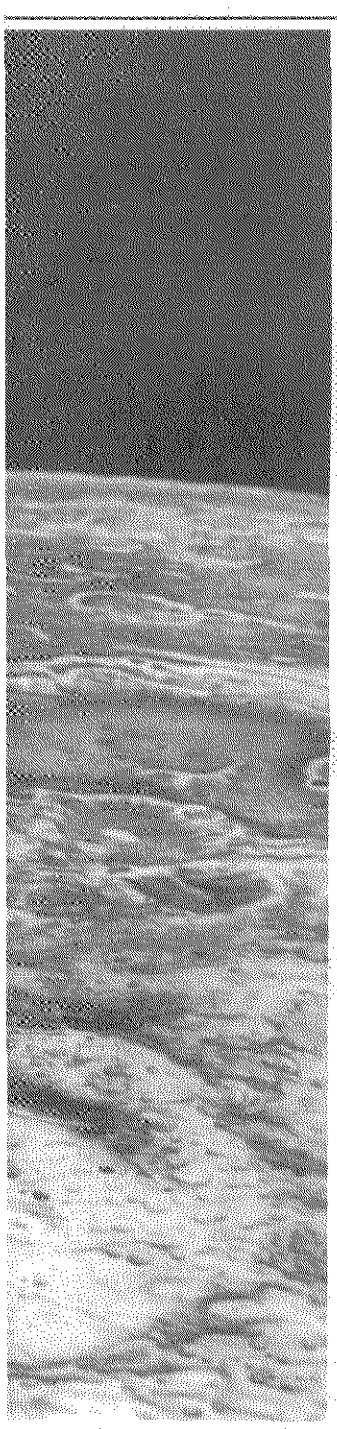
astronaut capabilities and mobility in space both inside a
hers at Langley also contributed significantly to NASA's
s would and would not be able to do while moving around

earchers investigated an astronaut's ability to walk, run
r exploration activities. With this facility NASA studied
notion by suspending the subject on his side so that he
t 80.5 degrees relative to the local horizons. Holding up
network of slings and cables. This was attached to a
g an overhead track that was part of the larger Lunar

acticed lunar walking in Langley's Reduced Gravity



Lunar Landing Walking Simulator prepared astronauts for that first step on the moon as well as lunar exploration.



volved systematic photogra-
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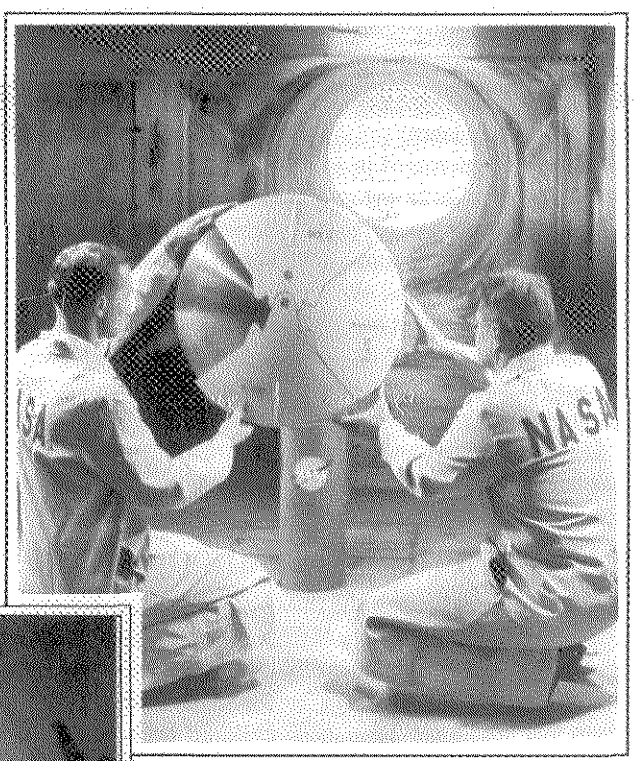
Aerodynamics and Structures Research

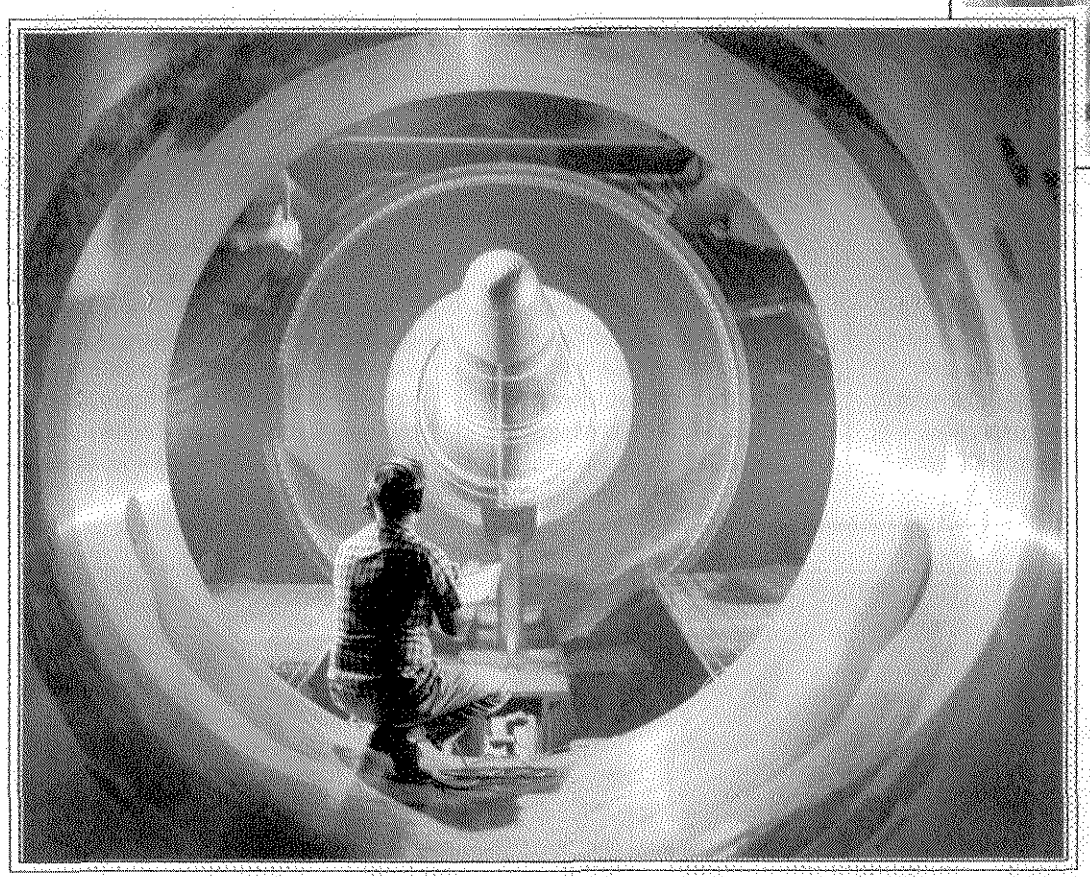
Many other things were done at Langley to support Apollo. Through hundreds of hours of wind-tunnel testing, researchers helped to determine the aerodynamic characteristics of the Apollo-Saturn launch configuration. In order to evaluate Apollo's ablative heat-shield materials, an electric arc heater was used at Langley that could duplicate the intense heat generated by friction during reentry. In numerous facilities, including the 8-Foot High-Temperature Tunnel, Langley engineers conducted critical investigations into the structural integrity of Apollo.

One of the major research projects managed by NASA Langley in support of Apollo was FIRE (Flight Investigation Reentry Environment). Although this project mainly consisted of flight tests involving Atlas rockets with recoverable reentry packages, FIRE also involved wind-tunnel testing. The purpose of the project was to study the effects of reentry heating on spacecraft materials.

From lunar orbiter tracking data, staff members constructed representations of the moon's gravitational field. These mathematical models proved invaluable in the design and timing of critical operating maneuvers during the flight of Apollo 11 and the subsequent lunar landing missions.



Project FIRE studied the effects of reentry heating on spacecraft materials.

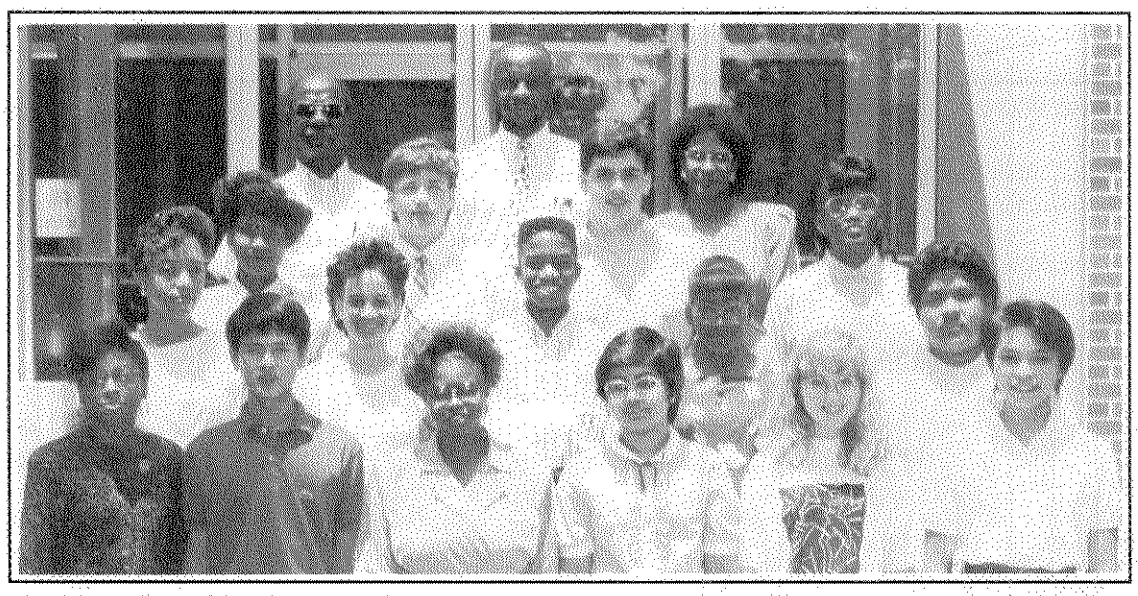


Effects of reentry on the Apollo spacecraft are tested in the 8 Ft. High-Temperature Structures Tunnel.

In Conclusion

This discussion only summarizes the highpoints of Langley's contributions to the Apollo lunar landing and exploration program. As President Kennedy indicated, the entire nation would have to go to work if Americans were to set foot on the moon by the end of 1969.

No place was more fortunate to participate in the achievement of the lunar objective than was the Langley Research Center.



SHARP STUDENTS POSE WITH PROGRAM STAFF. NASA's Summer High School Apprenticeship Program (SHARP) provides students with first hand experience to help them make decisions about a career in science, engineering or math. Earning while they learn this summer are SHARP participants (front row, L to R) Rebecah Gould, Nhat Ngo, Toni Winn, Shalini Gupta, Jennifer Burt, Lilian Rodriguez; (second row) Ronnie Harris, Tia Harris, Alton Jones, Michelle Armstrong, Efraim Caja; (third row) Mattie Goodman, John Cartier, Matthew Marrion, and Sheila Howard. Also pictured are (top row) Walt Darden, SHARP coordinator; Roger Hathaway, Langley education specialist, and Zanette Larrimore, administrative assistant.

SHARP Students Earn and Learn at Langley

Fifteen talented high school students are participating in an eight-week, intensive science and engineering apprenticeship program at Langley.

Hired through NASA's Summer High School Apprenticeship Research Program--SHARP, these local students, who have demonstrated an aptitude for and an interest in science and engineering careers, are earning as they learn.

All have participated in an orientation process outlining Langley's mission and the activities necessary to accomplish the center's goals and objectives. Each participant has been assigned to a mentor, a NASA scientist or engineer, who guides the student's progress.

During their apprenticeship, the students will complete designated assignments, prepare written reports, make oral presentations, and participate in a variety of enrichment activities. SHARP is a feeder program used to build a resource pool of potential applicants for future NASA employment in the fields of science and engineering.

Peninsula participants are Ronnie Harris and Sheila Howard, Denbigh High School, Newport News; Rebecah Gould, Alton Jones, Toni Winn and Shalini Gupta, Menchville High School, Newport News; Tia Harris, Bethel High School, Hampton; Nhat Ngo and Jennifer Burt, Ferguson High School, Newport News; and Michelle Armstrong, Phoebus High School, Hampton.

Southside students selected for SHARP are Mattie Goodman, J.F. Kennedy High School, Suffolk; John Cartier, Green Run High School, Virginia Beach; Lilian Rodriguez, Kempsville High School, Virginia Beach; Matthew Marrion, Deep Creek High School, Chesapeake; and Efraim Caja, Norview High School, Norfolk.

SHARP, which runs from June 19 through August 11, is specifically designed to attract and serve minorities underrepresented in the NASA scientific and engineering workforce.

Students who live within commuting distance of a participating NASA center, are U.S. citizens, and are 16 years old are eligible to apply. Contact Walt Darden, 864-4848, for information on future SHARP opportunities.

Tidbits from Training

Career Field Development Program: An Investment in Human Potential

Based on the success of the pilot program, the Career Field Development Program will increase the number of participants and scope of eligibility for the 1989-90 year.

Initiated at Langley under the auspices of the Undergraduate Training Committee, this competitive program provides financial assistance for selected employees to earn a baccalaureate degree by attending classes on a part-time basis. The program is structured in two tiers. Tier I participants may attend up to nine hours of classes each week during duty hours; Tier II participants attend courses during off-duty hours.

Four administrative professionals participated during the pilot year. The four--Yvonne Armstrong, Fabrication Division; Judy Evans, Financial Management; Virginia Marks, Guidance and Control; and Phyllis Kay Millen, Space Station Freedom Office--and their supervisors believe the program is an excellent opportunity to reward and challenge deserving employees.

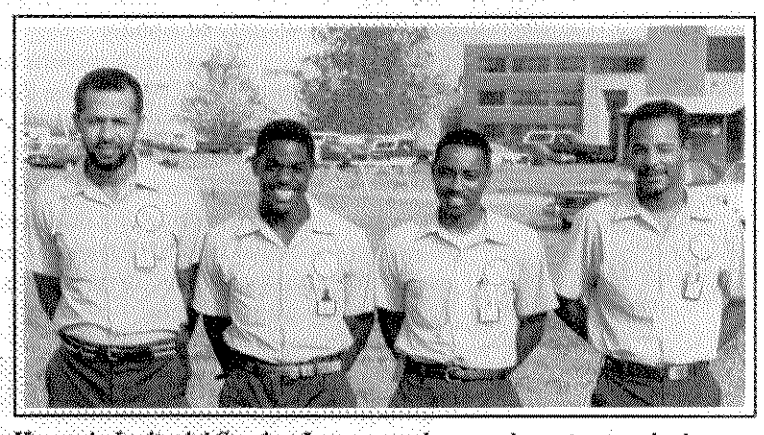
Eligibility for this program has been expanded to include all permanent, non-degreed, civil service employees who have completed approximately two years of undergraduate courses. This includes wage grade employees, technicians and clericals as well as administrative professionals. Applicants must have approval of their immediate supervisors and division/directorate management.

Application packets are available from Geraldine Pardue, Training and Education Section, Building 1195C, Room 252. Completed packets should be routed through the applicant's supervisory chain to the program director's office by July 20, 1989.

A rating panel, consisting of a representative from each directorate, will screen the applications and recommend participants to the Undergraduate Training Committee for approval.

Selection criteria includes past academic achievement documented by college transcripts, written appraisal from the supervisor, past work experience, academic plan and career goals, benefit to the center, as well as outside activities. Selected participants will be notified during the first week of August.

Dr. Mary H. Lewis, Employee Development and Services Branch, coordinates the training aspects of the program.



Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The awards committee convened on June 1 and selected the Versatile Maintenance Team for the Crew of the Month Award for May. This crew obtained a perfect score of 95 points and received a letter of commendation for the excellent manner in which they consistently maintain all areas of Building 1202 Clean Room. Team members are (L to R) Lawrence Lovett Jr., Vincent Brooks, Dwayne Artis and Reginald Williams.

Save on summer fun. Buy tickets to local attractions at discount prices from the LAA Office. Busch Gardens, $17.50; King's Dominion, $16.50; Water Country, $12.75; and more.

VLM Presents '20 Years on the Moon'

In commemoration of the twentieth anniversary of America's first manned moon landing, the Virginia Living Museum will hold a special lecture series. Featured will be Langley test pilot Lee Person, who will discuss the technology that got the U.S. to the moon, and VLM astronomy director Jon Bell, who will talk about the things learned about the moon since that historic occasion.

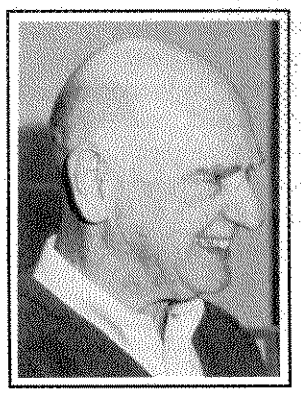
The lectures begin at 8 p.m., Thursday, July 20. Admission is free for Museum members; for non-members, cost for adults is $5 and $2.50 for children 4-12; children under 4 are free. Seating is limited and **advance reservations are required**. Call 595-1900 to make reservations.

The evening will conclude with telescopic observations of the rising moon through the Observatory's 14-inch telescope, weather permitting.

GWU Offering

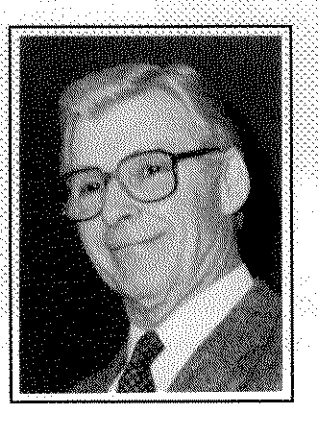
George Washington University (GWU) School of Engineering and Applied Science at Langley plans to offer a new set of courses leading to the master of Engineering Administration degree beginning in the fall semester 1989. Interviews at LaRC will be arranged on Thursday and Friday, August 17 and 18. If you are interested in entering this program, or desire further information on GWU programs, call 864-1982.

Forty Year Service Awards

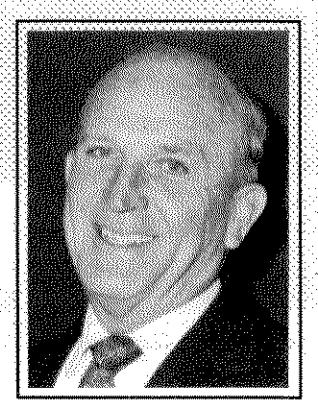


James R. Hall

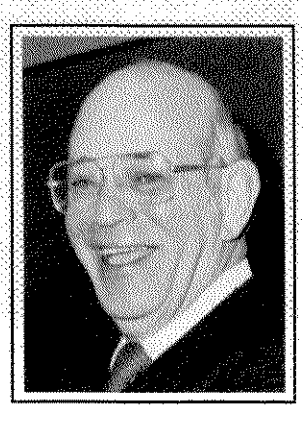
James L. Williams



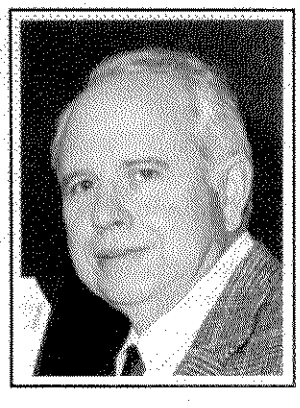
George C. Ashby Jr.



Calvin C. Berry



Percy J. Bobbitt



James S. Bowman

People & Places

Health Corner

Concerned about Matters of the Heart?

HEARTLINE volunteers assisted 254 callers in a single month concerning questions about cardiovascular health.

These volunteers help callers in many ways, often by sending them pertinent information about cardiovascular disease and stroke, or by answering questions about the amount of fat and cholesterol contained in various foods.

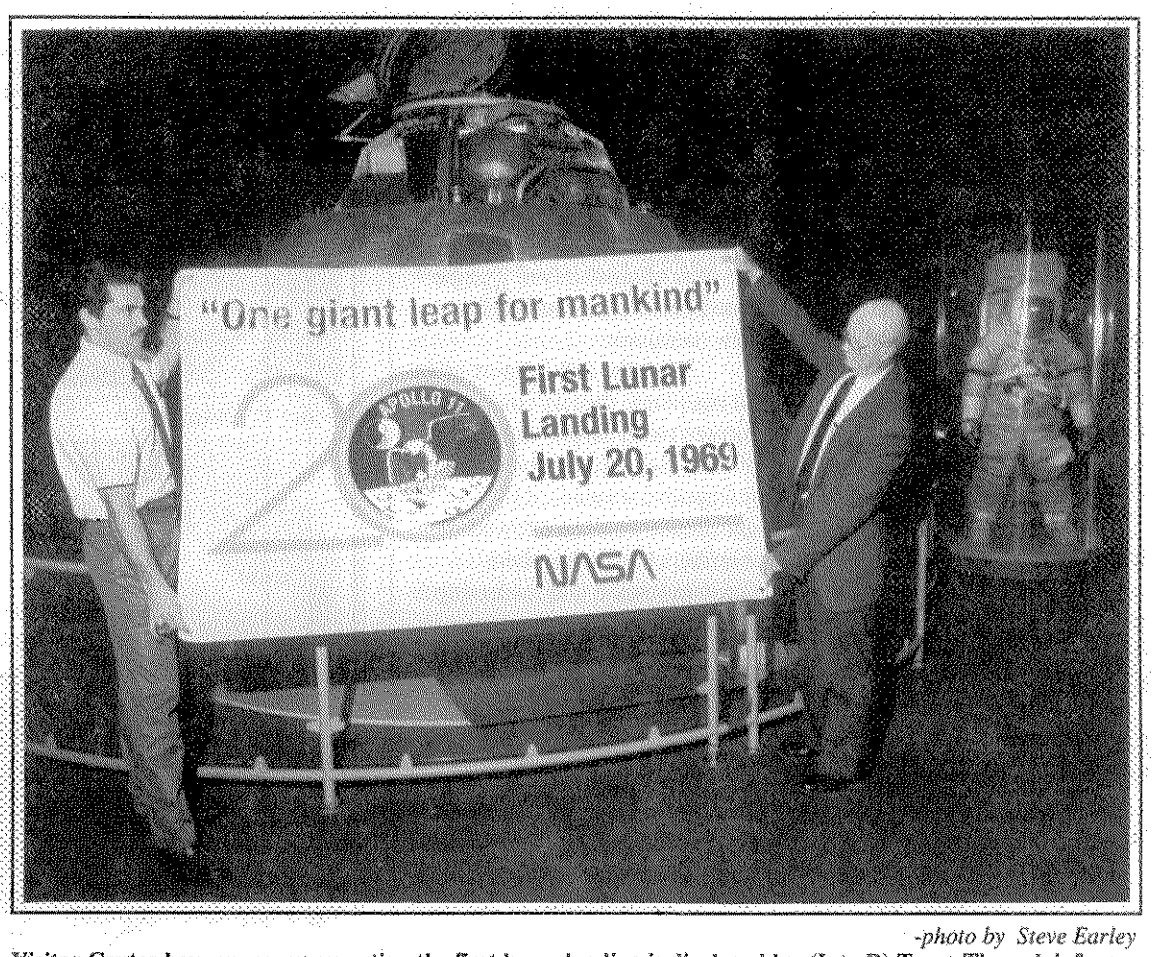
HEARTLINE volunteers are frequently asked questions about cholesterol. The general public often thinks that all cholesterol is damaging to the cardiovascular system. Callers learn that their risk of developing cardiovascular disease depends on the ratio of two types of cholesterol present in their blood.

Low-density lipoproteins (LDL) are most likely to contribute to the development of atherosclerosis and are often referred to as "bad cholesterol," while high-density lipoproteins (HDL) carry cholesterol to the liver for processing or disposal, thus not leaving deposits on the artery walls and earning the nickname "good cholesterol."

An HDL reading below 35 mg/dl is considered a strong risk factor for cardiovascular disease. A desirable LDL level is below 130 mg/dl.

Armed with this information, callers are equipped to change their eating habits for the better...for good.

1-800-HEARTLINE



-photo by Steve Earley

Visitor Center banner commemorating the first lunar landing is displayed by (L to R) Terry Tizzard, information specialist, and Richard E. Mackin, director. The VC will celebrate the Apollo 11 landing throughout July.

Voluntary Leave Transfer Program

The Voluntary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing a period of unpaid leave as a result of a medical emergency.

As a result of such an emergency, the following employees are approved leave recipients.

- Robert M. Connell Jr.
- Twanda L. Copling
- Randolph F. Culotta
- Janet L. Edmondson
- Kenneth N. Jones
- Bernard Spencer Jr.
- Catherine B. Worth

If you wish to donate annual leave to these recipients, or wish more information concerning the program, please contact Linda Park, Employee Relations Section, ext. 42610.

Notes of Thanks

Penny Murphy writes: "I want to thank those who donated their leave to me during my husband's long illness and at the time of his death. Without your generosity, I would not have been able to be with him when I really needed to be. May God bless each of you."

Suzanne N. Barnes writes: "Thank you so very much to everyone who donated leave to me while I was out this spring. It is a wonderful feeling to know that you are not just my co-workers; you are also special friends!"

Milton Lamb writes: "My family and I would like to thank all of our friends for the flowers, cards and words of encouragement during our time of sadness at the loss of our son Anthony."

Ernie Greene writes: "I would like to extend my many thanks to all the people who attended my retirement picnic party. Thanks also for the gifts; they shall long be remembered and cherished. Thanks again."

Robert Jensen writes: "I would like to thank all my co-workers for their contribution to and participation at my retirement luncheon. It was a joyful event. I will always cherish my memories and good friends."

Visitor Center Announces Apollo Celebration

"...Houston, Tranquility Base here. The Eagle has landed." Over 500 million people heard astronaut Neil Armstrong announce to Mission Control on July 20, 1969, the success of the first manned landing on the moon.

This July, throughout the U.S., Americans will join NASA in celebrating man's first step on the lunar surface. The Langley Visitor Center, in addition to its regular displays of major artifacts from the Apollo missions, is presenting several special programs commemorating Apollo 11.

"A Salute to Apollo," a slide program highlighting accomplishments of the Apollo program, will be presented Monday through Friday at 2 p.m. in the Visitor Center theater. The feature film for the month is "Apollo 11: The Eagle Has Landed," a 30-minute presentation shown daily at noon. On weekends, historic films detailing the Apollo missions will be featured.

What is the moon like? How were the men who walked on the moon protected from the lunar environment? How did the astronauts move in the low gravity of the lunar surface? Is it possible to live on the moon?

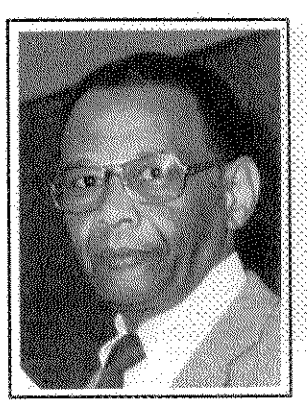
These and more questions will be answered during the July 1989 Children's Program, "The Moon: Past and Future." Open to children eight to eleven years old, the program is scheduled Monday through Saturday from July 1 through July 31. Hours are 10 to 10:45 a.m. for children entering grades three and four and 11 to 11:45 a.m. for children entering grades five and six. The program is free and open to the public. **Advance reservations are required.** Call 864-6000 for reservations.

See historic Apollo artifacts at the Visitor Center. The Apollo 12 Command Module is on display daily. The module, named the Yankee Clipper, is autographed by the crew, Pete Conrad, Dick Gordon and Alan Bean. Visitors can see inside the spacecraft where the crew lived and worked for nine days during their 950,000-mile round trip to the moon.

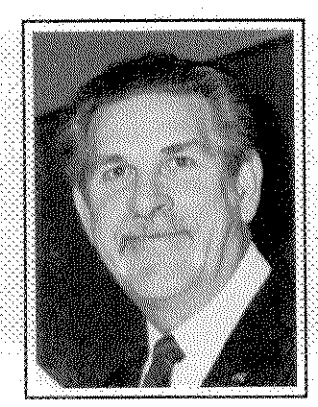
Next to the Apollo 12 Command Module is displayed the actual spacesuit worn by Apollo 15 astronaut David Scott when he walked on the lunar surface. The suit, encrusted with moon dust, weighs 180 pounds on Earth; on the moon it weighed only 30 pounds. Apollo 15 was the lunar mission during which the astronauts traveled in the lunar rover, the first powered vehicle driven on the moon.

In the lobby of the Visitor Center, guests can see a moon rock. This segment of the "Good Will Rock" was collected by astronaut Eugene Cernan in December 1972 during the Apollo 17 mission. Portions of the "Good Will Rock" were distributed to each of the 50 states and to 136 foreign nations with wishes for world peace.

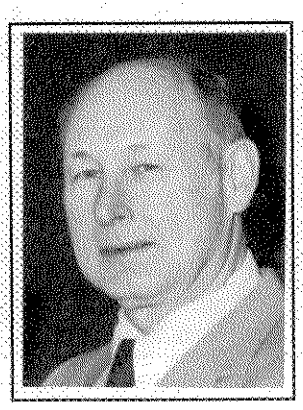
The NASA Visitor Center is open daily. Hours are 8:30 a.m. to 4:30 p.m., Monday through Saturday, and noon to 4:30 p.m. on Sunday. Admission is free. The Visitor Center is easily accessible from I-64 by following the NASA directional signs. For further information, call 864-6000.



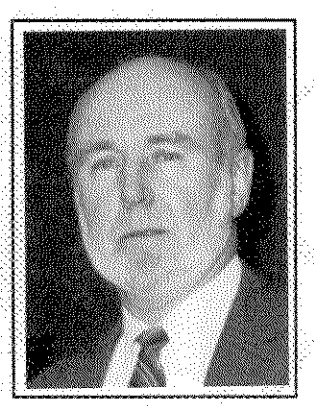
Robert E. Darby



Dale A. Gwaltney



Albert B. Insley



David R. Johnson

Vinton T. Land

Donald R. Riley

Happenings

SPECIAL LAA SOCIAL will be held Friday, July 21, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Join your co-workers to celebrate the 20th anniversary of Apollo 11. Free admission, hors d'oeuvres, and entertainment by Charlie Johnson and the NASA Combo.

NASA BOWLING LEAGUE. If anyone is interested in joining the NASA Tenpin Bowling League, call Pat Gates, ext. 46362. Join as an individual or sign up a whole team.

ENTERTAINMENT for Carnival---amateur or professional---is needed. Friday and/or Saturday, August 18 and 19. Contact Frankie Ward, ext. 46369.

LAFB OFFICERS' CLUB Membership Drive. Sign a new member and enjoy a free Sunday Brunch.

AFGE LOCAL 2755 will meet Wednesday, July 19, at 4:38 p.m. in the Union Office, Building 1232B. Call Sandra Zumbrun, ext. 44548, for details.

FOUND: GLASSES. Black framed glasses in a brown case were found in Building 1209. Call Security, ext. 43416.

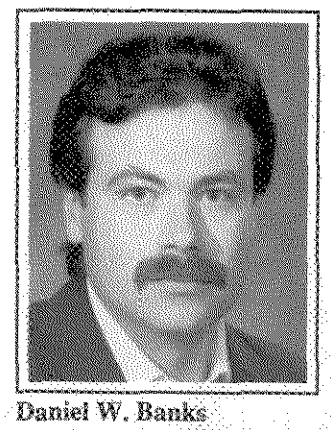
Toastmasters Get President's Award

NASA Langley Toastmasters club has been recognized as a President's Distinguished Club for 1988. Under the leadership of past president Ron Harvey, the club attained seven Competent Toastmasters and eighteen new members.

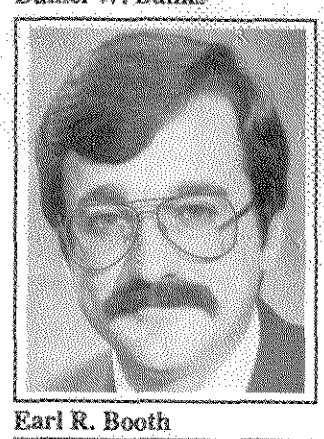
With the full support of its 28 members, the club outperformed many larger clubs. The NASA club has achieved and maintained a standard of excellence that has allowed members to develop their communication and leadership skills at their best rate.

The club has been cited for helping officers develop leadership skills, providing stimulating programs, promoting social interaction among members and providing opportunities for growth.

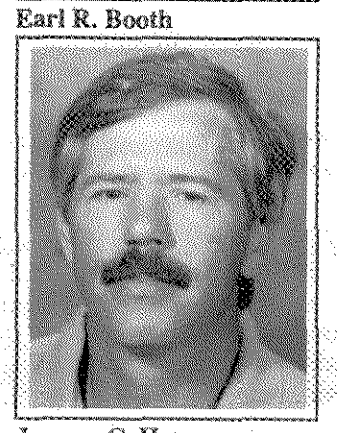
The NASA club meets the second and fourth Wednesdays of the month. Membership is open; current members are NASA employees, contractors and active military. Guests are always welcome. Improve your speaking and listening skills. For additional information, contact Steve Yaros, president, at ext. 43050.



Daniel W. Banks



Earl R. Booth



Jerome C. Hoerger

Employees Earn Advanced Degrees

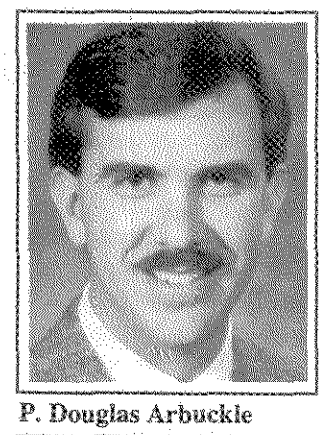
Six additional Langley Research Center staff members received advanced degrees through the center's Graduate Study Program during Fiscal Year 1988..

Master's degrees were awarded to the following: Daniel W. Banks, Applied Aerodynamics Division, and P. Douglas Arbuckle, Guidance and Control Division, received the Master of Science in Flight Sciences from George Washington University (GWU); Earl R. Booth, Acoustics Division, received the Master of Science degree in Aeronautics from GWU;

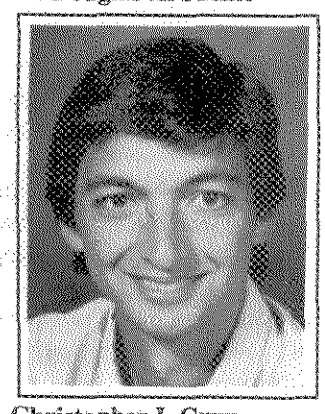
Christopher I. Cruz, Space Systems Division, received the Master of Science degree in Fluid Mechanics and Thermal Sciences from GWU; Jerome C. Hoerger, Business Data Systems Division, received the Master of Arts in Administrative Sciences from GWU; Charles E. Niles, Facilities Engineering Division, received the Master of Science in Computer Science from Old Dominion University.

The Training and Education Section apologizes for the oversight and congratulates these individuals on the long hours and hard work necessary for this academic accomplishment.

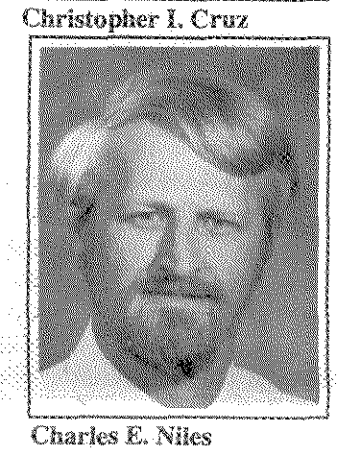
Those employees who have received advanced degrees in Fiscal Year 1989 will be recognized in September. Those who have completed or expect to complete the requirements for a graduate degree program during Fiscal Year 1989 and have not notified the Training and Education Section, please call George Allison, ext. 42594.



P. Douglas Arbuckle



Christopher I. Cruz



Charles E. Niles

The first landing of man on the moon is depicted in this Aerospace Penpoint, calligraphy by Langley retiree Wes Berryman. Aerospace Penpoints cover a variety of topics and are available for sale at the Visitor Center Souvenir Counter.

Researcher News

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Langley Research Center
Hampton, Virginia 23665-5225

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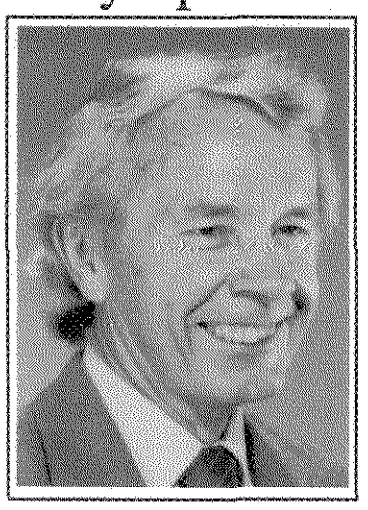
Langley Research Center

News Researcher

Volume 3, Issue 15 July 28, 1989
Bi-weekly Employee and Contractor Publication

Langley Colloquium

Micro-Scale Mechanics To Be Discussed by Berkley Speaker

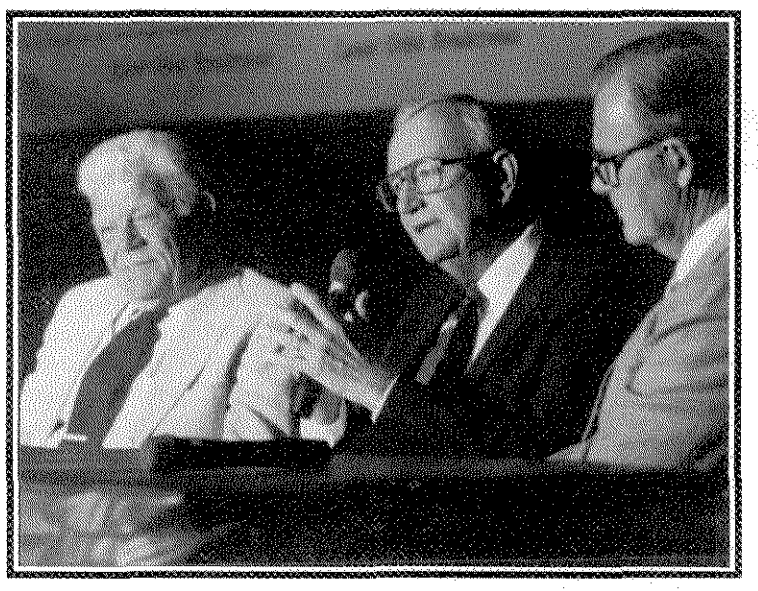


Researchers around the world have recently made a wide variety of sub-miniature sensors and moving elements, measuring only thousandths of an inch across, by employing techniques similar to those used to make computer chips. Their ultimate goal is to make inexpensive and small sensors and actuators for use in transportation, manufacturing and process control, health care and consumer products.

Dr. Richard M. White, professor of electrical engineering and computer science at the University of California, Berkeley, will present "Micro-Scale Mechanics for Sensors and Actuators" at a Langley colloquium Monday, August 14. The lecture will be held at 2 p.m. in the H.J.E. Reid Conference Center, followed by a question and answer period. In his lecture, White will describe some of these devices and applications, and the unusual problems associated with the design and fabrication of them.

Among the miniature devices made by these processes are pressure sensors, accelerometers, gas flow sensors, a microphone on a chip and microscopic gears, sliders, cranks and springs. Even electrostatically-driven micromotors narrower than a human hair have been demonstrated.

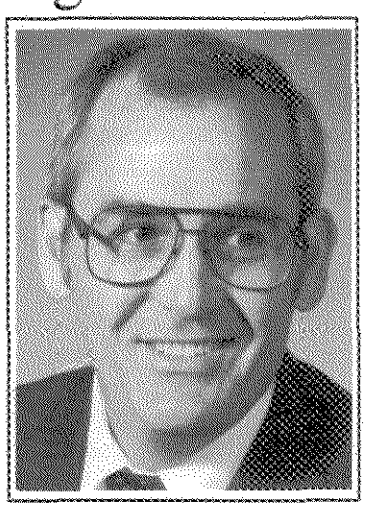
At the University of California since 1962, White has been primarily concerned with teaching and research in solid-state electronics.



-photo by Steve Earley

Opening Langley's celebration of the Apollo anniversary was a panel discussion lead by Dr. James Hansen, LaRC historian, and featuring (L to R) Arthur W. Vogeley, Dr. William H. Michael, and Clinton E. Brown, all key figures in the genesis of the lunar-orbit rendezvous concept.

Jones Receives NASP Pioneering Award



Robert A Jones, manager of the Hypersonic Technology Office, has been presented the NASP Pioneering Award by the National Aero-Space Plane (NASP) Joint Program Office. Jones was honored for his contributions in establishing the National Aero-Space Plane program.

Also receiving the award were former President Ronald Reagan; Bob Williams, Defense Advanced Research Projects Agency (DARPA); General Lawrence Skantze, USAF, Retired; Anthony duPont, duPont Aerospace; and Dr. Fred Billig, Johns Hopkins University, Applied Physics Laboratory.

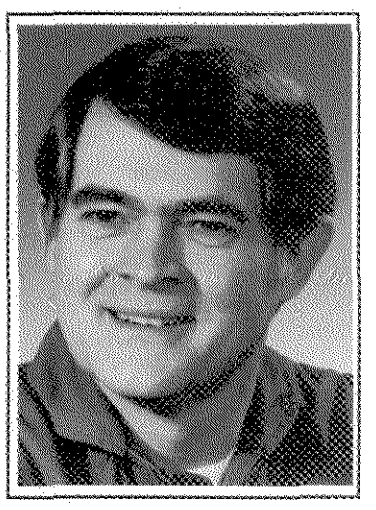
The awards were presented at the American Institute of Aeronautics and Astronautics' First National Aero-Space Plane Conference, held July 20 and 21 in conjunction with the Dayton Air and Trade Show, Dayton, Ohio.

The National Aero-Space Plane program is a major research initiative to develop technology for a horizontal take-off, single-stage-to-orbit vehicle. Such a vehicle would combine elements of spacecraft and aircraft to make possible routine, economic access to near-Earth orbit. "The key to useful applications in space is routine access to orbit at much lower cost," said Jones. "Technology being developed in the Aero-Space Plane program will make this possible early in the next century."

Jones began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics, as an aeronautical research engineer in May 1955. He became head, Entry Vehicle Configuration Section in April 1970; head, Aerodynamics and Heat Transfer Section in April 1972; and head, Hypersonic Propulsion Branch in March 1975. He was assistant chief, High-Speed Aerodynamics Division from September 1985 to February 1989.

He was assigned to DARPA in Arlington, Virginia, from September 1984 to September 1985, as deputy program manager for NASP. In his current position he has responsibility for defining, advocating and guiding hypersonic research at Langley. He coordinates all Langley activities and involvement in support of the NASP program.

Research Pilot Honored by Automotive Society



Lee H. Person Jr., research pilot, has been honored by the Society of Automotive Engineers. Person has been selected a recipient of the 1989 SAE Oral Presentation Award for his presentation titled "To Go...or...Not To Go: Another Look at Monitoring Takeoff Performance."

The purpose of the SAE oral presentation program, established in 1972, is to maintain the high quality of presentations at the society's technical sessions by recognizing individuals who deliver outstanding lectures. Only five percent of SAE's oral presentors receive this award.

Person began his NASA career at Langley in 1962. His flight experience includes 8,500 hours in over 110 types of fixed-wing, rotary-wing and vertical short take-off and landing (V/STOL) aircraft.

For the past 14 years, Person has been lead pilot for NASA's Advanced Transport Operating Systems Program (ATOPS), spending most of his time in the research flight deck of a highly modified Boeing 737 aircraft. His work with the ATOPS program, as aerospace engineer and as pilot, has contributed to technology which will enhance the safety of air travel and reduce flight delays.

A graduate of the Naval Test Pilot School, Person is a member of the Society of Experimental Test Pilots and the SAE S-7 Committee. He was a 1987 recipient of the IR-100 Award for the Takeoff Performance Monitoring System (TOPMS). The IR-100 Award is presented annually by Industrial Research and Development magazine to 100 scientists and engineers who have contributed the most significant products for advancing science and technology during the year.

NASA Exhibit at EAA Fly-In Focuses on 'Investing in the Future'

NASA returns to Oshkosh, Wisc., July 28-August 3, as a main exhibitor at the 37th Annual Experimental Aircraft Association International Fly-In Convention and Sport Aviation Exhibition. This yearUs exhibit, RInvesting in the Future,S will emphasize aeronautics, space science and exploration.

In the aeronautics area, visitors will see how NASA scientists, engineers and craftsmen are working to make the aircraft of tomorrow safer, faster and more efficient.

Visitors also will learn about high-speed research and technology projects that will enable commercial airliners to travel from Los Angeles to Tokyo in less than four hours.

Plans include the exhibition of an 80-foot half-scale mockup of the National Aero-Space Plane built by engineering students at Virginia Polytechnic Institute, Blacksburg, Va.

Aircraft safety improvements will be featured. The exhibit showcases NASA technology designed to help pilots avoid collisions, make critical takeoff decisions, detect and correct engine problems and overcome weather hazards like wind shear, heavy rain and icing.

Engineers from Langley have added a vortex flap to the front of the wing of an F-106 aircraft to reduce drag and increase aircraft lift. This concept, which will be on display, promises to increase the maneuverability of swept-wing aircaft by 20 percent.

Also on display will be revolutionary new engine, wing and fuselage designs being tested to make the aircraft of tomorrow more maneuverable and fuel efficient.

Visitors can examine a scale model of a Mach 5 aircraft engine inlet model that recently underwent wind tunnel tests at the Lewis Research Center, Cleveland.

At the NASA exhibit, visitors can learn more about Space Station Freedom and this yearUs three major space exploration projectsQthe Hubble Space Telescope, the Magellan mission to Venus and the Galileo mission to Jupiter. Models of the Hubble Space Telescope and Space Station Freedom will be available for inspection.

The exhibit also describes the Pathfinder Program which is developing technology for possible 21st century missions such as a manned outpost on the moon or robotic or manned exploration of Mars.

One of the most popular diaplays, the NASA craftsmanship exhibit, returns this year. Operated by technicians from Langley, Lewis and the Ames Research Centers, the exhibit highlights fabrication crafts and focuses on selected examples of metal and composite structures, aeronautical models, test equipment and data measurement hardware.

Outside the exhibit building will be the AEROVAN traveling aeronautics exhibit and the SARSAT van, a mobile exhibit that presents an overview of the Search and Rescue Satellite system.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has announced the appointment of Charles T. Force to head the Office of Space Operations. Force succeeds Robert O. Aller who left the agency and government service July 14. Prior to his new assignment, Force was deputy associate administrator for Space Tracking and Data Systems.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- Thomas J. (Jack) Lee has been appointed director of the Marshall Space Flight Center. Lee succeeds James R. Thompson Jr. who was selected by President Bush to the the NASA deputy administrator. Lee has been Marshall's deputy director since December 1980, following seven years as manager of the Spacelab program at the center.

JET PROPULSION LABORATORY, Pasadena, Calif. --- A new moon has been discovered orbiting Neptune say NASA scientists at JPL. The moon's discovery was confirmed July 5, when it was located in images returned from the Voyager 2 spacecraft enroute to Neptune. Temporarily designated 1989N1, the new moon was initially seen in Voyager 2 images transmitted to Earth in mid-June. Later images showing the small body in its predicted orbit confirmed its existence.

HEADQUARTERS, Washington, D. C. --- Dr. William F. Ballhaus Jr. resigned July 15 as director of NASA Ames, Mountain View, Calif. Ballhaus served as director of the center from January 1984 through January 1988 and from February 1989 to the present. From February 1988 through March 1989, he served as acting associate administrator for Aeronautics and Space Technology, NASA Headquarters. Ballhaus cited inadequate compensation for senior federal executives and vague new post-government employment regulations as factors in his decision.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- NASA Lewis has announced the selection of the Harris Corp., Melbourne, Fla., for final negotiations leading to award of a contract to develop a prototype Earth station for use with the Advanced Communications Technology Satellite (ACTS). ACTS is a key element in NASA's efforts to develop high-risk, advanced communications technology usable in the higher frequency bands to support our nation's future communications needs. The contractor-proposed price is $3.4 million for the prototype development.

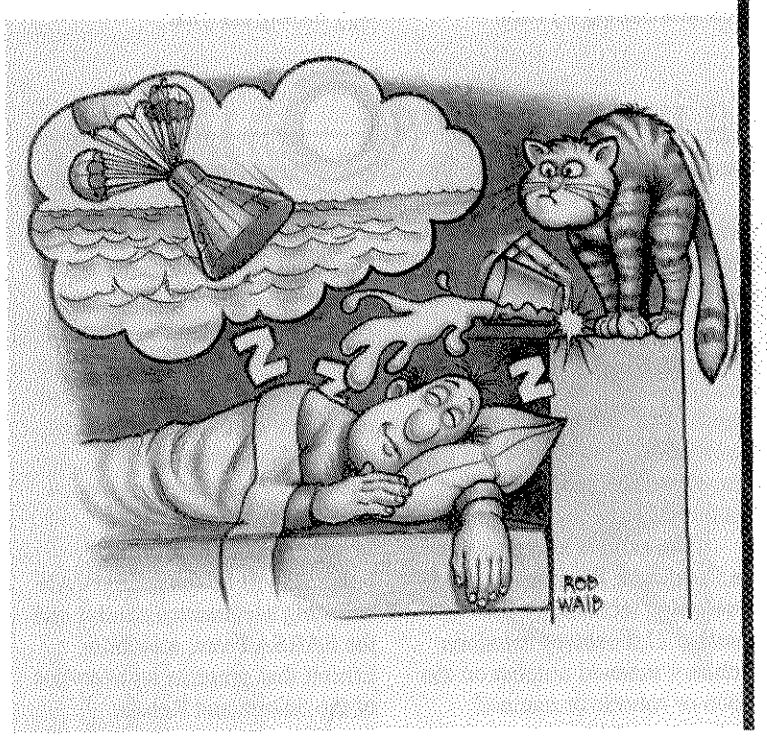
HEADQUARTERS, Washington, D.C. --- NASA's Office of Exploration has awarded a series of study contracts to various organizations to provide NASA with ideas, concepts, devices, systems, trajectories, operations or implementations which could be applied to furthering human exploration of the solar system. The 20 winners, selected from 115 proposals submitted in response to the April 12 research announcement, are located in 12 different states and come from various occupations with five industry-related firms, two space support-related organizations and 13 universities receiving awards.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA is planning to fly a Canadian experiment to measure the behavior of radio waves in space and properties of the upper atmosphere, the ionosphere, during the demonstration flight of the Orbital Maneuvering Vehicle (OMV). The maiden voyage of the OMV, a remotely controlled, reusable "space tug" designed to perform a number of tasks including maneuvering other spacecraft on orbit, is currently scheduled for launch aboard the Space Shuttle Endeavour in 1993.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly and Heinz Riesenhuber, Federal Minister for Research and Technology of the Federal Republic of Germany, have signed a memorandum of understanding in Washington, D.C., enabling the launch of German payloads on the Space Shuttle. This agreement confirms general understandings for the terms and conditions under which NASA will furnish launch and associated services on a reimbursable basis consistent the U.S. and German space policy. The first flight will be the D-2 Spacelab mission, currently scheduled for launch in February 1992.

JET PROPULSION LABORATORY, Pasadena, Calif. --- An experiment placed on the lunar surface 20 years ago by the Apollo 11 astronauts continues to be used to study the Earth-moon system by NASA JPL scientists and other scientific centers around the world. Scientists who analyzed the data from the Laser Ranging Retro-reflector Experiment, have observed, among other things, that the moon is moving away from the Earth, tectonic plates of the Earth are slowly drifting and the length of a day varies.

Lankley



Editorials

Apollo Alumni Reminisce

"The Eagle has landed' has affected us all in different ways, even those of us in aeronautics," writes **Cornelius Driver** who worked in the Full-Scale Division in 1969. "**Owen Morris** was the government project manager for the Lunar Lander program and **Howard Wright** was head of the Systems Engineering Division of Grumman, who constructed the lunar module. When Owen retired in 1980, he formed a consulting business and named it Eagle Engineering because of his long-time association with the development of the Lunar Lander, which was named Eagle. Howard Wright subsequently left Grumman and came to work for Langley as director for projects and is presently deputy project manager for the National Aero-Space Plane program. Upon my reitrement in 1986, " Driver continues, "I joined Eagle as head of the Hampton Division."

Where were you when the Apollo astronauts landed/walked on the moon?

Domenic Maglieri, manager, Transport Technology, Aeronautical Systems Office, was picnicking on the James River. "The group included my wife, skipper **Tommy Coleman** and his wife. We were returning to the Warwick Yacht Club on a lovely, warm, sunny day with calm seas. The announcement of the landing over a local radio station made the day a perfect one!"

"Even though my memory wanes as I get older," writes **Betty Joyner**, who worked in Rotor System Research in 1969, "I will never forget the occasion and words of Neil Armstrong as he took that famous walk." She and husband **Jimmy Joyner**, Reproduction Division, were on vacation in Las Vegas and were passing through a noisy casino on their way to witness the walk. "We noticed that even the most serious gamblers took time out to honor this very special moment in history."

Emanuel Boxer, Propulsion Division, and his wife had just bought a new motor home. "We were on our way to Nags Head to try it out. We had taken a 10-inch TV so we could watch the moonwalk. We hooked the camper up, got settled and then found out we could not get any reception on the TV. We quickly unhooked the camper and headed back home, arriving just in time to see Neil Armstrong set foot on the moon."

Teleconference Commemorates Apollo

The Virginia Department of Education, in cooperation with NASA Langley, presented an interactive video teleconference for middle and high school students June 2.

The theme of the videoconference was a salute to Apollo, the first landing of humans on the surface of the moon. After a retrospective view of the Apollo program, the future directions of human space exploration and utilization was examined.

The stellar panel included astronaut John Young; Ray Tanner, former director of the Space Station Freedom Program Office; James Rose, assistant administrator of the NASA Office of Commercial Programs and former Space Task Group member; and Carl Pilcher, chief scientist for the NASA Office of Exploration.

Dr. Arlene Levine, Langley education specialist, and Dr. Joseph Exline of the Virginia Department of Education coordinated and produced the live, interactive video conference shown nationwide during Virginia Space Education Week.

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-108.....Lee Appointed Director of Marshall Space Flight Center
89-109.....Harris Corp. Selected for Advanced Communications Technology Work
89-110..... Voyager 2 Finds New Moon Around Neptune
89-111.....Ballhaus Resigns as Director of NASA's Ames Research Center
89-112.....NASA, Canadians to Fly Plasma Experiment on OMV Mission
89-113.....NASA and German Ministry Sign Space Transportation Agreement
89-114.....LaRC Wind Tunnel Mishap Study Report Released
89-115.....Force to Head NASA Space Operations, Aller to Leave Civil Service
89-116.....NASA Exhibits at EAA Convention
89-117.....Apollo Technology Transfer
89-118.....NASA Awards Grants for Future Exploration Studies
89-119.....Apollo-11 Lunar Experiment Still Useful After 20 Years

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

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Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

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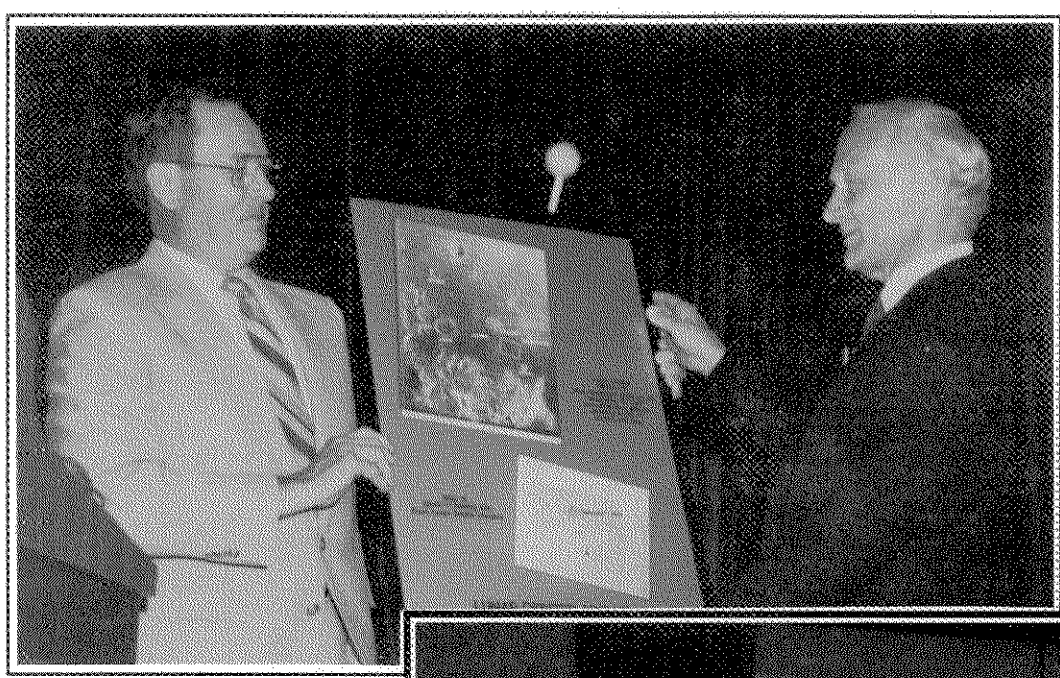
Langley Salutes Apollo

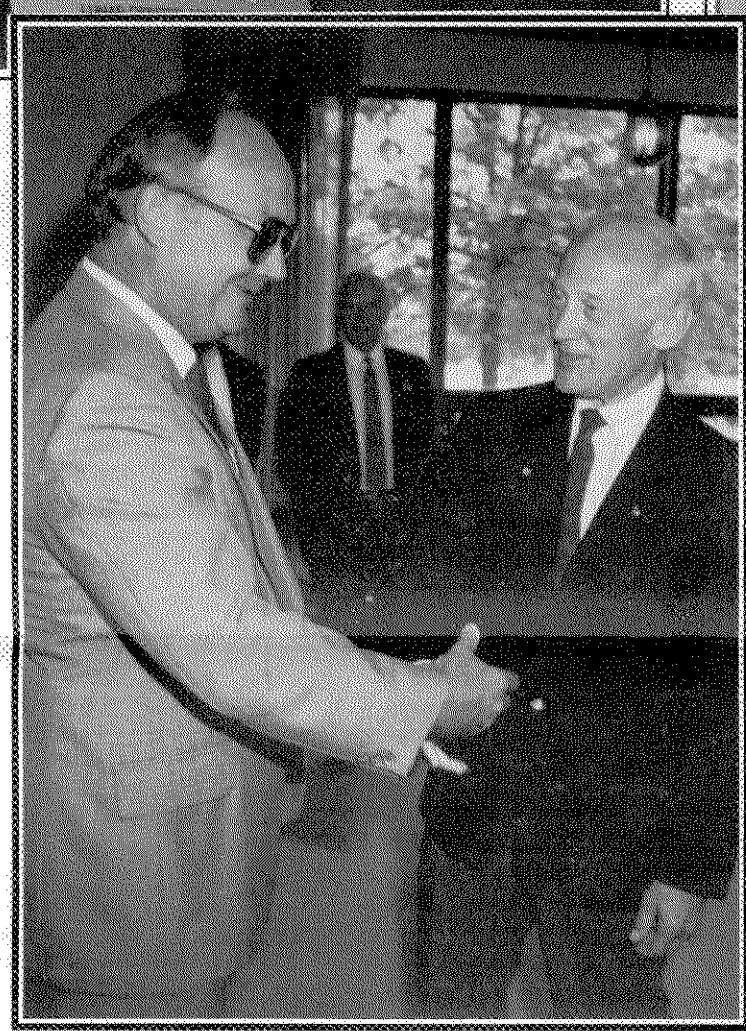
Buzz Aldrin Celebrates Apollo Anniversary with NASA Langley and Community

-photos by Steve Earley



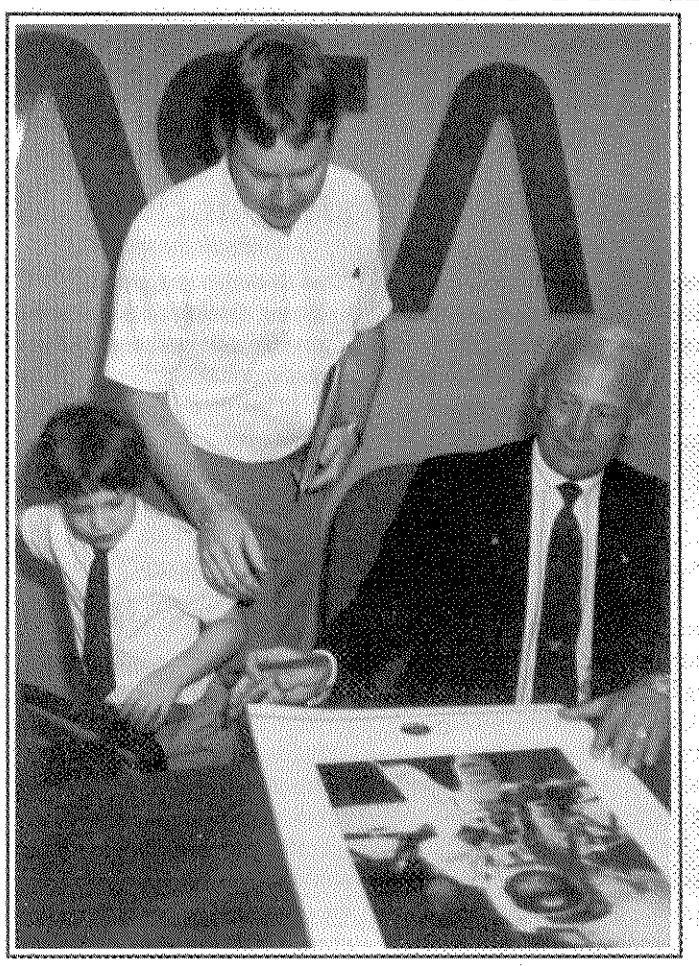
LaRC Alumni Association president William Boyer presents Aldrin with a plaque featuring a photograph and a map of the Apollo 11 landing sight taken by Langley's Lunar Orbiter spacecraft.

Hampton Mayor James Eason (right) introduced Aldrin at a reception in honor of the Apollo 11 astronaut held at the Radisson Hotel prior to Aldrin's presentation to the general public for The Sigma Series.

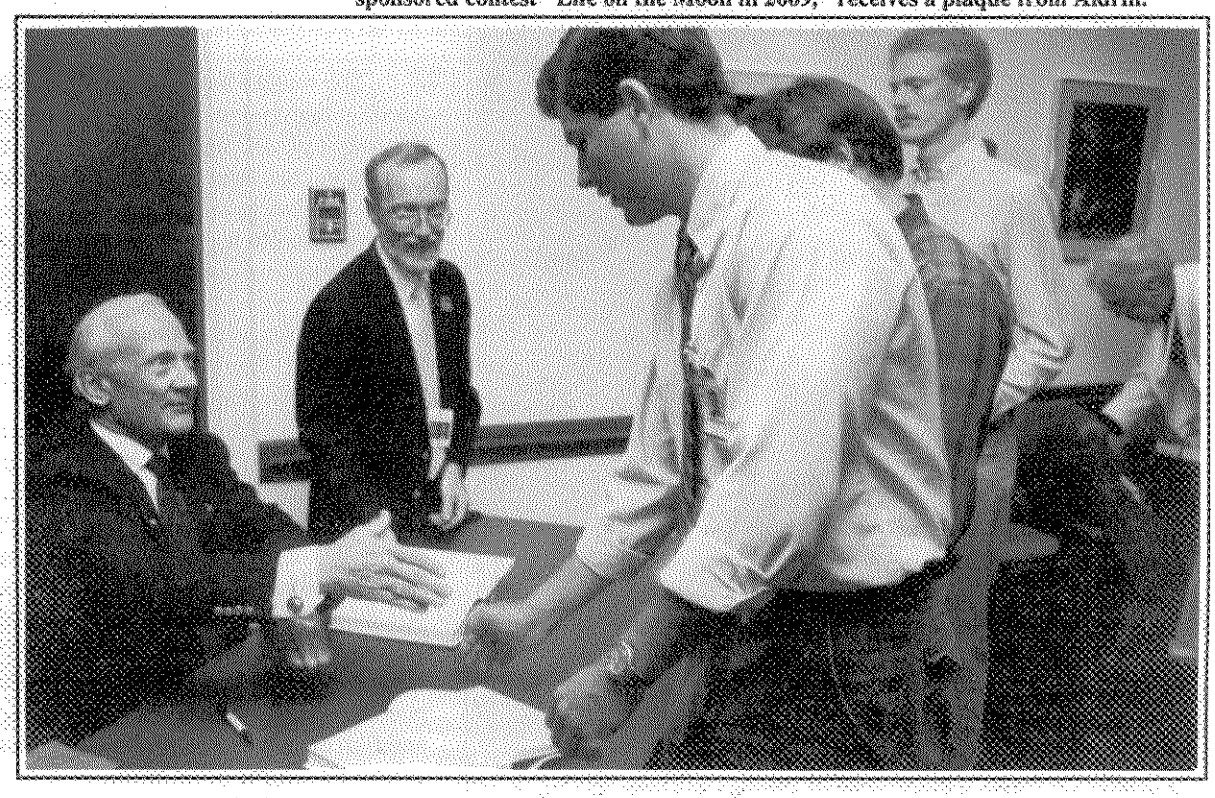


Acting Deputy Director Sidney F. Pauls welcomes Apollo 11 astronaut Edwin "Buzz" Aldrin to Langley Research Center.

Carmen Patrick, first place winner in the Grade 4-6 category of the AIAA-sponsored contest "Life on the Moon in 2069," receives a plaque from Aldrin.



Aldrin autographs a commemorative poster for five-year-old Christopher Lee Joyce as dad Lee Joyce, communications specialist for General Electric, watches.



The line for autographs seemed never-ending as Buzz Aldrin signed copies of his book *Men from Earth* for Langley employees, retirees, contractors and their families at a reception sponsored by the Langley Federal Credit Union.

Apollo Benefits Mankind

Apollo astronauts returned 382.535 kilograms of lunar surface materials--rocks and soil--for study. But Apollo produced much more than a collection of rocks . . . .

Twenty years after the triumph of America's first lunar landing, the technologies developed to enable manned spaceflights and exploartion of the moon continue to enhance human life here on Earth through technology spinoffs to the fields of health, safety, comfort and the enjoyment of life.

The achievement of the national commitment to land U.S. astronauts on the moon and return them safely to Earth spurred major advances in emerging technologies, such as computers, which became smaller, lighter and more efficient to meet the requirements for manned spacecraft.

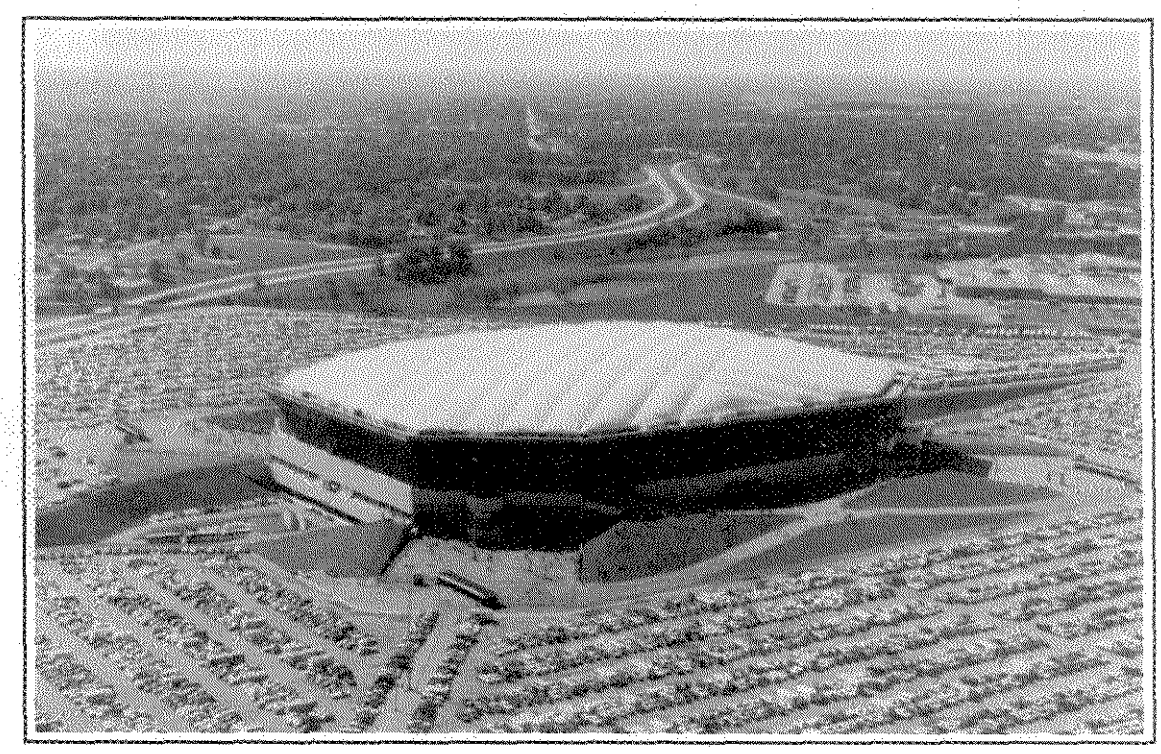
The lunar roving vehicle, developed for use by the Apollo astronauts to venture several miles away from their landing base, was the source of a unistix controller now used by severely handicapped people to accelerate, brake and steer a typical passenger vehicle on the highway.

Scratch resistant sunglass lenses were derived from a highly abrasion-resistant coating developed to protect the helmet visors worn by moon-walking astronauts.

A collection of cordless tools--such as drills and dust vacuums--were derived from tools developed for the astronauts to use on the moon while collecting surface and subsurface lunar soil samples.

Patient monitoring equipment, commonly used at nurses' stations to monitor vital signs of patients, employs the same technology that was developed to monitor astronauts during spaceflight.

And the list goes on and on . . . .



-photo courtesy of Pontiac Silverdome

A special fabric developed for Apollo spacesuits provided the technology basis for heavier material used for constructing fabric roofs on structures like Michigan's Silverdome.

Apollo Technology: From Space Applications to Sports and then to the Heart of the Matter

-by Jennifer Vincent

In 1967, NASA needed a light, durable, thin, flexible and noncombustible fabric for the Apollo space suit. At that same time, Owens-Corning Fiberglass Corporation of Toledo, Ohio, was experimenting with a new material called Beta yarn. Woven into fabric and coated with Teflon TFE fluorocarbon resin made by the DuPont Company of Wilmington, Delaware, Owens-Corning came up with exactly what NASA needed.

Years later, the city of Pontiac, Michigan, needed a home for the National Football League's Detroit Lions, as well as a facility for concerts and trade shows. Due to the inclement weather characteristic of Michigan, an indoor stadium was a necessity.

The New Orleans Superdome had cost $168 million. Pontiac, with only $56 million to spend, accepted a $10 million estimate for a fabric dome, made from the same materials as the Apollo space suit.

Thickened fiberglass Beta yarn heavily coated with Teflon TFE had several attractive qualities for the dome. It was impervious to weather and sunlight; would not stretch, shrink, mildew or rot, and had a projected life span of 25 years. Strong, lightweight and flame resistant, the roof was also self-cleaning and cost 30 to 40 percent less than conventional roofing.

The new dome weighed only 200 tons, as compared to a conventional roof weighing 6,000 tons. This meant less load bearing requirements for the foundation and, thus, less steel and concrete required in construction. Using the principles of skewed symmetry, a criss-crossing of cable also decreased cable tonnage by one-third. The 80,000 seat Pontiac Silverdome was completed in 1975 below budget.

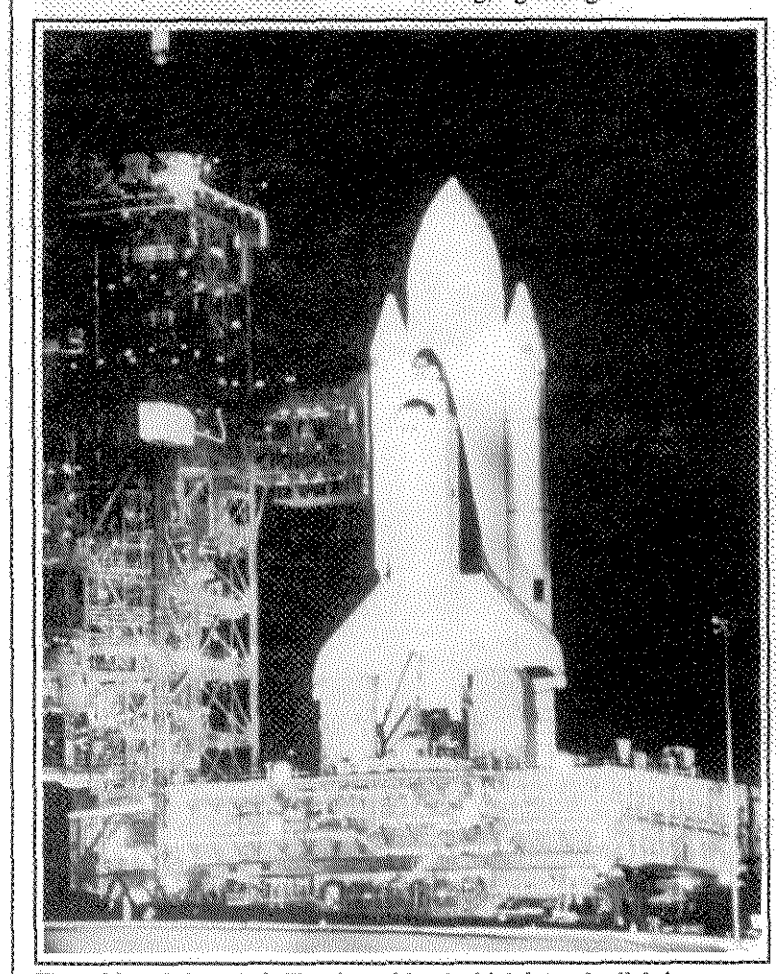
To construct the domed roof, a ten-acre fabric envelope made of 100 panels was stretched over reinforcing cables anchored to a concrete ring round the top of the stadium. The envelope's compartments were inflated by 29 air-blowing fans for support during construction. Later, only two or three fans were required for support. The roof was erected in four months--including time off when the Lions played home games in the stadium.

A far cry from construction concerns, Apollo technology has been responsible for life itself, in the case of the very ill.

The Programalith, manufactured by Pacesetter Systems, Inc., Sylmar, California, is an implantable heart pacemaker based on Apollo technology. The pacer, first implanted in 1981, is able to monitor and modify--noninvasively--the interaction of the heart and the pacemaker. The Programalith was the first multiprogrammable cardiac pacer with bidirectional measured telemetry. This feature is important because it allows the pacer functions to be changed without surgery as the patient's conditional changes.

Another NASA concept utilized on the Programalith is pulse code modulation. Using this technology, the receiver will accept only properly coded messages, so the pacer will not respond to false signals such as electrical noise or other interference.

Using NASA technology, Pacesetters, Inc., introduced a new age of medical technology with the Programalith. The new pacemaker has led to a decreased number of repeat heart surgeries and an increased efficiency in patient care.



The orbiter Columbia is illuminated by the high intensity lighting system at Kennedy and blazes white against the night sky prior to the launch of STS-1 in April 1981.

Lighting to Lightning, Apollo Has Expanded our Horizons

-by Katherine Holloway

The world's most intense floodlighting system is used at Kennedy Space Center in Florida and has been employed for all launches since the 1968 launch of Apollo 8.

The system consists of 50 searchlights, each containing a 20,000 watt xenon lamp. The lamps provide daylight quality light and generate a one billion candlepower beam visible 50 miles away.

Nightime illumination is an important part of round-the-clock pre-launch preparations for space missions. Each step of the preliminaries and, at times, steps leading to the identification of causes of a malfunction during countdown is monitored by TV and film cameras. The xenon system eliminates color distortion in film and TV coverage.

Modified versions of this system have had assorted applications. For example, the battery of spotlights with colored filters that light up Niagara Falls is a spinoff of the KSC system designed for Apollo launches. Xenon lighting is also used extensively in projection systems for outdoor theaters and in solar simulators.

Apollo was also instrumental in the creation of the Lightning Detection and Ranging (LDAR) system. LDAR came into being as a result of an incident on an early Apollo mission, when a lightning strike just after launch knocked out the spacecraft's main electrical power system. The strike caused momentary loss of spacecraft instrumentation and necessitated readjustment of the instruments. Consequently, Kennedy instituted an active program of lightning detection and measuring systems development--one of which was LDAR.

Though originally developed to give space launch controllers additional information on which to base launch/no launch decisions, lightning detection is extremely important to civil aviation.

Lightning can affect electronic equipment onboard airplanes making approaches to airports dangerous. Pilot reports of lightning and thunderstorms provide some warning to other aircraft, but LDAR provides specific location information of electrical activity. LDAR has the capability to detect electrical charge build-up in thunderstorms before the storm reaches the lightning stage.

People & Places

Health Corner

C.A.R.E.S. Van Coming to LaRC

The Office of Occupational Health Services in conjunction with Riverside Health System announces the C.A.R.E.S. van--a mobile unit equipped with a computerized cancer risk analysis system--will be on Center Tuesdays and Thursdays starting August 15 and 17. The service is provided free of charge to Center employees, contractors, retirees and their families by Riverside Cancer Services.

Individuals will be seen by appointment only. Each individual will receive a printed analysis of her/her cancer risks. A nurse will also be available to discuss specific actions you may take to reduce your risk of getting cancer. The total time involved is approximately 20 minutes.

To make an appointment, or for further information, contact the Office of Occupational Health Services, ext. 43191.

Competitive Placement Positions Open

89-51: Administrative Officer, GS-341-09, (Temp.); Office of the Director for Structures, Structural Dynamics Division. Closes Aug. 1

89-52: Supervisory Aerospace Engineer, AST, Aerospace Flight Systems, GM-861-13 or 14; Office of the Director for Systems Engineering and Operations, Systems Engineering Division, Space Systems Engineering Branch, Experiment Systems Section. Closes August 17.

Contractors Recognize Employees

J. L. Associates, Inc., of Hampton, recently recognized Sandra Harrison, Visitor Center secretary, as J.L.A. Employee of the Month. Harrison was presented with a certificate of merit and a cash award.

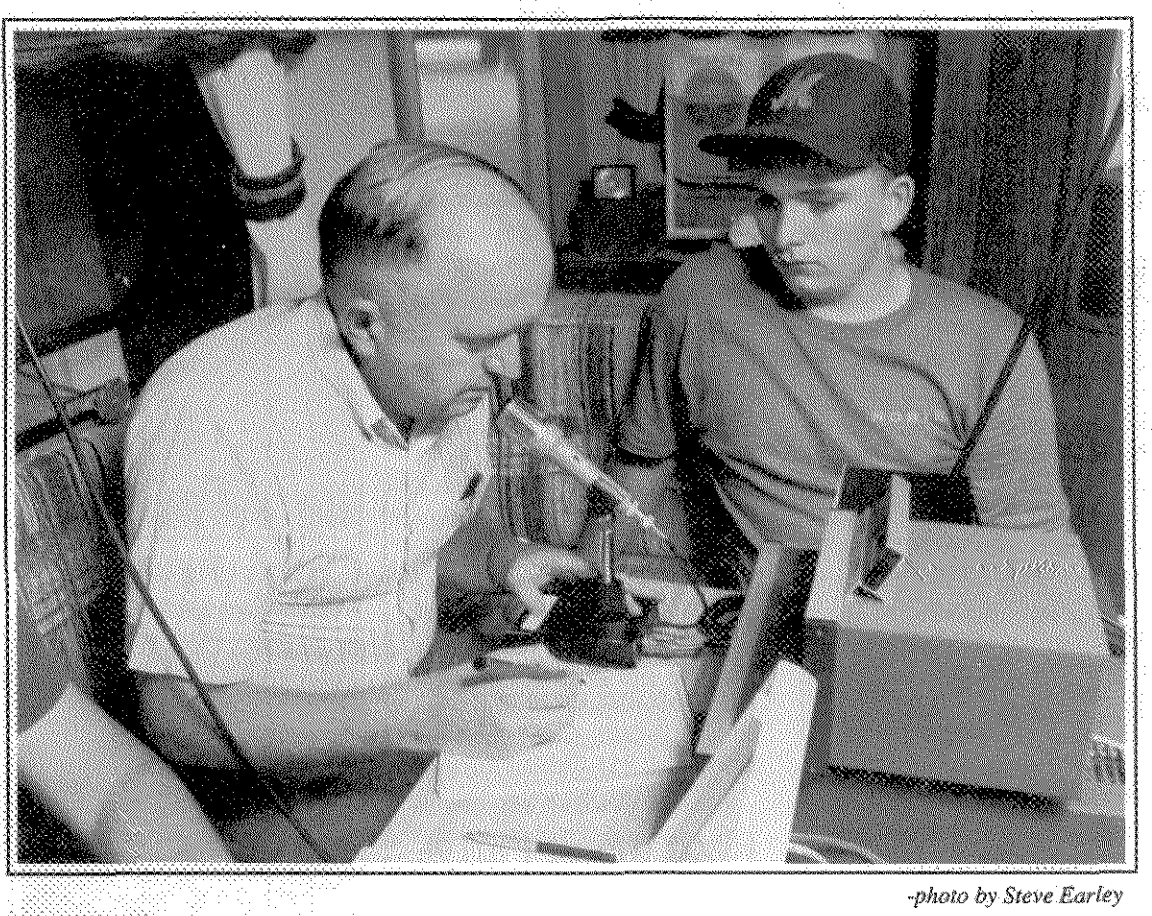
The Klate Holt Company, Logistics, Administrative Support Services, recently recognized Vivian "Check" Stevens as Employee of the Quarter. Check retired June 23.

Lunar Eclipse Visible August 16

The best lunar eclipse Hampton Roads has experienced in seven years will bevisible-Wednesday, August 16.

At 8:24 p.m., the moon will dim slightly as the earth's shadow (the penumbra) creeps onto the lunar face. At 9:21 the first "bite" will be taken out of the moon's left edge. The bite grows until 10:20 p.m., when totality is reached and the darkened moon takes on a ruddy glow. At three minutes to midnight, totality ends and, at 12:56 a.m., the moon is restored to its accustomed roundness.

A NASA volleyball team competed in a Coast Guard-sponsored tournament held at the Yorktown USCG Station recently. With seven teams competing in the double elimination tournament, NASA won the second place trophy. Team members are (L to R) Bob Daugherty, Ken Learman, Judi Hannon, Tom Yager, Wayne Hollenbaugh and Phil Robinson.



-photo by Steve Earley

IT'S A FAMILY AFFAIR. Clint Lee, Advanced Transport Operating System, communicates via a ham radio set up in a camper during SPARK Field Day. Lee's son, Jeffrey, watches.

Club 'Hams It Up' for 24 Hours Straight

There was constant communication from Langley Research Center to all points of the world for a twenty-four hour period beginning at 2 p.m., Saturday, June 24, continuing through Sunday afternoon. For the third consecutive year the Southern Peninsula Amateur Radio Klub (SPARK) held their annual Field Day on Langley grounds.

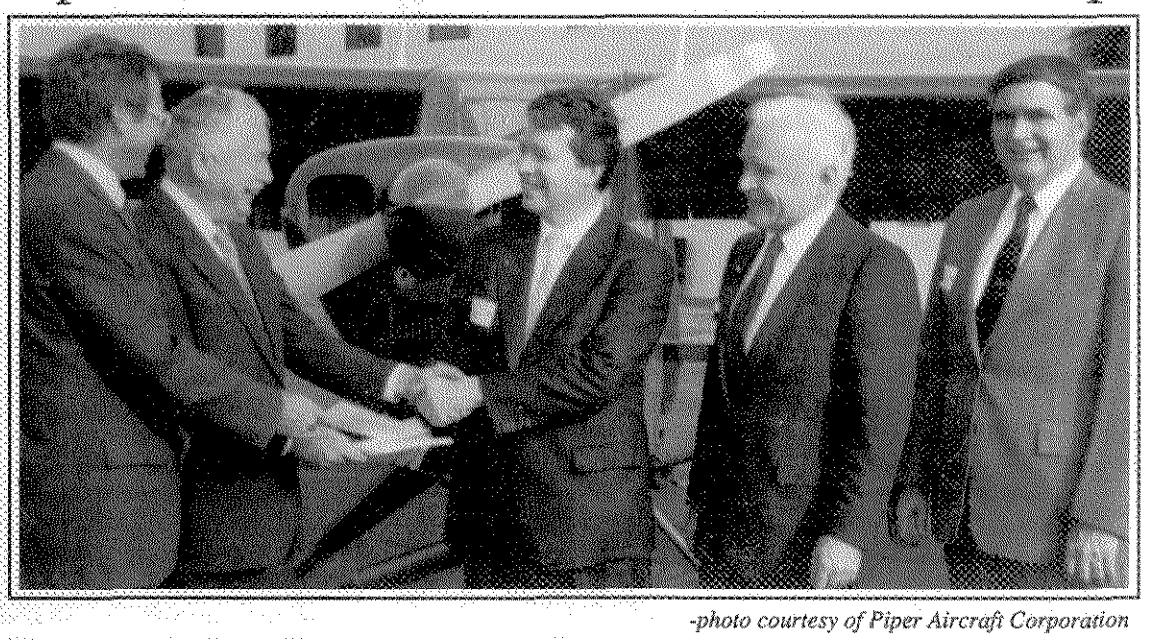
Field Day is amateur radio's number one operating event for the year. It is designed as an emergency preparedness exercise to subject people and equipment to conditions similar to the rigors of setting up and operating a diverse communications facility during time of war or natural disaster.

The exercise is in the form of a contest, the object of which is to contact as many amateur stations as possible in a 24-hour period. Jim Wise, a robotics engineer for PRC and SPARK Field Day chairman, said the club made 2,784 contacts in 1988. "This year radio conditions were poor. Our scores will be down a bit, but that may be a general trends for all participants." Wise felt the greatest improvement was with the satellite station which made 61 contacts in several countries, including Japan and the Soviet Union, via the OSCAR-13 satellite.

SPARK had six stations operating for Field Day---three primary stations communicating via voice, morse code and a combination of the two, plus satellite, novice and digital stations. Points are also earned for using independent power for all stations. The 24-hour communication marathon was conducted totally on emergency power, utilizing no power from power lines on center.

When the points are tallied SPARK hopes to move up from their 1988 position of ninth out of 294 entries in their class. Wise reports this year's competition was the biggest turn out ever. "Besides," notes Wise, "Field Day is a great opportunity for camaraderie--good food, good friends, good competition and, this year, few mosquitos!"

Piper Establishes General Aviation Scholarship



-photo courtesy of Piper Aircraft Corporation

Piper Aircraft Corporation owner Stuart Millar and the Piper Foundation recently presented the American Institute of Aeronautics and Astronautics (AIAA) a check for $15,000 for the initial endowment of the William T. Piper Sr. General Aviation Graduate Scholarship. On hand for the presentation were (L to R) John Piper, Piper's director of manufacturing support and grandson of Piper Aircraft Corporation's founder; Millar; Bruce Holmes, chairman of AIAA's General Aviation Systems Committee and Langley employee on detail to NASA Headquarters; and committee members Robert Stewart and Langley Chief Engineer Joseph Stickle.

Happenings

LAA SOCIAL will be held be held Friday, August 4, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Join your co-workers for TGIF fun.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, August 8, at 2 p.m. in the H.J.E. Reid Conference. Concerns to be brought before the board should be addressed to the appropriate chairperson.

VA TECH SEAFOOD FEAST will be held at 6:15 p.m. Monday, August 7, at Captain George's, Mercury Boulevard. For information and reservations, call Joe Drewery, 864-5842, or Bill Bradley, 877-7397.

MOTORCYCLE COURSE. Those interested in taking the Experienced Rider Course offered by the Motorcycle Safety Foundation, please contact Mike Mastaler, ext. 46931.

WANTED: CAR POOL MATE between Colonial Place in Norfolk and NASA west area on 8 a.m. shift. Call Dan Giesy, ext. 44006 or 625-7558.

TAC BAND IN CONCERT. The Tactical Air Command Band will perform outdoor concerts Monday evenings at the Williamsburg Lodge and Tuesday evenings at Hampton's Mill Point Park during August. Concerts begin at 7 p.m., are free and open to public. For further information, call 764-2931.

Items for Sale

LAWN VACUUM. 1989 Billy Goat. Cost $579.99. 5 HP, 4-blade impeller, vertical crankshaft, aircooled 4-cycle engine. Bag capacity 8 bushels. Price negotiable. Call Frank or Jane, 229-8995.

AUTOMOBILE. 1979 Thunderbird, 2-door. Good condition. $895. Call 851-7836.

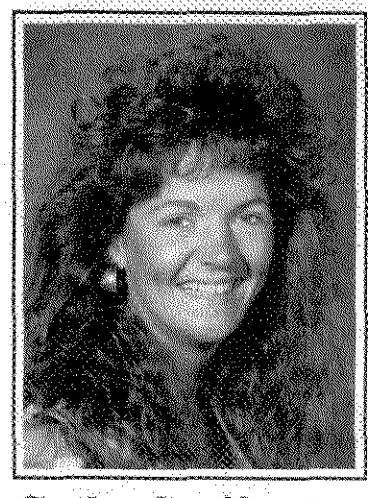
Retirement Party

Jim Monteith will be honored at a lunchtime get-together in the cafeteria private dining room Tuesday, August 15, at 11:30 a.m. A $3 contribution for gifts, etc., will be appreciated. Contact Natalie Shrader, ext. 44649, Mail Stop 238 by Aug. 8 for reservations/contributions.

Mark your calendar.
LAA Carnival, August 18-19.

1989 Carnival Monarch Contestants

Cathy Perkins
Wyle Laboratories



Cathy Stafford
Kelsey-Seybold Clinic

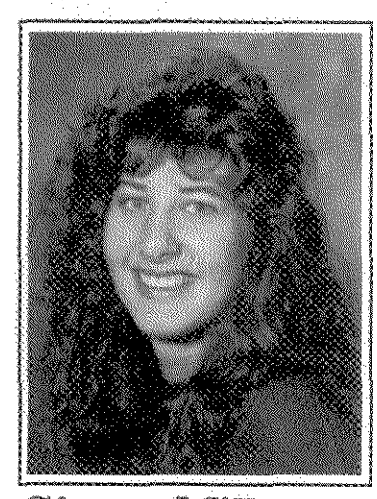
The Langley Activities Association will sponsor its biggest fund-raising event, Carnival, on Friday and Saturday, August 18-19.

Four Carnival Monarch contestants will be vying for your support. Raffle tickets may be purchased from the LAA Office, Carnival Monarch contestants, various facility coordinators and members of the LAA Executive Board.

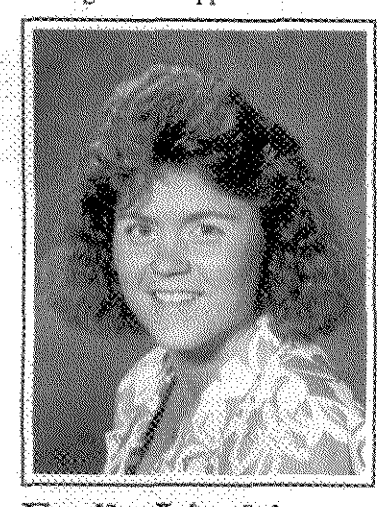
The contestant selling the most raffle tickets will be crowned Carnival Monarch on Friday evening and will reign over all Carnival events. The Monarch will also be awarded a cash prize of $300; first runner-up will receive $150; second runner-up, $100; third runner-up, $75.

Friday night grand prize is $1200 ; Saturday night grand prize is $1500. Prizes of $250 and $500 will be awarded at 6 and 9 p.m. respectively each night. Winners need not be present. For those present, $50 prizes will be awarded on the hour and half hour both evenings.

Support the Carnival. Vote for the contestant of your choice--cast you ballot by buying a Carnival raffle ticket.

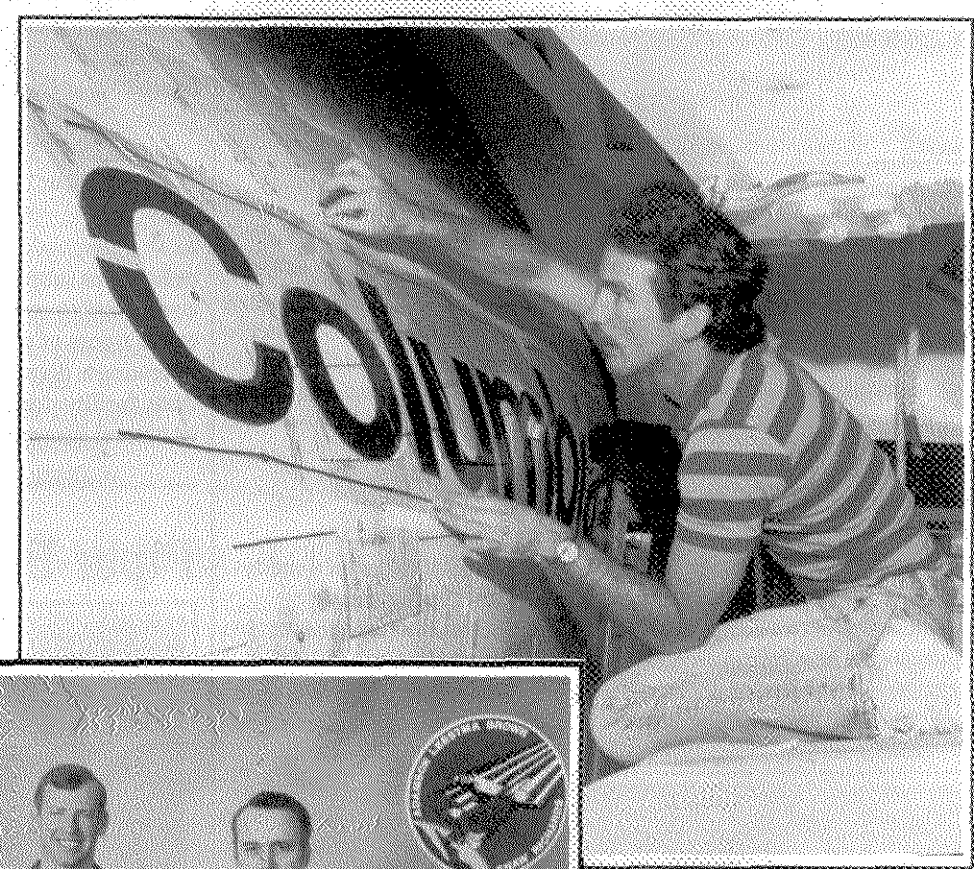


Ginger Millar
Management Support Division



Emily Linthicum
Kelsey-Seybold Clinic

Vote for the Contestant of your choice;
Cast your ballot by buying a Carnival ticket!



A Kennedy Space Center technician places the orbiter Columbia's name on the Shuttle's fuselage as preparations continue in the Orbiter Processing Facility toward an early August launch of the Department of Defense dedicated mission, STS-28. The original lettering was removed when then orbiter's thermal protection tiles were replaced with thermal blankets. Columbia is the oldest orbiter in NASA's Shuttle fleet and was last flown on Mission 61-C in January 1986.

STS-28 CREW MEMBERS are (front row, L to R) Richard N. Richards, Cmdr., USN, pilot; Brewster H. Shaw, Col., USAF, commander; David C. Leestma, Cmdr., USN, mission specialist; (back row) Mark N. Brown, Maj., USAF, and James C. Adamson, Lt. Col., USA, mission specialists. Liftoff for STS-28 is scheduled for no sooner than Sunday, August 6.

Researcher News

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News Researcher

Volume 3, Issue 16 August 11, 1989

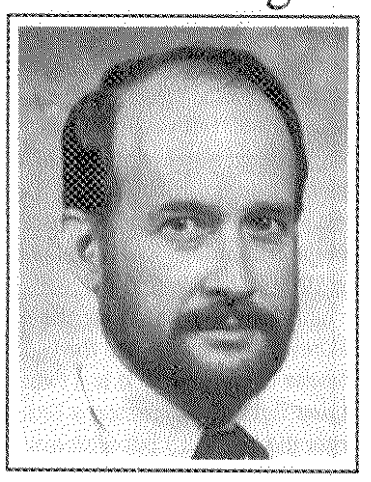
Bi-weekly Employee and Contractor Publication

Cockrell Attends Maxwell Program

Charles E. Cockrell, head of the Models Engineering Section, has been selected to attend the Maxwell Midcareer Program in Public Administration at Syracuse University. Selected by NASA Headquarters following an intercenter competition, Cockrell will participate in an opening seminar followed by five months of intensive study at the Syracuse, New York, institution.

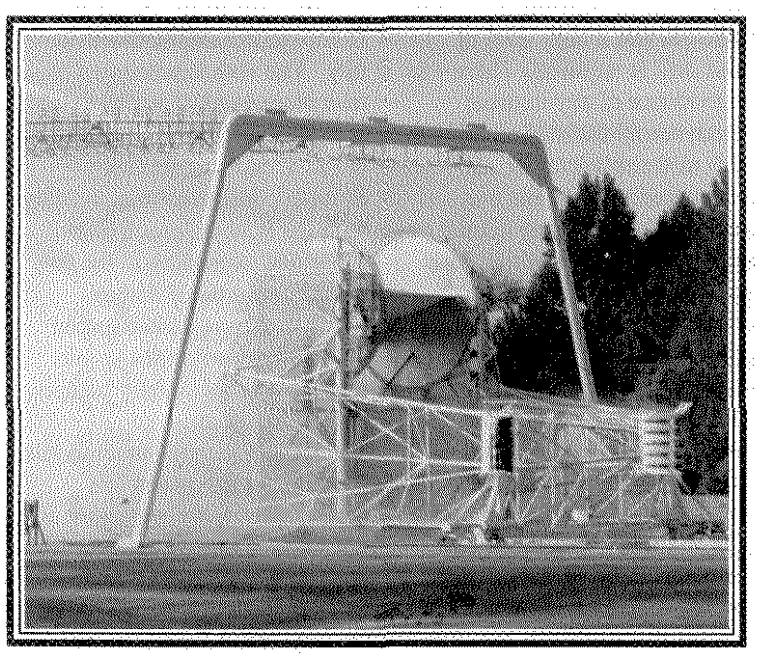
The Syracuse-Maxwell Program has been preparing men and women for public service since 1924; and since 1964, its Midcareer Development Program has provided career public servants with a wide range of long-term opportunities and graduate credits which may be applied to the master's degree.

Cockrell began his NASA career at Langley as an apprentice sheetmetal worker in 1961. He completed the apprentice school as an engineering draftsman in 1965, and earned a bachelor's degree in mechanical engineering from Old Dominion



University in 1978. He is presently pursuing a master's degree at ODU.

"The Syracuse-Maxwell Program will expand my horizons by offering exposure to new concepts and ideas," says Cockrell. "I hope to broaden my managerial capabilities by improving my leadership, communications and decision-making skills." The midcareer program will allow Cockrell to complete credit requirements for the master's program and graduate from ODU in May 1989.



This giant, tinkertoy-like carriage is propelled to 155 miles per hour in a preliminary test to measure the effects of "heavy rain" on aircraft wing performance. Mounted on top of the carriage is an aircraft wing section typical of a modern jetliner wing.

Top Students Team with Langley Scientists

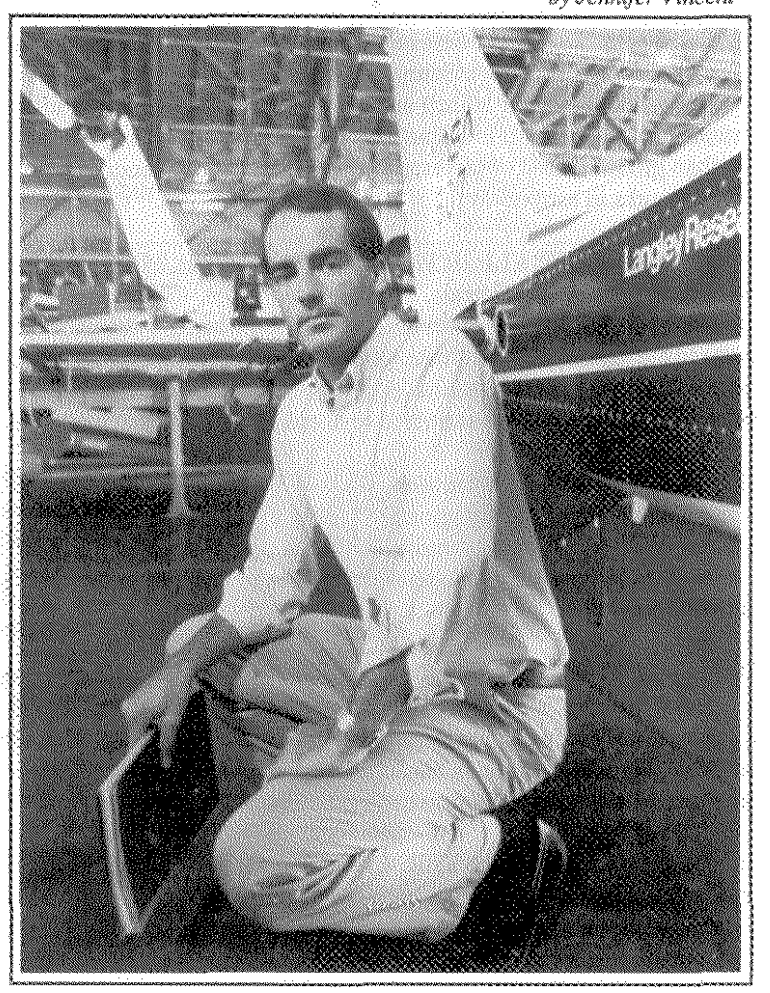
-by Jennifer Vincent

Eighty-six of the top engineering students from around the country were chosen from over 400 applicants to participate in the Langley Aerospace Summer Scholars (LARSS) program from June 5 to August 11. The participants are U.S. citizens who are college juniors, seniors, and first year graduate students with at least a 3.0 grade point average. The program is intended to motivate high-caliber engineering and science students to pursue graduate degrees and to heighten interest in aerospace research. According to program coordinator Dr. Samuel Massenburg, the overall goal is to produce capable researchers and university professors.

Three students in particular have learned that certain valuable experience cannot be learned in the classroom and that a program such as LARSS allows students to apply the theories and concepts learned in college.

Jose Stevens of Burlington, New Jersey, is a senior at MIT. His summer research was conducted in the Experimental Aerodynamics Branch, where he used a computer to test the trajectory and size test limits for models. An astronautical engineering major, Stevens had learned the basic theories at MIT, but found the practical experience helpful, saying, "I've learned aerodynamics before, but I've never applied what I learned. Plus, it's interesting to experience how NASA really works."

Melissa Bingham is a senior electrical engineering major at Virginia Tech. A resident of Lynchburg, Virginia, she worked in the Flight Electronics Division on hardware design for the Space Flight Optical Disk Recorder for the Earth Observing System.



-photo by Steve Earley

William Milholen, a North Carolina State University senior, worked with Gregory S. Manuel in the Flight Research Branch, studying stall and spin resistance.

Bingham found her past summer experience elsewhere not challenging enough, so she came to NASA this summer. "In college, I learned the basics. I knew what I was looking at, but I hadn't had any classes in digital design, so most of what I'm doing is work I haven't done before. So actually I've learned volumes."

William Milholen, an aerospace engineering student from Ashville, North Carolina, worked on the Stall and Spin Resistance Program in the Flight Applications Division, testing general aviation aircraft and making modifications to them to improve stall and spin resistance. The North Carolina State University senior found that his research at Langley went beyond anything he could have learned in college. "Things like this, they don't teach you in class. In class, you're given theories of how to do certain things, where this is the actual application."

In addition to research, the students also took part in an F-15 demonstration at Langley Air Force Base, social and recreational activities and a lecture series by prominent engineers and scientists.

NASA Studies Heavy Rain Effects on Aircraft Wing Performance

-by H. Keith Henry

Preliminary results from a series of high-speed ground tests indicate that heavy rain may reduce aircraft wing performance when it is most needed--- during landing approach or take-off in the presence of a microburst storm, an important factor for pilots to consider while flying through severe storms.

Until recently, explains R. Earl Dunham, Jr., Langley heavy rain project manager, little attention has been directed to the influence of rain on airfoil performance since it was long thought to be insignificant.

A survey of commercial aircraft accidents and incidents related to severe storms prompted NASA to study the possibility of a heavy rain effect on aircraft safety and performance. Heavy rain is generally defined as a high-intensity, short-duration rainfall.

Modern wings on commercial aircraft, optimized for economy, rely on a smooth, uninterrupted flow of air across the wing surfaces for maximum performance. Tests suggest that very heavy rain disrupts the airflow, reducing wing lift and performance.

The heavy rain research is part of a broad NASA-Federal Aviation Administration (FAA) airborne wind shear detection and avoidance program begun in 1986.

Understanding heavy rain is important to the study of wind shear. In cases where greater than usual lift is required, as in a low-altitude encounter with wind shear, heavy rain may reduce wing performance when it is most needed. In fact, a series of small-scale wind tunnel tests in the mid-1980's suggested that there is a heavy rain effect at extremely high rain rates. Wing lift losses of greater than 20 percent were observed when simulated rain was sprayed on a test wing in the tunnel.

To test in more realistic conditions, the program was extended to the present high-speed, large scale ground tests. Results after the first 20 runs tend to verify the wind tunnel tests for the particular wing section being tested, namely that at extremely high rain rates there is a significant loss of wing lift, a loss that could be critical to safety of flight in high-lift conditions such as approach or take-off.

During the next phase of the program, the project team plans to change the rain rate to determine at what point heavy rain begins to affect wing performance. The key question being addressed--- "Are heavy rain effects a potential concern even at light or moderate rain rates or is it something to consider only in the most intense downpours?" The answer is important to help define the seriousness of the problem.

If heavy rain effects prove to be significant under realistic flight conditions, it follows, says Dunham, that piloting procedures need be changed to take the effects into account. Present piloting procedures are based on what is known about flying through dry air. No corrections to performance have previously been developed to account for the effect of heavy rain on airfoil performance.

Questions about possible heavy rain effects were first asked by researchers looking at wind shear and related strong downdrafts called microbursts. Microbursts are small, intense downdrafts which, upon striking

Continued on page 2.

News Briefs

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA Goddard has selected McDonnell Douglas Space Systems Co., Hunnington Beach, Calif., for negotiations leading to award of a firm, fixed-price contract for medium class, commercial, expendable launch vehicle services. The contract, expected to be effective Oct. 1, 1989, will provide launch services for three firm missions--the International Solar Terrestrial Program GEOTAIL, WIND and POLAR missions--and 12 optional missions currently unidentified.

HEADQUARTERS, Washington, D.C. --- The Space Telescope Science Institute, Baltimore, Md., has completed selections of the first science observation proposals from the astronomy community to be carried out using the NASA/European Space Agency (ESA) Hubble Space Telescope. The Hubble Space Telescope, scheduled for launch in March 1990, is the first major international optical telescope to be permanently stationed in low-Earth orbit. Capable of viewing the universe with a tenfold greater resolution than ground-based observatories, the HST has a tremendous potential for fundamental scientific breakthroughs in astronomy.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA scientists, joined by others from the U.S., Soviet Union, Canada, England and France, will set up camp during mid-summer on a prairie grassland site in Central Kansas to learn how land surface vegetation regulates the rate of soil moisture return to the atmosphere, ultimately influencing local weather and regional climate. In addition to land surface vegetation, scientists also expect to learn more about the effects on climate of other land surface properties, such as soil moisture and regional hydrologic characteristics.

HEADQUARTERS, Washington, D.C. --- The U.S./USSR Joint Working Group on Earth Sciences held its second meeting in Washington D.C., July 17-21. The group agreed to cooperate in two sub-satellite experiments related to land-atmosphere interactions, outlined plans for a joint research program in volcanology and agreed to cooperate in studies of changes in the Earth's cryosphere in response to global climate warming.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly announced that John E. O'Brien has returned to NASA as assistant deputy administrator, effective July 30. In this position, O'Brien will support the agency's efforts in formulating plans to implement future goals in space as outlined by President Bush in his July 20 speech. Also, he will perform special analyses for the Administrator and be involved in management problem solving.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- Scientists at NASA Lewis have established a new benchmark in the application of high-temperature superconductors to high-frequency electronic circuits. They have produced the first electronic circuit able to operate at 33 to 37 gigahertz, a frequency range more than three times higher than attainable with previously developed circuits. Attaining these higher frequencies is important because advanced communications satellites will operate at 20-30 gigahertz and above. These frequencies will allow satellites to process data at much faster rates, resulting in a three-fold increase in the number of communications linkup they can handle.

HEADQUARTERS, Washington, D.C. --- Administrator Truly has asked Aaron Cohen, director at the Johnson Space Center, to lead agency activities in response to the national goal of human exploration of the moon and the planet Mars announced by President Bush. Cohen will be temporarily assigned to NASA Headquarters in Washington for the next few months.

NASA Studies Heavy Rain Effects

Continued from page 1.

the ground, spread out into a circular vortex radiating in all directions. When microbursts are encountered at low levels on approach or takeoff, the pilot usually has little time to react correctly to maintain the desired flight path. Between 1964 and 1985, there were at least 26 accidents and 3 incidents involving 500 fatalities and more than 200 injuries where wind shear was the direct cause or a contributing factor.

In 1980 James Luers and Patrick Haines of the University of Dayton Research Institute, Dayton, Ohio, performed theoretical calculations based on their hypothesis that aircraft performance is reduced during heavy rain and wind shear periods. The work was funded under a grant from NASA's Goddard-Wallops Flight Facility, Wallops Island, Va. Following these calculations small scale wind tunnel tests were conducted at Langley. These tests indicated a possible effect that required verification at more accurately simulated flight conditions with full-size wing sections.

As a result, ground tests using a tubular steel carriage are being conducted at Langley on a half-mile track originally constructed to test aircraft tires and landing gear. The 127,000-pound carriage is propelled down the track by a burst of high-pressure water. In 2-3 seconds, the carriage accelerates to 160 knots (184 mph) and the airfoil mounted on top the carriage "flies" through simulated heavy rain provided by 1590 nozzles suspended from 6 trusses spanning the track. The airfoil represents a full-scale wing section, with working flaps, from a typical modern commercial transport.

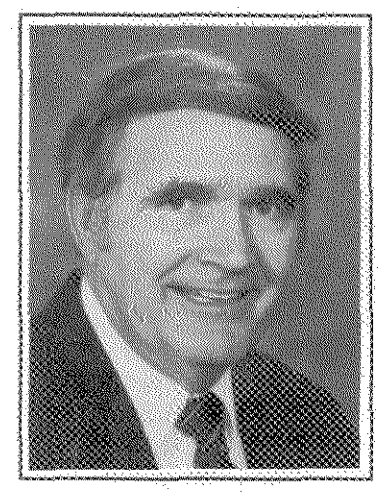
NASA's current test program is expected to require about 60-80 carriage runs. They will continue this year until freezing weather makes using the water propulsion and spray systems impractical.

Lankley

Editorials

Langley

Headquarters Forum



Greetings from the Chief Engineer! Perhaps some of you would like to know what the duties of the Chief Engineer are and, perhaps, when my name next appears on the schedule to contribute to the Headquarters Forum, I will tell you.

Today, however, I would like to discuss airplanes! Let me give you my impressions of the foreign technology displayed at the 1989 Paris Air Show.

In the military arena, the Sukhoi Su-27 was by far the favorite of the show. It is a twin engine fighter/interceptor, a little larger than an F-15 but with low speed agility approaching that of an F-16. According to the press, it incorporates a multi-channel fly-by-wire control system.

The most eye catching maneuver occurred following a low speed, low altitude pass over the airfield. The pilot added power and pulled the nose up until it was clearly past the vertical but still in near level flight. The nose was then lowered and afterburner power applied to accomplish an accelerating climb.

Only one of the two Soviet pilots would demonstrate the "cobra" maneuver which indicates that a high level of pilot skill is required. There was no evidence of any unusual aerodynamic surfaces or features such as thrust vectoring. I expect that the airplane was loaded to provide near neutral or slightly negative longitudional stability with the automatic control system working to prevent a roll or yaw departure during the very high angle-of-attack part of the maneuver. In this condition, only a small amount of pitching moment control would be required for the pilot to rotate the nose past the vertical and then recover. The large one-piece horizontal tails operate symmetrically for pitch and differentially for roll control. The tails together with leading-edge flaps could provide sufficient nose pitch control. Engineers at Sukhoi have worked extremely hard on aft-end drag reduction. They are obviously well aware of the area ruling principle and have taken advantage of it in the difficult region of the tail surfaces and engine nozzles.

The overall quality of workmanship on the Su-27 was far superior to other Sukhoi products such as the Su-25 fighter that was also on display. In my judgement, it was also superior to the Mig-29 that has been the showcase of Soviet fighter airplanes.

On the civil side, the Russians brought out their new IL-96-300 transport. Although it had all the features of the latest U.S. and European airplanes--including fly-by-wire, "glass" cockpit, supercritical airfoils, and winglets--the quality was not comparable. In contrast, "quality" and "pride of workmanship" are becoming household words with the European manufacturers in aircraft, ranging from fiberglass single-engine trainers to the Airbus Industries A-320. Europe is hungry for aerospace dollars and they are willing to overcome language, economic and cultural barriers in order to formulate saleable products.

Much of the media news throughout Europe is now targeted on a seven-nation vote to eliminate internal trade barriers and form a single European Economic Community. The vote is scheduled to take place in 1992 and the goal is to establish in the business world a "united states of Europe." Joint ventures, starting with the British-French Concorde and expanding to the five nation consortia of Airbus Industries, have demonstrated the ability of countries to join together to successfully compete with U.S. industry.

There is much more to talk about than I can put in this message and there was more at the airshow than I could absorb in three days. I have some amateur photographs of some of the airplanes on display that I will gladly share with anyone who stops by my office in Building 1219, Room 115. I did appreciate the opportunity to represent Langley.

Joseph W. Stickle
Chief Engineer

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . Jean Drummond Clough

Editor . . . . . Marty S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

MIXED FLEET MANIFEST

Space Shuttle

Flight	Date/ Orbiter	Crew/ Duration	Primary Payload	Carrier
34	10/12/89	5	GALILEO	IUS
	Atlantis	5	IMAX-02	MD
33	11/19/89	5	DOD	
	Discovery	—		
32	12/18/89	5	SYNCOM IV-05	Unique
	Columbia	10	LDEF-RETR	N/A
			IMAX-03	MD
36	2/1/90	5	DOD	
	Atlantis	—		
31	3/26/90	5	HST	N/A
	Discovery	5	IMAX-04	ICBC + MD
35	4/26/90	7	ASTRO-01	IG + 2 PALL
	Columbia	9**	BBXRT-01	TAPS
37	6/4/90	5	GRO	Unique
	Atlantis	5		
38	7/9/90	5	DOD	
	Discovery	—		
40	8/16/90	7	SLS-01	LM
	Columbia	8*		
41	10/5/90	5	ULYSSES	IUS/PAM
	Atlantis	5		
39	11/1/90	7	AFP-675	Pallet
	Discovery	8	IBSS	SPAS
42	12/6/90	7	IML-01	LM
	Columbia	9**	IMAX-05	N/A
43	1/31/91	5	TDRS-E	IUS
	Atlantis	5		
44	3/4/91	5	DOD	
	Discovery	—		
45	3/28/91	7	ATLAS-01	IG+2 PALL
	Columbia	9**	IMAX-06	MD
46	5/16/91	7	TSS-01	MPESS+1P
	Atlantis	7	EURECA-1L	EURECA-A
			IMAX-07	ICBC
47	6/17/91	7	SPACELAB-J	LM
	Discovery	7		
48	8/22/91	7	STARLAB	LM+1 PALL
	Atlantis	7		
49	9/30/91	6	LAGEOS	IRIS
	Discovery	7	GEOSTAR-01	PAM-D2
50	11/27/91	5	UARS	N/A
	Atlantis	5		
51	1/16/92	5	SPACEHAB-01	SPACEHAB
	Discovery	7	EURECA-1R	EURECA-A
52	2/6/92	7	SL-D2	LM + USS
	Endeavour	9**		
53	3/5/92	7	USML-01	LM + EDO
	Columbia	10***		
54	4/6/92	7	ASTRO-02	IG + 2 PALL
	Atlantis	7	BBXRT-02	TAPS
55	5/18/92	5	PUR-1	
	Endeavour	7	USMP-01	MSL+MPESS
56	6/15/92	7	SRL-01	PALL+MPES
	Columbia	9		
57	7/9/92	7	ATLAS-02	IG+1 PALL
	Atlantis	7		
58	8/6/92	TBD	Flight Opportunity	
	Discovery	TBD		
59	8/27/92	5	SPACEHAB-02	SPACEHAB
	Endeavour	7	SPAS-ORFEUS	ASTRO-SPA
			GEOSTAR-02	PAM-D2
60	9/30/92	7	SLS-02	LM+EDO
	Columbia	10***		
61	11/12/92	7	INMARSAT-01	PAM-D2
	Discovery	7		
62	12/10/92	5	TDRS-F	IUS
	Endeavour	5		

*Possibility of extension to 9 days **Possibility of extension to 10 days ***Possibility of extension to 13 days

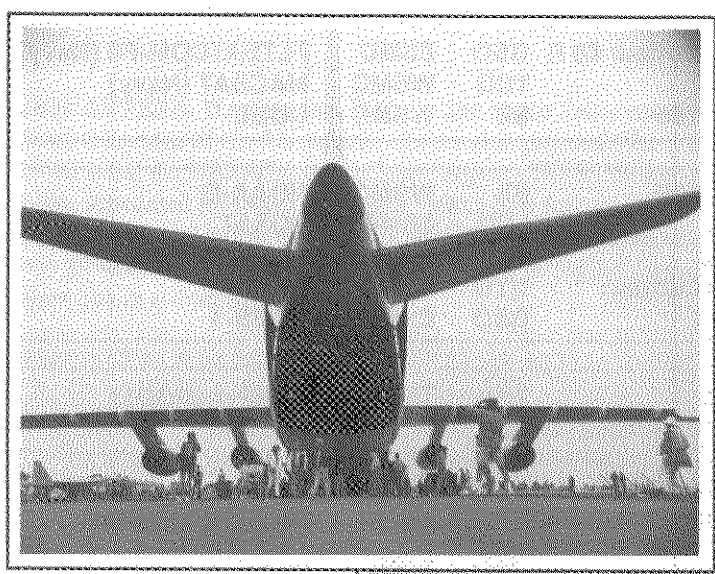
Expendables

Date	Launch Vehicle	Orbit	Launch Site	Payload
9/89	Atlas Centaur 68 R	GSO	ESMC	FLTSATCOM-F8 (Navy)
9/89	Scout	TBD	WSMC	MACSAT (Navy)
11/89	Delta 186	SS	WSMC	COBE
1/90	Atlas 50E	SS	WSMC	NOAA-D
2/90	Delta	LEO	ESMC	ROSAT
3/90	Scout	TBD	WSMC	SALT (Navy)
6/90	Atlas Centaur	GTO	ESMC	CRRES
10/90	Atlas I	GSO	ESMC	GOES-1
3/91	Scout	TBD	TBD	USAF-1 (DOD)
5/91	Atlas 34E	SS	WSMC	NOAA-1
8/91	Delta	LEO	ESMC	EUVE
11/91	Atlas I	GSO	ESMC	GOES-J
5/92	Atlas I	GSO	ESMC	GOES-K
6/92	Scout	TBD	WSMC	SAMPE
7/92	TBD	HE	ESMC	GEOTAIL
9/92	Atlas IIE	SS	WSMC	NOAA—J
9/92	Titan III	EO	ESMC	Mars Observer
12/92	TBD	HE	ESMC	WIND

Glossary

Manifest courtesy of Space News Roundup

AFP	Air Force Polar Bear
ASTRO	Ultraviolet Astronomy
ATLAS	Atmospheric Laboratory for Applications and Science
BBXRT	Broad Band X-Ray Telescope
CIRRIS	Cryogenic Infrared Radiance Instrument for Shuttle
COBE	Cosmic Background Explorer
CRRES	Combined Radiation Release Experimental Satellite
DOD	Department of Defense
EDO	Extended Duration Orbiter
EO	Escape Orbit
ESMC	Eastern Space and Missile Center
EURECA	European Retrievable Carrier
EUVE	Extreme Ultraviolet Explorer
FLTSATCOM	Fleet Satellite Communication
GALILEO	Jupiter Probe
GEOTAIL	Earth Plasma Physics Geotail Explorer
GEOSTAR	Interactive Radiodetermination Satellite
GOES	Geostationary Operational Environmental Satellite
GRO	Gamma Ray Observatory
GSO	Geosynchronous Orbit
GTO	Geosynchronous Transfer Orbit
HE	High Eccentricity Orbit
HST	Hubble Space Telescope
IBSS	Infrared Background Signature Survey
ICBC	IMAX Cargo Bay Camera
IG	Igloo Environmental Control for Pallet Subsystems
IML	International Microgravity Laboratory
INMARST	International Maritime Satellite
IRIS	Italin Research Interim Stage
IUS	Inertial Upper Stage
LAGEOS	Laser Geodynamics Satellite
LDEF	Long Duration Exposure Facility
LEO	Low Earth Orbit
LM	Long Module Spacelab Crew Module
MACSAT	Multi-Access Communication Satellite (DOD)
MD	Middeck
MPESS	Mission Peculiar Equipment Support Structure
MSL	Materials Science Laboratory
NOAA	National Oceanic and Atmospheric Administration
PALL	Spacelab Pallet Structure
PAM	Payload Assist Module
PUR	Payload Under Review
ROSAT	Roentgen Satellite
SALT	Special Purpose Inexpensive Satellite Altimeter
SAMPE	Solar, Anomalous, and Magnetospheric Particle Explorer
S/L	Spacelab
SLS	Space Life Sciences
SPAS	Shuttle Pallet Satellite
SS	Sun Synchronous Orbit
STARLAB	DOD Spacelab
SYNCOM	Hughes Geosynchronous Communication Satellite
TAPS	Two-Axis Pointing System
TDRS	Tracking Data Relay Satellite
TSS	Tethered Satellite System
UARS	Upper Atmosphere Research Satellite
ULYSSES	Formerly International Solar Polar Mission
USML	U.S. Microgravity Laboratory
USMP	United States Microgravity Payload
USS	Unique Support Structures
WIND	Solar Wind Measurement Satellite
WSMC	Western Space and Missile Center



Viewed from the rear, the silhouetted Antonov An-124 dwarfs the crowd gathered to examine the Russian craft.

The Antonov An-124, the world's largest transport, drew large crowds of spectators. The transport delivered two Sukhoi Su-26M aerobatic airplanes, which were flown by Russian pilots during the seven-day convention.

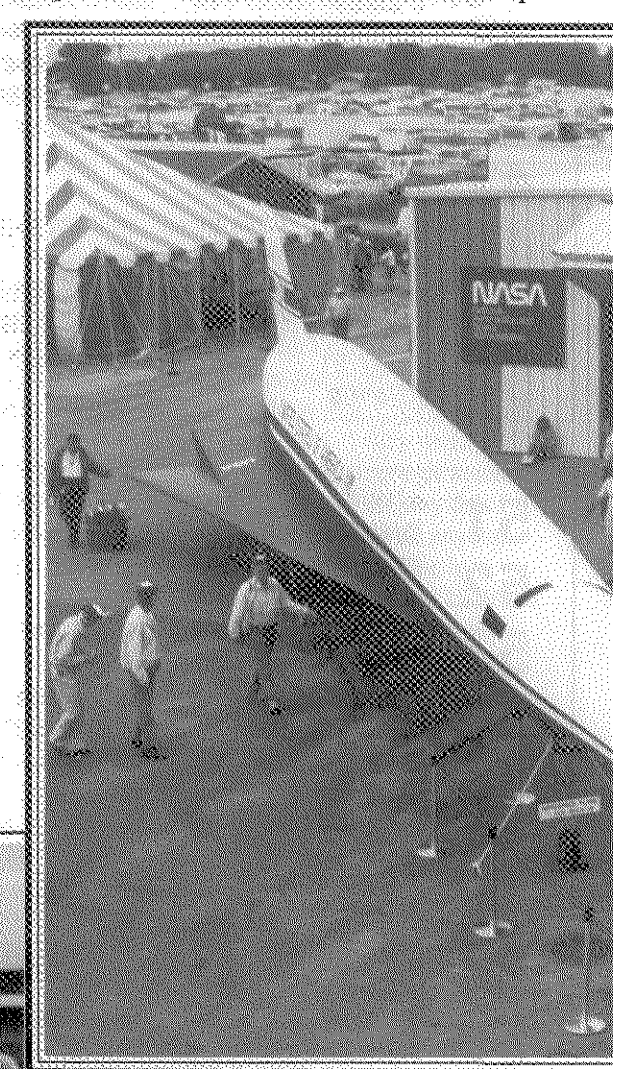
From Jennies to

From July 28 through August 3, Oshkosh Wisc
Regional Airport became the world's busiest airport--
tional, the world's busiest airport for the other 51 wee

Oshkosh became home to hundreds of thousand
arrived via different modes of transportation, but all h

NASA returned to Oshkosh for this 37th Annua
This year's exhibit, "Investing in the Future," emphasi
major contributors in the "learn from the experts" for
special in the air at Oshkosh '89. Catch the spirit of a

NASA Marshall's Ralph Hoodless and Langley's Ariene Levine take advantage of a rare opportunity to sit in the cockpit of the Antonov An-124 Russian transport.

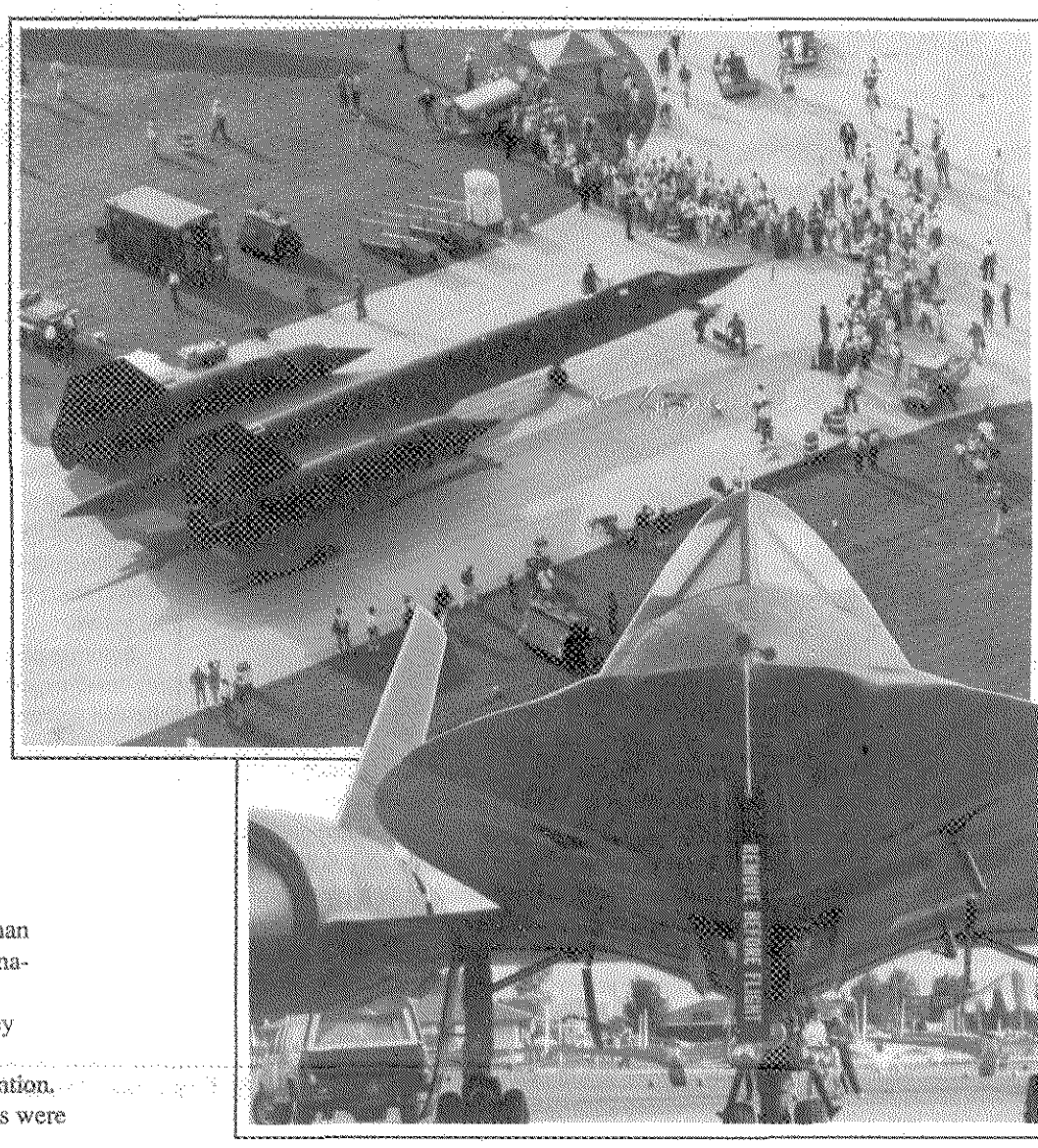


The 80-foot long model of th
students, drew visitors to the
the Paris Air Show in July.

Posed in front of the VPI-built NASP model were as many of the Langley crew as could be gathered in one place at the same time.

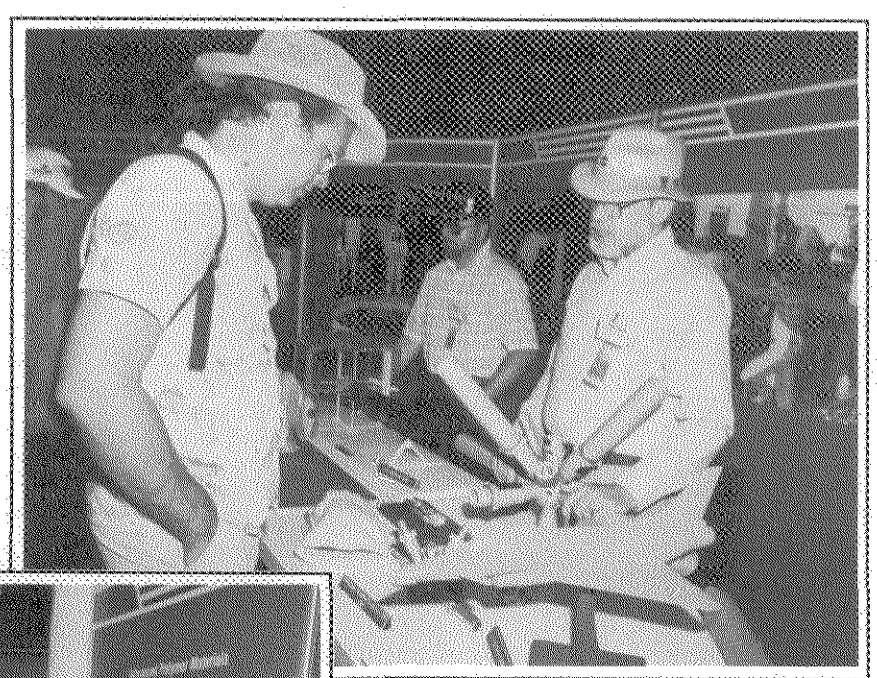
ts...OSHKOSH '89

was, once again, the aviation capitol of the world. Wittman
ing more aircraft movements than Chicago's O'Hare Interna-
he year.
sitors from across the country and around the world. They
thing in common--a deep and abiding love for aviation.
rimental Aircraft Association International Fly-In Convention.
ronautics, space science and exploration. NASA speakers were
gram. Planes...people...programs....There was something
that is Oshkosh!

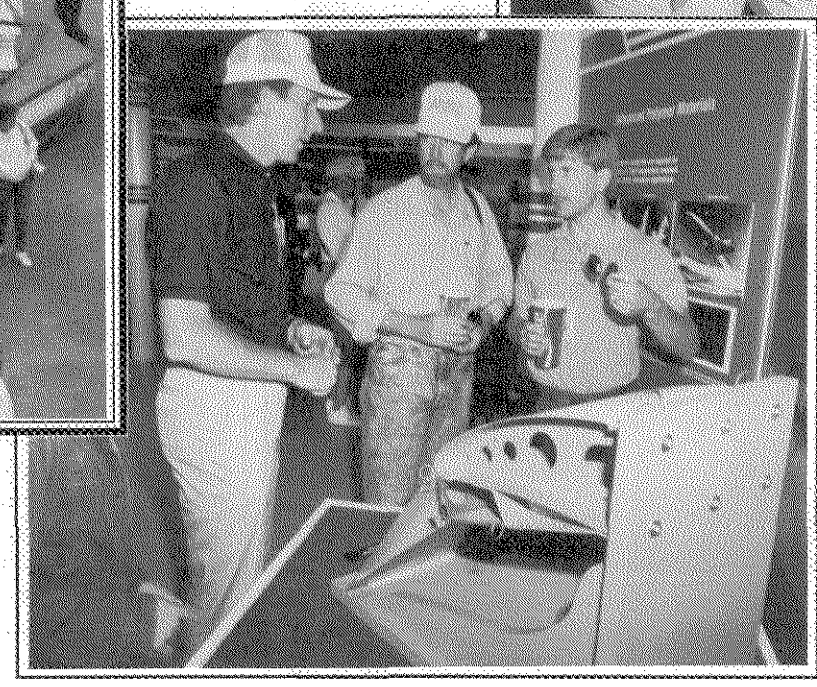


The world's fastest airplane--the U.S. Air Force SR-71 "Blackbird"--made a rare appearance at the civilian air show. The Blackbird is a long-range, high-altitude surveillance aircraft capable of sustained flight at speeds three times the speed of sound.

nal Aero-Space Plane (NASP), built by VPI
pavilion. The model was previously on display at



John Thompson, right, demonstrated a truss joint assembly that may be used to build Space Station Freedom.



Paul Stough, left, explains Langley's vortex flap research to Oshkosh visitors. The vortex flap is a sharp extension to the front of the wing designed to improve the performance capabilities of swept wing fighter aircraft by as much as 20 percent.

Teachers Learn about Aeronautics at Sky School

-by Walter Rankin

Twenty-six elementary and junior high school teachers recently met at the Center for Effective Learning in Virginia Beach to participate in Sky School, a ten-day summer workshop designed to introduce the principles of aeronautics into the classroom.

For one week, the teachers became the students. Divided into "squadrons" with names like "Bat Girls," "Wing Nuts," and "Ghostriders," they studied techniques to teach aeronautics. They took notes, had vocabulary tests on aeronautical terms and went on field trips to Langley and the Hampton Roads Airport. The participants built models, flew hot-air balloons and made gliders.

During their second week, the teachers demonstrated what they had learned to visiting students. In addition to repeating those exercises listed above, other creative teaching strategies were explored. They made parachutes and protective boxes for eggs; played a "Win, Lose or Draw"-type game in which the students drew aeronautical terms for teammates to guess; and they even made musical instruments to play aeronautical songs written by both teachers and students.

The teachers were specialists in science, psychology, home economics, social studies and physical education . When asked what they hoped to gain from Sky School, several noted the teacher-recertification credit they would earn upon completing the workshop. But others, like Claire Floege, a third-grade teacher at Indian Lakes Elementary School, were more concerned with developing effective teaching methods which would include aeronautics. Floege, a self-proclaimed "life-long space nut," explained, "I like to modernize my curriculum every year and enjoyed 'playing astronaut' while learning about aeronautics."

John McLaughlin, Virginia Teacher of the Year and a FAA regional award winner, cautioned against "burying the science" in those subjects which seem to have few scientific applications. McLaughlin, a teacher at the Career Development Center in Virginia Beach, deals with students who have had trouble in a regular scholastic environment. He has directly applied what he has learned from Sky School in his social studies class.

By using an "across-the-curriculum approach," McLaughlin interjects aeronautical projects throughout his courses. He even developed a class called "Sky School for Social Studies," in which students study pollution, data-gathering by satellites, as well as longitude and latitude using techniques he learned at Sky School. McLaughlin has had a great deal of success getting kids excited about learning," and he claims that, once students become interested, "(they) don't want to stop learning."

Sky School is the only educational program to concentrate solely on aeronautics as a means of bringing science into all aspects of the curriculum. Jim Fletcher, chairman of the Virginia Beach School Board, noted that Sky School activities "will certainly spill over into other subject areas."

Sky School, co-sponsored by Langley Research Center and the Virginia Beach Public Schools, is coordinated by Patterson Biggs of Langley and Debi Dyer of the school system. Upon completion of the program, teachers earn three credits towards teacher-recertification from Old Dominion University.

The Sky School Baron, pictured above, is the program mascot . The Baron is a creation of **Researcher News cartoonist Rod Waid, LaRC Graphics Section.*

-photo by Steve Earley

THE RUSSIANS ARE COMING. Eighteen Russian students, participating in the international science exchange program "People to People," toured Langley Research Center in mid-July. This portion of the group is shown in the Basic Aerodynamics Research Tunnel. They are captivated by a video which explains the function of the tunnel. Scott Byington, Governor's School coordinator, was their host for the afternoon visit.

Tidbits from Training

Executive Seminars for Managers

Langley Research Center has recently completed the process of obtaining nominations for Fiscal Year 1990 management seminars at the Office of Personnel Management (OPM) Executive Seminar Centers in Denver, Colorado; Oask Ridge, Tennessee; and Kings Point, New York.

The seminars fall into two main categories--management and national policy. The management seminars focus on management issues, concerns, skills, and competencies needed by government managers. The national policy seminars stress policy applications and the need to integrate long-range perspectives with short-range operational views.

Seminar presenters are policy-level experts from the public and private sectors, senior scholars and leaders from business and academia. Participants come from all departments and agencies in the Executive Branch of government. In addition to learning about the focus topic for the seminar, participants learn about the similarities and differences between NASA and other government agencies.

Langley participants give the seminars high marks on both the program content and the way the OPM staff run the seminars. The Training and Education Section pays the $1750 tuition, which includes room and meals for the two-week period. The participant's organization pays only the travel to and from the seminar centers, and a nominal $2 per diem.

For details about these seminars or other management training opportunities, contact Joe Mathis, Training and Education Section, ext. 42592.

Competitive Placement Positions

89-61: Technical Information Specialist, GS-1412-05; Office of the Director for Management Operations, Research Information and Applications Division, Technical Library Branch. Closes August 14.

89-62: Supervisory Electrical Engineer, GM-0855-14 or 15; Office of the Director for Flight Systems, Information Systems Division. Closes August 25.

Positions Filled

Howard G. Maahs has been selected Supervisory Materials Research Engineer, Applied Materials Branch, Materials Division, under CPP 89-22.

Edwin P. Riddle has been named Supervisory Electronics Engineer, Communications and Network Systems Branch, Analysis and Computation Division, under CPP 89-23.

Glenn A. Gates has been selected Project Manager, Facilities Engineering Division, under CPP 89-24.

Upcoming Conference

The Atmospheric Sciences Division is sponsoring an advanced studies workshop in Williamsburg, August 28-31. Distinguished scientists will explore specific discipline areas within the atmospheric sciences, emphasizing recent observational and theoretical results, identifying significant scientific questions and suggesting future research needs. Open discusion between the workshop speakers and attendees will be encouraged. Information concerning topics and registration may be obtained from Dr. Bill Grose, 864-5820.

Current News Releases

To obtain a copy of any of the NASA News Releases summarized on page 2, contact Edith Watts, Mail Stop 147, ext. 43293. Request information by release number and title.

89-120.....Contractor Selected for Medium Expendable Launch Vehicle Services
89-121.....Science Observations Selected for NASA/ESA Hubble Space Telescope
89-122.....NASA Studies Heavy Rain Effects on Aircraft Performance
89-123.....U.S./USSR Earth Sciences Group Identify Areas of Cooperation
89-124.....NASA to Study How Vegetation Influences Weather, Climate
89-125.....O'Brien Returns to NASA as Assistant Deputy Administrator
89-126.....Truly Assigns JSC's Cohen to Lead NASA Preparation for New Civil Space Goals
89-127.....Milestone Reached in Superconductivity

People & Places

Health Corner

Want to Stop Smoking? Need Help?

The Office of Occupational Health Services will sponsor a Smoking Cessation Program beginning August 22. Participants will meet Tuesdays and Thursdays through September 28 from noon to 1 p.m.

The class will be limited in size in an effort to provide individual support and instruction. Due to the limited class size, additional programs will be scheduled if the response indicates the need.

Interested civil service employees should contact the Office of Occupational Health Services, ext. 43191, for more information.

Employees Support Bloodmobile

The American Red Cross Bloodmobile visited Langley July 26. A total of 304 units of blood were donated by Langley employees, retirees and contractors.

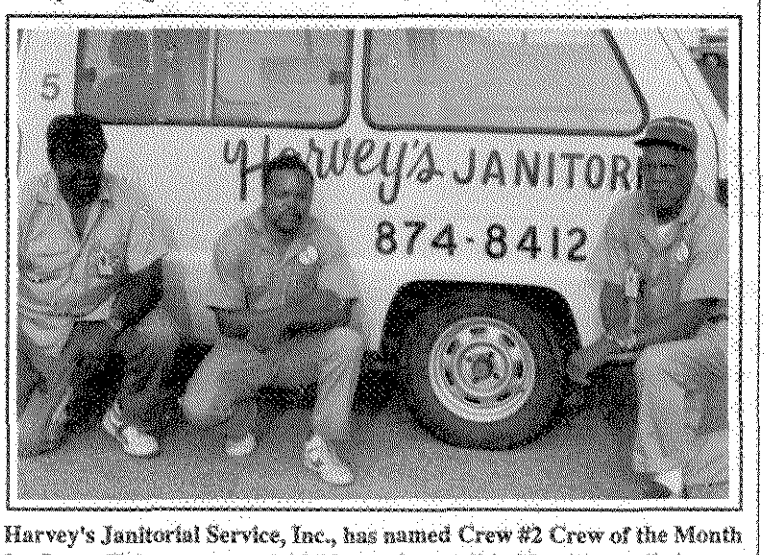
Achieving gallon status were:
17 gallons---Billy Dancy;
15 gallons---Richard Holt;
13 gallons---Raymond Midden;
11 gallons---Roger Amick and Billy Beasley;
10 gallons---Joseph Power;
9 gallons---John Crosby III and Frank Jones;
8 gallons---Samuel Banks;
7 gallons---David Coombs;
6 gallons---Melvin Jones and Frank Boyer;
5 gallons ---Ben Wilson Jr.;
4 gallons---John Brown, Glenn Woodell and Kelli Willshire;
3 gallons---Stephen Jumper, Arthur Charnick, Joseph Foglia;
2 gallons---Richard Foss, Robert Caldwell, Michael Dashiell and Elizabeth Filer;
1 gallon---Brenda Harris, James W. Cormsen, Jeffrey Johnson, Mark Trybe, Peter LeBel, Rogard Ross and Theresa Pinkerton;

First Timers---Herschell McCoy, Shaun Reno, Karl Maddox, David Kessler, Carol Fowler, Douglas Thayer, Joseph Bunch, Michael DeLong, Leslie Watkins, James Post Jr., and George Insley.

NASA coordinators for the Bloodmobile were Annette Forrest and Octavia Judge.

Many thanks to the generous Langley employees and retirees who are willing to share the gift of life. The next Red Cross Bloodmobile will be Wednesday, September 27.

The Klate Holt Company, Logistics Administrative Support Services, announces the winners of the Outstanding Unit Award, the Micrographics/EDF department. Department members are (top row, L to R) Joan Whitley, Kathy Griffin, Ruth Childress; (bottom row) Carol Herbert, Kathy Bunting and Alice Jenkins. Not pictured is Jane Morris.



Harvey's Janitorial Service, Inc., has named Crew #2 Crew of the Month for June. This team scored 94.44 out of a possible 95 points on their facility evaluations. Crew members are (L to R) Alton Davis, Steven Hill and Walter Terry.

-photo by Steve Earley

U.S. Post Office Commemorates Apollo 11

Adolph Chiappa (left), a postal official from Norfolk, and Paul Holloway, Langley acting director, unveil an enlarged reproduction of the 20th anniversary commemorative priority mail stamp presented earlier at a special ceremony at the Smithsonian's National Air and Space Museum, Washington, D.C. The Washington ceremony, featuring Apollo 11 astronauts, President Bush, Vice President Quayle and NASA Administrator Richard Truly, was broadcast live via satellite to Langley's H.J.E. Reid Conference Center where approximately 450 employees and contractors watched the special Apollo 11 commemorative celebration July 20.

Senior Management Research Review

The Senior Management Research Review will be held Monday, August 21, from 9:30 to 11:30 a.m., in Building 1219, Room 225. Following the Director's comments and program directors' status reports, the following Langley scientists will give program accomplishments:

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
10:00	Unstructured Dynamic Grid Method Developed for Aeroelastic Analysis with High Level CFD Codes	John Batina (Structures/SDyD)
10:15	Mini-Mast Modal Analysis Predictions Confirmed by Experiments	Richard Pappa (Structures/SDyD)
10:30	Positron Lifetime Spectroscopy in Materials Research	Jag Singh (Electronics/IRD)
10:45	Recent Findings on Middle Atmosphere Transport from Satellite Observations	Ellis Remsberg (Space/ASD)
11:00	Graphical Display of Fluid Flow Results on Unstructured Grids	Robert Weston (Aeronautics/FLDMD)
11:15	Variable-Gain Output Feedback for High-Alpha Control	Aaron Ostroff (Flight Systems/GCD)

Thank You...ThankYou...Thank...You

Bud Bobbitt writes: "Jeanne, my family and I want to thank all of our friends who contributed to and attended my retirement party. It was a wonderfully humorous and heartwarming evening--one that we shall cherish for a very long time. The awards, anecdotes and poems presented showed the kind of imagination, ingenuity and skill that Langley is famous for. Many who attended were retirees that we had not seen in a long time and we were greatly flattered by their presence. I want those who contributed to my gift to know that I am looking for a desk with a large top and strong legs so that I can reestablish my "filing system" at home. Finally, I want you to know it was great to finally "get a dinner." Gob bless you all!"

Conrad Compton writes: "I would like to extend my heartfelt thanks to all those friends who participated in the recent reception honoring my retirement. It was a delightful experience for me. Your generosity and expression of friendship through the gifts that my wife and I received are greatly appreciated. We shall cherish this friendship and remember your kindness always."

Manuel Stein writes: "I wish to thank all those who helped make my retirement party such a memorable experience. It was a most pleasant evening and I leave with fond regards to my co-workers. Again, thank you for the entertaining anecdotes and the nice gifts."

Bob Hayduk writes: "After 27 years at Langley, it was difficult to depart and begin the next phase of my career at NASA Headquarters. My thanks to all of you who participated in a farewell social for me. Whether you attended, contributed or called to wish me well, you have my gratitude for a memorable event and gifts that I'll always cherish."

Phil Everhart writes: "Thanks so much for making my retirement party such a success. My family and I will always cherish it--the fellowship, the kind words and, particularly, the memories rekindled. thank you for your support throughout my time at NACA/NASA."

Happenings

NO LAA SOCIAL. There will be no LAA Social on Friday, August 18. Instead, come out for the annual LAA Carnival beginning at 6 p.m., Friday, and continuing through Saturday, August 19. Join the fun!

RUNNERS CLUB will hold the Carnival 5 Mile Race on Saturday, August 19, starting on Doolittle Road at 10 a.m. The race is open to all NASA and contractor employees, family members and friends. For more information, call Richard Shearer, ext. 47036.

AFGE LOCAL 2755 will meet Wednesday, August 16, at 4:38 p.m. in the Union Office, Building 1232B. Retired and active members are welcome. Call Sandra Zumbrun, ext. 44548, for details.

BUSINESS & PROFESSIONAL WOMEN'S CLUB will meet Tuesday, August 15, at 6:30 p.m. at the Holiday Inn, Jefferson Ave. Contact Joan, ext. 43092, for information.

ROOMMATE NEEDED to share townhouse with male engineer. Large furnished room, full bath, access to washer/dryer. Denbigh area. $300/mo. plus 1/2 utilities. Available August 14. Call 864-6978 from 8 a.m. to 3:30 p.m.

Carnival Promises Fun for All

The Langley Activities Association sponsors Carnival, the biggest fund-raising event, on Friday and Saturday, August 18-19.

There will be fun for all members of the family. Featured attractions include pony rides, face painting, carnival rides, games, Lego table, VIMS Marine Animal Petting Zoo and a fire prevention obstacle course. On Saturday, children will be entertained throughout the day by roving characters, like "Chucky Cheese," "Peter Panda," "Sparky, the Fire Dog," "Hamburgular" and "Yogi Bear."

Don't miss the good food, games and craft show.

Featured Entertainment

Friday, August 18

6:00 p.m.	"Hot Rod Rhythm and Blues Band"
8:00 p.m.	"Caravan East Dance Troupe"
9:00 p.m.	"Crabgrass Band"

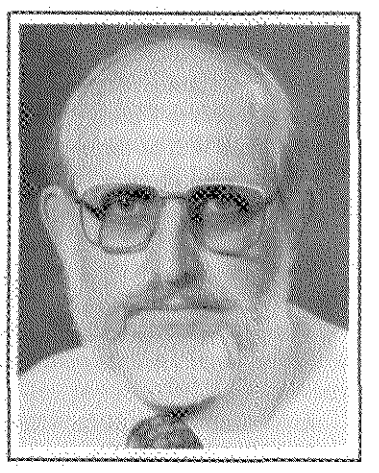
Saturday, August 19

12:15 p.m.	Riverside Wellness & Fitness Center High Power Aerobics Team
12:30 p.m.	Mattaponi/Pamunky Indian Dancing
1:00 p.m.	H2O Robot
1:15 p.m.	NASA Fire Dept. Sesame Street Puppets
2:00 p.m.	Powerhouse Bike Team
3:00 p.m.	"The Virginia Cloggers"
4:00 p.m.	Walter Boswell, Magic and Ventriloquist
4:30 p.m.	"The Publick Times Chorus" Sweet Adelines, Inc.
5:00 p.m.	Gymnastics World
5:30 p.m.	Zem Temple Drill Team
6:00 p.m.	"Mideastern Dance Troupe"
7:00 p.m.	"Crossfire"

Vote for the 1989 Carnival Monarch Contestant of your choice

At the VC during August

New Landing Gear Could Reduce Structural Fatigue



Why are supersonic aircraft like the Concorde more likely than other aircraft to suffer structural fatigue while taxiing over a bumpy taxiway?

NASA aeropace technologist W. Edward Howell will address this and related issues at noon, Wednesday, August 16, at the Visitor Center. Howell's presentation "Active Control Landing Gear for the F-106B" is co-sponsored by the Visitor Center and the AIAA Hampton Roads Chapter Student Branch.

NASA engineers believe that active control landing gear may decrease structural fatigue by using an onboard computer to sense vibrations caused by runway or taxiway uneveness. If the vibrations indicate the surface is too bumpy, hydraulic fluid would be pumped into or out of the landing gear, acting as a cushion. Howell believes this promising technology will decrease the fatigue load on supersonic aircraft and extend their service life.

Howell has been with the Langley Active Control Landing Gear Program since 1983.

In late August, the Voyager 2 spacecraft will sail past Neptune and provide the first close-up scientific view of that planet. This encounter will be the culmination of Voyager's 12-year odyssey through the outer bodies of the solar system.

The Visitor Center will provide constant coverage of the Voyager encounter at Neptune, August 21 through 26. Closest encounter and best viewing will be August 24 and 25. Viewing will be available at the cafeteria as well as the Visitor Center on that Thursday and Friday. A detailed notice to employees will follow indicating viewing options, sites and times.

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National Aeronautics and
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Langley Research Center
Hampton, Virginia 23665-5225

Researcher News

-photo by William Salyer

RETRIEVAL TEAM MEETS LDEF INVESTIGATORS. Space Shuttle astronauts selected to bring the Long Duration Exposure Facility (LDEF) home this December pose with project managers during the LDEF Investigators Working Group Meeting held in Williamsburg. Captain Daniel C. Brandenstein, commander; Lieutenant Commander James D. Wetherbee, pilot; Marsha S. Ivins, mission specialist; E. Burton Lightner, manager of Langley's LDEF Office; Bonnie J. Dunbar, mission specialist; William H. Kinard, LDEF chief scientist; and G. David Low, mission specialist, met with investigators who have experiments on board the facility. The purpose of the conference was for investigators to describe their experiments, data analysis plan and expected results to the crew. An overview of flight operations for LDEF retrieval was presented by Dunbar, who will operate the Remote Manipulator System (RMS) during retrieval. LDEF, shown on the RMS arm of the Space Shuttle, will return home aboard the orbiter Columbia after more than five years in the space environment. Mission STS-32 launch is scheduled for December 18 with LDEF retrieval set for December 21.

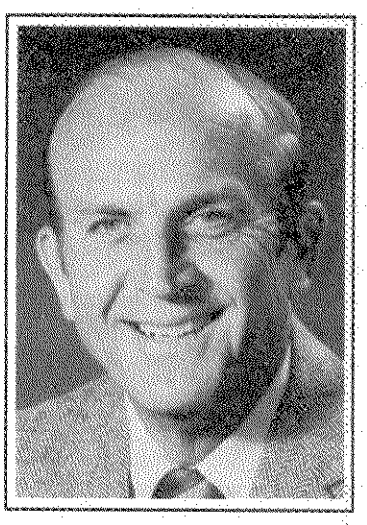
NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 17 August 25, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

Berry to Retire from Langley

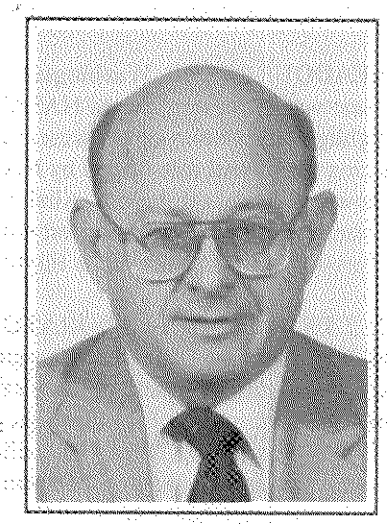


Calvin C. Berry, assistant chief of the Operations Support Division, will retire September 1 with more than 41 years of government service.

In his position since March 1985, Berry assists in planning, developing, directing and evaluating technical support in the operation, maintenance and modification of research test facilities and associated systems and equipment at Langley.

Berry began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics, in September 1949 as an apprentice electrician. He graduated from the Langley Apprentice School in 1954 and worked as an engineering technician in the Electrical Systems Division until he was named head, Research Operations Electrical Section, in 1969. In 1972, he became head, Technical Support Section D, and in 1977, head, Tunnels Operations Branch.

Howell to Study at MIT Center for Engineering



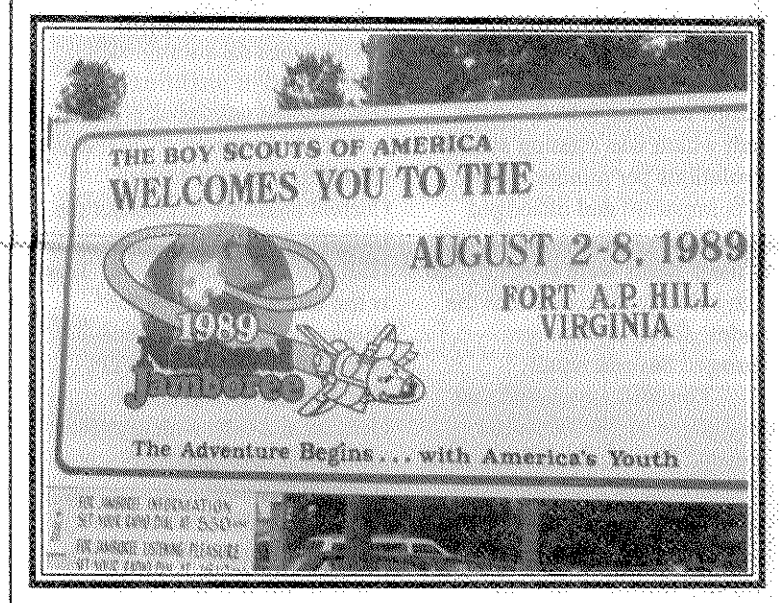
William E. Howell, manager of the Advanced Transport Operating Systems Program at NASA's Langley Research Center, has been selected to attend the Massachusetts Institute of Technology (MIT) Advanced Study Program. Howell was selected in a NASA-wide competition.

The 15-week program is designed to improve and extend the capabilities and effectiveness of practicing professionals in engineering and the sciences. Participants in the MIT program come from over a hundred organizations in over fifty countries.

Howell feels the MIT program offers an excellent opportunity to become current in advanced computer technology.

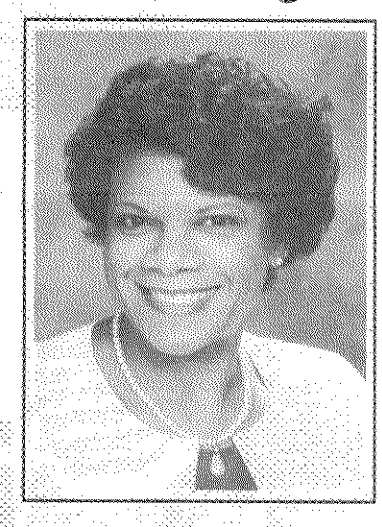
Howell began his NASA career in June 1959. As a specialist in control system design and application, he led NASA technical teams responsible for the early development of precision control laws for large space telescopes. In 1968, he was named head of the Guidance Systems Research Center. From 1977 to 1985 he was assistant head and, later, head of the Avionics Technology Research Branch, responsible for the formulation and direction of advanced concepts for both spacecraft and aircraft guidance and control.

The author of 14 technical papers and holder of three patents, Howell received a bachelor of science degree in electrical engineering and a master's degree in math from Virginia Polytechnic Institute and State University.



SPACE IS THE PLACE. When tens of thousands of scouts from all over the globe get together every four years for the National Jamboree, you expect them to get in plenty of boating, fishing and other outdoor activities. This year, something new was added to the agenda: space. You could see it reflected in the Jamboree patch, in the campsites named for U.S. spacecraft, and in a variety of activities sponsored by NASA. See story on page 5.

Crawford Chosen for Simmons Executive Program



Buena Moore Crawford, senior program analyst in the Programs and Resources Division at NASA's Langley Research Center, has been selected to attend the Simmons College Program for Developing Executives. Crawford was selected for this program in a NASA-wide competition.

The eight-week Simmons program in Boston, Massachusetts, was founded to prepare promising women for increasing responsibilities in middle and upper middle management positions in corporations in the U.S. and abroad. The Program for Developing Executives is based on the renowned content and design of the Simmons College Graduate School of Management.

Crawford feels the Simmons program will enhance her skills and broaden her education through participation in a management program specifically designed for women. "I anticipate many benefits from the unique group process seminar and the diverse and specialized faculty. Additionally, the opportunity to interface with other participants from different areas of the country and with experience in public and private sector organizations will expand my base of knowledge."

Crawford began her NASA career in October 1981. In her current position, she is responsible for the program planning, implementation, review and coordination of a $135 million personnel and related-cost budget at NASA Langley. In addition, in 1985, she was appointed to the Langley Exchange Council and is responsible for the management oversight of the NASA Langley Child Development Center.

Voyager Discovers 3 Additional Moons, 2 Partial Rings Around Neptune

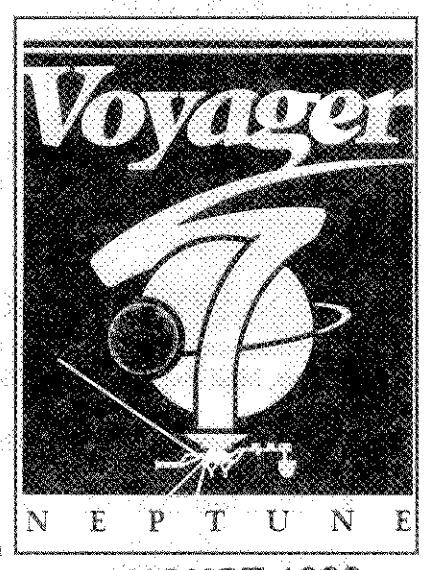
Images from NASA's Voyager 2 spacecraft have revealed three new moons in orbit around Neptune. In addition, the Voyager imaging science team has found two of the long-sought-after ring arcs, or partial rings, thought to exist around the distant planet.

The discovery brings to six the number of moons known to exist around the blue planet. Voyager 2, launched in 1977, has explored Jupiter, Saturn and Uranus and came within 3,000 miles of Neptune at 12 midnight EDT last night.

Finding so many moons when the spacecraft was more than 22 million miles away from Neptune may mean there are many more to be found. The three newest Neptunian satellites, temporarily designated 1989 N2, 1898 N3 and 1989 N4, were tracked as candidate moons in images returned by the spacecraft over a five-day period. When the objects were found to follow predicted orbits, Voyager imaging scientists were able to confirm them as moons of Neptune. Their temporary names designate the order in which they were discovered.

Like 1989 N1, discovered in July, the three new moons occupy nearly circular and equatorial orbits around the planet. All move in prograde orbits (in the same direction the planet rotates) making the large moon Triton, which occupies a retrograde orbit, even more of an oddity in the Neptune system.

The innermost of the new moons is 1898 N3, which orbits at a distance of about 32,300 miles from the center of the planet or about 17,000 miles from Neptune's cloud tops. It makes one complete orbit of



Neptune every eight hours, ten minutes.

Next is 1989 N4, orbiting about 38,000 miles from the planet's center or about 23,300 miles from the cloud tops. It orbits the planet every ten hours, 20 minutes.

The outermost is 1989 N2, orbiting at about 45,400 miles from Neptune's center or about 30,000 miles from the cloud tops. It completes an orbit every 13 hours, 30 minutes.

The two newly-discovered ring arcs apparently are associated with two of the new Neptunian moons. The arcs appear to partially wrap around approximately 45 degrees and 10 degrees, respectively, the planet's equatorial plane. One is about 30,000 miles in length, and the second is about 6,000 miles long.

Astronomers have long suspected the existence of such an irregular system around Neptune. Data from repeated ground-based observations hinted at the existence of disorderly strands of partial rings orbiting Neptune. Voyager's photographs of the ring arcs are the first photographic evidence that such a ring system exists.

Voyager scientists said the ring arcs may be comprised of debris associated with the nearby moons or may be remnants of moons that have been ground down or torn apart through collisions. Close-up studies of the ring arcs by Voyager 2 should help determine the rings' composition. More ring arcs are expected to be found as the spacecraft nears the planet.

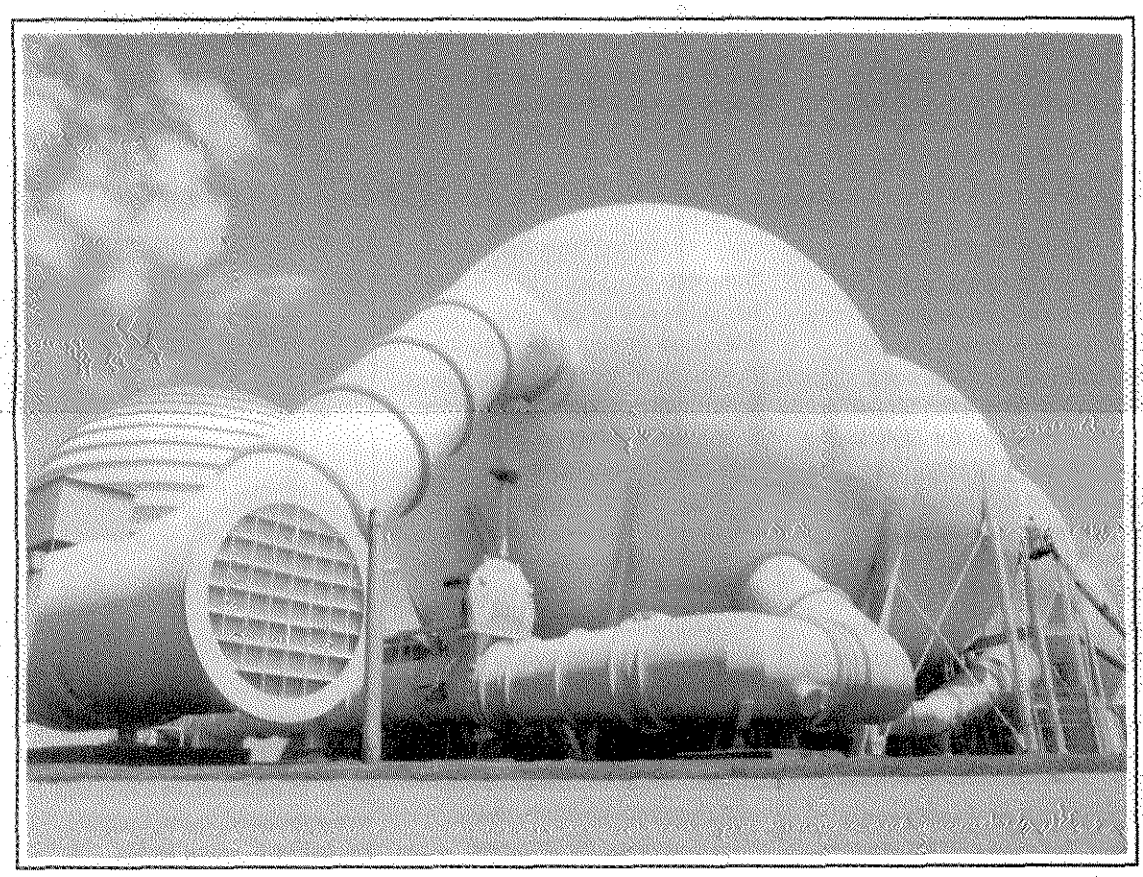
Mission status reports of the Voyager2/Neptune encounter will be carried on a special 900 phone line. For status reports and live press conference audio, dial 900-590-1234. Cost is 45 cents for the first minute and 35 cents per additional minute.

News Briefs

JET PROPULSION LABORATORY, Pasadena, Calif. --- Voyager 2's near encounter of Neptune late this month will provide researchers at NASA's JPL with an opportunity to demonstrate a new expert system designed to monitor the condition of interplanetary spacecraft and ground operations. The software demonstration, called the Spacecraft Health Automated Reasoning Prototype (SHARP), will be used by mission operators to better analyze radio signals from spacecraft as they are received through the Deep Space Network ground stations and sent to the mission control center at JPL. The computer program combines conventional computer science methods with artificial intelligence techniques to automatically detect and analyze potential spacecraft and ground data systems problems.

HEADQUARTERS, Washington, D.C. --- The 80-foot-long mockup of the U.S. National Aero-Space Plane was the centerpiece of NASA's pavilion at the first Airshow Canada, August 9-13. The exhibit highlighted America's past, present and future achievements in aeronautics and space technology, emphasizing the pivotal role played by NASA throughout this history. In conjunction with its aerospace trade show and flying exhibitions, Airshow Canada sponsored a symposium titled "Looking to 2020," which examined the future air transport environment, the uses of space and the world of the airport. Samuel Morello, assistant chief of the Flight Management Division, described the aircraft flight deck of the future.

JET PROPUSLION LABORATORY, Pasadena, Calif. --- A tracking station in Japan has been added to the network of giant antennas trained on Voyager-2 during its flyby of Naeptune today to help the spacecraft mission's radio science experiments. Scientists say they will be able to "see" twice as deeply into the atmosphere of the giant gas planet, thanks to the participation of the 210-foot antenna at Japan's Usuda Deep Space Center. The collaboration was arranged through an agreement signed in 1988 between NASA and Japan's Institute of Space and Aeronautical Studies (ISAS), which operates the Usuda center. Under the agreement, physicist Dr. Nobuki Kawashima will join the Voyager Radio Science Team.



-photo by Steve Earley

LANGLEY LANDMARK GETS A FACELIFT. The helium discharge spheres at the Gas Dynamics Complex received a touch-up paint job earlier this summer, both for cosmetic and protective reasons. Eventually the spheres will be completely repainted.

Lankley

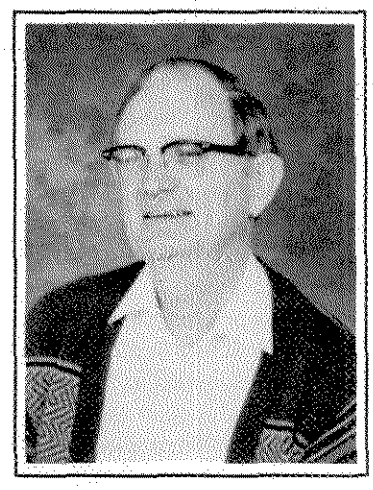
During a presentation, Lankley slips in slides of his latest vacation and no one remembers.

1989 CFC Goal Set at $245,000

Editorials

Langley

Headquarters Forum



As most of you are aware, on January 18, 1989, a major mishap occurred at the National Transonic Facility (NTF), destroying all 25 fan blades and inflicting damage to other tunnel components, primarily in the fan drive region. The report of the Mishap Investigation Board (MIB), chaired by Joe Yuska, deputy director of engineering at NASA Lewis, was recently approved by NASA Headquarters following an intensive three-month on-site investigative activity heavily supported by Langley personnel across the Center.

The MIB concluded that the mishap was initiated by fatigue and fracture failure in a thin-gauge (.035-inch) stainless steel sheet metal band (about four feet in diameter and two feet long) which secured a two-inch thick layer of thermal insulation to the drive shaft immediately ahead of the fan blades. This failure resulted in a high-energy centrifugal release of this band and the heavy clamps securing it to the drive shaft which was rotating at 580 revolutions per minute. These parts impacted and dislodged several heavy fairing plates, and all these items were swept by the high velocity airstream into the blades, all of which were damaged beyond repair.

The MIB concluded that the designs of this "External Thermal Barrier," or ETB, and a flow blocker in the same proximity were less than adequate, that the ETB was not properly identified through design/operation as a "critical" item/assembly, and that an earlier (two years) problem with the flow blocker had not triggered appropriate problem/failure investigative actions which might have warned us of the impending ETB failure. Further, the MIB recommended a detailed review of the rest of the drive system and other critical elements of NTF to provide assurance of systems integrity.

Since January, we have had an intense recovery activity underway. A new set of 25 fan blades was recently completed by the Fabrication Division (three-shift, six-day week) and installed in NTF on August 1. Quite a feat! Facilities Engineering Division is conducting/directing extensive structural analyses/redesigns where required to provide high confidence in the rebuilt NTF system. That work is nearing completion and redesigned/modified parts are now being reinstalled in NTF. Operations Support Division has disassembled/cleaned and/or modified/reassembled numerous NTF systems/subsystems to upgrade the integrity of the facility. Current plans are to conduct the Integrated Systems Review (ISR) on September 13-14. This is the last formal milestone/checkpoint before initiating checkout operations of NTF, first with air in September-October and then with cryogenic nitrogen in October-November. A return to research operations by late November is expected.

While none of us wanted the NTF failure, several things shine forth as positive results of this problem: (1) NTF returns a markedly better facility; (2) Langley has been sensitized in a painful way to the inadequacies of some of our design-review and problem-reporting systems; and (3) this amazing recovery once again bears mute testimony to the incredible value of having a strong in-house capability--both engineering and technician!

Robert L. Swain
Director for Systems Engineering and Operations

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-128.....Voyager Discovers Three Additional Moons Around Neptune
89-129.....New System Uses Artificial Intelligence to Monitor Spacecraft
89-130.....NASA Participates in First "Airshow Canada"
89-131.....Voyager 2/Neptune Encounter Press Kit
89-132.....Two Partial Rings of Neptune Discovered by Voyager Spacecraft
89-133.....Antenna in Japan to Aid Voyager's Radio Science Study of Neptune

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Chairman's Message

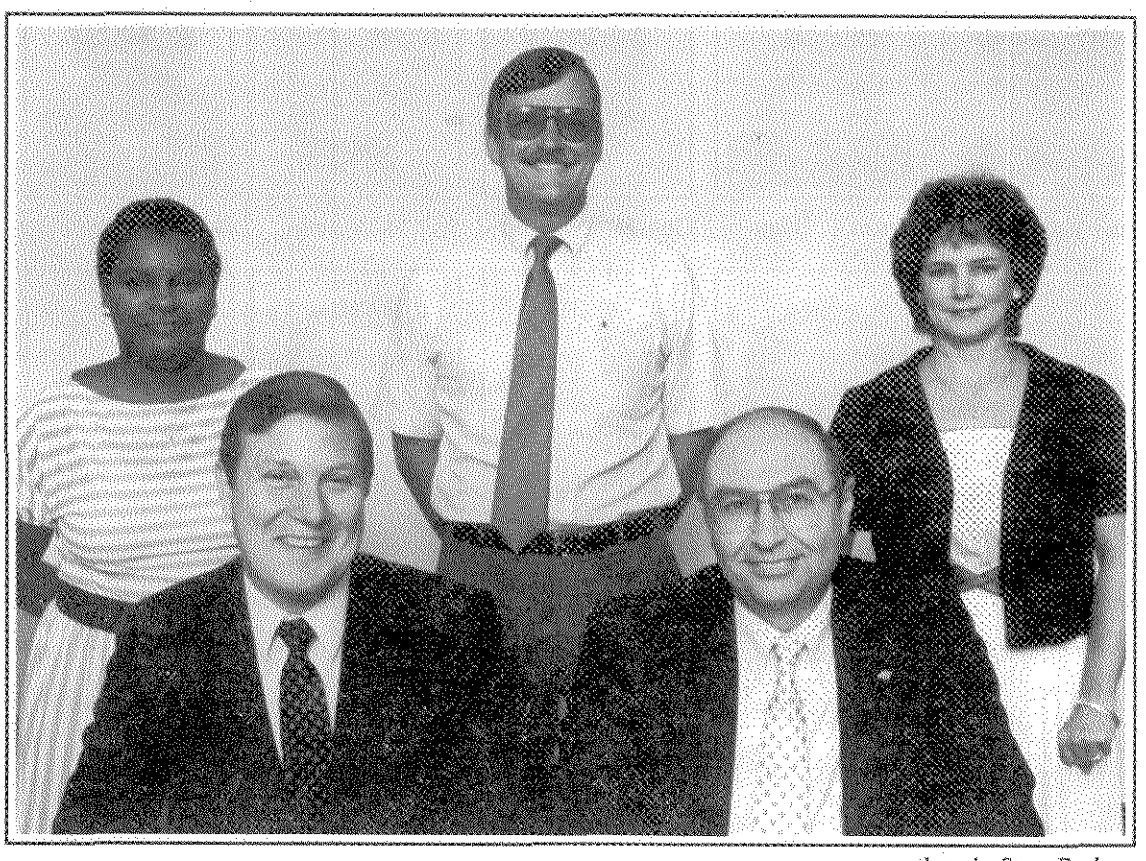
Combined Federal Campaign Committee Selected; Goal Set at $245,000

Once again the Center has organized for the annual Combined Federal Campaign. The CFC committee is looking forward to another successful program at Langley this year. We can all be proud that Langley has always been a leader on the Peninsula in the CFC campaigns. Among the participating government organizations, we are consistently first in the percentage of our employees who contribute to the campaign. In addition, although we are less than one-fourth the size of the largest organization, we are usually the second largest contributor to the campaign. We, therefore, have demonstrated that we care about the communities where we live and work, and that we are committed to make a difference in the lives of those in need.

Our contributions to the CFC are an investment in our future. The many agencies supported by the CFC improve the quality of life here on the Virginia Peninsula as well as around the world. The funds provided to the local, national and international agencies permit them to relieve suffering; provide care for the young, aged, homeless and hungry; and bring hope to the depressed. It is the one campaign which helps people--our families, friends and neighbors--all year long.

This year we have set a CFC goal of $245,000. This goal represents the participation of active civil service employees only. New regulations specifically limit solicitation to only those who are paid directly by the Federal Treasury. These regulations have a severe impact on the Langley campaign, because we are not able to include groups of generous contributors like our Child Care Center, ICASE, George Washington University and the majority of our retirees, who have participated with us in the past. For reporting purposes, however, we do plan to add the contributions of Langley Alumni Association members to ours for a total from the NASA Langley family.

When your "key person" contacts you during the one-day solicitation on October 5, I encourage you to help Langley maintain leadership in this important community service activity by giving generously. We have always exceeded our goal in the past and, with your help, we will continue this fine Langley tradition.



-photo by Steve Earley

CFC COMMITTEE CHOSEN. Center Director Richard H. Petersen has launched this year's Combined Federal Campaign by selecting a committee led by Jim Arrington to oversee campaign activities. Committee members are (seated, L to R) Vice Chairman Darrel Tenney, Materials Division; and Arrington, Space Systems Division; (standing, L to R) Financial Chairman Sandy Favor, Financial Management Division; NASA Union Liaison Roscoe Edge, Personnel Division; and Secretary Carol M. Forrest, Space Systems Division. Not pictured are committee members A. G. Price, Office of External Affairs; Publicity Chairman Jean Clough, Office of Public Affairs; AFGE Representative Ben Schlichenmayer, Operations Support Division; and Pattern Makers Union Representative Tom Vranas, Fabrication Division.

Headquarters Selects Langley Employees for Professional Development Program

Four Langley Research Center employees have been selected to participate in NASA's Professional Development Program (PDP) for the period August 1, 1989 to July 31, 1990.

P. Douglas Arbuckle, aerospace engineer, Aircraft Guidance and Contracts Branch, is assigned to the Information Sciences and Human Factors Division of the NASA Headquarters Office of Aeronautics and Space Technology (OAST).

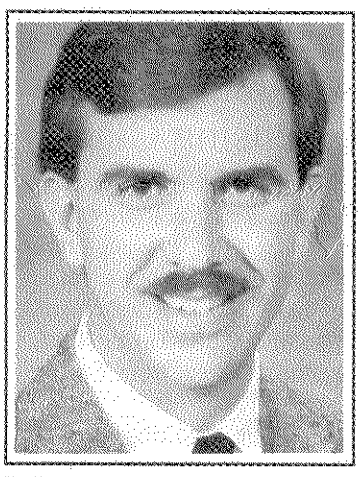
John J. Warhol Jr., requirements integration manager, Facilities Program Development Office, is working in the Office of Facilities Management at NASA Headquarters.

Rosa C. Webster, technical staff assistant to the Director for Structures, is located in the Headquarters Directorate for Institutions, OAST.

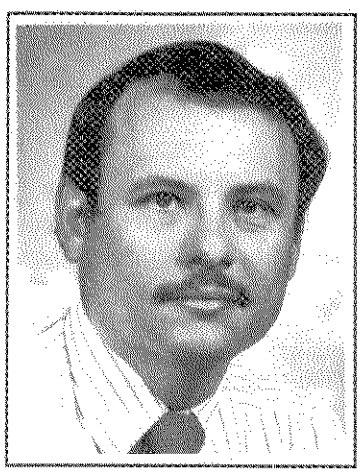
Woodrow Whitlow Jr., senior research scientist, Unsteady Aerodynamics Branch, is assigned to the Materials and Structures Division of OAST.

Arbuckle will be working with Ray Hood, deputy director for Information Sciences and Human Factors Division. He will be responsible for the generic, transport, rotorcraft and high performance elements of the aeronautical controls and guidance program.

"The PDP program provides me an opportunity to learn how NASA Headquarters works and what information they need from the field centers," says Arbuckle. "I feel this opportunity will give me a broader perspective of the Agency and its activities, while allowing me to make contributions at Headquarters."



P. Douglas Arbuckle



John J. Warhol Jr.

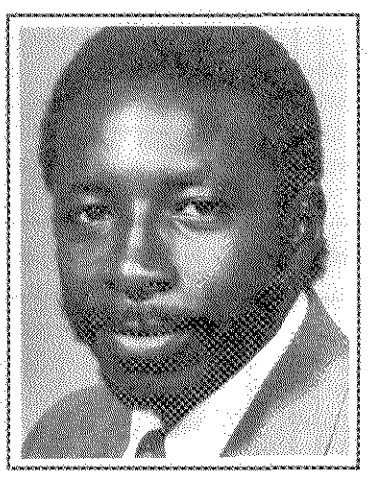
Warhol will be working with Frank Durso, director for Facilities Management. He will be involved with the Construction of Facilities (CoF) Program for the Space Science and Applications centers.

"I have worked in the facilities arena at Langley for my entire 24 years of government service, having started as a 'fresh out' and proceeded to project manager," explains Warhol. "I have worked on various projects from conception to completion at the Center. This assignment will give me an opportunity to better understand the Agency's CoF process and fiscal policies with an enhanced insight into the Headquarters perspective of doing business." Warhol feels the Headquarters experience will be of great value and will allow him to do a more efficient job for LaRC upon his return.

Rosa C. Webster

Webster will be working with Joseph R. Phillips, assistant director for Resources. She will serve as institutional manager and will be responsible for developing and maintaining a broad understanding and awareness of institutional issues and programmatic activities as they impact the institution.

"My professional work experiences have spanned both technical research and administrative/managerial functions. These experiences, however, have been limited to the Langley perspective," notes Webster. "Participation in this program will give me an opportunity to observe and to participate in the daily activities of a NASA Headquarters office. This experience should broaden my perspective and enhance my administrative and management skills."



Woodrow Whitlow Jr.

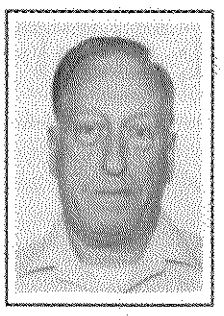
Whitlow will be working with Samuel Venneri, director of the Materials and Structure Division. He will serve as acting program manager, Structures and Dynamics Program. In this position, Whitlow will advocate, plan, direct, implement and evaluate technology programs in the areas of advanced aircraft, spacecraft and space transportation system structures. He will further establish objectives, scope and overall programmatic approaches and be responsible for program funding and scheduling in close coordination with project managers at the NASA centers involved in the programs.

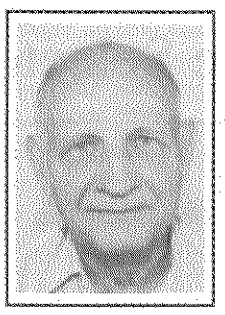
"During my PDP assignment, I hope to learn the roles my organization and each NASA center play in helping the Agency to accomplish its overall goals," says Whitlow. "I hope to learn how research managers successfully present programs for financial support as well as learn and participate in the process by which managers at Headquarters decide which programs to fund."

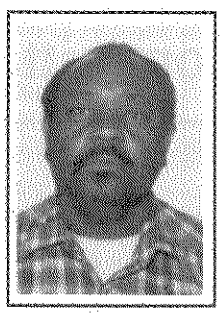
To date, the PDP program, in existence since 1973, has given nearly 50 Langley employees the opportunity for professional development at the Agency level. The goal of the program is to give participants an Agency-wide perspective of NASA activities as well as valuable programmatic experience.

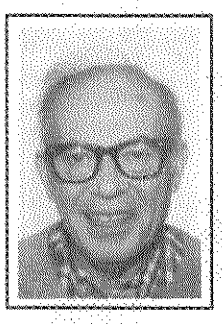
Billie Jean Neil

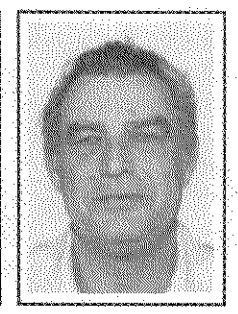
Hiram T. Hogge

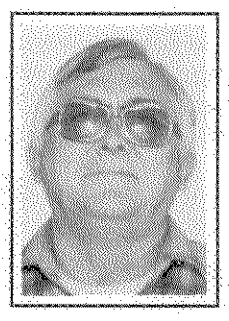

Charles F. Spear

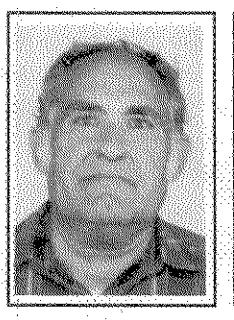

Ray M.Wilhelm

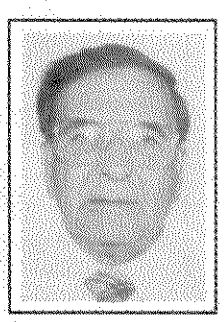

James H. Jones

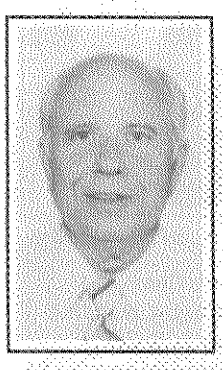

Manuel Stein


Earl German Jr.


J. R. Ellingsworth


Anthony J. Muller


John C. Page


James S. Bowman

Recent Retirees

Farewell and Best of Luck

Billie Jean W. Neil, Analysis and Computation Division, retired April 7.

Hiram T. Hogge, **Charles F. Spear**, and **Ray M. Wilhelm**, Fabrication Division; **James H. Jones**, Operations Support Division; and **Manuel Stein**, Structural Mechanics Division, retired April 28.

Carl G. Baab, Operations Support Division, retired April 29.

Charles W. Knight, Instrument Research Division, retired April 30.

Earl S. German Jr., Instrument Research Division, retired May 1.

Charles F. West, Operations Support Division, retired May 3.

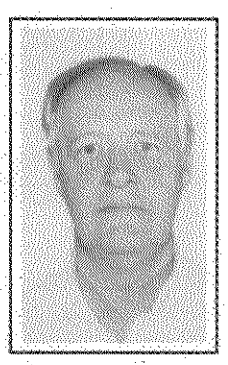
John R. Ellingsworth and **Anthony J. Muller**, Fabrication Division; **John C. Page**, Facilities Engineering Division; **Barbara M. Buchanan** and **Ernest L. Nicholas**, Financial Management Division; **James S. Bowman**, Flight Applications Division; **William F. Stewart**, Instrument Research Division; **Gordon F. Bullock** and **James R. Kelly**, Office of Director for Flight Systems; **Edgar L. Collier Jr.**, **John Roller Huffman**, **Ronald J. LoGioco** and **Walter C. Whitt**, Operations Support Division; and **Robert L. Jensen**, Space Station Freedom Office, retired June 2.

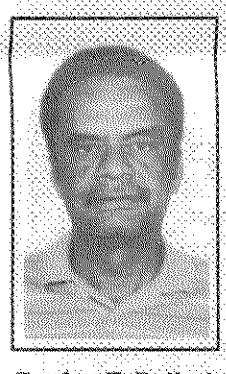
John L. Hobgood, Operations Support Division, retired June 6.

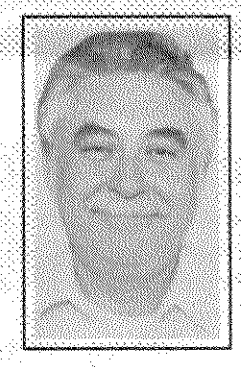
James H. Monteith, Instrument Research Division, retired June 29.

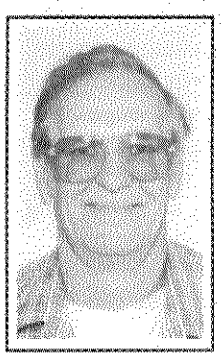
Forrest L. Dickinson, Facilities Engineering Division; **Mary T. Bayless**, Financial Management Division; **Robert C. Ingram**, Information Systems Division; and **Roy J. Duckett** and **Ann L. Simmonds**, Space Systems Division, retired June 30.

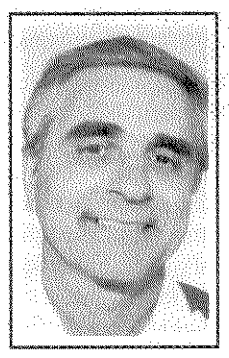
Albert B. Insley and **Charles B. Karpa**, Operations Support Division, retired July 28.

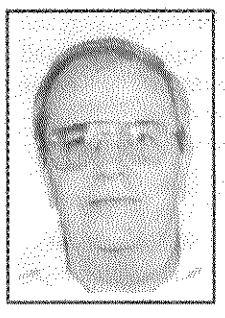

William F. Stewart

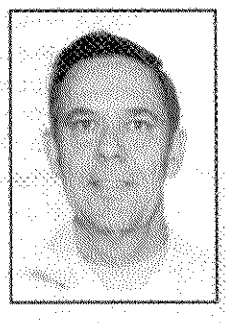

Gordon F. Bullock

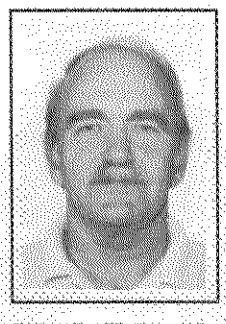

James R. Kelly

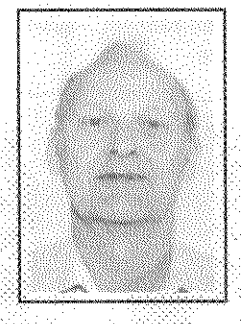

Edgar Collier Jr.

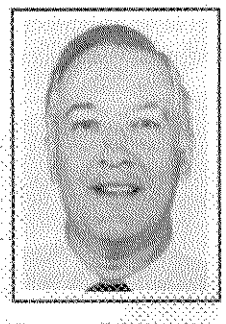

Ronald LoGioco


Walter C. Whitt

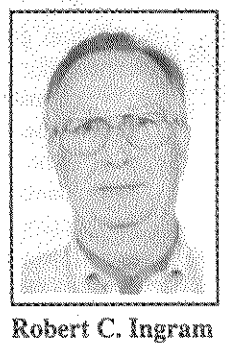

Robert L. Jensen

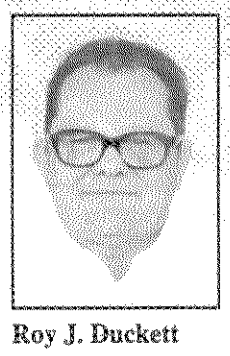

John L. Hobgood

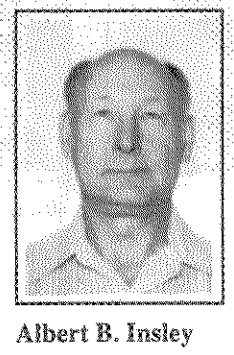

James Monteith

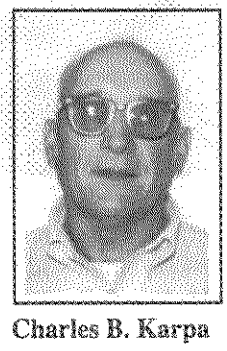

Forrest Dickinson

Mary T. Bayless


Robert C. Ingram


Roy J. Duckett


Albert B. Insley


Charles B. Karpa

Baby Needs Heart Transplant

Lakida Ann, infant daughter of Langley employee Karl Maddox and Karen Perry, was born July 18, with a rare heart disorder. Doctors say the newborn needs a risky and expensive heart transplant performed in a California hospital renowned for such operations.

Lakida has been diagnosed with Hypoplastic Left Heart Syndrome-- the left side of her heart and some major vessels are not fully formed--which is fatal unless the extensive surgery is performed. Doctors at Children's Hospital of the King's Daughters made arrangements to fly her to California. Maddox and his daughter left early Tuesday morning, August 15.

Officials at Loma Linda University Medical Center in California are making arrangements to find a donor. The hospital has performed 47 infant heart transplants. Because of the extensive recovery period, Lakida's parents would probably have to live in California for six months to a year--if the operation is successful.

Friends and family members have started raising money to help pay the child's expenses. They have set up the Lakida Perry Heart Trust Fund; donations are handled at any Signet Bank branch. For further information on how to help a co-worker, contact Signet Bank.

Retirement Parties

Shirley Freeman will be honored at a retirement picnic September 6 at 5 p.m. at the Activities Center. For details, contact Barbara Fryer, 864-1933.

Martha J. Norman will be honored at a retirement social Tuesday, September 19 at 6 p.m. in the H.J.E. Reid Conference Center. Cost is $6.50/person; contribution of $2.50 for gift only are welcome. Contact Paula Rawles, ext. 45974, Mail Stop 412, by September 11 for reservations/contributions.

Amateur Radio Licensing Class

A course leading to an FCC Amateur Radio License will meet Mondays, September 11 through November 13, at St. Luke's United Methodist Church, 300 Ella Taylor Road, Grafton. Class is from 7 to 10 p.m.

There is no charge for the instruction; test books and other items will cost approximately $35. This is one of several courses in amateur radio theory and practice offered each year by the Southern Peninsula Amateur Radio Klub, SPARK.

Fall Volleyball Registration Time

NASA Volleyball fall season begins September 5. There will be three leagues: B, C and D. Matches will be played Tuesday and Thursday evenings in the Langley gym.

Team rosters may be obtained by calling Frank Quinto, ext. 45068, or Susan Althoff, ext. 45059. These rosters must be returned by Tuesday, August 29 with the registration fee.

Watch the next issue for spring regular season and tournament winners.

Notes of Thanks

W. H. Fuller writes: "My family and I wish to express our deepest appreciastion to all who participated in my retirement party. Words cannot express our gratitude for a most enjoyable and memorable evening. We will cherish every moment of it. The program was exceptional; the gifts and memorabilia thoughtfully selected; and, best of all, the warm fellowship and kind words of affection will always be remembered. A truly nice way to top off a most enjoyable career at Langley."

Earl German writes: "Many thanks to the friends who took part in my retirement party. The fellowship and the gifts were very meaningful to me and my family. The people of LaRC will always have a special place in my heart."

Jim Bowman writes: "To all my friends and co-workers, thank you for all the joyous and happy times we shared during the years we worked together at Langley. These sentiments were expressed so completely at my retirement luncheon."

Jim Kelly writes: "Thank you one and all for a wonderful retirement party. I have many fond memories of my career at NASA, so it's fitting it should end on such a high note! I'll miss you all. Take care and good luck."

TAC Tattoo

The third annual Tactical Air Command Tattoo will be held at 7 p.m. at Langley Air Force Base, August 24-25. The hour-long patriotic musical program combines the talents of many: the Fifes and Drums of Colonial Williamsburg, the TAC Band and the Langley Escadrille Team.

For tickets, call the 1st Tactical Fighter Wing Public Affairs Office at 764-2010 or 764-2018.

People & Places

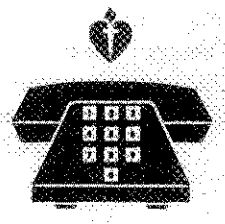
Health Corner

Participate in a Nutrition Event

The American Heart Association has scheduled September 10-16, 1989, as a nationwide nutrition event. During this period educational activities will take place in grocery stores, supermarkets and hospitals throughout Virginia.

Reducing your risks of heart and blood vessel diseases doesn't mean you have to cut corners on taste. You can have your cake and eat it too! Learning how to eat heart-healthy doesn't have to be intimidating.

Free help is available from the American Heart Association by calling the toll-free number. Take heart, call 1-800-HEART-LINE from 8:30 a.m. to 4:30 p.m., Monday through Friday.



1-800-HEARTLINE

In Memoriam

Sympathy is extended to the families of:

Edward A. Howe, who died July 6 in Riverside Hospital. Howe began his employment with NACA as an industrial engineer in 1943 and retired as fiscal officer of NASA in 1980.

Stanley Press, who died July 12 in Cape Coral, Florida. Press retired from the Flight Instrumentation Division in 1979.

Car Passes

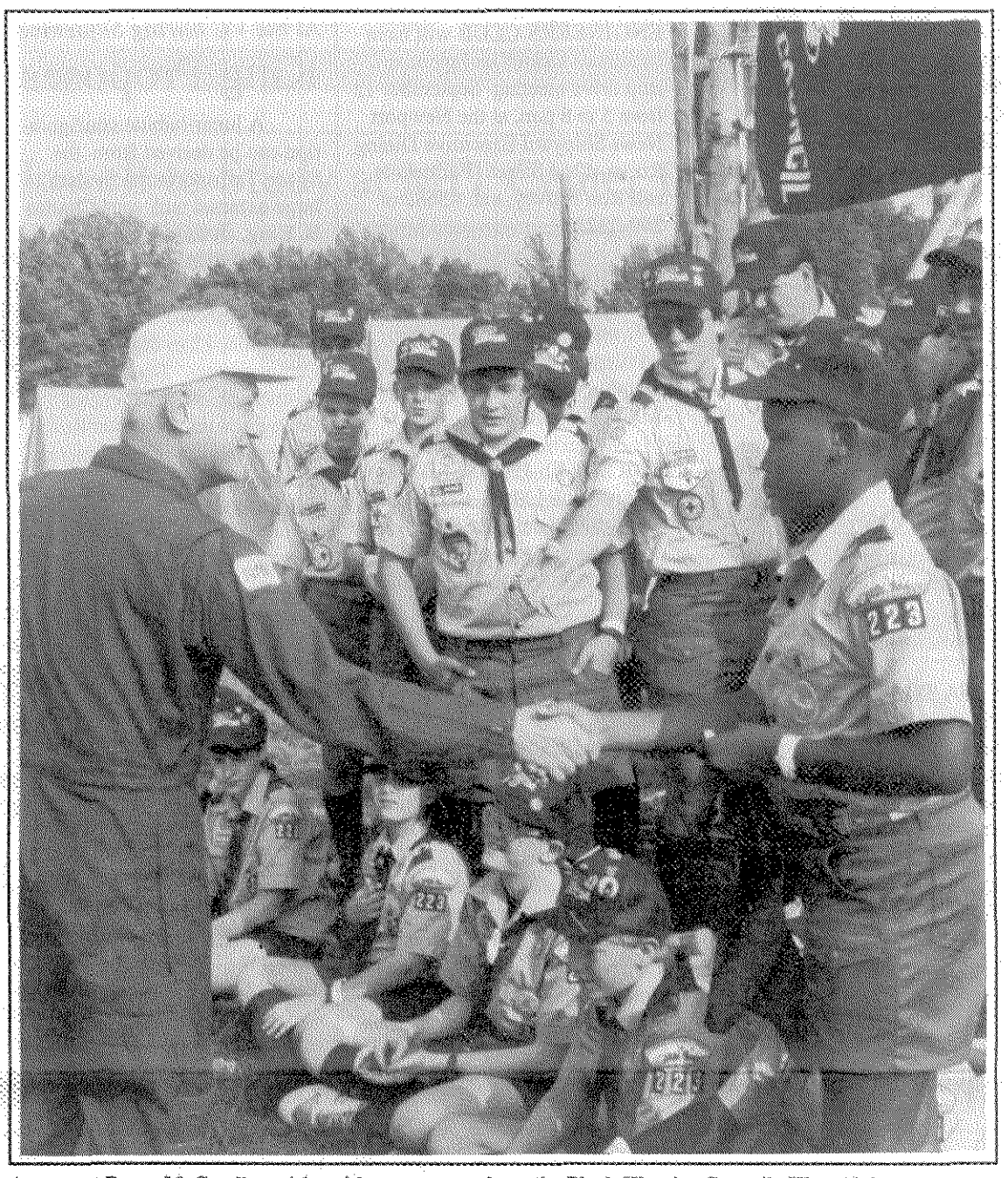
Employees desiring car passes for the STS-34 launch, currently scheduled for October 12, 1989, should contact Ann suit, ext. 43305.

Passes are available on a first come-first served basis.

Contractor News

Harvey's Janitorial Service, Inc. recognizes employee teams who have excelled on their Facility Evaluation Reports. The awards committee convened on August 1 and selected Crew #1, East Side, as Crew of the Month for July. This team obtained a score of 94.37 points out of a possible 95 points on their facility evaluations.Team members are (L to R) Linda Woodyear, Wayne Silver, Jo Ann Foster, Barbara Morton, William Smith and Thelma Kirby.

The Klate Holt Company, Logistics Administrative Support Services, announces the winners of the Outstanding Unit Award, the Micrographics/EDF department. Department members are (front row, L to R) Alice Jenkins, Carol Herbert, Kathy Bunting; (middle row) Joan Whitley, Ruth Childress; (top row) Jackie Fowler, Kathy Griffin and Jane Morris. The members of this outstanding team were incorrectly identified in the last issue. Apologies to Micrographics/EDF.



Astronaut Bruce McCandless visits with some scouts from the Black Warrior Council , West Alabama. McCandless, STS 41-B mission specialist, was NASA's official ambassador to the 1989 National Scout Jamboree. The astronaut's first priority was to meet and talk with as many scouts as possible.

NASA Supports National Scout Jamboree

-story and photo by Allan C. Hanrahan

Beneath the beaming sun of Virginia, upwards of 25,000 boys and a smattering of girls ambled the roads and footpaths of Fort A. P. Hill during the 1989 National Scout Jamboree.

Eventually, almost all of the scouts, as well as family members and other visitors, would stroll through Freedom Station, the NASA exhibit area. Housed in two giant tents, the NASA exhibit was an integral part of this U.S. Army training post transofrmed into a small "scout city" with its own post office, hospital, city hall, radio station and newspaper.

It was in the newspaper, Jamboree Today, that Eagle Scout writer Sean Akins quoted a fellow scout saying, "Space Station Freedom is one of the best exhibits at the Jamboree." Gratifying news indeed for all those who had a part in the exhibition effort.

The National Jamboree is a quadrennial event. Four years ago NASA was a major participant and Langley was the lead center. This time around, NASA was again a major sponsor with Marshall Space Flight Center in the lead capacity, aided by almost all the other centers.

Astronaut Bruce McCandless, STS 41-B mission specialist and the first astronaut to operate the Manned Maneuvering Unit (MMU) in space, was NASA's official ambassador to the Jamboree.

McCandless was a popular personnage with the scouts. He fielded questions from the scout press corps during a "Hometown News" press conference and welcomed visitors to the NASA exhibit area and spoke on space-related subject. He also visited with scouts in their camps, accepted their dinner invitation and talked with them about his career experiences as well as their aspirations.

More than 35,000 scouts and guests turned out to cheer President Bush when he visited the Jamboree. Drawing on the Jamboree's theme of space exploration, Bush noted that half of the nation's astronauts were scouts. He said, "The first spacefarers were unique, the lucky few. Your generation will have the broader, greater opportunity to live in space, to travel, to establish an outpost on the moon and explore the mysteries of Mars."

Space Exploration Badges Earned at Jamboree

-by Abraham Leiss

A goal of many of the scouts attending the 1989 National Jamboree was to complete requirements for the Space Exploration merit badge.

Requirements were stringent. Scouts had to build, launch and recover a model rocket; construct a data table of the planets to show distance from the Sun, period of revolution, rotation and the number of moons; and design a space station and a spacecraft to be sent on a mission to another planet.

The designs were highly creative. Bathrooms, greenhouses, power plants, docking stations, laboratories, manufacturing plants and libraries were plentiful.

History and an understanding of science played an important part in earning the badge.

Astronaut Charles Walker, current president of the National Space Society was available for signing autographs. Over 700 scouts earned the space exploration badge and another 500 partially completed requirements.

Happenings

LAA SOCIAL will be held Friday, September 1, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. End the week on a positive note, join your friends for TGIF.

LAA BOARD. The Langley Association Board of Directors will meet Tuesday, September 12, at 1 p.m. in the H.J.E. Reid Conference Center, Building 1222. Concerns to be brought before the board should be addressed to the appropriate chairperson.

LANGLEY SCUBA CLUB. Come dive with the Langley Mud Divers. For information on upcoming trips/dives, call Davy Haynes, ext. 45584.

NASA TOASTMASTERS will meet Wednesday, September 13, at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are welcome. Time in attendance up to one hour may be charged to A-1619. For additional information, call Steve Yaros, ext. 43050.

AMC THEATER TICKETS are available at a discount at the LAA office. Cost is $3.25. Tickets good until August 31, 1990.

ENGINEERS CLUB will have its annual kickoff and membership drive meeting September 12 from 5 to 8 p.m. at the Newport News Shipyard Executive Dining Room, 42nd Street. For details, call Ron Harvey, ext. 43682 or 249-2322.

FOR RENT: ROOM. Convenient to NASA or LAFB. Cable TV, washer/dryer and kitchen privileges. $60 per week or neg. monthly rate. Call 864-2521 or 838-6000 after 5 p.m

FOR SALE: HOUSE. York county/Tabb Lakes. Contemporary, vaulted ceilings, screened porch, double garage. Open family room/kitchen, LR, DR, 3 BR, 2 1/2 Baths. Gas heat/central air. 1,950 sq. ft. Nearly new. $136,500 by owner. Call 867-8346 after 6 p.m.

FOR SALE: AUTO EQUIP. Engine stand and dolly. Used once; designed for 4-cylinder, V-6 or V-8. $25. Call 898-4198

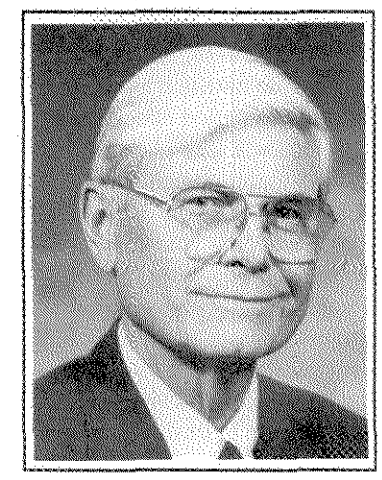
LOST: GLASSES. A pair of prescription ladies glasses, brown frames, lost in Building 1195A, Acquisition Operations Branch, on August 7. Last seen on counter in Room 103. Please call Denise Greene, ext. 42409, Mail Stop 126.

At the VC during September

King Proposes Use for Shuttle External Tank

A lunar-habitat configuration can be derived from the Space Transportation System's large external tank says Charles B. King. A Langley retiree, King will discuss this possibility in a free lecture, "A Concept for a Lunar Habitat," at noon September 13 in the Visitor Center theater. The lecture is co-sponsored by the Visitor Center and the Hampton Roads Student Branch of the American Institute of Aeronautics and Astronautics.

King believes the Shuttle's external tank can be inserted in low-Earth orbit, where it would be partially disassembled and outfitted as a 12-person habitat. The habitat would be designed for unmanned transport to low-lunar orbit and autonomously soft landed on the lunar surface. According to King, the lunar-habitat concept is feasible by the year 2000 with the concurrent development of a space transfer vehicle and manned cargo lander for crew changeover and resupply.



King, an aerospace engineer with the Bionetics Corporation in Hampton, retired from NASA Langley in 1980 after 38 years of service in materials technology and manufacturing.

X-15 Pilot Discusses Experimental Aviation

Using autobiography as the device and the research airplane era as the arena, Scott Crossfield will discuss the men and machines of the most productive government research program of record, the X-15. Crossfield will speak on "Aviation: Pushing to the Edge" at 7:30 p.m., September 14, in the Visitor Center theater.

Crossfield will draw attention to many of the misconceptions that guided our race to space, the judgmental errors that still pace our progress, and the optimism afforded by the incredible future promised by the influence of Pacific Rim economics and the demand for the Orient Express. He maintains that the technology of the National Aero-Space Plane is the key to a robust 21st century.

Beginning his career as a Navy fighter pilot in 1942, Crossfield was involved with and/or flew numerous advanced experitmental aircraft from 1950 to 1961. The first pilot to exceed Mach 2 and Mach 3, he flew the first thirty X-15 demonstration flights. Subsequently involved in managing many space and aviation programs and activities, he is currently Technical Consultant for the House Committee on Science and Technology.

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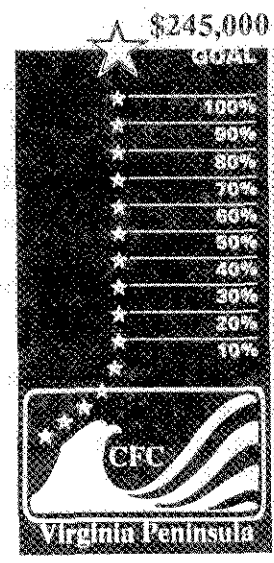
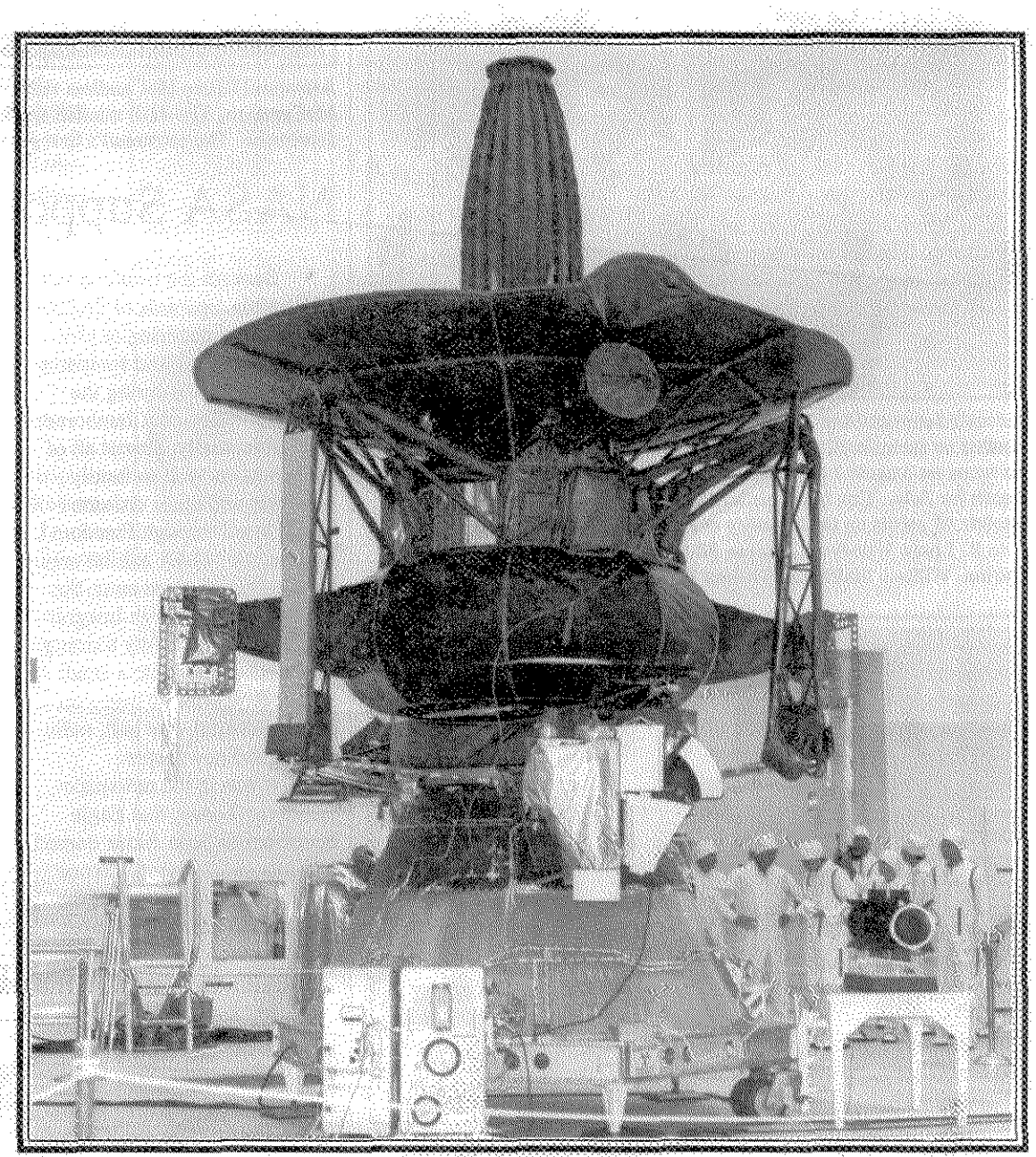
Langley Research Center
Hampton, Virginia 23665-5225

Researcher News





KENNEDY SPACE CENTER, Fla. --- At Kennedy Space Center's SAEF-2 planetary spacecraft checkout facility, technicians work on the spacecraft Galileo prior to moving it to the Vertical Processing Facility (VPF) for mating with the Inertial Upper Stage. Galileo will be launched aboard Atlantis on Space Shuttle Mission STS-34, now scheduled for October 12, and sent to the planet Jupiter, a journey which will take more than six years to complete. In December 1995, as the two-and-a-half-ton spacecraft orbits Jupiter with its ten scientific instruments, a probe will be released to parachute into the Jovian atmosphere.

NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

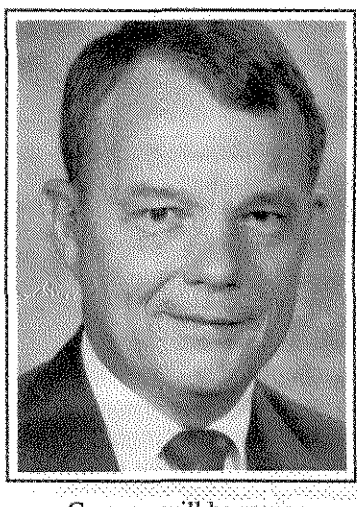
Volume 3, Issue 18 September 8, 1989

Bi-weekly Employee and Contractor Publication

Langley Managers Selected for Senior Executive Service Positions

Three Langley managers have been selected to head divisions under the Senior Executive Service program.

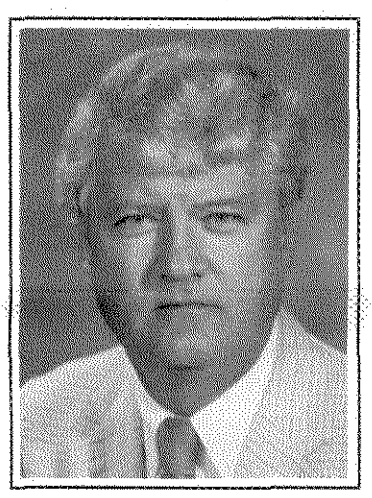
Pending approval by the Office of Personnel Management, **Bruce A. Conway** will head the Instrument Research Division; **William P. Henderson** will become chief of the Applied Aerodynamics Division; and **Glenn R. Taylor** will head the Flight Electronics Division.



Conway will be responsible for the overall management and technical direction of 140 civil servants and 270 support contractors engaged in measurements technology development and instrumentation support services for Langley's and NASA's aerospace research activities.

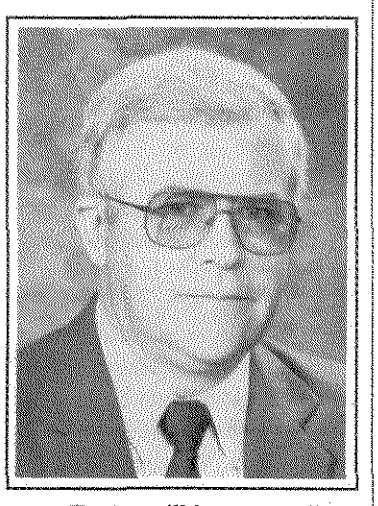
Sensor and measurement technology, in a wide variety of disciplines, are involved, including electro-mechanical instrumentation, nondestructive evaluation techniques and instrumentation, thermal instrumentation, non-intrusive gas parameter and optical spectroscopy measurements, photo-optical techniques and pressure measurement instrumentation.

Conway began his NASA career in 1961 as a student trainee in the cooperative engineering program between Langley and Virginia Polytechnic Institute and State University. During his career he has been an aerospace technologist, a staff assistant, a technical assistant and an assistant division chief. In addition, he served a one-year tour as chief of avionics at NASA Headquarters, Washington, D.C., as part of the NASA Career Development Program.



Henderson will be responsible for the division that conducts aeronautical research in configuration aerodynamics, including performance stability and control, propulsion system integration and related aerodynamic phenomena. The Applied Aerodynamics Division provides support and consultation for the nation's aircraft industry and military services. Theoretical, analytical and experimental research conducted in the division is aimed at closely simulating actual flight.

Henderson began his NASA career in July 1958 as an aerospace engineer. He has served as an assistant branch head and a branch head.



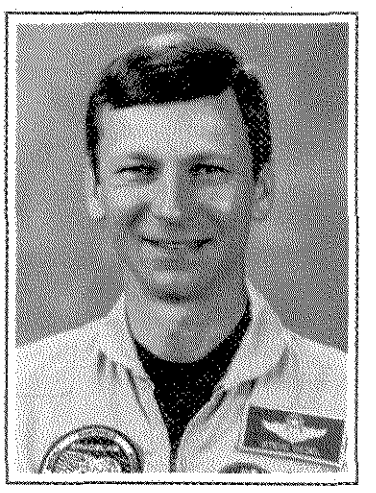
Taylor will be responsible for the Flight Electronics Division's research in solid-state lasers and electronics, and the development of advanced avionics systems for civil aircraft and new techniques for remote measurements of the environment from spacecraft.

Taylor began his NASA career in 1963 as an aerospace technologist. He was the photo scientist for the Lunar Orbiter Data Handling Group, headed various Viking Mars Mission operations and science teams, was instrument manager for the Earth Radiation Budget Experiment and has served as branch head, where most of his efforts have been directed to development of technologies and systems for spaceflight and aircraft research programs.

Langley Colloquium

Astronaut Nagel to Review Shuttle Emergency Systems

For the September 1988 return to spaceflight, all Space Shuttle emergency systems for crew survivability were reassessed and upgraded, including personal life support equipment, ground egress, abort opportunities and manual bailout.

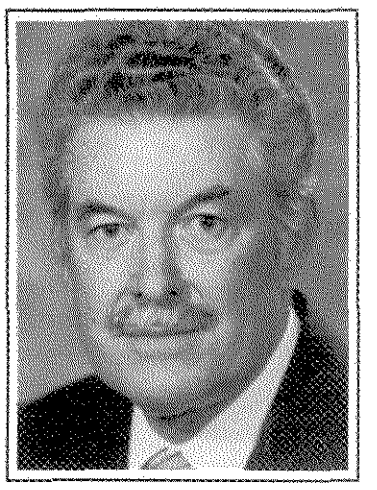


At a colloquium Monday, September 18, Col. Steven R. Nagel of NASA's Johnson Space Center will review these systems, two of which he personally managed, and will address his studies on expanding crew escape opportunities throughout the Shuttle operational envelope. Nagel's talk will be held in the H.J.E. Reid Conference Center, Building 1222, at 2 p.m.

Nagel, deputy chief of the Operations Development Branch within the Astronaut Office, has received numerous Air Force decorations as an undergraduate, instructor and test pilot and has logged over 6,000 hours of flight time. Nagel has flown twice in the Space Shuttle, serving as a mission specialist on STS 51-G in June 1985 and as a pilot on STS 61-A in October 1985. His next flight assignment is to command STS-37 in late 1990.

Cole, Division Chief, Retires

Kenneth N. Cole, chief of the Operations Support Division, retired September 1 with more than 43 years of government service.



Cole, a division chief since February 1985, has been responsible for managing the technician work force supporting Langley's research facilities and laboratories.

Cole began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics, in 1948 as an apprentice electrician. During his career he has served as facilities support electrician supervisor, supervisory electrical engineering technician, assistant branch head, branch head and assistant division chief.

Voyager 2's Encounter of Neptune May Provide Clues to Earth's Origin

In addition to new and unique information about Neptune and its large moon, Triton, the August 24 Voyager 2 encounter with Neptune has provided important information about the Earth's atmosphere and climate; in fact, about the origin and evolution of life on our planet, says Dr. Joel S. Levine, senior research scientist, Atmospheric Sciences Division.

Virginia's Outstanding Scientist for 1987 and a member of NASA's Space Science Advisory Board, Levine closely monitored this first approach to the fourth largest planet, Neptune, invisible to the naked eye and never before visited by a spacecraft. He interpreted the highlights of the encounter at a news conference held at Langley Friday, August 25, following closest approaches to both Neptune and Triton.

"The atmosphere of Neptune's peculiar moon Triton is made up of nitrogen and methane, the gases thought present in the Earth's atmosphere four and a half billion years ago that led to the formation of organic molecules of increasing complexity, the precursors of living systems," said Levine. "These conditions do not exist anywhere on Earth today; Triton may give us the opportunity to study the production of complex organic molecules, the building blocks of life, as they occurred early in the Earth's history."

Called the culmination of a 12-year-long journey, Levine viewed the Voyager 2 'grand tour' of the outer planets as the finale in a 27-year venture begun by Mariner 2, the first spacecraft to accomplish a planetary fly-by, passing by Venus in 1962.

Voyager 2's close look at the Neptune system shed light on atmospheric chemistry, climate, atmospheric circulation, weather phenomena, Earth's early atmosphere and, perhaps, even the origin of life on Earth.

-photo by Bob Reynolds

Dr. Joel S. Levine, Langley's expert on planetary atmospheres, highlights the accomplishments of the Voyager 2 spacecraft which culminated its 'grand tour' of the outer planets when it encountered Neptune and its large satellite, Triton, in late August.

"The very atmosphere that gave us life is the atmosphere on Neptune and Triton," Levine said. Comprised of nitrogen and methane, Earth's early atmosphere was "energized" by solar ultraviolet radiation and atmospheric lightning, which produced organic compounds of increasing complexity.

Methane is present at a concentratioin of several percent (or several parts per hundred) in the atmospheres of Neptune and Triton. Methane, an important greenhouse gas, is increasing on Earth at a rate of about one percent per year. This rise is attributed to human activities, such as global biomass burning, increased rice production and increased cattle production.

Continued on page 2.

News Briefs

JET PROPULSION LABORATORY, Pasadena, Calif. --- NASA's Voyager 2 spacecraft has detected intense radio emissions from Neptune, indicating that the planet has a magnetic field. This discovery greatly increases the likelihood that the spacecraft will discover a wide range of interesting phenomena related to a magnetic field, such as aurora and possible radiation-darkened ring arcs and moons. The emissions are generated around planets by high-velocity, charged particles as they spiral along magnetic field lines into the planet's atmosphere.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA's MSFC has awarded a $1.797 billion contract modification to the Martin Marietta Corp., New Orleans, La., to produce 60 additional Space Shuttle external tanks for delivery during the 1990s. The award is the second portion of a procurement to obtain the tanks. The first portion, awarded to Martin Marietta in June 1988, was for the long-lead hardware (parts and materials) needed for manufacture of the tanks. The tanks will be produced by Martin Marietta's Manned Space Systems Co. at NASA's Michoud Assembly Facility near New Orleans.

Voyager 2 Completes 'Grand Tour'

Continued from page 1.

Levine feels measurement of methane in the atmospheres of Neptune and Triton may provide important insights and information about the impact of methane on the climate and chemistry of the Earth's atmosphere.

Among the new discoveries Voyager has uncovered are:

o Neptune has a magnetic field three times stronger than the Earth's;

o Neptune also has radiation belts that contain charged particles from the Sun;

o These radiation belts give off radio signals;

o Measured for the first time, Neptune's rotation period--its day--is 16 hours long;

o Two full rings surround Neptune;

o Six new moons have been discovered, bringing to eight the total of Neptune's satellites;

o A giant dark spot in the southern hemisphere of Neptune measures 8,000 miles across and is similar to the great red spot on Jupiter;

o Sharp images from Voyager show high altitude white methane clouds on Neptune, similar to cirrus clouds on Earth;

o Voyager measured the atmosphere of Neptune to be 350 degrees below zero.

Levine predicted that the real story may lie in what is discovered about Triton, Neptune's largest moon. Photographs of Triton show it to be surprisingly colorful, with pink, red and blue areas. "We don't understand the colors yet," he added. Unlike any other body in the solar system except for Earth and Jupiter's moon Io, Triton shows signs of active volcanoes. The atmospheres of both Triton and Saturn's moon Titan may resemble that of early Earth.

At an estimated cost of $900 million, Voyager 2's 12-year sojourn has cost each taxpayer about 25 cents.

"I believe it's been a bargain," concluded Levine.

Langley Experienced 'Heavy Rain'

-photo by Steve Earley

Just about lunch time Friday, August 18, the skies opened up and drenched Langley Research Center as well as the surrounding communities. A record rainfall of three inches was reported. Area flooding was widespread.

Lankley

Lankley might be exaggerating a bit. Rain water mounted up past car tires on Center and, in many cases, it wasn't safe to open car doors until the waters began to retreat. Perhaps our favorite engineer travelled to Williamsburg where several cars, parked in low-lying areas, were visible only by their rooftops!

Contract Negotiations

NASA Langley Selects Lockheed for Contract Negotiations

The Langley Research Center has selected Lockheed Engineering & Sciences Co., Houston, for negotiation of a contract to support Langley's aerospace research and technology efforts.

The five-year, cost-plus-award-fee contract is estimated at $178 million. The contract will be effective October 1, 1989, and the majority of the work will be performed at Langley.

The company will provide support for research and technology activities in the broad fields of flight systems research, structures and materials research, space science and technology, aeronautics research, and flight projects engineering and development.

In addition, the company will provide specialized support in other areas such as project planning, scheduling, cost estimating, research computer software and hardware development and safety.

Bionetics Corporation Awarded NASA Public Awareness Contract

Bionetics Corporation of Hampton has been awarded a contract by NASA Langley to provide support services for the center's Public Awareness Program. The cost of the five-year, cost-plus-fixed-fee contract is approximately $8.5 million.

The contract became effective September 1, 1989, and work will be performed at Langley.

The company will operate the NASA Langley Visitor Center; the Public Inquiries Office, including the Teacher Resource Center; and the Traveling Exhibits Program.

In addition, the company will be responsible for preparing written material to support the Public Awareness Program, including the center newspaper, **Researcher News**, and other documents; creating and maintaining new or updated public exhibits and maintaining existing exhibits for Langley's requirements, the NASA Langley Visitor Center galleries, the traveling mobile units and portable exhibits program; and for providing support to conferences at Langley or other sites as required.

News from across the State

CIT and OSC Sign Agreement to Construct and Launch Satellite

Virginia's Center for Innovative Technology (CIT) and Orbital Sciences Corporation (OSC) have signed an agreement for the development, production and launch of a small, low-Earth-orbiting satellite for experimental use by Virginia universities and industry.

The new satellite program will be known at VaSTAR in recognition of the many activities in Virginia devoted to space research and space commercialization.

"Commercial space technology is Virginia's future economic frontier. The VaSTAR satellite program will provide the fundamental technology needed for our universities and industries to further distinguish Virginia as a leader in the space research and commercialization industries," Virginia Governor Gerald Baliles said.

The VaSTAR program will determine the technical, operational and economic feasibility of employing such small, lightweight satellites to collect environmental and other data from a number of widely disbursed remote data collection platforms in the Chesapeake Bay and other locations in Virginia. The program will also explore the potential for other space communications applications which could lead to commercial communications satellite development and launches in Virginia.

CIT will pay $250,000 toward the construction of the satellite. Orbital Sciences, based in Fairfax, will launch the satellite on its Pegasus launch vehicle as early as the fourth quarter of this year. OSC will also build a ground control station in Virginia and share with CIT in funding experiments with the satellite at Virginia universities.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . Jean Drummond Clough

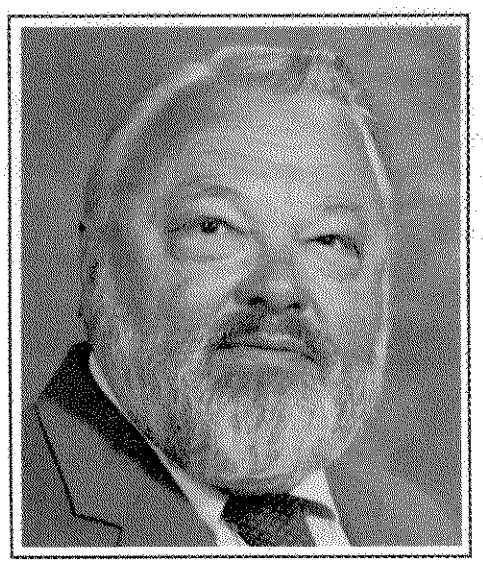
Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

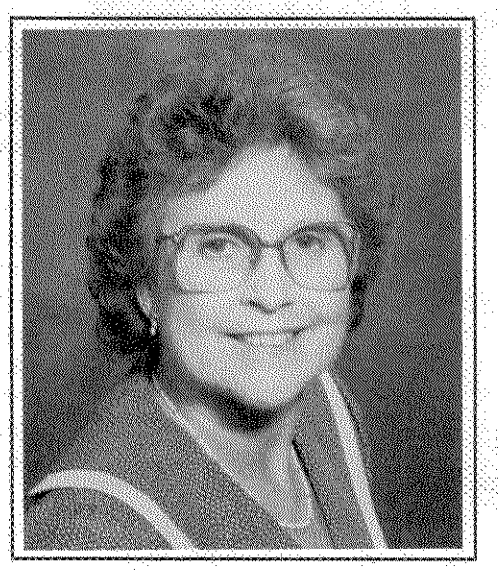
NASA Exceptional Service Medals Awarded Three Langley Employees

In a special ceremony August 18, 1989, Langley Director Richard H. Petersen presented three employees with the Exceptional Service Medal. This Medal is awarded for significant achievement or service characterized by unusual initiative or creative ability. The individuals selected for this medal have clearly demonstrated substantial improvement in engineering, aeronautics, space flight, space-related endeavors or administration and support of these endeavors.



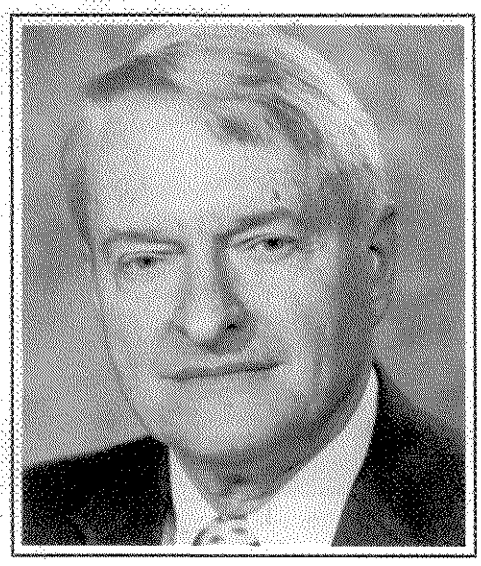
Richard M. Boykin Jr.

Outstanding technical contributions to NASA aerospace programs.



Evelyn D. Harris

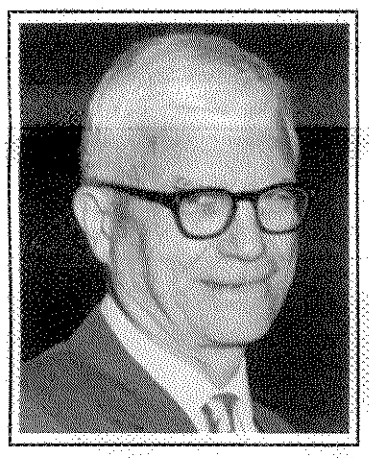
Outstanding contributions in administration of the Center's Cooperative Education Program.



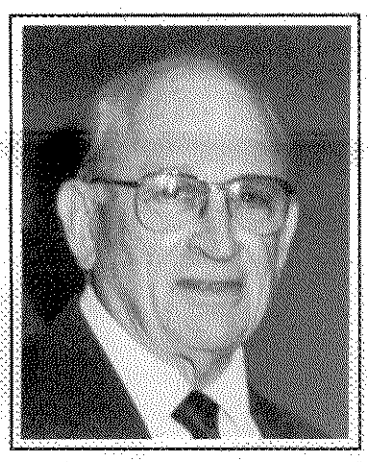
William R. Kivett

Exceptional contributions and leadership in effecting procurements essential to the support of the Langley Research Center mission.

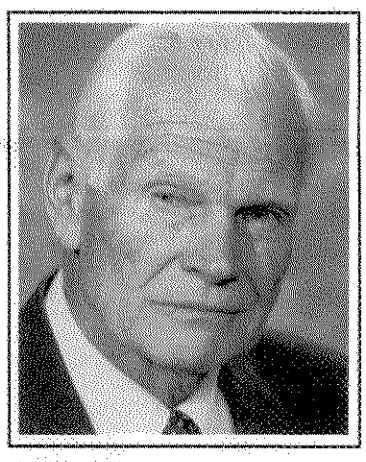
Forty-five-Year Service Awards



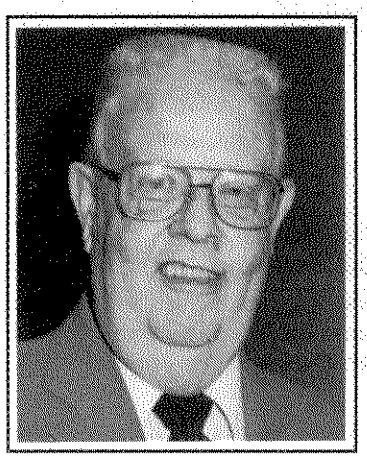
H. Douglas Garner



Joseph L. Johnson Jr.

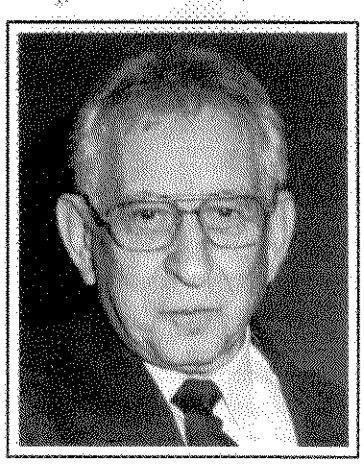


John E. Knemeyer



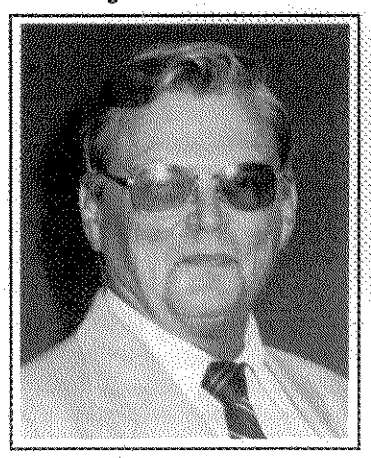
Nathaniel R. Spaulding

M. Leroy Spearman

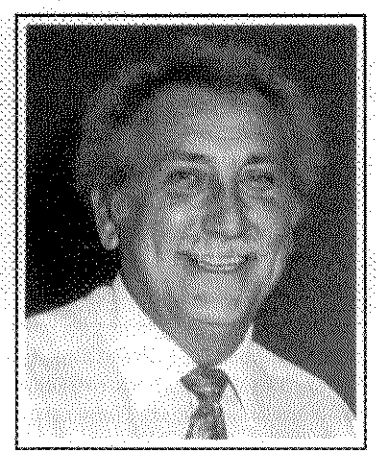


Charles N. Valade

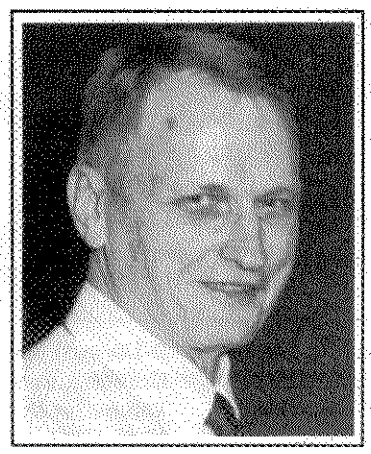
Forty-Year Service Awards



Earl C. Hastings Jr.



George F. Palko



Fred M. Smith

E. Carson Yates Jr.

New Exhibit Focuses on Space, Economics and America

See samples of the first "Made in Space" products and watch celebrities demonstrate the importance of space research in the Visitor Center's new exhibit, "Discovering Space for America's Economic Growth."

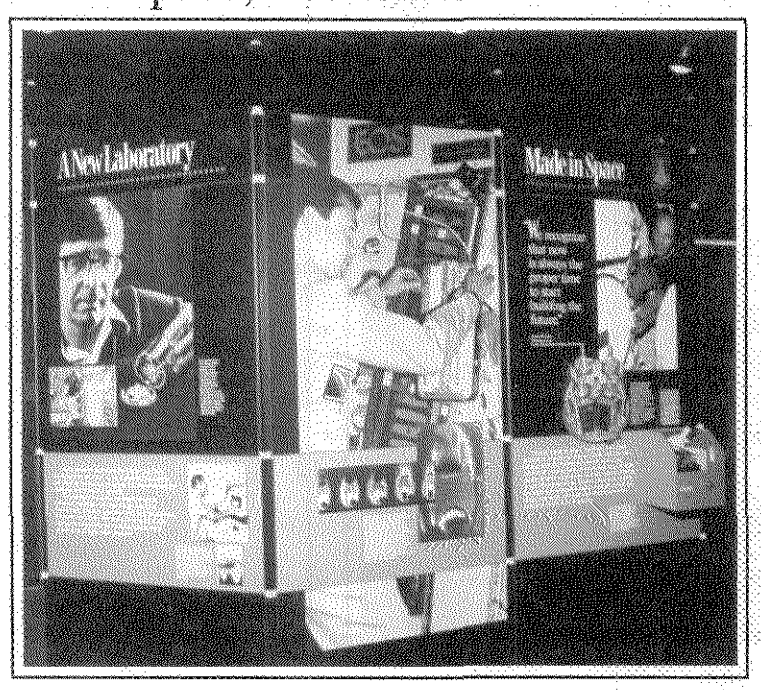
The exhibit traces the economic benefits of space, beginning with the United States' first communications satellite--Early Bird 1--and progressing to the Advanced Technology Communications Satellite, which is under development. Today, the satellite communications industry generates over $3 billion annually and has expanded beyond communications. One panel in the exhibit features the Landsat satellite, which uses remote sensing to aid in management of agricultural resources.

Another section of the exhibit focuses on the "down-to-earth" benefits of space research. A videotape shows celebrities explaining the practical uses of space technology. One benefit is eye glasses for the deaf that translate the spoken word into visual cues that appear on the lens.

The exhibit includes a sample of the first products to bear the label "Made in Space." Perfectly shaped, uniform-sized, microscopic latex spheres were made in the weightless environment of the Shuttle. Sold by the National Bureau of Standards, these spheres are used in finely tuned, high-precision instrument calibration. The exhibit contains some of these spheres which can be viewed through a microscope.

The exhibit also highlights the potential of protein crystal growth, the possibility of lunar bases, and the growing involvement of private industry in space.

Visitor Center hours are 8:30 a.m. to 4:30 p.m. Monday through Saturday and noon to 4:30 p.m. on Sunday. Admission is free.



-photo by Steve Earley

The NASA Langley Visitor Center announces the opening of its new exhibit "Discovering Space for America's Economic Growth."

Made in Space

Tidbits from Training

Use It or Lose It, Says Training

For several years the Training and Education Section has received numerous requests to establish an undergraduate engineering program at the Center.

In July, having received positive comments from the Undergraduate Study Committee favoring such a program, the Training and Education Section announced that Old Dominion University (ODU) would begin offering undergraduate engineering courses in the fall. The first phase of the program called for two courses, MEM 311 Thermodynamics 1 and ECE 201 Circuit Theory 1. However, due to the low number of registrations, ECE 201 had to be cancelled.

In spite of an initial low enrollment in MEM 311, ODU is willing to continue to provide an undergraduate engineering program at the Center if a need is demonstrated.

The future of this program is dependent upon the existence of a real need as demonstrated by increased employee participation. An announcement listing course offerings for the spring will be distributed prior to spring registration. For more information on this program, contact George Allison, Training and Education Section, ext. 42594.

Notes of Thanks

The family of **Vivian H. Raiford** would like to thank family and friends for the many cards, the kindness and support during their time of sorrow.

Forrest Dickinson writes: "I would like to thank all my friends and co-workers for the wonderful retirement social and the gifts. I will always cherish the memory of the great evening and my friends and associates at Langley."

Jim Monteith would like to express his thanks to all who participated in his retirement luncheon, Tuesday, August 15, 1989.

Al Insley would like to thank his many good friends for the retirement luncheon and the very generous gift certificate.

Do You Remember?

If anyone has information about Stephen Ferris, an employee who worked at NACA during the 40's, please call the Office of External Affairs, (804) 864-6124.

In Memoriam

Sympathy is extended to the family of **Howard B. Edwards**, who died August 16 in Hampton. Edwards retired from NASA Langley as chief of the Instrument Research Division in 1980 after 40 years of service.

LaRC Managers Elected to Credit Union Board

At the 1989 Annual Meeting, the membership of Langley Federal Credit Union elected two new board members: John K. Molloy, technical assistant to the Director for Aeronautics; and Buena M. Crawford, senior program analyst in the Programs and Resources Division; and reelected Jean Yokum, all for three-year terms.

After a reorganization meeting of the Board of Directors, the following members were elected officers: George R. Hayes, chairman; Albert L. Braslow, first vice chairman; Lt. Col. Charles R. Ritchie, USAF retired, second vice chairman; Lt. Col. James L. Frost, USAF retired, secretary; Jean M. Yokum, treasurer; and John K. Molloy, assistant secretary.

Langley Federal Credit Union is a cooperative, not-for-profit financial institution with a membership of over 75,000.

NASA Volleyball Announces Season and Tournament Champions

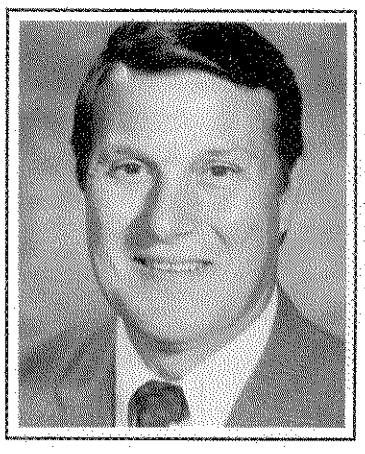
B-League Regular Season and Tournament Champions, Wham, (front row, L to R) Kam Hom, Suzy Fulton, Cathy Johnson; (back row) Carey Buttrill, Bill Dorogy, John Burton and Jim Prohaska.

C-League Regular Season and Tournament Champs, Freedom Fighters, (front row, L to R) Jonathan Cruz, Laura Waters, Angie Ayers; (middle row) Brent Robertson, Mark Whitaker, Pat Troutman; (back row) Kirk Ayers and Dave Young.

D-League Regular Season Champions, Court Cases, (front row, L to R) Emily Linthicum, Clint Reese, Tim Berry; (middle row) Pamela Davis, Tina Hawks; (back row) Ken Hamby, Tom Frasher and Willie Wilkerson. Not pictured are Kevin Davis, Melanie Long and Rod Waid.

D-League Tournament Champs, BB's, (front row, L to R) Brad Crawford, Jackie Tatum, Janet Dail; (back row) Bobby Davis, Russell Tatum, Joe Davis and Alan Scheidigger. Not pictured are David White, Mary Liggins, Bernie Backley, Floyd Backley, Jeff Deaver and Billy Allen.

People & Places



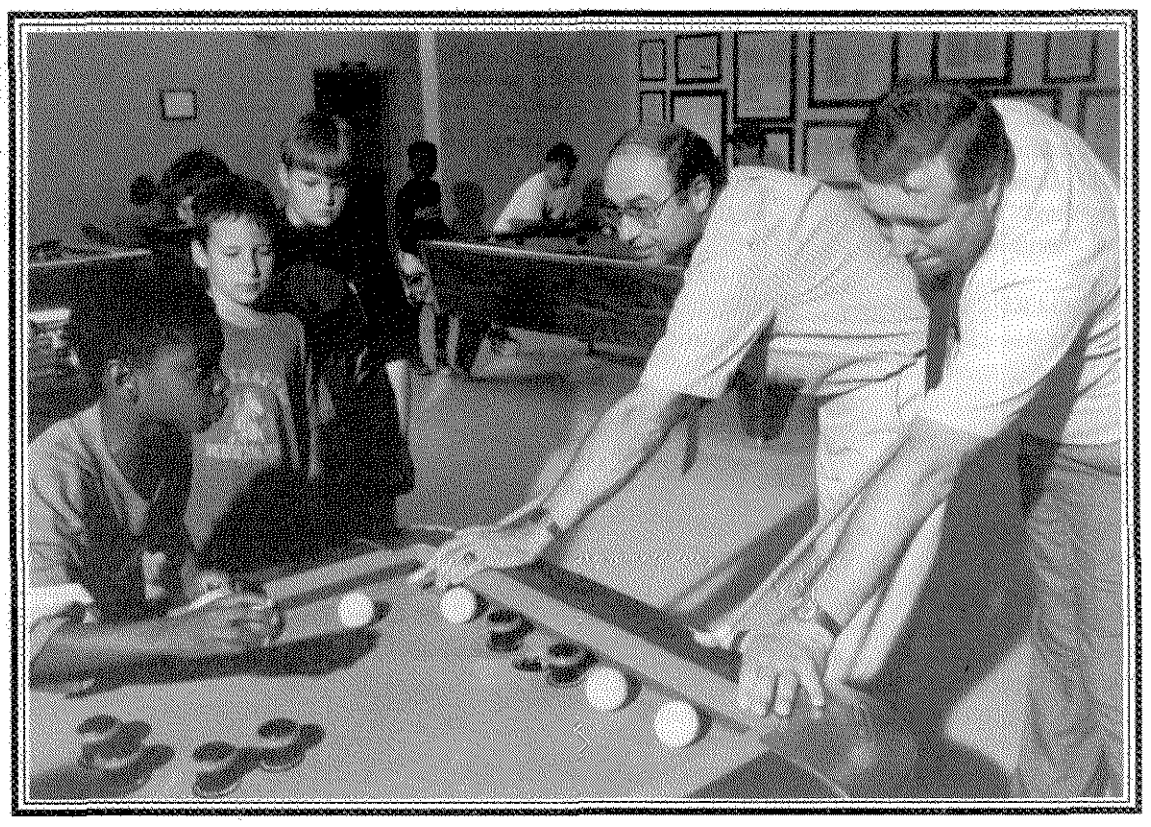
On Thursday, October 5, you will be contacted by a representative of your organization to solicit your continued support of the CFC campaign. The 1989-90 goal of $245,000 for NASA employees can be met this year as we have met and exceeded our goals in the past.

We have a proud heritage of being a leader on the Peninsula in the CFC campaigns. Your generous support in the past has helped many needy people and made our community a better place to live. Your individual contributions do make a difference and collectively our contributins make a big difference in our community. Many worthy community organizations depend on us for continued support.

The CFC campaign gives each of us an opportunity to do something good for "others." If you have ever experienced the joy and satisfaction that comes from helping a young person in need, you know what I am talking about. Most of us can also think of someone who helped us when we really needed help and they may have only made one request of us--that we help someone else. The CFC is our opportunity to help those less fortunate than we and show that we care about others.

Let us join together again this year to be a leader in the CFC campaign and do our part to help "others."

Darrel R. Tenney
CFC Co-Chairman

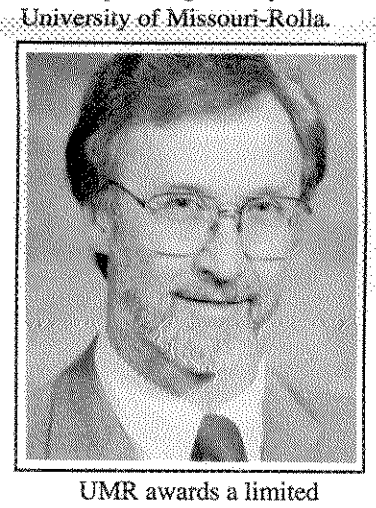


-photo by Steve Earley

GIVING A LESSON OR TAKING ONE? It's difficult to decide who's having more fun. Langley Combined Federal Campaign Chairman Jim Arrington (center) and Ed Prior, technical assistant to the Chief Scientist, stop for a moment on their tour of the Boys' Club to join in a game of bumper pool.

Zorumski Awarded Degree

William E. Zorumski, chief scientist of Langley's Acoustics Division, has been awarded the professional degree of aerospace engineer by the University of Missouri-Rolla.



UMR awards a limited number of professional degrees to persons who have made important contributions to the engineering or science profession. Recipents are usually graduates of the institution and the degree is awarded on faculty recommendation as well as the individual's distinguished career in engineering or science.

Zorumski joined NASA in 1962 and was assigned to the Flight Vehicles Division. He began research in the Acoustics Branch in 1967, studying acoustic material properties where he developed a nonlinear theory for porous acoustic materials. His later work on duct acoustic theory earned a patent on the multisectioned aircraft engine nacelle noise supressor for which he was awarded NASA's Exceptional Service Medal.

In 1972, he was assigned to the Aircraft Noise Prediction Office. The computer software developed by Zorumski has become an international standard for aircraft noise prediction. In 1985, he was named to his present position, responsible for long-range basic research on the aeroacoustics of boundary layers on supersonic and hypersonic vehicles.

MLB Enterprises, Inc., Langley groundskeeping and pest control support services, recently held Employee Appreciation Day. Recognized for outstanding contributions to the comapny's mission were (L to R) Kenneth Shearin, Most Impressive Temporary Hire; Herman Phelps, Employee of the Year; and Wally Moore, Safety Award Winner. Awards were presented by Michael Brittin, contract manager.

Who benefits from CFC contributions?

Boys' Club Participates in the Making of Men

The noise was overwhelming--not overbearing but all encompassing. There was evidence everywhere that boys were welcome in this facility.

Boys' Club director Tom Olaisen started to apologize for the noise, but it was not necessary. It was obvious that the programs were well-organized, well-supervised and just plain fun. Two hundred fifty boys couldn't be expected to have this much fun in silence! No, the noise gave credence to the fact that there were choices to be made at the Boys' Club of the Virginia Peninsula. The club staff was on hand to help prepare the participants to make choices, now and in the future.

The Boys' Club originated in 1946 and was located in downtown Newport News. In 1958, as the need and population shifted, the Club moved to midtown. On May 5, 1987, the present facility--a 2,100 square-foot building on six acres of land in the Denbigh area--opened for business, the business of serving Peninsula boys.

"We're open when boys need a place to be," says Olaisen. That means 2 to 9 p.m. Mondays through Fridays, and 9 a.m. to 5 p.m. on Saturdays during the school year; 6 a.m. to 6 p.m., six days a week during the summer. "We offer a diversified program," the director continues. "Even the least-motivated boy will find something that interests him here."

The boys move in groups from one activity to the next; there are both active and passive involvements. One group may be shooting pool or playing ping pong in the game room, while others are enjoying a movie in the video area, playing t-ball or soccer outdoors, or waiting for one more number before yelling BINGO!

The new facility boasts greatly improved equipment--an exercise room, computer studio, library, even a pool. On the grounds there are outdoor equipment for physical venting of energy and a nice picnic area for eating and more subdued fun. And there are trees for climbing or for sitting under to talk with a friend.

"We are a guidance organization," concludes Olaisen. "We insist on good behavior, reward a positive attitude and constantly work on character development. We really try to get involved in kids' lives."

Tom Olaisen joined the Boys' Club in downtown Newport News 35 years ago. He's been a member ever since; he's just worked in a different capacity since he turned 17.

The Boys' Club of the Virginia Peninsula serves boys ages six to 16. Seventy-four percent of the Club budget comes from the United Way.

As a federal employee, your contribution to the Combined Federal Campaign makes possible the Boys' Club program as well as hundreds of other affiliated agencies--local, national and international. Your one contribution helps them all year long.

Senior Management Research Review

The Senior Management Research Review will be held Monday, September 18, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, the following Langley scientists will give program accomplishments:

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
~9:30	Growth and Characterization of High Temperature Superconducting Materials	John Buckley (Systems Engineering and Operations/FD)
~9:45	Applications of Algebraic Grid Generation	Robert Smith (Electronics/ACD)
10:00	A Holographic Information Storage Device Using Two Photorefractive Crystals	Sharon Welch (Flight Systems/GCD)
10:15	Foreign Space Transportation System Assessment	Gregory Brauckmann (Space/SSD)
10:30	Pressure-Instrumented Model Rotor Noise Test	Ruth Martin (Structures/AcoD)
10:45	Vortex Flow Effects on Tail Buffet	Gautam Shah (Aeronautics/FAD)

Happenings

LAA SOCIAL will be held Friday, September 15, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Called Autumn Daze, this special social will feature Eric Stevens and "The In Crowd." Cover charge is $1.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, September 12, at 1 p.m. in the H.J.E. Reid Conference Center, Building 1222. Concerns to be brought before the board should be addressed to the appropriate chairperson.

CSA MEETING. The Hampton Roads Chapter of the Cryogenic Society of America will have its annual Spouses Night meeting September 11 in the H.J.E. Reid Conference Center. Social is at 5:30 p.m.; dinner at 6:30. The program will be a Cryogenic Magic Show by Bert Bean, general superintendent of production at the local Linde plant. For information and reservations, call Pierce Lawing, ext. 45137.

NASA TOASTMASTERS will meet Wednesday, September 13 at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are welcome. Contact Steve Yaros, ext. 43050, for details.

LANGLEY ALUMNI ASSN. Fall Kickoff luncheon will be held Wednesday, September 13, at 11:30 a.m. in the NASA Cafeteria. Buy your meal and join the group in the Executive Dining Room. Dr. Joel Levine will speak on the recent Neptune fly-by and the Earth's global climate changes. Visitors are welcome.

VA CHORAL SOCIETY will begin rehearsals for its 59th consecutive season on September 11. Auditions for new members are now being conducted. Tenors and basses are especially needed. If you have Monday evenings free, can sight-read music and can carry a tune, please call 850-0705 for an appointment.

ENGINEERS CLUB of the Virginia Peninsula will hold its annual Kickoff and Membership Drive meeting Tuesday, September 12 from 5 to 8 p.m. in the Executive Dining Room, Newport News Shipbuilding and Dry Dock. Call Ron Harvey, ext. 43682 or 249-2322.

FOR SALE: AUTO. 1984 Plymouth Horizon. Clean and in good running condition. AC, PS, new inspection. $2,375 OBRO. Call 249-2246 after 5 p.m. weekdays.

LAA Thanks Carnival Supporters

Cathy Perkins, Wyle Laboratories, was crowned 1989 Carnival Monarch by Associate Director Sid Pauls during Carnival activities on Friday, August 18. Perkins and her supporters sold 2,393 raffle tickets to win her top honors. A total of $9,916 was earned from the sale of carnival tickets.

Perkins wishes to express her appreciation to all who supported her for Carnival Monarch. "I have met a lot of wonderful people throughout the course of the contest as well as at Carnival events. I had a wonderful time and would like to congratulate the big prize winners."

Friday night's grand prize winners were C. K. Chiaung, $250; Tom Brinkley, $500; and Catherine Carr, $1,200. On Saturday evening, winners were Christmas Marshall, $250; Mark Shuart, $500; and Carl Pilkington, $1,500.

The increased children's entertainment brought to the Carnival by the Child Development Center was very exciting, said LAA board member Pat Gates. The Cafeteria did a super job handling food and beverage needs. "Attendance was good and everyone seemed to enjoy themselves," concluded Gates.

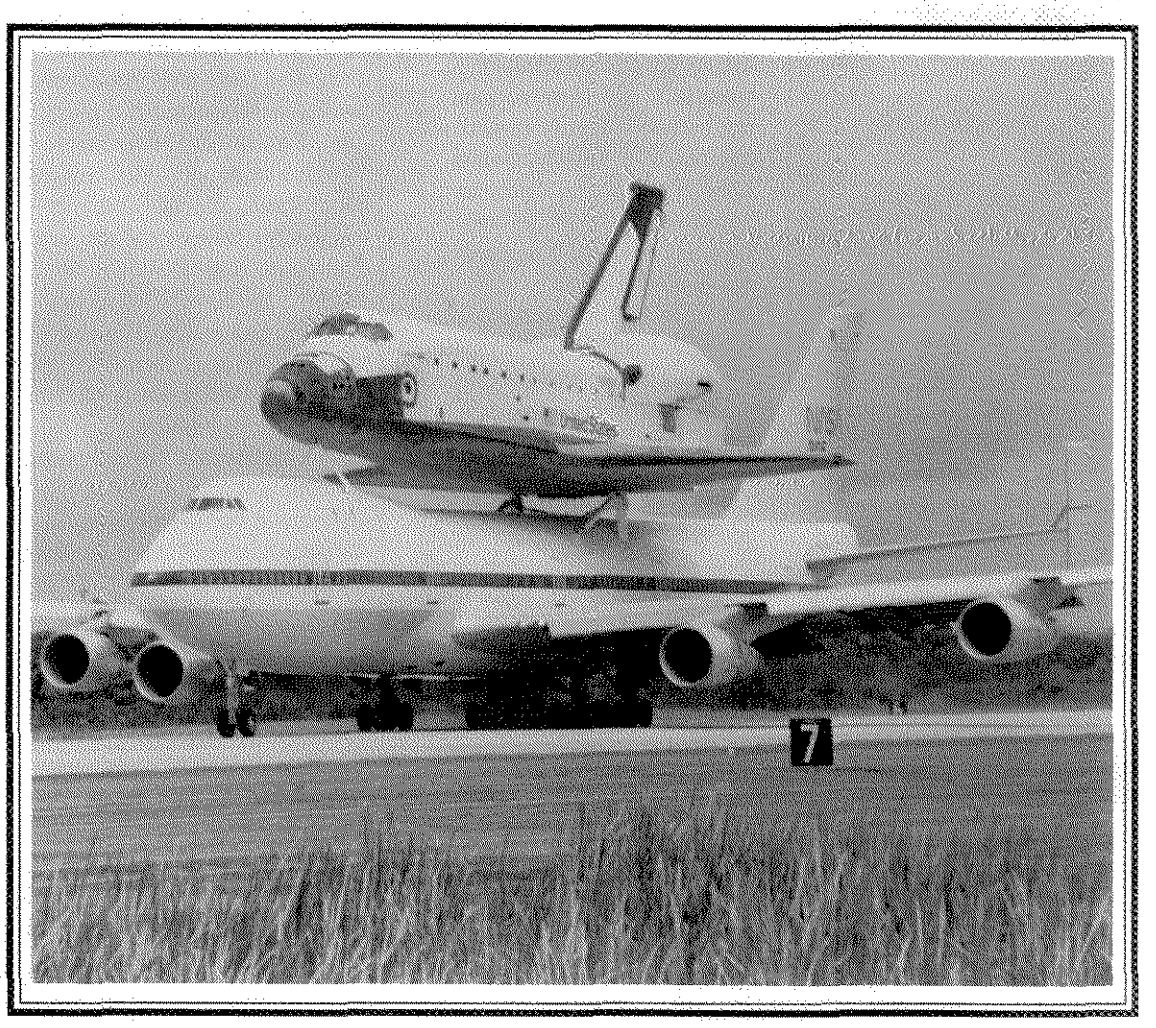
-photo by Frank Quinto

1989 Carnival Monarch Cathy Perkins draws a grand prize winner from the barrel as LAA President Geoffrey Tennille looks on.

Runners Club Announces Carnival Race Results

Winners of the NASA Runners Club Carnival 5 Mile Race, held Saturday, August 19 are:

Men	1	Gale Harvey	32:29
	2	Pete Earls	32:47
	3	Steve Sudik	34:01
	4	John Oth	36:29
	5	Joe Drozdowski	36:58
	6	John Aguirre	42:20
Women	1	Anne Drozdowski	35:42



-photo by Steve Earley

COLUMBIA COMES HOME. Space Shuttle Columbia, atop NASA's Boeing 747, returned home to the Kennedy Space Center Monday, August 21, at 11:42 a.m. EDT after successfully completing STS-28. The Orbiter was towed to the Orbiter Processing Facility that evening to begin preparations for the Long Duration Exposure Facility (LDEF) retrieval mission scheduled for December. LDEF, designed and built at Langley, carries 57 experiments and experiment hardware--such as structure, wiring harnesses, batteries and tape recorders--that have had five years in space and will yield valuable data on the effects of the space exposure. LDEF managers say that the LDEF has now become a treasure trove of technology data for future spacecraft designers.

Researcher News

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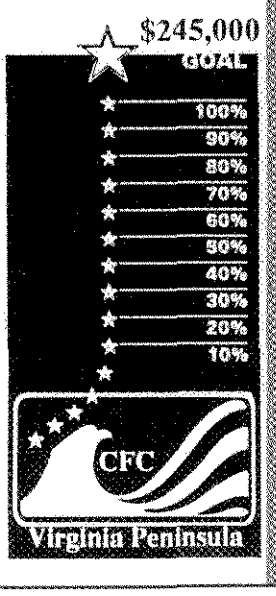


NASA
National Aeronautics and
Space Administration

Langley Research Center

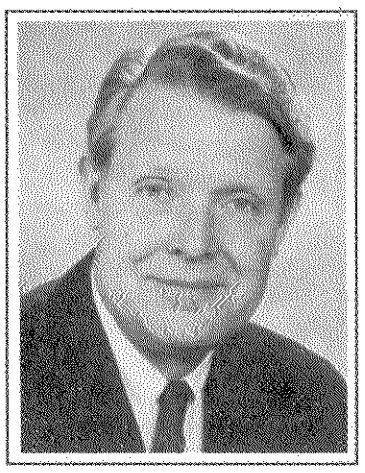
Volume 3, Issue 19 September 22, 1989

Researcher News

Bi-weekly Employee and Contractor Publication

CFC Message from the Director

Looking for Heroes? Look to Langley



Langley Research Center is known world-wide for solving problems. Finding innovative solutions to challenging problems is what research is all about.

But Langley's problem-solving reputation doesn't stop at the gate. Our people are actively involved in their communities. At this time each year, we are asked to look at the problems in our community, in our nation and around the world, and consider how we can help.

On behalf of the Combined Federal Campaign, I am appealing to the heroes at Langley, our employees who see the needs of others and tend to those needs.

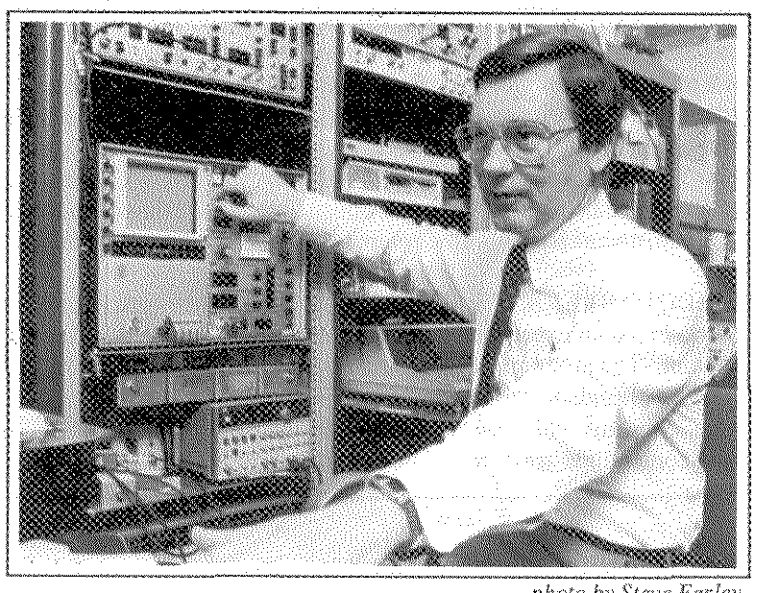
Everyday, people on the Peninsula, in Virginia, in the United States and all over the world need our help. Children need food, medicine, after-school care; troubled teenagers need guidance, alternatives and solutions to the tremendous pressures they face; senior citizens need transportation, a hot meal, a friend; and many families need our support and a chance to get back on their feet.

The needs are endless and the solutions often seem impossible. But together we can make a difference. Langley Research Center has always been a leader on the Peninsula in this campaign to help others.

Jim Arrington and his committee have set a goal of $245,000 for this year's campaign. I ask you to support Jim and do what you can when your key person contacts you on October 5. This is your opportunity to help others . . . and your one gift will help them all year long.

Richard H. Petersen
Director

Cantrell Awarded Physics Degree at Cambridge



-photo by Steve Earley

Back at Langley in the NDE Lab, Cantrell adjusts the acoustic harmonic generation system used to measure nonlinear properties of materials.

John H. Cantrell, senior research physicist, Materials Characterization Instrumentation Section, has returned from Cambridge University, England, having set a record for a visiting scientist in the amount of papers delivered or published.

Cantrell spent an academic year studying at the Cavendish Laboratory, Churchill College, Cambridge, as a Dryden Fellow, an honor awarded him by the National Space Club.

"My year at Cambridge has been one of the most intellectually stimulating and satisfying periods in my professional career," said Cantrell. "The Cavendish Laboratory is one of the truly outstanding teaching and research institutions in the world. It has a top-ranked faculty and world-class facilities in my areas of interest."

Cantrell's research at Cambridge focused on developing a deeper, more fundamental understanding of fatigue, stress, defect and damage mechanisms in aerospace materials. His special emphasis was on scanning electron acoustic microscopy (SEAM). "The use of SEAM in the assessment of material microstructure can give us insight into new methods of non-destructive evaluation of materials leading to safer, more reliable aerospace structures and vehicles," said Cantrell.

Cantrell's SEAM work resulted in the first complete three-dimensional theory of electron-acoustic signal generation using continuously chopped electron beams on a sample surface. The theory has provided both a greatly enhanced understanding of as well as new insights into spatial resolution and contrast mechanisms. "John Cantrell's research has turned SEAM around," announced Professor Archie Howie, the new chairman of the Cavendish Laboratory.

Cantrell's research output during his 11-month tenure has resulted in 10 papers published or to be published--a Cavendish Laboratory record for a visiting scientist. The quality and significance of his work resulted in Cantrell's appointment as a Winston Churchill Foundation Overseas Fellow and the awarding of a master's degree (status) in physics by Cambridge University.

Contracts Aim at Breakthroughs in Aircraft Composite Structures

-by H. Keith Henry

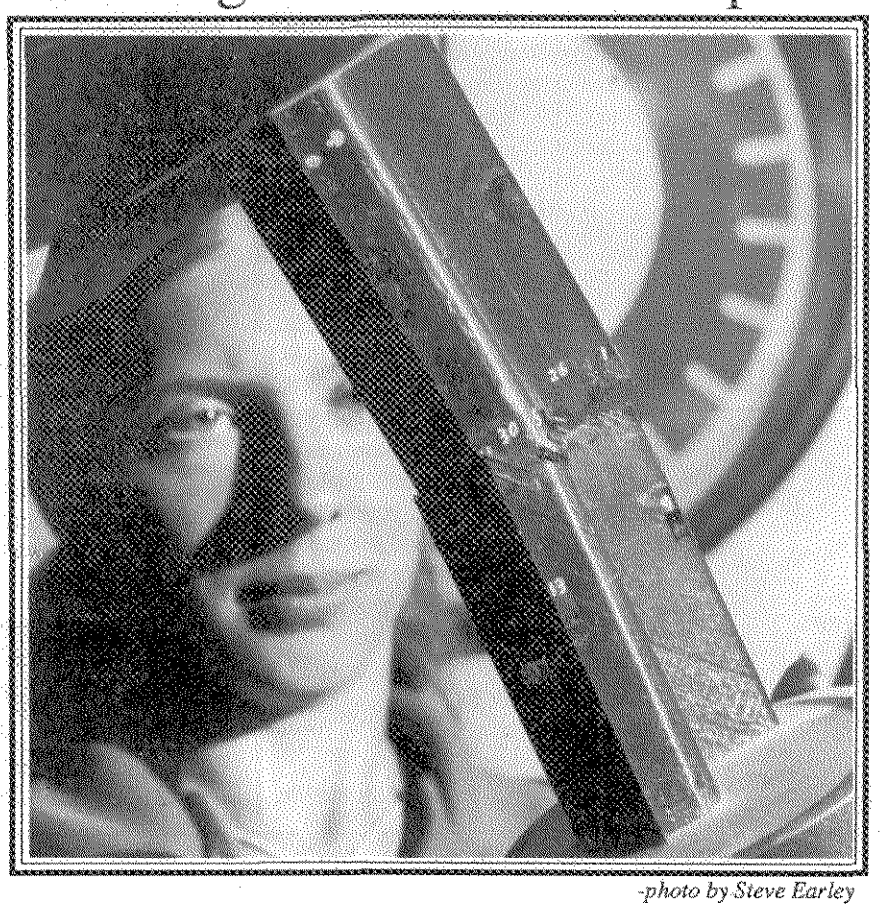
NASA has awarded initial research and development contracts with a potential value of $89 million to 15 aerospace companies and universities as part of the newly-established Advanced Composites Technology (ACT) program.

Recognizing the importance of developing new, high-strength plastics to maintaining U.S. leadership in the manufacture and sale of commercial airliners, NASA is seeking technology breakthroughs in these materials. Such breakthroughs would allow structures made of epoxy-type resins and high-strength carbon fiber to replace metal in the wings and bodies of future transport aircraft.

Extensive use of such "composite" components can reduce structural weight by 40-50 percent, purchase cost by 20-25 percent and the number of individual parts by half. "Composites are the key to maintaining our lead in the transport aircraft industry," said Charles Blankenship, director for structures. "The U.S. share of the transport aircraft manufacturing market has been declining since 1970."

Composite materials have demonstrated large weight savings for aircraft structures and outstanding corrosion and fatigue damage resistance. Depite these advantages, the full potential benefits of composites have been limited by the high cost of materials, labor-intensive manufacturing processes and inadequate technology in structural mechanics and materials science.

NASA researchers hope for breakthroughs in structural concepts, materials and fabrication techniques. The technology developed through the agency's efforts will be transferred to U.S. government agencies and to the American aircraft industry. To help meet these ambitious objectives, NASA is asking industry, government and universities for "innovative ideas for the efficient and cost-effective use of lightweight compostie materials" in aircraft manufacturing. The ACT program is an important part of the overall composites effort.



-photo by Steve Earley

An advanced composites crippling specimen, which failed during a compression test, is examined by aerospace engineer Dawn Jegely. The specimen, made with graphite fiber and damage tolerant resins, was designed to examine stifferer failure.

The development of a solid structural mechanics technology data base will make the ACT objectives obtainable. It will provide scientific understanding of failure mechanisms and establish true limits of performance so that design and analysis procedures may be applied to an airplane's primary structures. Currently, transport aircraft use composite materials only in secondary structures such as control surfaces, spoilers and trailing edge panels.

The multiple-year program will be managed by Langley, under the overall direction of NASA's Office of Aeronautics and Space Technology, NASA Headquarters, and will be conducted in three manor phases.

Phase I is called the "technology innovation" phase. It will last about 36 months, and will focus on basic research in materials and structures to define and develop unique and innovative structural concepts that fully exploit the potential benefits of composites, yet are efficient and cost-effective.

Phase II, the "technology development" phase, also is slated to last 36 months, with the major thrust beginning by early 1992. It will concentrate on the most promising concepts evolving from Phase I for scale-up to element and component-level tests and analyses that will provide the basis for an integrated technology data base.

The first two phases are designed to provide the fundamental technology necessary for Phase III, the "verification phase," a currently unfunded part of the program with a planned duration of three to four more years. Phase III represents a significant effort to establish cost and weight effectiveness on full scale components. This part of the ACT program would establish affordable technology for the development of transport and fighter aircraft primary structures by the mid-1990s.

News Briefs

HEADQUARTERS, Washington, D.C. --- More than 85 NASA-sponsored researchers from 19 states and three foreign countries are participating in 29 cooperative investigations on a Cosmos biosatellite mission launched by the Soviet Union September 8. The Cosmos biosatellite is an unpiloted recoverable spacecraft that accommodates plant and animal experiments. Cooperative investigations on the 14-day Cosmos '89 mission will address questions related to the biomedical effects of prolonged space flight. The Cosmos '89 mission is the seventh Soviet biosatellite mission in which NASA has participated.

AMES RESEARCH CENTER, Mountain View, Calif. --- NASA Ames, Genentech, Inc., South San Francisco, Calif., and Penn State's Center for Cell Research have announced their long-term collaboration on a major new commercial space research project in life sciences. The project involves a series of ground-based and Space Shuttle experiments to expand previous findings by NASA, Penn State and other investigators that microgravity accelerates reduction in bone calcium, body mass and immune cell function. The flight program, sponsored by NASA's Office of Commercial Programs and managed by Ames, is expected to begin in 1990 with a Space Shuttle experiment coordinated by Penn State's Center for Cell Research, one of NASA's 16 Centers for the Commercial Development of Space.

HEADQUARTERS, Washington, D.C. --- Eight high school students will present proposals for Space Station Freedom experiments as national finalists of the Ninth Annual Space Science Student Involvement Program. The program, co-sponsored by NASA and the National Science Teachers Association, gives high school students the opportunity to propose experiments which theoretically could be conducted in space. Students will compete for scholarships and other awards. In addition, two national student newspaper competition winners and three Destination Mars proposal competition winners will be honored.

CFC Message from the Past Chairman

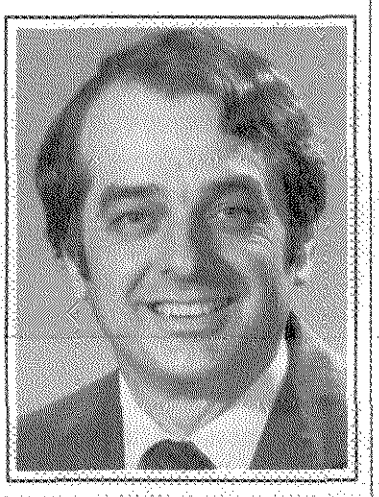
Langley's CFC Participation Traditionally High

As the time approaches for LaRC's annual Combined Federal Campaign (CFC) we need to think about the thousands of people each day who need help in our society. We can be thankful that there are people at dozens of agencies who can meet these needs. We can help by joining with other federal employees in contributing to the Peninsula CFC. Our contributions support the many health, welfare and service organizations within our community. With our support, these organizations continue to help our friends and neighbors throughout the year.

The goal set by this year's CFC committee is once again a challenging one for Langley. Some groups that contributed to the campaign at Langley in the past are no longer included in our campaign. The goal established is greater than the amount contributed by the remaining organizations participating in last year's campaign. To maintain our tradition of always exceeding our goal, we must all participate generously in this campaign.

In my association over the past two years with other federal organizations supporting the Peninsula campaign, I was consistently asked how we obtained such a high percentage of employee participation in our campaign. I told them that I believe our approach, in which each individual is personally contacted and given an opportunity to contribute, is one of the keys to our success. Therefore, enthusiastic involvement of the division representatives and the key people is essential for a successful campaign.

When your key person contacts you on Thursday, October 5, please support those less



fortunate in our community by giving generously to the CFC. You will ensure that the Langley Research Center continues to be recognized as an organization that cares about the communities from which our employees are drawn.

H. Milton Holt
1988 CFC Chairman

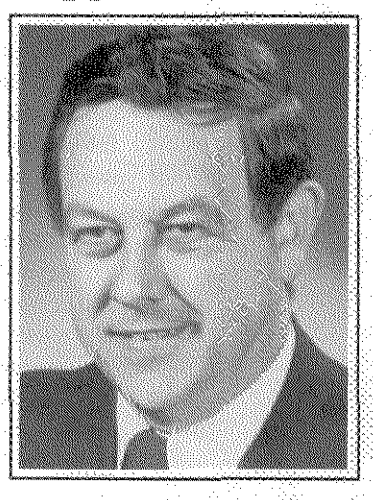
Message from the Alumni Association

Retirees Urged to Support Annual Campaign

Recent **Researcher News** issues have carried articles announcing plans for the annual Combined Federal Campaign at the Center. Changes in federal regulations prohibit the solicitation of Langley retirees directly by the Center now and in future years.

Holding the belief that helping others less fortunate than ourselves is important to all of us, the Langley Research Center Alumni Association's Board of Directors have decided to take over the solicitation of not only Alumni Association members, but all Langley retirees on behalf of the United Way agencies. We feel that we would provide a central focus for our part of the campaign that would otherwise be missing this year.

The Langley retiree has always been a very important contributor to the Center's annual campaign, and I know



most of us still feel part of the Langley family. Our contributions will be separately identified; however, we have arranged for our gifts to be counted as part of the overall Langley goal.

Our first goal has been set at $20,000--a figure readily achieved and surpassed by last year's contributions. I am confident that your generosity in past campaigns will permit us to again exceed this year's goal.

As is the past, you will be contacted by mail and invited to contribute. Literature explaining the many worthwhile organizations' needs and the method of making your contribution will also be enclosed.

William J. Boyer
President
LaRC Alumni Association

Current News Releases

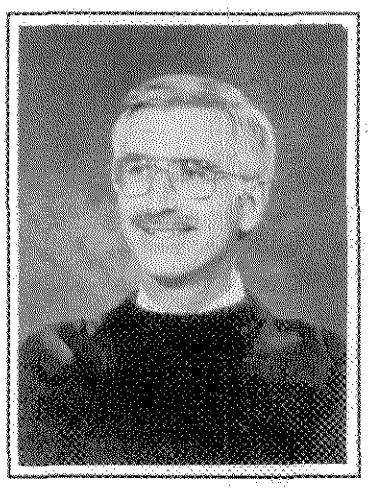
To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-135.....Contracts Aim at Breakthroughs in Aircraft Composite Structures
89-136.....NASA Designates 17 Space Grant Colleges/Consortia
89-137.....Intelsat Selected for C-band Use
89-138.....U.S.-USSR Life Science Investigations to be Launched
89-139.....NASA Announces Collaborative Research Project with Genentech

Editorials

Langley

Headquarters Forum



Like most organizations at Langley and within NASA, the Management Operations (MO) Directorate has put a substantial effort into strategic planning. While strategic planning is not an exciting exercise, it is an important process in order to know where an organization wants to be in five to ten years.

Strategic planning sets the framework for today's decisions. We in MO have followed the same top-down planning process that the Center uses-- involving both situation analysis and stakeholder analysis resulting in a mission statement supported by goals and objectives. Our mission statement was one of the first things we agreed upon and is as follows:

"The mission of the Directorate is to effectively and efficiently facilitate the accomplishment of the Center's mission through innovative and flexible provision of resources management and administrative services working within applicable laws, regulations and policies. Our success will be measured by:

- customer and management feedback;
- internal assessment;
- external reviews."

This mission statement is supported by only two goals: Excellence in mission performance and excellence in human resources management. These goals are to be accomplished through 24 objectives.

Our action plan is to work several of the objectives at any one time. This fall, we will embark upon an effort to work two objectives within the goal of excellence in mission performance. They are (1.) to involve our customers in determining support needs and recommended changes, and (2.) to understand our customers' perceptions of Management Operations services.

We are currently assembling a task team to survey our customers and make recommendations on service improvements. Our plan is to complete this effort by the spring of 1990 in order to use the data to develop a good advocacy package for the Research and Program Management (R&PM) funding necessary to provide better support to our customers.

John F. Stokes
Director
Management Operations

Voluntary Leave Transfer Program

The following employees are approved leave recipients:

o Robert M. Connell, Jr.
o Twanda L. Copling
o Randolph F. Culotta
o Janet L. Edmondson
o Kenneth M. Jones
o Grace N. Rodman
o Bernard Spencer, Jr.
o Catherine B. Worth

If you wish to donate annual leave to these recipients, or wish more information concerning the Voluntary Leave Transfer Program, please contact Linda Park of the Employee Relations Section at extention 42610.

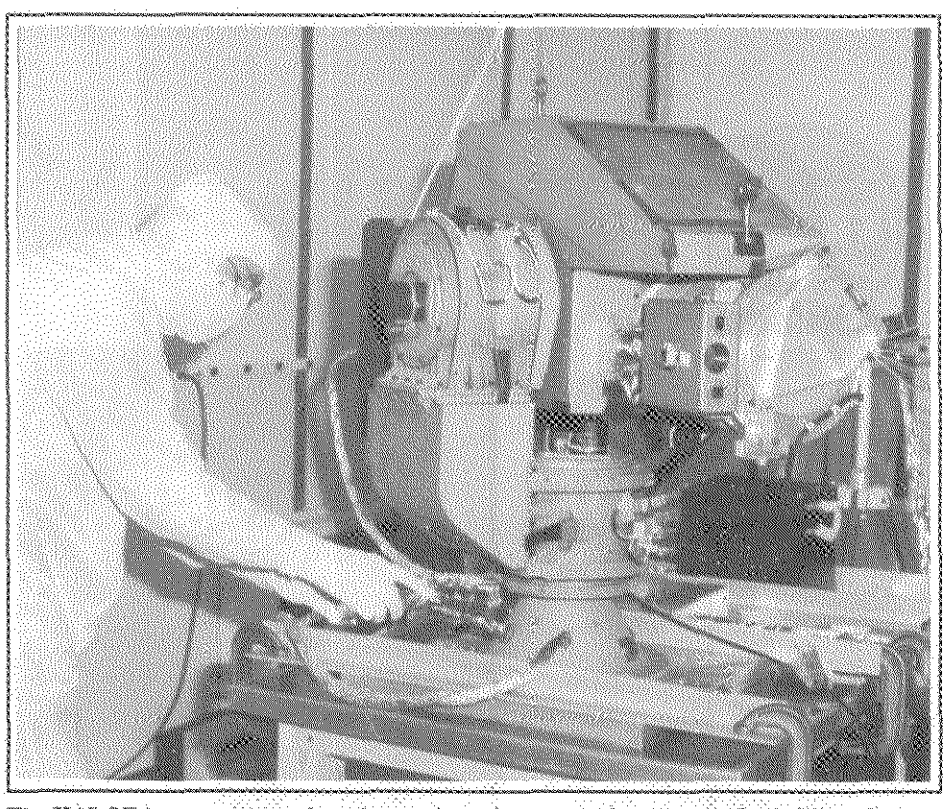
CFC
Virginia Peninsula

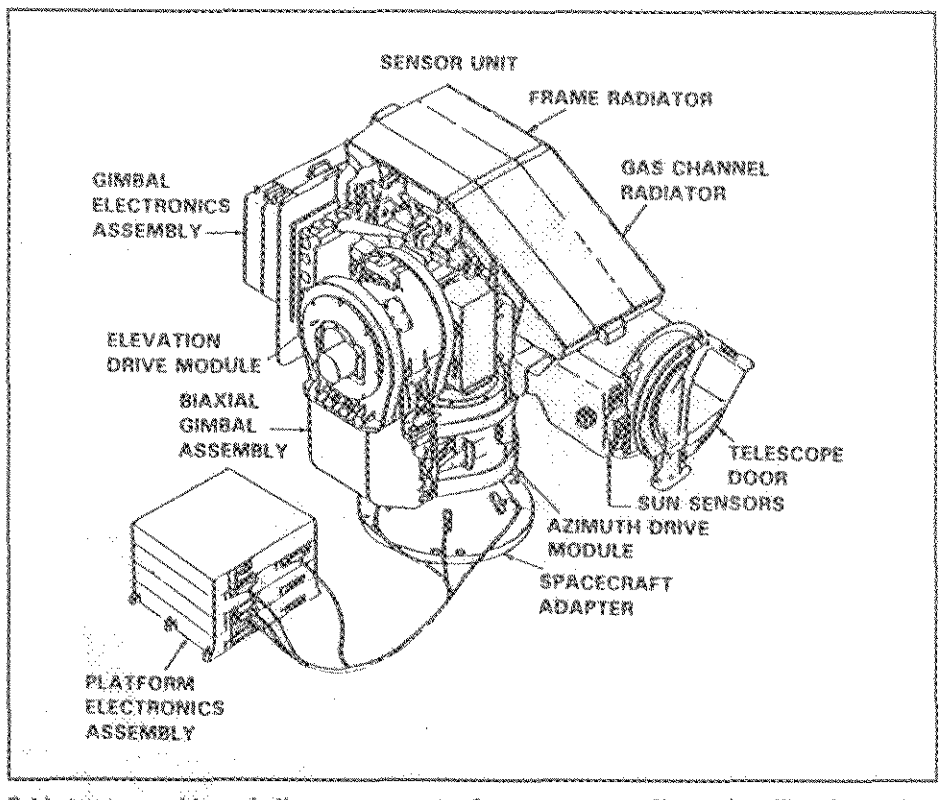
News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.





The HALOE instrument consists of an optics unit supported on a two-axis gimbal and an off-gimbal electronics unit. The optics unit contains the optics, modulators, detectors and preamps for all gas detection channels. A 16-cm diameter reflective telescope collects solar energy for all channels. A stepper-driven calibration wheel is located behind the telescope field stop to provide periodic measurements of gas response, radiometric calibration and instrument balance. The azimuth and elevation gimbal assemblies provide a capability for fine tracking, with tracking control signals derived from the sun sensors. The gimbal electronics unit provides signal processing, motor drives, sequence timing, mode control, power conditioning and data handling.

Langley's HALOE Ships Out

Langley's Halogen Occultation Experiment (HALOE), one of ten experiments to be launched on NASA's Upper Atmosphere Research Satellite (UARS), has reached yet another milestone in its journey to outer space. After 14 years in development, HALOE was shipped to General Electric Corp., Astro Space Division, East Windsor, New Jersey, September 12, for integration onto the satellite now manifested for launch in November 1991.

HALOE was the fourth instrument to be delivered to G. E. for the UARS mission, but will be the first integrated onto the observatory. "In this regard, HALOE serves as a pathfinder in terms of the integration effort," said Jim Raper, HALOE project manager. The instrument will first be mechanically installed and aligned with the observatory, and then be electrically mated.

Why a UARS Mission?

UARS is the first comprehensive space experiment ever mounted to study the coupled chemistry, dynamics and energetics of the Earth's upper atmosphere. It will provide valuable scientific input to critical policy decisions in the 1990s aimed at protecting the thin, fragile ozone layer.

Ozone is our shield against harmful solar ultraviolet radiation and is a major atmospheric driver of the Earth's climate system. It is highly vulnerable to destruction by man-made chemicals and to ongoing changes in the natural Earth system.

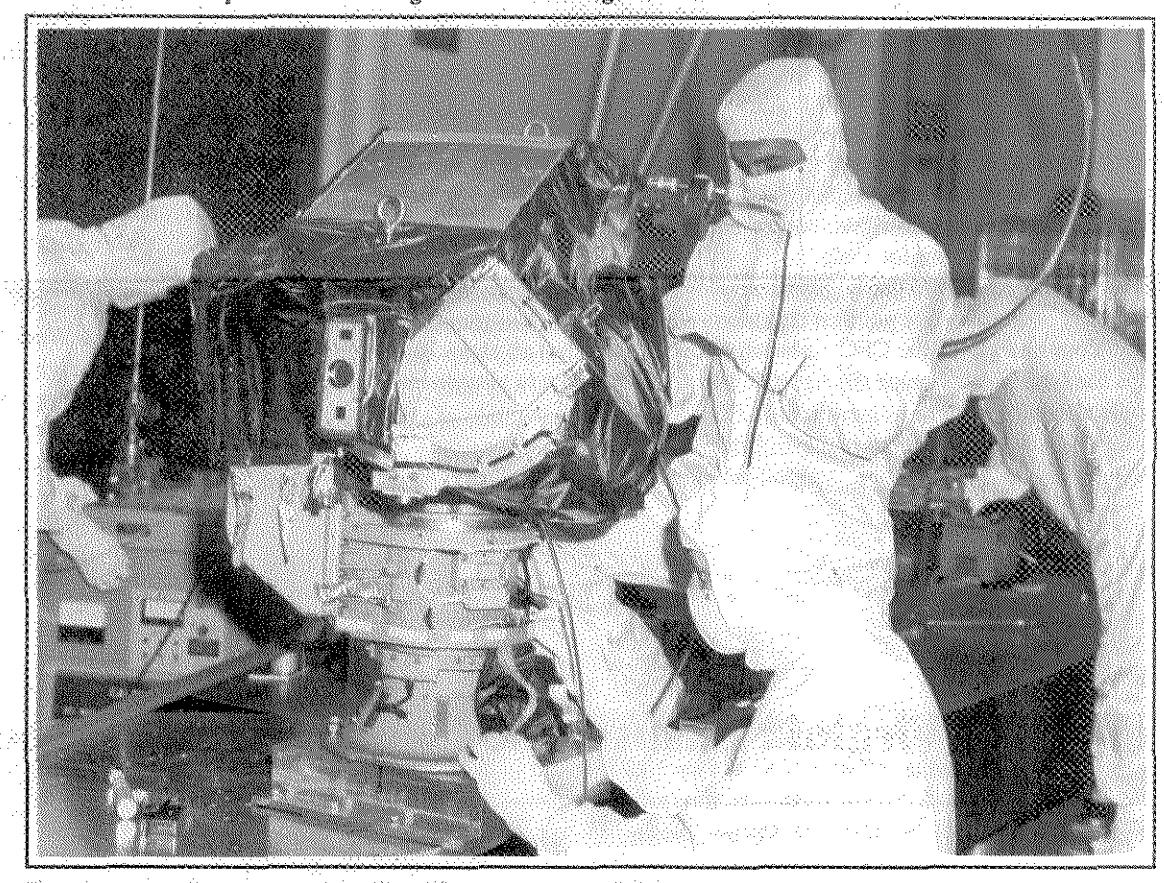
Scientific studies have shown that natural events and human-related activities cause changes in the chemistry and physics of the upper atmosphere. These studies have led to concern that mankind's activities many be altering weather, climate and the shield of ozone that is important to the protection of life on Earth.

HALOE's Role in UARS

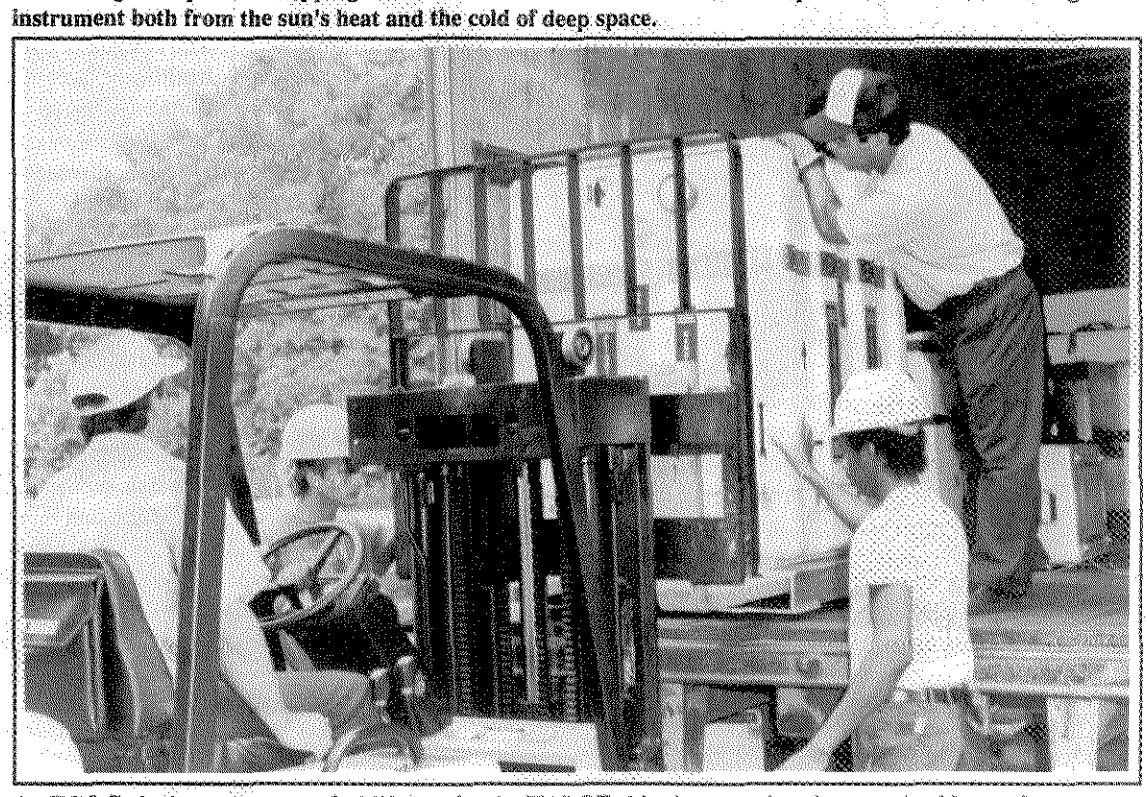
HALOE will provide important data needed to study the effects of chlorine, nitrogen and hydrogen-related compounds on the ozone layer. The long-term near global observations provided by HALOE will allow assessments to be made of the importance of the man-made versus natural sources of chlorine in the upper atmosphere. The HALOE concept was developed under the Advanced Applications Flight Experiment Program and demonstrated through flight tests of a brassboard instrument on the NASA CV-990.

HALOE is a solar tracking instrument designed to monitor the vertical distributions of a number of key upper atmosphere trace gases. Measurements will be made during the sunrise and sunset time of each orbit throughout the UARS mission, providing semi-continuous observations and nearly global coverage for the experiment.

Goddard Space Flight Center has overall responsibility for the UARS mission. Langley Research Center has responsibility for management of the HALOE experiment including fabrication, assembly and testing of the HALOE instrument, reduction of flight data, retrieval of geophysical data and supervision of scientific investigations.



HALOE assembly personnel install multilayer insulation (MLI) blankets on the instrument in the clean room in Building 1202 prior to shipping. The MLI blankets maintain constant temperature in orbit, insulating the instrument both from the sun's heat and the cold of deep space.



An EG&G rigging crew uses a forklift to raise the HALOE shipping container into an air-ride van for transport to GE, Astrospace Division, in East Windsor, N.J., for integration onto the UARS.

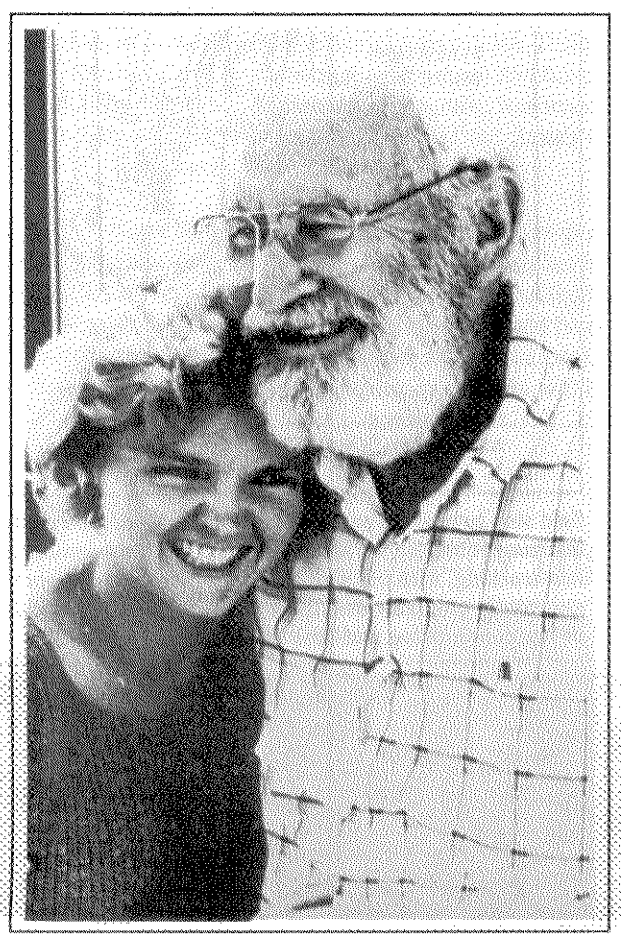
United Way Brings out the Best in All of Us

By uniting those who need help with those who can help, the United Way makes our community better for all of us. The United Way is more than just a group raising money for a worthy cause. It's a community volunteer effort to help all sorts of people in need--from infants to the elderly--right here on the Peninsula.

Forty-one human care agencies rely on the United Way of the Virginia Peninsula. Another 21 social service agencies rely on the United Way of Greater Williamsburg. And the United Way relies on you.

By giving to the Combined Federal Campaign, you are reaching out to someone who needs you. You are making a difference in your own community. The United Way is the link that holds together the caring spirit of our community through a single campaign and an effective and fair fund distribution system. It is a way for people who need help to get help.

Your one gift to the CFC helps the United Way help people all year long.



Without your help, some Peninsula people will go hungry, be left in the cold and feel all alone. By giving a little each week, you are giving a lot to someone in need.

United Way

ICA Helps Share the American Way

Independent Charities of America (ICA) represents 48 charitable agencies which:

- Feed the hungry, both in the U.S. and overseas;
- Shelter the homeless as well as find homes for orphans and children with special needs;
- Promote medical research for AIDs, autism, narcolepsy, leukemia and other diseases;
- Provide services for the disabled, including disabled veterans;
- Help people in depressed areas of America and in Third World countries find environmentally safe and economically viable alternatives for improving their lives and their children's lives;
- Work to protect the human rights and safety of children, refugees and others who do not have the resources to fight for themselves.

Through the ICA, your gift can help build world peace and bortherhood.

NVHA of Virginia Ensures the Good Health Connection

A specially trained instructor helps a patient who has lost her voice box learn an alternate method of producing speech. With determination, such patients can return to active lives.

The National Voluntary Health Agencies of Virginia is everyone's good health connection for services to help ease the effects of illness and disease. The NVHA is a federation of health and human care organizations working to find the cause, cure, control or elimination of illnesses, diseases and conditions which kill and cripple children and adults.

The 65 members of the NVHA benefit from designated funds raised during the Combined Federal Campaign. Member agencies provide a wide range of health needs, including medical research, patient services, public and professional education and referral services.

NVHA works to ensure that everyone enjoys the highest quality of life from the time they are little ones until they reach the golden years.

Langley Participates Campaign--A Case o

Again this year, Langley joins forces with other civilian and military employees to form the Peninsula Combined Federal Campaign. Throug this campaign, we have an opportunity-- once a year-- to contribute to the many health, welfare and community service organizations. The fund we provide make it possible for these agencies t relieve suffering and provide care for the young, the aged, the homeless and the hungry. It is the one campaign which helps people--our families, friends and neighbors--all year long.

The Langley Research Center, the second largest CFC contributor on the Peninsula, has se a goal of $245,000. The money Langley contrib utes will be distributed among the Peninsula United Way, Greater Williamsburg United Way, National United Service Agencies, National Vol untary Health Agencies, International Service

NVHA

ICA Independent Charities of America

Share The American Way

....the gift of self

Combined Federal
'eople Helping People

Agencies, Independent Charities of America and the Environmental Federation of America. Each of these organizations distributes its funds directly to subsidiary agencies.

Langley Research Center will hold its one-day solicitation Thursday, October 5. During the day each employee will have an opportunity to contribute or pledge--through payroll deduction--his or her fair share. A brochure, which lists the recipients of our gifts and describes their programs, will be distributed. Please take the time to study the brochure before making your contribution. Each agency needs your consideration and your support.

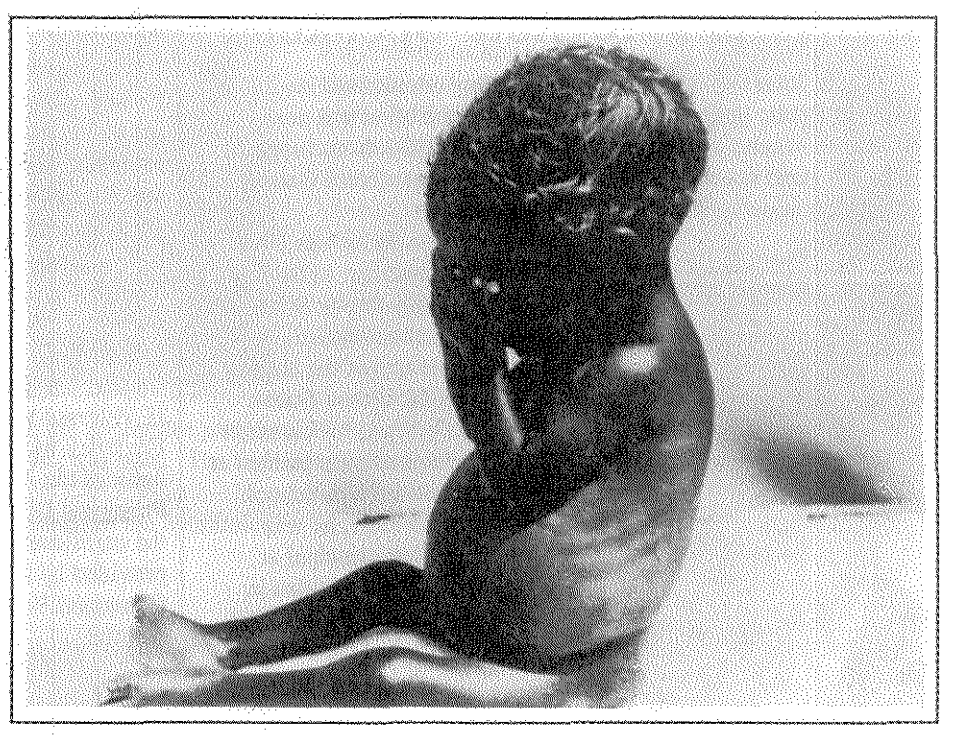
Langley employees play an extremely vital part in shaping our community's future and meeting the needs of our people. Once again, do your part to help fulfill the lives of others. Contribute to the Combined Federal Campaign.

NUSA: Serving You, Serving America

The National United Service Agencies (NUSA) are national voluntary organizations that provide specialized help to assist citizens in achieveing their basic human rights and/or human welfare needs.

These agencies help the disabled, the sick, the educationally impaired, the dying, minority groups, the young and the old, those who have been discriminated against, those who seek to protect the environment, the consumer and the needy. Individually and together they meet just about every category of assistance or advocacy need of importance to government workers and all Americans.

These agencies depend on support from the Combined Federal Campaign to supplement their operating budgets. Your one gift to the CFC helps them all year long.



There is nothing more frightening than being alone. This is the plight of many helpless children in developing countries where population problems are severe.

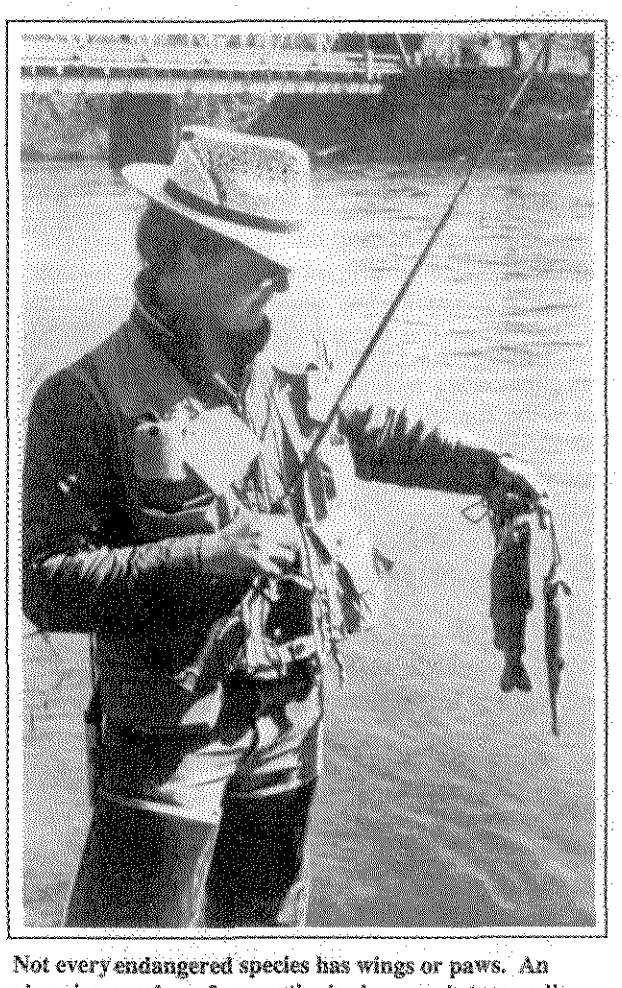
ISA: Making a World of Difference

International Service Agencies (ISA) is a federation of 37 agencies which, last year, assisted over 150 million impoverished people in Latin America, Africa, Asia and the Far East.

Did you know that every ten seconds, three children die of starvation or hunger-related diseases? That many people must walk five hours or more each day to obtain water? That only one in four has safe water to drink? That one in every five children die in childbirth? That, in some areas, one out of every two people cannot read or write?

ISA agencies are among the very first to bring life-saving emergency aid to the victims of disasters, providing critically needed food, medicine, water and shelter. Also, the "self help" programs of the agencies help the poor to gain new hope through farming assistance, education, clean water, medical care and training, small business development, job training and refugee assistance.

Your one contribution to the CFC helps them--and others, locally, nationally and internationally--all year long.



Not every endangered species has wings or paws. An alarming number of our nation's rivers and streams lie motionless behind dams; countless more are drained nearly dry or choked with pollution.

America has a Choice

Americans can choose between being overwhelmed with environmental problems--from toxic wastes, oil spills, air and water pollution, dwindling resources, global warming and the greenhouse effect, to overcrowded cities, species extinction and destruvtion of forests and other natural lands--or we can have a clean and healthy environment which supports our lives with parks and open space, managed and renewable resources and the preservation of those things we hold most precious.

The choice is clear. Making it work demands teamwork.

The Environmental Federation of America gives people the chance to help save America for ourselves and the children who follow us.

The 18 organizations work--often hand in hand with the government--to safeguard the public's health by reducing toxic wastes, acid rain, pesticides and pollutants in air and water. They protect wildlife and wildlife habitats and lands. They provide recreational opportunities that depend on the outdoors, and create and preserve open spaces, parks and nature sanctuaries.

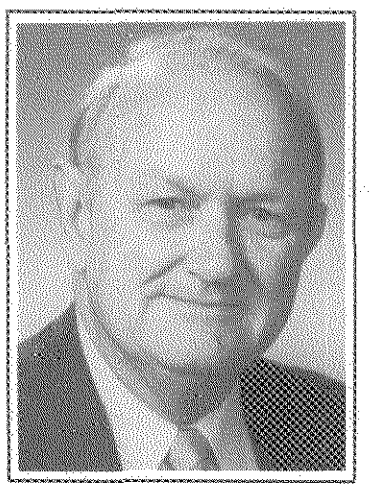
Your CFC contribution can help keep America alive. give today and preserve your right of choice.

NUSA
National | United Service Agencies

ENVIRONMENTAL FEDERATION OF AMERICA

Virginia School Official Is Graduation Keynote Speaker

Dr. S. John Davis, Superintendent of Public Instruction for the Commonwealth of Virginia, will be the guest speaker for the apprentice graduation ceremony October 6.



Appointed by former Governor John N. Dalton, Davis has held this position since 1979. As such, he heads all schools K-12 in the state of Virginia, including educational institutions for the blind and deaf, vocational schools and apprentice programs offered through these schools.

Previously he was Division Superintendent of the Fairfax County Public Schools, the largest school system in Virginia and one of the largest systems in the United States.

Davis began his career in education as a science teacher at Stratford Junior High School, Arlington. In 1955, he was named assistant principal at Kenmore Junior High also in Arlington. From 1958 to 1963 he was director of the Flint Hill Preparatory School in Oakton, Virginia. In 1963, he came to Fairfax County as assistant principal and later acting principal of Fort Hunt High School. In 1966, he was named principal of West Springfield High School in Fairfax.

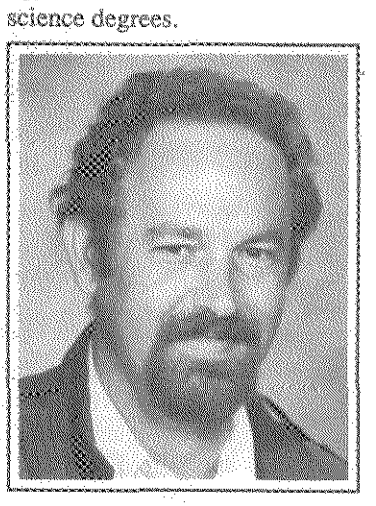
Wampler Elected Class Speaker

Apprentice Accomplishments Are Many

The Langley Research Center will graduate 19 engineering technicians at ceremonies Friday, October 6. Seventy-four percent of the Class of 1989 graduates with honors.

The Forty-Fifth Annual Completion Exercises for Engineering Technicians will be held in the H.J.E. Reid Conference Center. Langley Director Richard H. Petersen will preside and Frederick M. Thompson, coordinator of the Apprentice Program, Personnel Division, will present the certificates. Music will be provided by the Tactical Air Command Band's Woodwind Quintet.

All of the apprentices entered the program with at least two years of college and were given two years' credit toward graduation. Twelve of the apprentices have associate degrees in mechanical technology or electrical engineering technology and four have bachelor of science degrees.



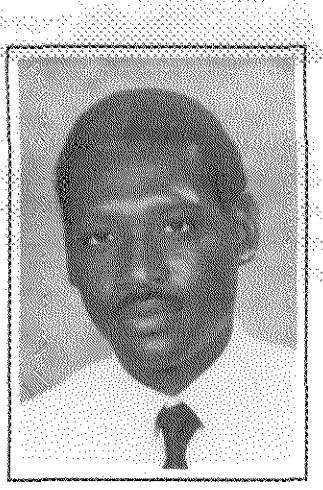
Mark S. Wampler was elected by his classmates as Speaker for the Class of 1989 and will address the commencement assembly.

A graduate of Thomas Nelson Community College with an associate degree in mechanical technology, Wampler entered the apprentice school from Langley's co-op program where he was assigned to the Fabrication Division in the machine shop. He was later selected by competitive placement as an engineering technician designer in the Systems Engineering and Operations Directorate.

Wampler received a Special Act or Service Award for his efforts in computer-aided design in April 1988. He is now a project lead designer at the National Transonic Facility and considers his work on the rehab of the liquid nitrogen fairings among his most valuable contributions to the Center.

Wampler is convinced of the benefit of Langley's apprentice program. "It affords hands-on experience in your area of interest and the opportunity for formal classroom study."

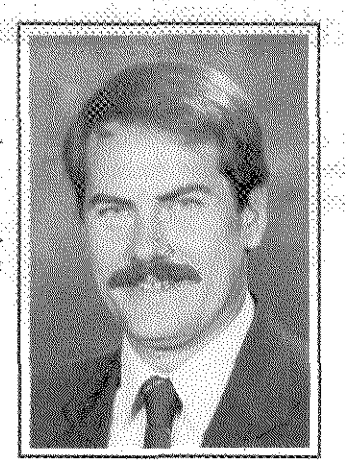
Langley Apprentice Class of 1989



Michael Bell is an engineering technician in the Laboratory Operations Branch, Operations Support Division. He is presently supporting the Materials Division, operating fatigue test systems and other related research equipment.

Bell, a cum laude graduate, is completing his second service apprenticeship. He is presently pursuing a degree in applied science at Thomas Nelson Community College and is interested in test facility design and fabrication.

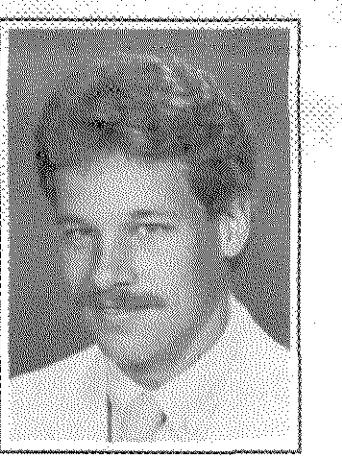
A native of Newark, New Jersey, Bell and his wife, Consuella, reside in Norfolk, Va. They have one daughter, Niki.



James R. Bronson is an electrical engineering technician in the Electrical Drives and Systems Operations Branch, Operations Support Division.

A magna cum laude graduate, Bronson earned an associate of applied science degree in electronic engineering technology from Thomas Nelson Community College. He has received two letters of recognition; one from the 8-Ft. High-Temperature Tunnel for his work in the rehab of that facility and the other for his work in the Vibration Lab.

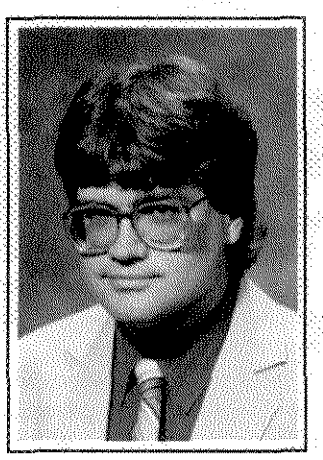
He is currently pursuing a private pilot's license through the Langley Aero Club.



Paul F. Brown is an electronics technician in the Laboratory and Plant Electrical Section, Operations Support Division. He is responsible for setting up instrumentation and designing tests for the Acoustics Lab.

Brown, a former co-op student, holds an associate of applied science degree in electronics. He has received an Outstanding Performance Award for his efforts in the Special Projects Section where he designed, implemented and verified a compute- controlled temperature monitor.

Brown is a magna cum laude graduate of the apprentice program.



Daniel J. Carey, engineering technician in the Fabrication Division, graduates cum laude.

Carey entered the apprentice program upon completion of the NASA Technical Co-op Program with Thomas Nelson Community College, where he earned an associate of applied science degree in mechanical engineering technology.

Assigned to the Advanced Machining Development Section, Metals Applications Technology Branch, Carey is currently supporting the Lidar In-space Technology Experiment (LITE) with the design and fabrication of optics hardware. He has also completed design and developmental work for the Lidar Atmospheric Sensing Experiment (LASE) project.

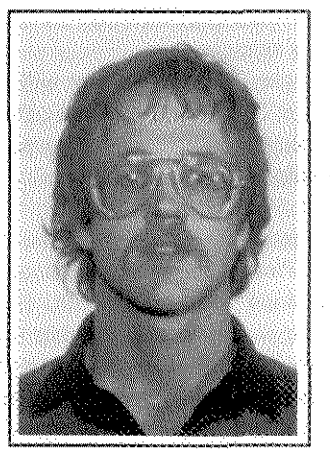
During his apprenticeship, Carey received a Special Achievement Award for his exceptional performance in the support of the HIARS project.

Catharine I. Croall is an engineering technician in the Tunnels Operation Branch, Operations Support Division.

Croall graduated from Virginia Polytechnic Institute and State University with a bachelor of science degree in chemistry and a minor in Spanish. She has received a Special Achievement Award for excellent technical support to the 20-Inch Supersonic Wind Tunnel in completing its shakedown test schedule, a Group Achievement Award as a member of the National Transonic Facility Enhancement Team, and a letter of commendation for the NTF Mishap Investigation.

Croall is a summa cum laude graduate of the apprentice program.

Biographical sketches of apprentice graduates were written by class members Jim Bronson, Shirley Jones and Steve Lee.



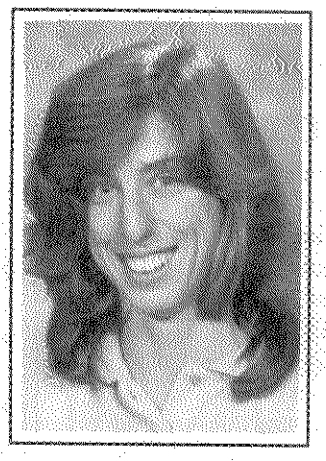
James J. Fay III, engineering technician in the Operations Support Division, graduates summa cum laude.

Fay earned a bachelor of science degree in biology from Old Dominion University before entering the apprentice program.

Assigned to the Unitary Plan Wind Tunnel, Tunnels Operations Branch, Fay prepares wind tunnel models and associated instrumentation for testing; operates the data system which records test information; maintains vacuum, pressure and cooling systems associated with tunnel operation; and is involved with the management and updating of configuration control documents and drawings.

Fay has received a Certificate of Appreciation for his support in the refurbishing of the 16-Foot Transonic Tunnel Fan Blades and two Certificates of Outstanding Performance.

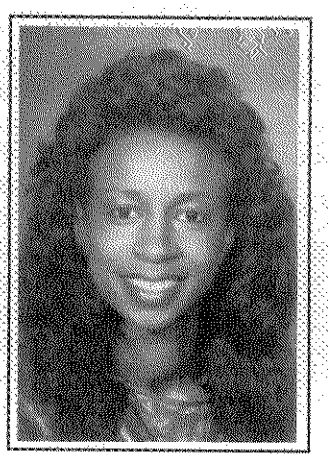
Apprentice Graduation



Leslie K. Heaslet is an electronics technician in the Guidance and Control Division. She entered the apprentice program through the co-op program at Tidewater Community College, where she earned an associate of applied science degree in electronics technology.

Assigned to the Aerospace Control Research Laboratory, she supports research scientists through set-up and execution of laser optics experiments, microprocessor programming, and creating holograms.

She has received a Group Achievement Award for her contributions to the Space Control Laboratory Experiment (SCOLE).

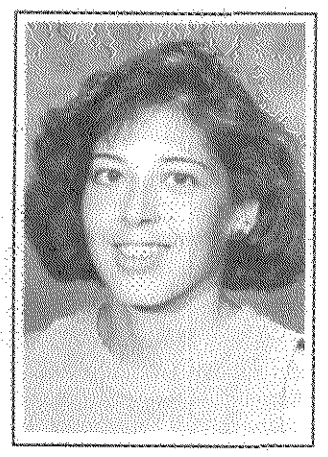


Christal Kellam is an electrical engineering technician in the Hypersonic Continuous Flow Facility, Operations Support Division.

Kellam entered the apprentice program with an associate degree in applied science in electronics technology from Norfolk State University.

During her participation in the apprentice program, her second child, Jerry Kellam, Jr., was born. The family resides in Suffolk, Va.

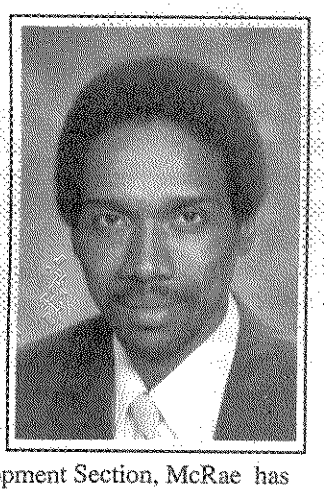
Kellam graduates cum laude from the apprentice program.



Shirley M. Jones, engineering technician in the Operations Supprt Division, graduates summa cum laude. She earned a bachelor of science degree in biology from Christopher Newport College.

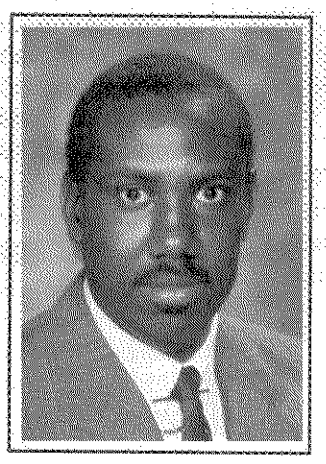
Assigned to the 7- x 10-Foot High-Speed Tunnel, Jones is responsible for test model installation and modifications; instrumentation design, installation and maintenance; facility equipment operation and safety maintenance; data acquisition and updating facility documentation.

She received a Certificate of Appreciation for her support of the refurbishment of the 16-Foot Transonic Tunnel Fan Blades.



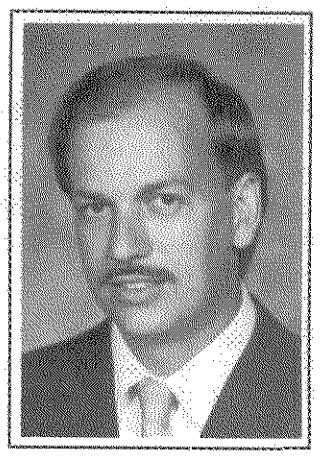
Jimmy L. McRae, engineering technician in the Fabrication Division, graduates magna cum laude. He entered the apprentice program through the co-op program at TNCC where he earned an associate of applied science degree in mechanical engineering technology and a certificate in electricity.

Assigned to the Advanced Machining Development Section, McRae has received a Special Achievement Award for his exceptional performance in the fabrication of the Advanced TurboProp (ATP) freeflight model and a Group Achievement Award for his contributions to the development and engineering of the advanced color display system.



Steve M. Lee is an engineering technician in the Laboratory Operations Branch, Operations Support Division. He is presently supporting the Applied Materials Branch in the Multiparameter Facility conducting evaluations on oxidation-resistant carbon-carbon composite materials in simulated NASP airframe mission environments.

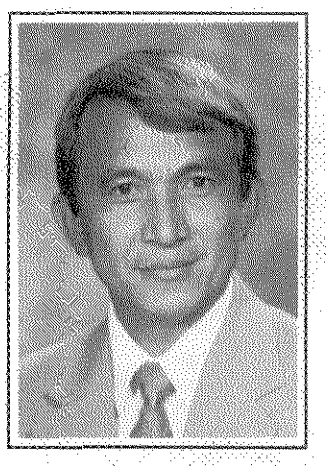
Previously employed by the Norfolk Naval Shipyard, Lee transferred to Langley in 1985 and is now completing degrees in engineering and architecture.



Joseph G. O'Donnell, Jr., is a mechanical engineering technician in Technical Support Section C, Operations Support Division. He supports the 8-Ft. High-Temperature Tunnel, the 7-Inch Pilot Tunnel and the Arc Jet.

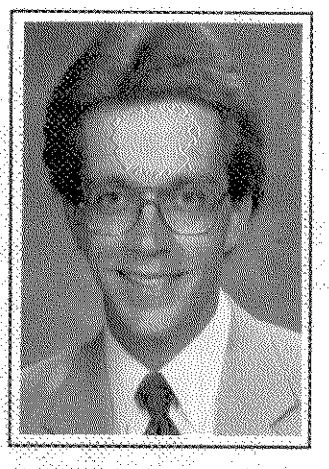
O'Donnell earned a bachelor's degree in business administration from Old Dominion University and an associate in applied science degree in electronic engineering technology from Thomas Nelson Community College.

He was awarded a Superior Accomplishment Award for his work on the Actively Cooled Test Stand (ACTS).



Ruperto T. Razon, an engineering technician in the Laboratory Operations Branch, graduated from Tidewater Community College with an associate degree in engineering and is graduating magna cum laude from the apprentice program.

Razon has earned Special Achievement Awards for exceptional performance in the development of a high pressure seal ring test fixture and for improved filter cleaning procedures for the Hypersonic CF4 Facility as well as a Suggestion Award for exceptional technical support of thermal and mechanical property measurement at the Polymetric Materials Lab.

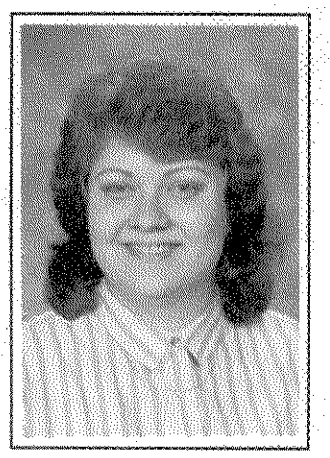


Michael Smock, a mechanical engineering technician in the Fabrication Division, graduates cum laude. He entered the program through the TNCC co-op program, where he earned an associate in applied science degree in mechanical engineering technology.

He has received Commendations for Outstanding Workmanship and Cost Avoidance, Certificates of Appreciation for his efforts on Fan Blade Rebuild and HALOE projects, and a Superior Accomplishment Award. He is currently assigned to the HALOE project where he has manufactured and constructed components for HALOE.

Alan P. Scheidegger, engineering technician in the Fabrication Division, graduates magna cum laude. He entered the apprentice program through the co-op program at TNCC, where he earned an associate of applied science degree in mechanical engineering technology.

Assigned to the Advanced Machining Development Section, he is responsible for the operation of numerically controlled equipment for machining components in support of Large Space Structures. He has received two Special Achievement Awards and a Group Achievement Award for his contributions to the HALOE project.



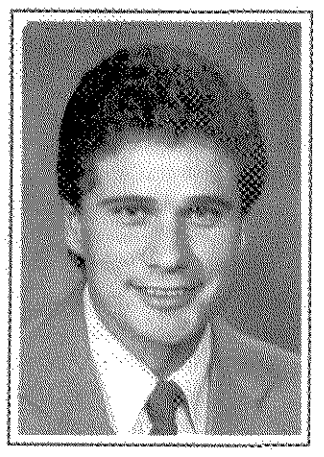
Debra P. Shimek Mabe, engineering technician in the Systems Engineering Division, graduates summa cum laude with a 4.0 GPA. She entered the program through the co-op program at TNCC, where she earned an associate of applied science degree in mechanical engineering technology and was listed on the President's Honor Roll, the National Dean's List and was granted a partial academic scholarship. She is now pursuing a bachelor of science degree in mathematics at Christopher Newport College.

Among numerous awards, she has received a Special Achievement Award for the F-106B Vortex Flap and a Certificate of Appreciation for HALOE .

Teresa L. Wallace-O'Neil, an engineering technician in the Laboratory Operations Branch, is assigned to the Structures Materials Laboratory. She primarily supports the Dimensional Stability Laboratory.

Wallace-O'Neil attended Old Dominion University where she majored in physics.

She has received Special Service Awards for work performed at the Aircraft Landing Dynamics Facility and the Structures and Materials Laboratory. She also received a letter of commendation for her work in the Subsonic Aerodynamics Branch.



Timothy G. Wood, an engineering technician in the Fabrication Division, entered the apprentice program through the co-op program at Thomas Nelson Community College where he graduated with honors. He is assigned to the CNC Unit where he fabricates components for the large Space Station Structures Project.

Wood has received a Superior Accomplishment Award for exceptional performance in support of the LITE Project and a Special Achievement Award for performance in support of the Space Station Rotary Joint. He graduates summa cum laude from the apprentice program with a 4.0 GPA.

Happenings

LAA SOCIAL will be held Friday, September 29, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, September 27, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center, Building 1222. Share your good fortune. Give the gift of life.

NASA TOASTMASTERS will meet Wednesday, September 27, at 11:30 a.m. in Building 1212, Room 200. Guests are welcome. Time in attendance up to one hour may be charged to A-1619. For additional information, call Steve Yaros, ext 43050.

MEDITATION. Starting a weekly noontime meditation group. All beliefs encouraged. Beginners are welcome. Call Karen, ext. 41492.

NASA INTERCENTER RACES will be held during October with 10 KM races on Oct. 2, 12, 16 and 26; and 2 Mile races on Oct. 5, 10, 19 and 23. All races start at 5 p.m. on Doolittle Road, except the 2 Mile race on Oct. 10, which will be on the Bethel HS track at 12 noon.

AFGE LOCAL 2755 will meet Wednesday, September 27, at 4:38 p.m., in the Union Office, Building 1232B. Call Sandra Zumbrun, ext. 44548, for details.

FOR SALE: HOUSE. Two-story contemporary, nearly new! Open FR/Kit, LR, DR, 3 BR, 2 1/2 BA, screened-in porch, double garage. Gas heat, central air. 1950 sq. ft. $136,000 by owner. York Co./Tabb Lakes. Call 876-8346 after 6 p.m.

FOR SALE: HOUSE. Cozy 2 BR, 1BA, DR, LR w/FP, sunroom. Detached garage with rental apartment. Assumable. $76,900. Call 722-6766.

FOR SALE: REFRIGERATOR, General Electric. 25 years old, fair condition. $40. Call 826-4472.

WANTED: ROOMMATE. Male to share townhouse in York Crossing; 1/2 mo. rent plus 1/2 utilities; townhouse features 2 BR, 1 1/2 BA, DR/Kit comb. w/FP, LR, W/D, A/C. Available Nov. 1. Call 898-5113 after 5 p.m.

APPRENTICE JACKETS available to current apprentices and those who have ever completed the Apprentice Program. Orders accepted Thurs., Sept. 28. Call Fred Thompson, ext. 42595.

Annual D.C. Trip

A trip to Washington D.C. is planned for Saturday, October 7, 1989. Plans include a matinee performance at the National Theater of *The Three-Penny Opera* starring Sting. Time for shopping and sightseeing is included plus a stop at Potomac Mills for some early Christmas shopping! Transportation is by deluxe motorcoach. Cost is $60 per person due September 25 to Donna Speller, ext. 46636.

Hispanic Heritage Remembered

September 10-16 was designated by President Bush as National Hispanic Heritage Week. During this week Langley paid tribute to our Hispanic employees by serving special foods in the cafeteria and distributing literature which highlights the achievements of Hispanics.

Retirement Party

Bill DeShazor will be honored at a retirement party, Wednesday, October 4, in the H.J.E. Reid Conference Center. Festivities begin with a cash bar at 5 p.m. followed by heavy hors d'oeuvres. Cost is $7/person. Donations of $2.50 for a gift are welcome. Contact Velma Clark, ext. 43785, by September 27.

Langley Holds CFC Kickoff

Director of William & Mary MBA Program Gives Keynote Address

Langley Research Center will begin the 1989-90 Combined Federal Campaign with a special kickoff ceremony Friday, September 29.

Dr. Donald J. Messmer, director of The College of William and Mary's executive MBA program, will speak on this year's theme, "Be A Hero," at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222. Langley division chairmen, key solicitors and new employees are invited to hear Messmer speak at the kickoff ceremony. the CFC film, "You Are My Hero," featuring Hollywood's Churck Norris and former astronaut Rick Hauck, will be shown during the kickoff program.

Messmer, president of the Greater Williamsburg United Way, is also J. S. Mack professor of business administration at W&M and president of Mid-Atlantic Research Inc., a management consulting firm with offices in Williamsburg.

Messmer holds a doctorate in marketing and quantitative methods from Washington University in St. Louis. His research includes work which has appeared in a number of journals and he has been an associate editor for **Decision Sciences** and a feature editor for **Decision Line**.

USAF Group Performs at Coliseum

Tops in Blue, the U. S. Air Force's entertainment touring group, will perform at the Hampton Coliseum, October 5, at 7:30 p.m.

Although admission is free, a ticket is required for admittance. For ticket information, contact Senior Airman Dana Flores at 764-2010.

Researcher News

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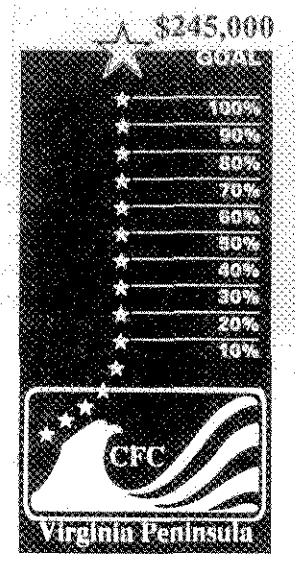
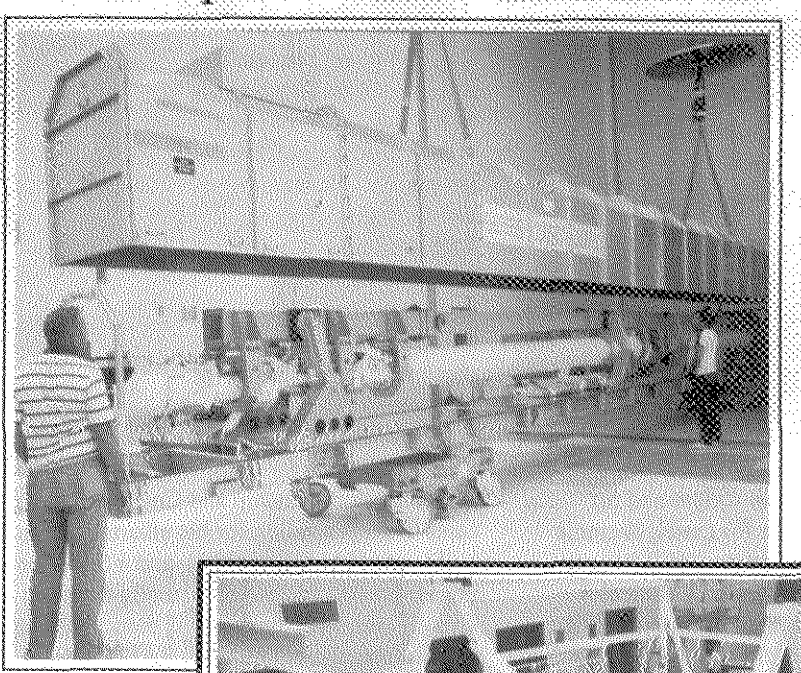
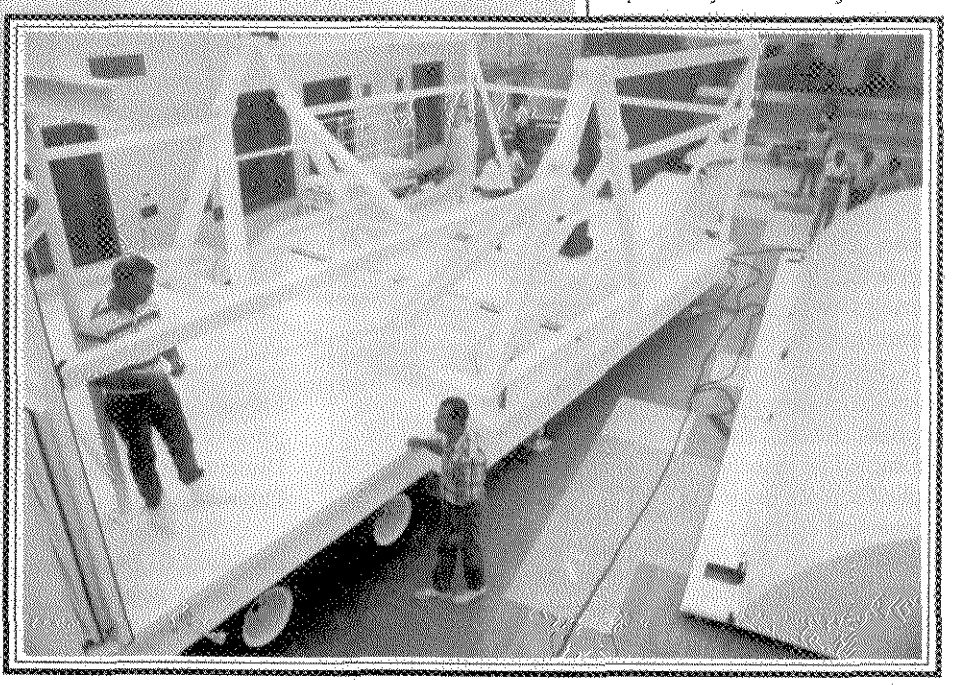


LDEF Preparations Continue: From Retrieval to Research



Signs of preparations for the retrieval of the Long Duration Exposure Facility (LDEF) continue to appear at the Kennedy Space Center in Florida. KSC workers (left) unveil the remote manipulator system (RMS) or robot arm that will be used by astronaut mission specialist Bonnie Dunbar to retrieve Langley's satellite in December.

-photos by Steve Earley



Langley technicians Vance "Sonny" Overbay (left) and Frank Boyer construct the LDEF assembly and transportation system (LATS) which will house LDEF once it is returned to KSC for facility and experiment activities in January. Designed and built at LaRC, LDEF is the first spacecraft to place experiments in space for a long period of time and then return the experiments to Earth for comprehensive laboratory analysis.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 3, Issue 20 October 6, 1989

Langley Researcher News

Bi-weekly Employee and Contractor Publication

Center Leaders Receive Presidential Awards at Washington Ceremony

Center Director Richard H. Petersen was presented a Distinguished Presidential Rank Award by President George Bush in a special ceremony in Washington, D.C., Thursday, September 14.

In addition, Langley program directors Frank Allario, director for electronics; Jeremiah F. Creedon, director for flight systems; and W. Ray Hook, director for space, were presented Meritorious Presidential Rank Awards.

With these awards, "we honor some of America's finest--those men and women of the Senior Executive Service who serve our country with integrity and unwavering commitment to excellence, faithfully executing the will of the American people," said President Bush. "Through their leadership, hard work and sacrifice, Presidential Rank Award recipients are outstanding examples to all of us of what can be accomplished by talented individuals dedicated to serving their fellow Americans."

The President conferred on Petersen the rank of Distinguished Executive in the Senior Executive Service (SES) for "sustained extraordinary accomplishment in management of programs of the United States Government and for leadership exemplifying the highest standards of service to the public, reflecting credit on the career civil service."

At Langley Research Center, Petersen directs the aeronautical and space programs, all facilities, personnel and administration of the first aeronautical research laboratory established by the federal government. He is also an advisor to the NASA Administrator on NASA programs.

Petersen came to Langley in July 1980 as deputy director. He joined NASA at Ames Research Center, Moffett Field, California, in 1957 and advanced to chief of the Aerodynamics Division where he directed a 200-person team conducting research in aerodynamics and fluid mechanics.

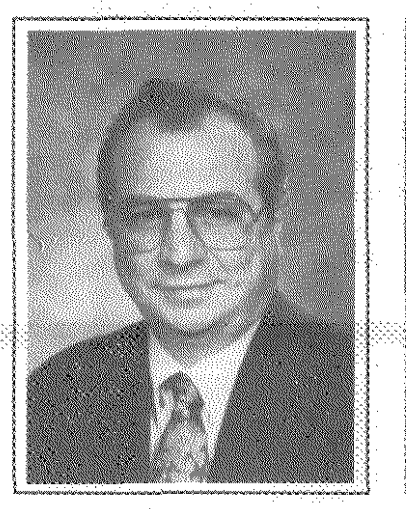
Allario, Creedon and Hook were awarded the rank of Meritorious Executive for their outstanding contribution to the management of NASA programs.

Allario assumed his position as director for electronics May 1. He began his NASA career in November 1967 as an aerospace technologist. He has served as head, Laser Physics and Applications Section, group leader and principal investigator of the Laser Heterodyne Spectrometer Experiment, and assistant chief and chief of the Flight Electronics Division.

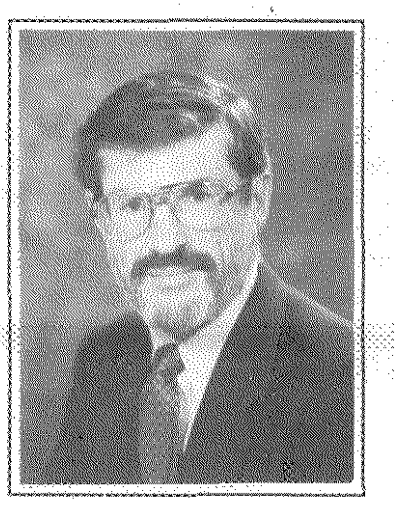
Creedon assumed his position as director for flight systems in July 1985. He joined Langley in June 1963 as a research engineer in the Navigation and Guidance Research Branch. In 1970, he was named head of the Control and Information Systems Section and, in 1979, became assistant head of the Avionics Technology Research Branch. In 1982, he was named chief of the Flight Control Systems Division.

Hook assumed his position as director for space in October 1988. He began his federal career at Langley in 1955 as an aeronautical research intern. After serving in the U.S. Air Force, he returned to Langley in 1958 as an aerospace engineer. In 1969, he was selected assistant head of the Advanced Aerospace Studies Branch, and, later, head of the Systems Analysis Branch. He was assigned to NASA Headquarters, Washington, D.C., as acting director for Space Shuttle technology payloads. He was also head of Langley's Shuttle Experiments Office and the Systems and Experiments Branch. Prior to his present position, he was head of the Space Station Freedom Office.

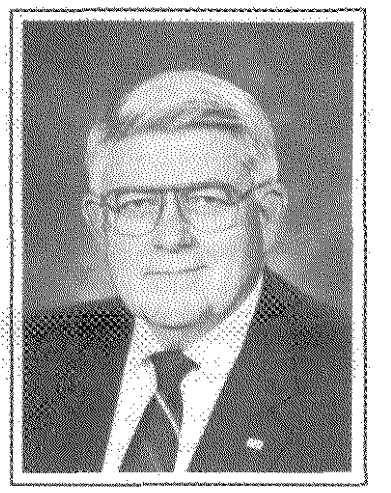
Each year only one percent of SES executives may receive the rank of Distinguished Executive and only five percent may be named Meritorious Executive.



Frank Allario



Jeremiah F. Creedon



W. Ray Hook

Langley Colloquium

Author to Discuss "How We Allowed Japan to Take the Lead"

"Clyde Prestowitz has painted a devastating picture of Japanese economic success and American industrial neglect. It is a world in which the United States plays by very different rules and bears a much heavier international burden. Prestowitz lays down a challenge for the United States that calls for a revolution in American thinking about world competition."

These words summarize the thrust of "Trading Places: How We Allowed Japan to Take the Lead," written by Clyde V. Prestowitz Jr.

Prestowitz will review his book and his beliefs about the rise of Japan and the fall of the United States in economic and technological superiority at a Langley colloquium Tuesday, October 10, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222.

His book has been praised as one of the most significant of our time. Prestowitz argues that government policies of Japan and the United States, rather than management practices or individual excellence, have been the main factors in the loss of U.S. leadership in semiconductors, machine tools, computer chips, automobiles and computers.

According to Prestowitz, Japan's latest technology drives include advanced materials, aircraft and space. In Japan, the government fosters technology very differently than in the United States. For example, the government, rather than industry, undertakes the risk of investment. It also makes interest and energy rates low for industry and high for consumers.

Prestowitz is a senior associate for the Carnegie Endowment for International Peace. Previously he was counselor on Japanese affairs to the Secretary of Commerce.

Partnership Will Preserve the Past

-by Allan C. Hanrahan

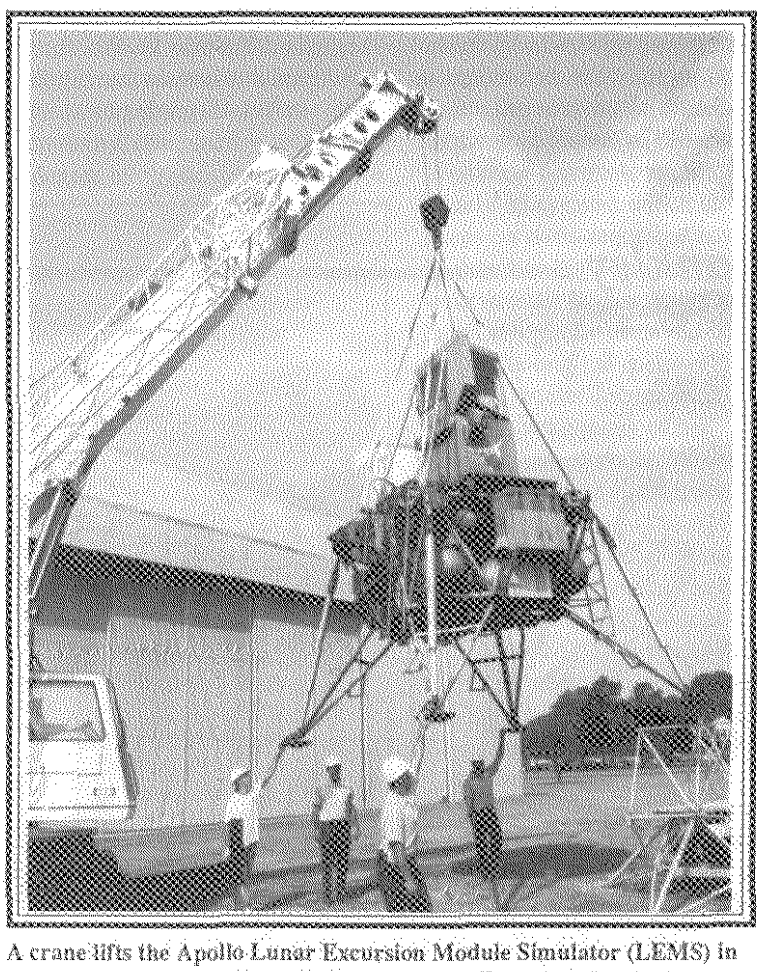
The Apollo Lunar Excursion Module Simulator (LEMS), used to help train every astronaut who set foot on the moon, has been transported to the New Horizons Technical Center (NHTC) in Hampton. At New Horizons, students will restore the historic landmark and prepare it for display in the Virginia Air and Space Center in downtown Hampton.

The NHTC will perform the work in partnership with Langley, the National Historic Landmarks Commission and the Virginia Air and Space Center.

"We think of space as the future, but now we have to think about preserving the past in space, " said NHTC Director Dr. Ralph W. Johnson, referring to the four-way partnership that will preserve the lunar module.

The module was part of the Lunar Landing Research Facility, a unique resource that allowed NASA to train Apollo astronauts to fly in a simulated lunar environment. Neil Armstrong, Edwin "Buzz" Aldrin and 22 other astronauts used the facility to practice piloting problems they would encounter in the last 150 feet of descent to the surface of the moon.

"While refurbishing," stated Principal Dr. Patrick M. Konopnicki, "the students will learn the engineering design and construction principles of the 'Lander' from actual engineers and technicians who worked on the project. The students will be working from original blueprints and photographs.



A crane lifts the Apollo Lunar Excursion Module Simulator (LEMS) in preparation for its move to the New Horizons Technical Center for refurbishment. The national landmark will be displayed locally.

News Briefs

HEADQUARTERS, Washington, D.C. ---A study examining in detail some 250 commercial uses of NASA-furnished technology has identified estimated economic benefits totalling nearly $22 million in sales revenues and cost savings, and an employment impact of more than 350,000 jobs. The study, entitled An Exploration of Benefits from NASA "Spinoffs," was conducted for NASA by the Chapman Research Group, Application Center, located in Tolland, Conn. More than 400 companies were contacted to research the economic benefits derived from NASA-developed or provided technology in terms of sales revenues and cost savings, generation of jobs and contributions in federal corporate income taxes.

JOHNSON SPACE CENTER, Houston, Texas --- The first of several groups of prospective astronauts arrived at the Johnson Space Center on Monday, September 18, to begin a week of orientation, interviews and medical evaluations. Approximately 100 of the nearly 2,500 total applicants are expected to be interviewed over the next several weeks for an opportunity to be among the final 15 to 20 who will be named astronaut candidates in January 1990. The first group of 20 includes James A. Jones, Lt. Cdr., USN, from Virginia Beach. Astronaut selections are conducted on a bi-annual basis.

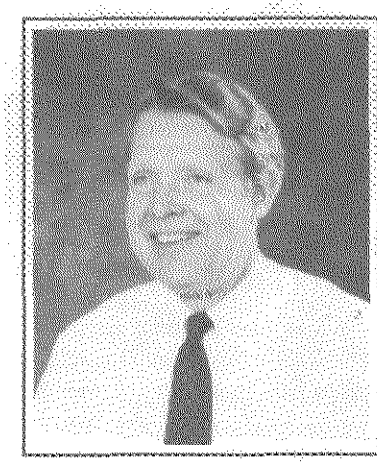
HEADQUARTERS, Washington, D.C. --- NASA's Educational Affairs Division, Washington, D.C., through Oklahoma State University, Stillwater, transmitted via satellite, an educational video conference October 3 discussing upcoming solar system exploration missions and the recent Voyager encounter with Neptune. Dr. Leonard A. Fisk, associate administrator of Space Science and Applications, discussed NASA's upcoming space science and planetary missions. Dr. Edward C. Stone, Voyager Project Scientist, NASA's Jet Propulsion Laboratory, Pasadena, Calif., discussed the recent Voyager 2 encounter with Neptune and showed imagery of the planet and its recently discovered massive dark spot, rings and moons.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA has opened its computerized science data bases to the nation's universities to stimulate "cottage industry" space research by professors and entice more students to specialize in science and engineering studies. Through the new Joint Venture (JOVE) Program, NASA makes available scientific and engineering data generated from space missions in exchange for analysis and interpretation by faculty members and students. In 1989, NASA is expected to generate several trillion bits of raw science and engineering data--roughly equal to the amount of information stored in the Library of Congress.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has announced the appointment of Jerry J. Fitts as the deputy associate administrator for Space Operations, effective Oct. 8. Fitts will succeed Charles T. Force, who was appointed the associate administrator for Space Operations in July 1989. The Office of Space Operations manages the agency's worldwide data and tracking network, which tracks and communicates with all manned and unmanned spacecraft and interplanetary probes.

Editorials

A Message from the Director:



Today the NASA Langley Apprentice Program graduates 19 engineering technicians. I congratulate the young men and women of the Class of 1989. You have distinguished yourselves through your perseverance and through the numerous awards you have received for outstanding performance in assignments all over the Center.

Originated in 1941 as a vehicle to bolster aeronautical applications and research, the apprentice program has provided 1,237 journeyman technicians to NASA. The six-year program, conducted in cooperation with Thomas Nelson Community College, Tidewater Community College and Elizabeth City State University, identifies talented individuals and fosters and channels this talent to benefit NASA.

I note with pride that seventy-four percent of the Apprentice Class of 1989 graduates with honors. Special congratulations go to Mark Wampler, elected by his peers as class speaker, and to Debra Shimek Mabe and Timothy G. Wood, who graduate summa cum laude with perfect 4.0 grade point averages.

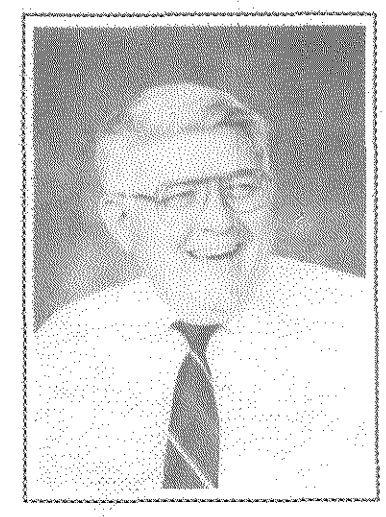
I wish all of you continued success as you begin your new careers.

Pete Petersen

Richard H. Petersen
Director

Langley

Headquarters Forum



Perhaps, for the first time since the Kennedy-Johnson era, we have an administration which is demonstrably pro-NASA. On the occasion of the twentieth anniversary of the Apollo 11 landing on the moon, President Bush set the goal for the nation to complete Space Station, carry out Mission to Planet Earth, establish a permanent base on the moon and land people on the planet Mars. Space Station Freedom is to be completed in the decade of the 90s, the lunar base in the first decade of the new century and a human landing on Mars in the second decade.

Admiral Truly has assigned Aaron Cohen, director of Johnson Space Center, Houston, Texas, to head a task force to plan the details of this new initiative. The planning is being carried out by task teams assembled at Johnson for overall mission planning, Marshall Space Flight Center in Alabama for transportation systems and NASA Headquarters Office of Aeronautics and Space Technology (OAST) for technology needs and facility requirements. Langley is actively participating at all locations with studies being carried out here to supply key information.

The broad plan has Mission to Planet Earth starting with Eos (Earth Observing System) beginning in 1991, followed by a geoplatform initiative beginning in 1996. The S. S. Freedom will begin assembly in 1995, be inhabited in late 1996 and fully complete by the end of the decade. In 2002 or 2004, the first element of the lunar outpost would be launched. The base would be staffed by 2010.

In 2015, the first piloted mission to Mars would be launched from Space Station Freedom. In fact, S. S. Freedom will be the departure point for missions to the moon, Mars and geosynchronous orbit.

When supporting these launches, S. S. Freedom is referred to as an Earth transportation node. Langley is responsible to NASA's Exploration Office for establishing transportation node requirements and to the Space Station Program Office for evoluntionary designs which allow S. S. Freedom to grow to fill the future need.

These new missions will place increasing demands on Langley. We will need to accelerate some of our technology efforts and broaden others. Also, Langley will likely be assigned a development role commensurate with our technical interest. Obviously we expect additional human and fiscal resources to support much of the new work.

We have exciting and challenging times ahead.

W. Ray Hook
Director for Space

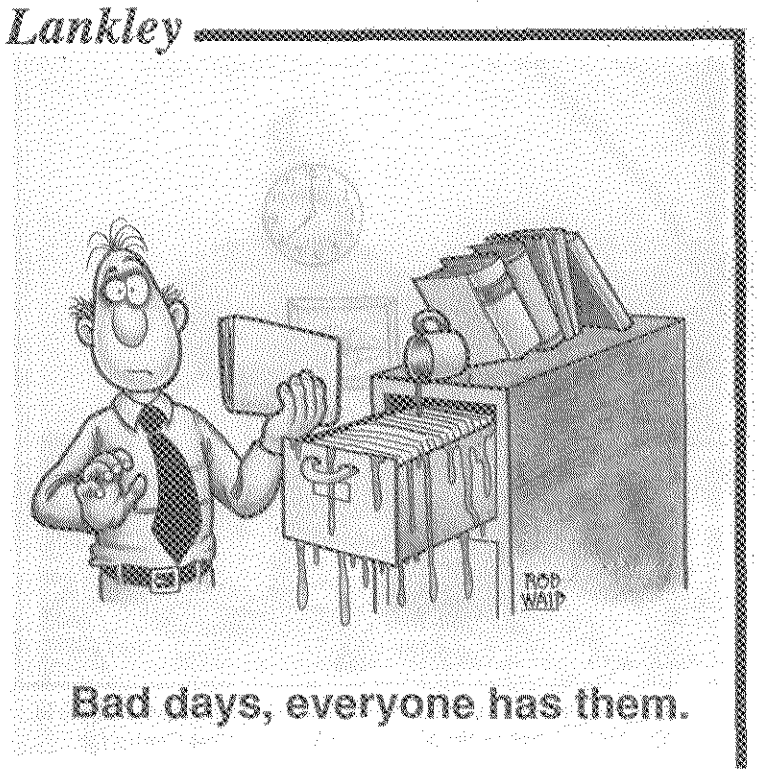
LEMS Personnel Expertise Needed

New Horizons Technical Center (NHTC) is interested in identifying NASA employees who worked with the Lunar Excursion Module Simulator (LEMS) and/or the Lunar Landing Research Facility.

NHTC would like speakers to share knowledge and experiences about this historic time period. Also, this expertise would be helpful for the NHTC restoration team as they progress with the refurbishment process.

Volunteer speakers or technical contacts should respond to Shelley Canright, Mail Stop 154, by October 13. Please indicate presentation topic or area of involvement.

Lankley



Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-142.....Economic Benefits from NASA Technology Spinoffs
89-143.....First Group of Perspective Astronauts Arrive at JSC
89-144.....Planetary Exploration Featured in Satellite Video Conference
89-145.....NASA To Launch Navy Communications Satellite
89-146.....National Student Winners Named in SSIP Competition
89-147.....Jerry J. Fitts Appointed Deputy Associate Administrator of OSO
89-148.....NASA Opens Its Data Bases to Stimulate Student Science/Engineering

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

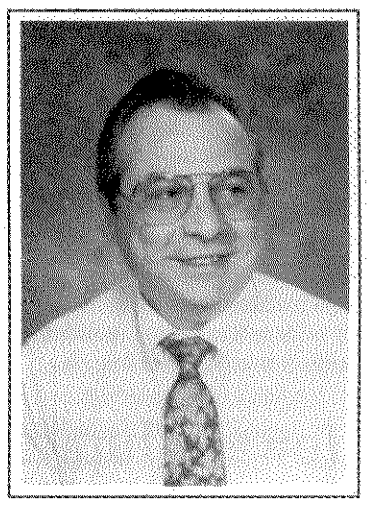
Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

...towards independence

Able though Disabled, Discover the Potential of the Handicapped

I'd like to address you today not as Director for Electronics but as the new chairman of the Handicapped Individuals and Disabled Veterans Workforce Program Advisory Committee. In this capacity, I succeed Bill Mace who headed the committee since its inception. Bill succeeded in increasing both our complement of disabled employees and our awareness of their contributions, and in enhancing the commitment of Center management to the disabled work force.



The President's Committee on Employment of People with Disabilities has designated October as National Disability Employment Awareness Month. In an attempt to draw public attention to the fact that disability does not mean loss of ability, the President's Committee emphasizes the productivity and dedication to national goals offered by the disabled. With a modest investment in continuing rehabilitation and job training, the employment of America's 30 million disabled citizens produces a substantial return on that investment.

During October at Langley we have adopted the very appropriate theme, "Discover the Potential." An aggressive program has been planned by the Advisory Committee's Employee Satellite Committee, currently chaired by my good friend Nola Graves. This month-long observance will (1) recognize employers who consistently provide employment opportunities to the disabled; (2) salute the achievements of the disabled who make substantial contributions in their community as well as in their jobs; and (3) develop funding programs intended to educate the public that negative attitudes--not disabilities-- restrain the disabled from realizing their full potential.

During my tenure as chief of the Flight Electronics Division, I became aware of the role attitude plays in working with the disabled. It was my privilege to observe two disabled students hired for summer positions. Both were given very challenging assignments related to high-technology spaceflight experiments. Both students completed their assignments well ahead of schedule and submitted excellent documentation. At the exit debriefing, I noticed a high degree of frustration on the part of each student. I naturally assumed it was tied to his inability to communicate with our technical personnel. At the conclusion of the interview, I realized that, in each case, the frustration was due to our inability to communicate with them. Each young man had completed his assignment in a quarter of the allotted time and each was thirsting for more challenging and aggressive tasking. I learned an invaluable lesson from this experience. We had assumed that their disabilities handicapped them in the performance of their responsibilities. In reality, we were handicapped in not tasking them to their full potential.

As chairman of the Disabled Committee at Langley, I take pride in my new role. I intend to ensure that the dedicated efforts of the Employee Satellite Committee will reach Center management. Over the past few years, the combined committees have addressed such issues as reasonable accommodations, nondiscriminatory policies and procedures, attitudinal barriers, designated parking and accessibility to facilities. I will strive to continue to advocate these issues. Additionally, I plan to focus on increased hiring of the disabled throughout the Center. In this respect I will need your help and commitment.

I urge you to participate in the series of activities planned to recognize the contributions of the disabled as well as to draw attention to the natural barriers they face, on a day-to-day basis, in the execution of their duties and responsibilities.

Langley's most important asset is its people. Take the time to "discover the potential" in every employee, make the disabled a part of your team, and then stand back with pride and watch your investment grow. Investing in people with disabilities is good business.

Frank Allario

Activities for Disabled Month

Friday, **October 13, 1989**	Presentation: Lily Bess, Director Department for the Deaf and Hard of Hearing, State of Virginia "The Hearing Impaired Employee: A Recognized Asset" 9 a.m., H.J.E. Reid Conference Center
Wednesday, **October 18, 1989**	Disability Awareness Training for Managers and Supervisors Two sessions Building 1229, Room 120
Tuesday, **October 31, 1989**	Presentation: Bill Mace, former Langley Director for Electronics 9 a.m. Building 1219, Room 225

NASA Langley Scientist Leaves Legacy of Self-Esteem

You've read the headline and probably taken note of the accompanying photograph. Now--stop for a moment and examine your posture.

Are you holding this copy at arm's length--a sure sign of approaching "middle age"--or a bit too close to your face as you've seen a child--your own, a niece, nephew or student--do. You make a mental note to recommend an eye exam. Or, perhaps, even before attempting to read this issue, you located and affixed on your nose those corrective lenses you've grown so dependent upon.

What if glasses don't help and you can't pull this copy close enough to make these words readable?

An estimated eleven million people in the U.S. are partially sighted and two million are considered legally blind--not totally blind, but people who cannot read printed matter, write or perform the simplest hand-eye tasks.

A Langley employee with the right mix of experience and expertise in electronics, optics, physics and advanced engineering is helping some of these people regain what they thought had been lost to them forever, their independence.

Leonard Weinstein, Fluid Mechanics Division, leads two lives. From 8 a.m. to 4:30 p.m. he is located in Building 1247A and performs tasks as group leader, Viscous Flow Branch. In the evenings and on weekends, he often retreats into the garage workshop of his Newport News home to work on a closed circuit TV system that magnifies and focuses words . . . a system that has made it possible for the legally blind to read, to write, to work.

While Weinstein emphatically stresses he did not invent the process, he has perfected it in terms of his two main goals--to produce a simple and inexpensive device that does the job.

The impetus for his efforts was the plight of his stepdaughter, Sandra, who suffers from Stargardts disease (retina degeneration). First noted when she was a teenager, the slow degeneration process has caused her to lose most of her central vision, leaving her with only peripheral sight.

Weinstein was turned on to his avocation by a visual aid loaned to Sandra by the Virginia Department for the Visually Handicapped. "The closed circuit magnifying TV system was limited in performance and very expensive, but it allowed my daughter to read again," said Weinstein. He focused immediately on her need for high magnification and sharp contrast. Based on his knowledge of optics and electronics, resulting from a long time interest in astronomy, combined with a degree in physics and experience in advanced engineering, Weinstein felt he could produce a comparable machine with improved performance features that would be far less expensive.

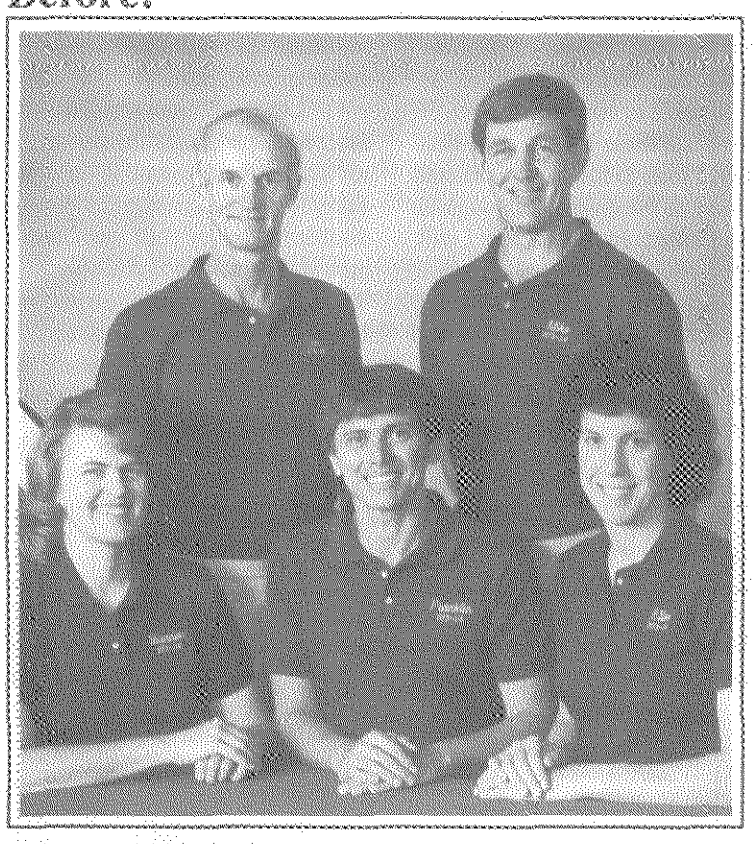
His system, which sells for half the price of existing models, uses a closed circuit TV camera zoom lens and can be used with any home TV. The first system, which he calls Viewstar, was completed in 1982. Since then, he has developed two other versions of Viewstar. To date, Weinstein has made approximately 25 systems which he produces on an as-requested basis. Rather than big business, Weinstein stresses he just wants to help the visually impaired.

His original focus--Sandra--boasts documented success. As a result of her newly regained skills, Sandra landed a job as a clerk-typist for the Yorktown Coast Guard Station. She has attained superior performance ratings in her position and has been named Handicapped Employee of the Year for the past three years.at Yorktown. Sandra was recently named the 1989 Outstanding Handicapped Worker for the U.S. Department of Transportation. Weinstein has given back to his daughter not just her sight, he has given her back her independence. Self-esteem is a tremendous legacy from parent to child.

-photo by Steve Earley

CAN YOU READ THIS? Don't ever take sight for granted; it's a precious gift say the visually impaired. Leonard Weinstein demonstrates the closed circuit TV magnification system he builds in his garage workshop.

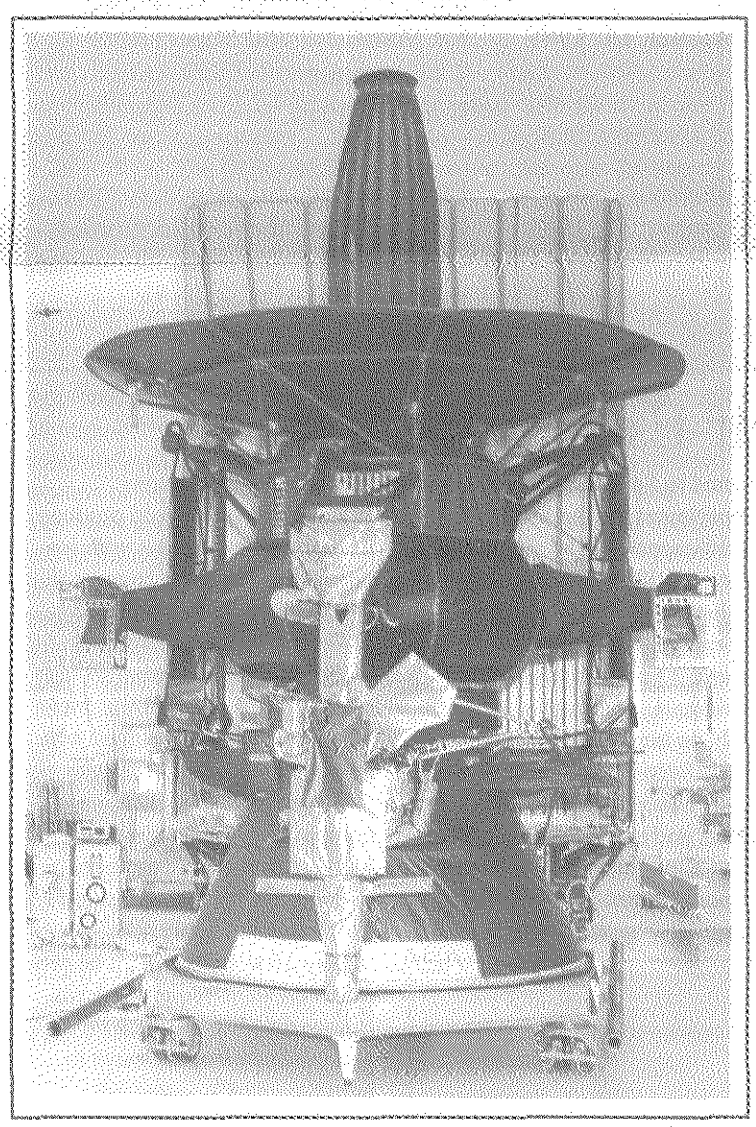
Before:



Selected for Mission STS-34 aboard the Space Shuttle Atlantis are (seated, L to R) mission specialists Shannon W. Lucid, Ph.D.; Franklin Chang-Diaz, Ph.D.; and Ellen S. Baker, M.D. Standing are Donald E. Williams, commander and Michael J. McCulley, pilot.

After: STS-34 Crew Ready for Launch

KENNEDY SPACE CENTER, Fla.—The STS-34 crew wait for emergency egress training in their partially pressurized flight suits and attached cooling packs at the shuttle landing facility prior to Terminal Countdown Demonstration Test (TCDT) activities at KSC. STS-34 aboard the orbiter Atlantis is scheduled for launch October 12. The spacecraft Galileo will be deployed to the planet Jupiter.



Galileo's scientific experiments will be carried out by more than 100 scientists from six nations. Except for the radio science investigation, these are supported by dedicated instruments on the Galileo orbiter and probe. In December 1995 as the two-and-one-half ton spacecraft orbits Jupiter with its ten instruments, a probe will be released to parachute into the Jovian atmosphere.

Atlantis to Deploy Galileo Probe Toward Jupiter

Space Shuttle mission STS-34 will deploy the Galileo planetary exploration spacecraft into low-Earth orbit starting Galileo on its journey to explore Jupiter. Galileo will be the second planeteary probe deployed from the Shuttle this year following Atlantis' successful launch of Magellan toward Venus exploration in May.

Following deployment about six hours after launch, Galileo will be propelled on a trajectory, known as Venus-Earth-Earth Gravity Assist (VEEGA) by an Air Force-developed, inertial upper stage (IUS). Galileo's trajectory will swing around Venus, the sun and Earth before Galileo makes its way toward Jupiter.

Flying the VEEGA track, Galileo will arrive at Venus in February 1990. During the flyby, Galileo will make measurements to determine the presence of lightning on Venus and take time-lapse photography of Venus' cloud circulation patterns. Accelerated by Venus' gravity, the spacecraft will head back to Earth.

Enroute, Galileo will activate onboard remote-sensing equipment to gather near-infrared data on the composition and characteristics of the far side of Earth's moon. Galileo also will map the hydrogen distribution of the Earth's atmosphere.

Acquiring additional energy from the Earth's gravitational forces, Galileo will travel on a two-year journey around the sun spending ten months inside an asteroid belt. On October 29, 1991, Galileo will pass within 600 miles of the asteroid Gaspra.

On the second Earth flyby in December 1992, Galileo will photograph the north pole of the moon in an effort to determine if ice exists. Outbound, Galileo will activate the time-lapse photography system to produce a "movie" of the moon orbiting Earth.

Racing toward Jupiter, Galileo will make a second trek through the asteroid belt passing within 600 miles of asteroid Ida on August 29, 1993. Science data gathered from both asteroid encounters will focus on surface geology and composition.

Five months prior to the December 7, 1995 arrival at Jupiter, Galileo's atmospheric probe, encased in an oval heat shield, will spin away from the orbiter at a rate of five revolutions per minute (rpm) and follow a ballistic trajectory aimed at a spot six degrees north of Jupiter's equator. The probe will enter Jupiter's atmosphere at a shallow angle to avoid burning up like a meteor or ricocheting off the atmosphere back into space.

At approximately Mach 1 speed, the probe's pilot parachute will deploy, removing the deceleration module aft cover. Deployment of the main parachute will follow, pulling the descent module out of the aeroshell to expose the instrument-sensing elements. During the 75-minute descent into the Jovian atmosphere, the probe will use the orbiter to transmit data back to Earth. After 75 minutes, the probe will be crushed under the heavy atmospheric pressure.

The Galileo orbiter will continue its primary mission, orbiting around Jupiter and four of its satellites, returning science data for the next 22 months.

Voluntary Leave Transfer Program

The following employees are approved leave recipients:

- Robert M. Connell, Jr.
- Twanda L. Copling
- Randolph F. Culotta
- Janet L. Edmondson
- Kenneth M. Jones
- Karl I. Maddox
- Grace N. Rodman
- Bernard Spencer Jr.
- Catherine B. Worth

If you wish to donate annual leave to these recipients, or wish more information concerning the Voluntary Leave Transfer Program, please contact Linda Park of the Employee Relations Section, ext. 42610.

Senior Management Research Review

The Senior Management Research Review will be held Monday, October 16, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	Johnson-King Turbulence Model for 3-D Flows	Veer Vatsa (Aeronautics/FLDMD)
9:45	Effects of Planform Curvature on Flutter of Swept Wing Determined in TDT	Donald Keller (Structures/SDyD)
10:00	Development of Superplastic Forming Practice for Advanced Aluminum Alloys	Thomas Bales (Structures/MD)
10:15	Grid Generation for Complex Geometric Shapes	James Weilmuenster (Space/SSD)
10:30	Comparison of Theoretical and Observed Cirrus Radiative Properties	Bruce Wielicki (Space/ASD)
10:45	Automated Assembly of Large Space Structures	Ralph Will (Flight Systems/ISD)

People & Places

Tidbits from Training

Career Program Candidates Chosen

Ten additional employees have been selected for the Career Field Development Program (CFDP).

The CFDP is a competitive program designed to provide opportunities for selected employees to earn undergraduate degrees with financial assistance from the Center.

The program is structured in two tiers. Participants in Tier I may attend up to nine hours of classes each week during duty status. Selected employees are Donita E. Gause, Personnal Division, and Glenn A. Woodell, Information Processing Technology Branch.

Tier II participants attend courses during off-duty hours. Selected employees are Elaine I. Crawford, Resource Analysis Branch; Cynthia S. Cruz, Vehicle Analysis Branch; Jeanette W. George, Administrative Software Applications Branch; Lisa M. Harvey, Research and Services Contracts Branch; Donna L. Martin, Instrument Applications Branch; Margaret P. O'Keefe, Technical Editing Branch; Frances E. Sabo, Advanced Vehicles Division; and Kevin G. Vipavetz, Flight Instrumentation Branch.

A rating panel representing each directorate selected the ten employees from twenty-five highly qualified candidates. Their selection was approved by the Center's Undergraduate Training Committee.

Four administrative professionals were selected for this program during Fiscal Year 1989, the pilot year. Selected for Tier I was Yvonne M. Armstrong, Resources Control Section; and Phyllis Kay Millen, Space Station Freedom Office.

Tier II selectees were Judy W. Evans, Cost Accounting Section; and Virginia B. Marks, Guidance and Control Division.

Dr. Mary H. Lewis, Employee Development and Services Branch, coordinates the Career Field Development Program.

Retirement Parties

A retirement party for **"Pete" Kelly, Clyde Winters, Dale Rodman and Joe Dixon** will be held at the Langley Officer's Club, October 25, from 6 to 8:30 p.m. Cost is $12/person, $24/couple, including gifts. Donations for gifts only are welcome. Contact Grace Girton, ext. 41106 or 41105 ,by Oct. 19.

A retirement party for **James S. Harvey** will be held Friday, Oct. 20, 6:30 to 9 p.m. in the H.J.E. Reid Conference Center. Cost is $8.50/person, $16/couple (including gift) for heavy hors d'oeuvres and cash bar. Donations for gift only are welcome.

Opera Enthusiasts

The Virginia Opera offers special discounts for groups. Also available are dining packages with downtown restaurants.

The Opera also offers the "Piggyback Express," bus service for B series Sunday performances. Buses will pick up at Williamsburg Regional Library and Coliseum Mall. For cost information or reservations, call 877-2550, by October 10.

Volunteer Training

The Casemate Museum plans a training seminar October 17-18 for volunteers who wish to become tour guides at Ft. Monroe. For more information, call the Casemate, 727-3973.

Harvey's Janitorial Service, Inc., recognizes employees teams who have excelled on their Facility Evaluation Reports. The award committee convened on September 1 and selected the Window Washing Crew/Crew #1 of the Night Shift as Crew of the Month for August. This crew obtained a perfect score of 95 points. Crew members are (front row, L to R) Johnny Beale, Linwood Byrd, Robert Jones; (back row) Charles Mann, Charles Gayles and Robert Jeter.

-photo by Steve Earley

IT DOESN'T MATTER WHERE A GIRL COMES FROM, AS LONG AS SHE KNOWS WHERE SHE IS GOING.. This Girls' Clubs motto summarizes the thrust of the program. Langley representatives (L to R) Milt Holt, Bruce Conway, Tom Vranas and CFC Chairman Jim Arrington watch as the girls perform a science experiment at the Newport News facility.

Who Benefits from CFC Contributions?

CFC Helps Girls' Clubs, An Award-Winning Organization

-by Wayne Kanoy, Fort Monroe

Girls' Clubs of the Greater Peninsula, Inc., is one of many nonprofit human care agencies that receives support from the annual Peninsula Combined Federal Campaign (CFC).

The CFC involves 43 federal facilities and is now underway. The campaign provides 45,000 federal employees an opportunity to support worthwhile charities of their choice by making a one-time contribution.

Girls' Clubs operates two facilities, one in Hampton and one in Newport News, for 650 girls. An addditional 130 youngsters are on a waiting list to join, when more operating funds become available for expanding programs and improving facilities.

Donna L. Myers, executive director for Girls' Clubs, said CFC funds make up approximately 26 percent of the agency's operating budget. She pointed out that the organization now requires more than $200,000, annually, to provide well-balanced programs.

"Our facilities are like home to many girls," Myers said. "They don't want to leave at the end of the day."

She said club members are exposed to a variety of activities and learning situations that are not available elsewhere. "We are the only youth-serving agency on the Peninsula that has programs geared specifically for girls ages 4-18," she cited. Approximately 30 percent of all girls served are from military families.

One program director and four part-time instructors carry out programs at each of the two Peninsula Girls' Clubs facilities. Each staff member receives specialized training in all programs offered.

Myers said the agency's goal is to help youths become more confident and responsible adults. "We help them look ahead, set goals and work on developing their talents for achieving economic independence and personal fulfillment," she said. The clubs also work with children who are mentally retarded or physically handicapped.

Significant programs offered include Operation SMART, for encouraging girls and young women to participate in science, math and relevant technology. A program for substance abuse prevention, "Friendly Peersuasion," uses a peer leadership approach in working with high-risk girls. The Preventing Adolescent Pregnancy (PAP) program is offered to girls ages 9-18.

"I'm proud of the work in our clubs," Myers said. In 1988, the clubs received the Colgate Palmolive Youth for America award for offering an after-school tutoring program and school outreach program. Also, last year, Girls' Clubs won the McCalls National Sewing award. For the past six years, club members have won nine Eastman Kodak photography awards.

Support this award-winning endeavor. As a federal employee, your contribution to the Combined Federal Campaign makes possible the Girls' Clubs program as well as hundreds of other affiliated agencies--local, national and international. Your one contribution helps them all year long.

A message from the Unions:

The time has come to ask for support for the Combined Federal Campaign. Many of you have either experienced a need yourself or know someone who has needed the assistance of some charitable organization during a crisis. These organizations are extremely underfunded and, in many cases, operated by volunteers who must work under marginal conditions. Even so, their contribution to the wellbeing of those in need far surpasses any monetary generosity donated during these campaigns.

The local labor organizations are in full support of the CFC and encourage all to please study the list of organizations and give generously.

You have received a list of many organizations requesting support. The list covers national, regional and local groups. Should you select a specific agency, you have the satisfaction of helping an organization worth your support.

There is no greater reward than the satisfaction of helping one who is less fortunate.

Patternmakers Union
AFGE Local 2755

Happenings

SPECIAL LAA SOCIAL will be held Friday, October 13 from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Back by popular demand is the *Permanent Vacation Band*. $1 cover charge.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, October 10, at 2 p.m. in the H.J.E. Reid Conference Center.

NASA TOASTMASTERS will meet Wednesday, Oct. 11, at 11:30 a.m. in Building 1218, Room 205. Guests are welcome. For additional information, call Steve Yaros, ext. 43050.

LANGLEY ALUMNI ASSOC. will meet Tuesday, Oct. 10, for lunch in the private dining room of the NASA cafeteria. Burt Lightner, LDEF Project Manager, will be the speaker.

BASKETBALL BLAST 2. See the L.A. Lakers take on the Washington Bullets. One-day trip to Capital Centre, Landover, Md., Saturday, Dec. 9. Leave Hampton about noon; game is at 7:30 p.m.; return about 2 a.m. Cost for transportation and court-side game ticket is $50 per person. Contact Donna Spelter, ext. 46636, for details.

BOOK SALE. The Visitor Center Souvenir Counter will hold a book sale October 23-29. All books 1/2 off! Books make great Christmas gifts.

NASA BASKETBALL will have an organizational meeting at 4:45 p.m., Oct. 11, in the H.J.E. Reid Conference Center. All team coaches and/or reps must be present to sign-up for the 1989-90 season.

SERVICES FOR HIRE: Formal gatherings to family get-togethers---bartending, valet parking, host and hostess assistance, party set-up, clean-up offered. Contact Peggy or Tim at 838-2051 or 838-3075.

WANTED: CARPOOL from Williamsburg (Richmond Road-Old Town Road area) to LaRC. Call Karl Moeller, ext. 41827.

FOR RENT: ROOM. Furnished room with new private bath, kitchen privileges, W/D, off-street parking. $300/mo. Call 867-8776.

WANTED: ROOMMATE. Male to share condo in Newport News. 1/2 month rent plus 1/2 utilities. 2 BR, BA, kit w/fpl. Available Oct. 20. Call 827-9110 after 4 p.m.

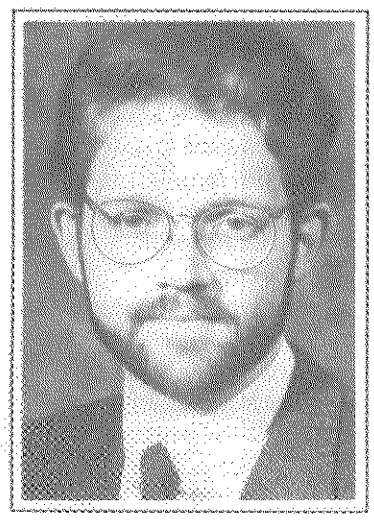
At the VC during October

Researcher Explains "Mission to Planet Earth" Objectives

Ozone depletion, build-up of greenhouse gases and acidification of lakes and forests are global environmental problems affecting man's future on Earth. These concerns are increasingly important to the public. Gary Qualls, aerospace engineer, will discuss NASA's initiative "Mission to Planet Earth" at noon, Wednesday, October 11, in the Visitor Center theater. The lecture is co-sponosred by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

The focus of "Mission to Planet Earth" is our home planet --how forces shape and affect our environment, how that environment is changing and how those changes affect us. Qualls will describe the scientific objectives and associated infrastructure proposed to meet those objectives.

Qualls, an employee of Flight Mechanics and Control, Inc., in Hampton, is assigned to the Spacecraft Analysis Branch.



Johnson Discusses High-Speed Civil Transportation System

NASA Langley is paving the way into the next generation with research on the development of the High-Speed Civil Transportation System. Dr. Vicki Johnson will discuss the impact of these supersonic jets in a lecture "Flight 2001: Supersonics in U.S. Commercial Aviation," Thursday, October 12, at 7:30 p.m. in the Visitor Center theater.

Johnson will examine the technology and concepts being developed for the High-Speed Civil Transportation System, as well as the economic and environmental aspects of such advanced aircraft.

According to Johnson, these supersonic jets will travel at speeds exceeding Mach 2 and carry 300 passengers. A normal nine-hour trip to the Orient would take three hours with no significant increase in ticket price. The market is targeted for the years 2001-2010.

Johnson is an aerospace engineer in the Advanced Vehicles Division.

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Researcher News

National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23665-5225

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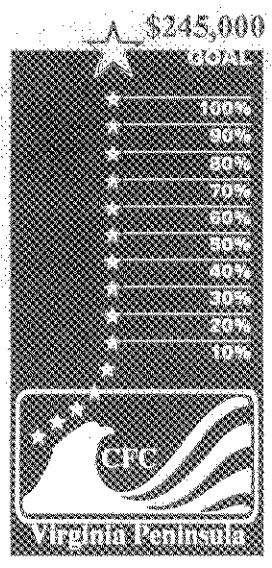
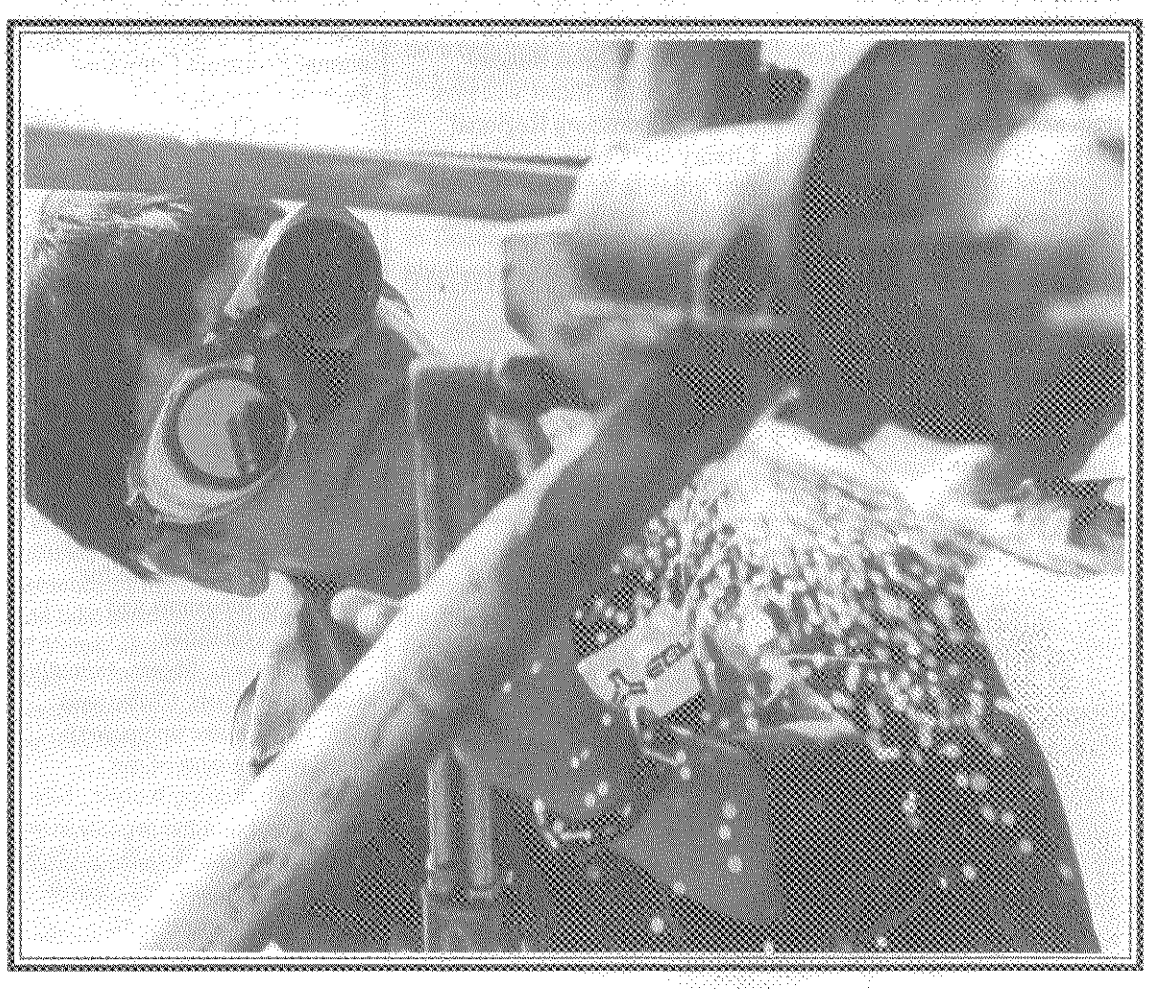




-LEMS photos by Steve Earley

A Woman's Work is Never Done

EG&G welder Eloise Shreaves, or Pee Wee as she's known on the job, works to remove a leg of the Apollo Lunar Excursion Module Simulator (LEMS). All four legs were removed before the LEMS was transported via flatbed truck to the New Horizons Technical Center in Hampton. The LEMS, designated a national historic landmark in 1985, will be refurbished by New Horizons students and will become the cornerstone exhibit of the new Virginia Air and Space Center, scheduled to open in dowtown Hampton in 1992.

The module, part of the Langley Lunar Landing Research Facility, was used to help train every astronaut who set foot on the moon. A restoration advisory committee made up of past and present NASA employees associated with the LEMS, along with a liaison officer from the Virginia Air and Space Center, will oversee and monitor the restoration process which should take about two years. For details, see story on page 1.

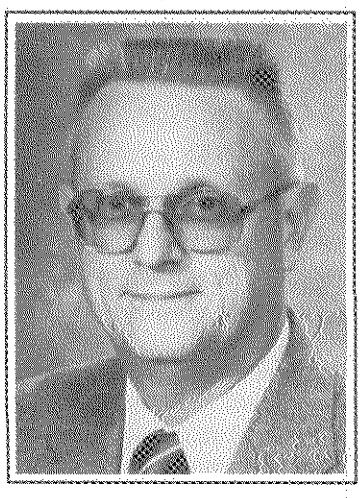
NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 3, Issue 21 October 20, 1989

Bi-weekly Employee and Contractor Publication

Taylor Named Projects Chief



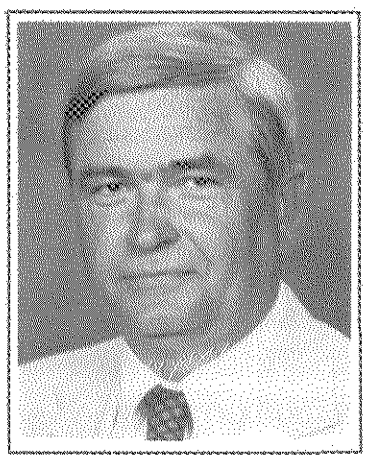
Leon V. Taylor has been selected chief of Langley's Projects Division. He replaces Robert L. James who retired March 31.

Pending approval of the Office of Personnel Management, Taylor will head the division responsible for such major projects as the Long Duration Exposure Facility (LDEF), the Scout launch vehicle and the Earth Observing System (Eos). In pursuing these and other programs, Taylor will supervise the definition and evaluation of candidate hardware and software configurations and the determination of resource requirements and procurement strategies. He will also lead studies to identify opportunities for flight experiments. Overall, he will plan and direct management of major Langley and agency spaceflight projects.

LDEF is the focus of the December 1989 mission of the Shuttle Columbia which will retrieve the large free-flying structure from low-Earth orbit. LDEF contains 57 international science, application and technology experiments and was launched in 1984 by the Space Shuttle for exposure to the environment of space. The original plan was for a one-year stay in space; because of setbacks in the Shuttle program, recovery has been delayed. However, scientists consider this longer exposure will offer greater insights into the effects of space on both hardware and experiments.

Taylor came to Langley as an engineering aid in 1956. In 1969, he was named head of the Spaceflight Electronics Development Section. In 1980, he became head of the Spaceflight Electronics Branch and, in 1984, was named its chief engineer.

Berrier Awarded Manly Memorial Medal

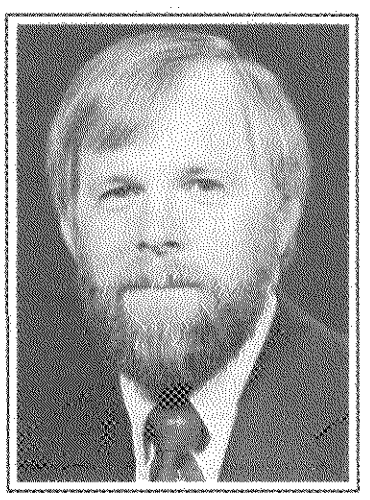


Bobby L. Berrier, assistant branch head of the Propulsion Aerodynamics Branch, has been presented the Charles M. Manly Memorial Medal by the Society of Automotive Engineers (SAE).

The award, named in honor of Charles Matthews Manly, honors meritorious contributions to aeronautical and spaceflight engineering. Berrier received the award for his paper titled "Results from NASA Langley Experimental Studies of Multiaxis Thrust Vectoring Nozzles." Berrier was presented the medal at AEROTECH 89, held September 27 in Anaheim, California.

Berrier began his NASA career at Langley in 1963. Except for two years during which he worked in the Advanced Configurations Branch, Berrier has spent his entire career assigned to the Langley 16-Foot Transonic Tunnel. He has published over 50 papers.

Berry Named Technician of the Year



Robert F. Berry Jr., Fabrication Division, has been named Technician of the Year by the American Society for Nondestructive Testing (ASNT). He was recognized at the ASNT Annual Fall Conference held October 11 in Valley Forge, Pennsylvania.

Berry began his NASA career at Langley 23 years ago and has been actively involved in nondestructive testing (NDT) for the past 20 years. Among his many accomplishments, he has developed a unique radiographic technique for nondestructive evaluation of wooden fan blades using freon as an opaque penetrant for detecting internal defects. This technique has been used at both NASA Lewis and Langley Research Centers.

In support of the Space Shuttle, he has worked with NASA Marshall Space Flight Center and Morton Thiokol in the nondestructive evaluation of Shuttle solid rocket motor case materials. His expertise has also been valuable to the Martin Marietta Corporation in designing and solving an ultrasonic inspection problem evaluating weldments on the external fuel tank of the Space Shuttle. He has patented a process proven successful in inspecting the type of welds in question and his process is presently being used by Martin Marietta.

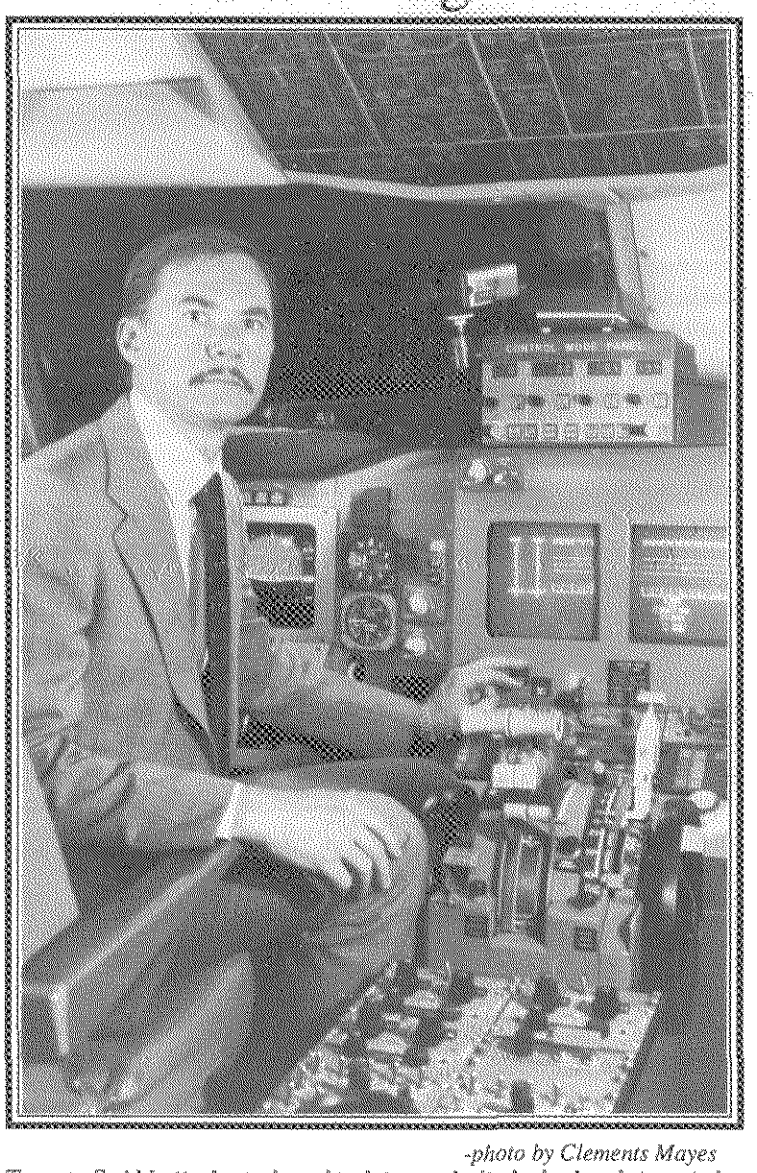
NASA Langley Scientist and Engineer Take R&D 100 Awards

A cockpit display system designed to reduce pilot workload and increase situational awareness and a device to aid the blind have been awarded R&D 100 awards, recognizing each as one of the 100 most significant new technical products of 1989.

Terence S. Abbott, senior research engineer in the Flight Management Division, developed an integrated engine display system called the Engine-Monitoring and Control System (E-MACS) as an innovative interface to the engine system.

H. Douglas Garner, senior research scientist in the Flight Management Division, developed the Braille Mouse, a tactile read-out device designed to help the blind use computers capably. Garner is also a 1986 recipient of the IR-100 (now the R&D 100) award for developing the "Smart Compass," a magnetic heading sensor for aircraft.

The R&D 100 award is presented annually by **Research and Development** magazine to the 100 scientists or engineers who have contributed the most significant products for advancing science and technology during that year. Selections are made by a panel of scientists and engineers after studying new technology around the world.



-photo by Clements Mayes

Terence S. Abbott, shown in a simulator cockpit, devised an integrated engine display system called E-MACS for which he received an R&D 100 award, deeming it one of the 100 most significant new technical products of the year.

E-MACS, Aircraft Monitoring Device

-by Jennifer W. Vincent

The E-MACS system was developed to provide the pilot with an improved capability for monitoring and control of aircraft engines. For the control task, the display provides a model of engine performance characteristics, indicating engine thrust relative to the computed maximum thrust available. For the monitoring task, information is presented in the form of column-deviation indicators that display the difference between actual engine performance and computed ideal values.

The E-MACS system provides information to the pilot about total engine performance and presents it in a simple form, taking advantage of human pattern recognition ability. The display system shows the direct indication of engine power, the maximum power available under current conditions, and the difference between the computed "ideal" value and the current value for each engine parameter.

"I can show the pilot where a parameter ought to be, given the speed and altitude he's flying," Abbott explained. "By giving the pilot the ability to determine whether the system is operating properly, E-MACS gives him a way to see if there is degraded performance, not just performance that's totally out of limits."

The E-MACS display system was implemented and tested on the NASA Langley Terminal Systems Research Vehicle (TSRV) simulator, where pilots evaluated the ease of use and acceptability. The subjective results of this test showed an overall preference for the E-MACS display relative to the traditional display. The use of the E-MACS resulted in a 100 percent detection rate for all system faults relative to a 56 percent rate for the traditional display.

According to Abbott, conventional displays are outdated. "The design of computer-generated displays today is still based on design guidelines that were basically formulated 15 to 20 years ago, so they really don't take advantage of any of the computational capabilities of the computers." In contrast to the raw sensor data provided to the pilot by conventional display systems, the E-MACS system processes the raw data into information that is more meaningful to the pilot and presents it in a form that is easier to understand and use.

(See Braille Mouse, page 4.)

News Briefs

STENNIS SPACE CENTER, Miss. --- Common indoor plants may provide a valuable weapon in the fight against rising levels of indoor air pollution. NASA and the Associated Landscape Contractors of America have announced the findings of a two-year study that suggests the common indoor plant may provide a natural way of combating "sick building" syndrome--an acute incidence of indoor air pollution that can occur in closed or poorly ventilated offices and residences. Research into the use of biological processes as a means of solving environmental problems, both on Earth and in space habitats, has been conducted for years at NASA.

HEADQUARTERS, Washington, D.C. --- NASA has announced the selection of 248 research proposals for immediate negotiation of Phase I contracts in NASA's 1989 Small Business Innovation Research (SBIR) program. Proposals were selected from 198 small, high technology firms located in 35 states. The awards were selected competitively from 2,142 proposals received in response to the SBIR solicitation which closed June 28. Selections were made on the basis of scientific and technical merit, capabilities of the firm and value of the proposed research innovations to NASA.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- Scientists at NASA Goddard have observed the development of an ozone hole that may equal the record-setting hole of 1987. Scientists have been closely monitoring ozone levels over the Southern Hemisphere with the Total Ozone Mapping Spectrometer (TOMS), an instrument on board NASA's NIMBUS-7 satellite.

HEADQUARTERS, Washington, D.C. --- Richard H. Kohrs, director of Space Station Freedom, has announced that Robert W. Moorehead will serve as the deputy director, Program and Operations, Space Station Freedom Program Office. James M. Sisson, who has been acting deputy director since June, will assume the position of deputy manager, Space Station Freedom Program and Operations. Moorehead was formerly special assistant on the staff of the director of the Johnson Space Center, Houston.

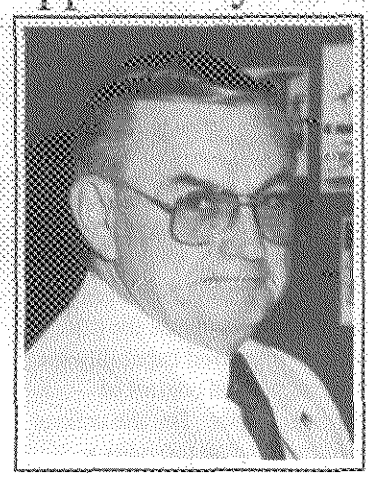
JOHNSON SPACE CENTER, Houston, Texas --- Astronaut crew assignments have been made for five Space Shuttle missions in late 1990 and early 1991, including the first assignments from the astronaut class of 1987, the first U.S. Coast Guard astronaut to fly, the first European Space Agency (ESA) astronaut to be named as a mission specialist and the first black woman to be selected for space flight.

JET PROPULSION LABORATORY, Pasadena, Calif. --- A five-mile-tall, geyser-like plume of dark material has been discovered erupting from the surface of Neptune's moon Triton in images returned last month to NASA's JPL by the Voyager 2 spacecraft. This is the first time geyser-like phenomena have been seen on any solar system object, other than Earth, since Voyager discovered eight active geysers shooting sulfur above the surface of Jupiter's moon Io. The new finding augments Triton's emerging reputation as the most perplexing of all the dozens of moons Voyagers 1 and 2 have explored.

Three Win Equal Opportunity Awards

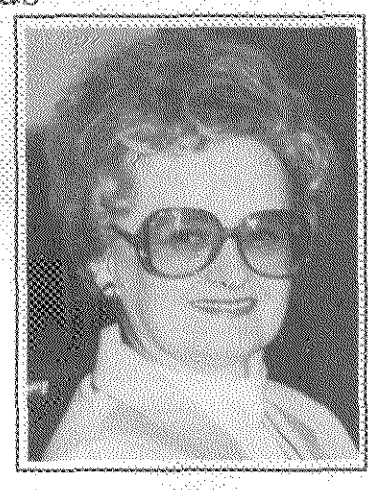
Elizabeth Buchan

"In recognition of personal commitment and leadership in advocating the ideals of the Equal Opportunity Program at Langley Research Center in general, and within the Aeronautics Directorate in particular."



Joseph B. Davenport

"For personal dedication to advancing the ideals of Equal Employment Opportunity at the Langley Research Center in general and within the Fabrication Division in particular."



Gloria Champine

"For her exemplary dedication to the Federal Women's Program which has resulted in NASA being the 1989 recipient of the Office of Personnel Management and the Federal Women's Interagency Board Achievement Award for the most outstanding Federal agency's Federal Women's Program."

Lankley

Each Halloween Junior's costume looks less and less like the other kids'

Editorials

Actions Speak Louder than Words

Language is powerful. It reflects, reinforces and shapes our perceptions of people, ideas and events.

Actions are more powerful. Actions increase awareness in both the individual or group acting and in those who observe the action. Action involves risk-taking, decision-making and commitment.

The Langley community took on a challenge recently. The challenge was offered by the Employee Satellite Committee of the Handicapped Workforce Program Advisory Committee.

The Langley community is better for the challenge accepted by eight volunteers who chose to adopt a disability for a day, or a few hours of the day, on Thursday, October 5. The goal was to increase awareness---their own awareness and the awareness of their co-workers---to the challenges our disabled employees face every day on the job. Their story appears on page 3.

At Langley Research Center we are involved in experimentation of some kind every day. I'll be honest with you. At first, I was concerned that this "experiment" would be misunderstood by some or would not be taken seriously. I was afraid there would not be enough volunteers. I was too conservative on both counts.

At the debriefing session held at the end of the day, my concerns were allayed. Our "experiment" was a tremendous success in increasing awareness at Langley. I attribute this success to the professional and dignified demeanor of those involved.

Some barriers to the productivity of our disabled workforce were identified--inadequacies in facilities, too few parking spaces--areas where minor modifications would solve the problem. But the consensus of all involved was that, with a little bit of training and some advanced planning, almost all could do their jobs.

There is a vast resource that we, at Langley, would deny ourselves if we fail to see the ability in those who have a disability.

Frank Allario
Chairman, Handicapped and Disabled Veterans Workforce Advisory Committee

Many, Many Thanks

The committee and I would like to express our sincerest appreciation to those who participated in the first annual Adopt-A-Disability program.

Your good nature and willingness to accept the challenge was an example of the Langley spirit. The sharing of your experiences has helped us to be more aware of the many things we take for granted.

Thanks to all of you, the day was a great success.

Nola Graves
Chairperson, Employee Satellite Committee of the Handicapped Workforce Program Advisory Committee

Positions Open

M-89-1: Education Specialist, GS-1710-11 (Target: 12); Office of the Director for Management Operations, Personnel Division. Closes October 27.

89-81: AST, Facility System Safety, GS-801-11 or 12; Office of the Director for Systems Engineering and Operations, Systems Safety, Quality and Reliability Division, Safety Engineering Branch, Facility Systems Safety Section. Closes November 6.

Current News Releases

To obtain a copy of any of these NASA News Releases summarized above, contact Edith Watts, Mail Stop 147, ext. 43293.

89-149.....Study Shows Common Plants Help Reduce Indoor Air Pollution
89-150.....NASA Selects Small Business Research Proposals
89-151.....Atlantis/Galileo Press Kit
89-152.....NASA Scientists Observe Strong Antarctic Ozone Hole
89-153.....Second Group of Astronaut Hopefuls to Arrive at JSC
89-154.....Astronauts Named for Five Space Shuttle Missions
89-155.....Moorehead Named Space Station Freedom Program Deputy
89-156.....Geyser-Like Plume Discovered on Neptune's Moon Triton

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

What would it be like to be disabled?

Langley Staff Members Participate in an Experiment in Human Awareness

Three were hearing impaired. One was deaf and mute. Three were wheelchair-users and one was ambulatory only with the aid of crutches. All were volunteers. All came away from the "experiment" with heightened awareness. All were tired at the end of the day and glad they could put away their adopted challenges.

Eight members of the NASA Langley staff agreed to adopt a disability for a day, or for a few hours of the day, Thursday, October 5. The goal was to increase awareness. What would your life be like if you were suddenly disabled? Could you perform the same job? Could you live in the same house? How would your family and friends react?

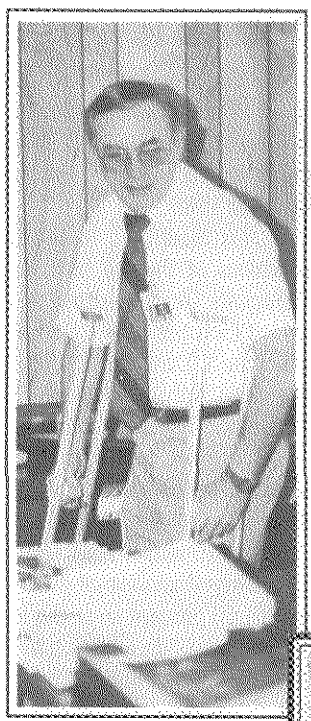
The participants came from the management, research, engineering and technician workforce. Some were very enthusiastic about the experiment, some were skeptical; some persevered the whole day, some barely lasted the minimum two hours. But all spoke freely of their experiences at the debriefing session, and everyone who had participated had changed.

Joe Davenport, chief of the Fabrication Division, admitted his awareness of the plight of the disabled increased immediately. "We were able to choose our disability, not have it forced on us by act of God," he said. Davenport made his selection based clearly on his agenda for the day. "I saw the options open to me" and chose crutches. He thought he could still do everything he needed to do.

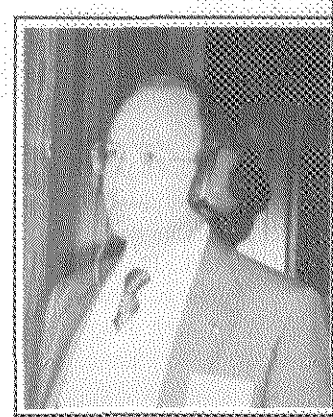
"Doorways were a big problem," Davenport admitted and he tried to plan better. "I needed some things from the supply cabinet and gathered them all in one trip. Then I realized I couldn't carry them back to my desk! My hands were already occupied with the crutches." His brain was operating at optimum rate but his body was working at a reduced capacity. Quite suddenly, he was very aware of what he couldn't do; this was a dramatic change of focus.

Branch head Bill Derby, Models and Materials Technology Branch, chose to be hearing impaired. "At first the silence was deafening! I could hear myself swallow," he said. Derby admitted his day was severely altered. He would forget his plight and try to use the telephone. Can't do that without an interpreter or special equipment. "I got into a discussion about a job but my counterpart was forced to write everything down." He and Davenport had an appointment to conduct Derby's performance appraisal. This routine, but very important process, was extremely difficult given Derby's disability. They rescheduled the appointment.

-photos by Katherine Holloway

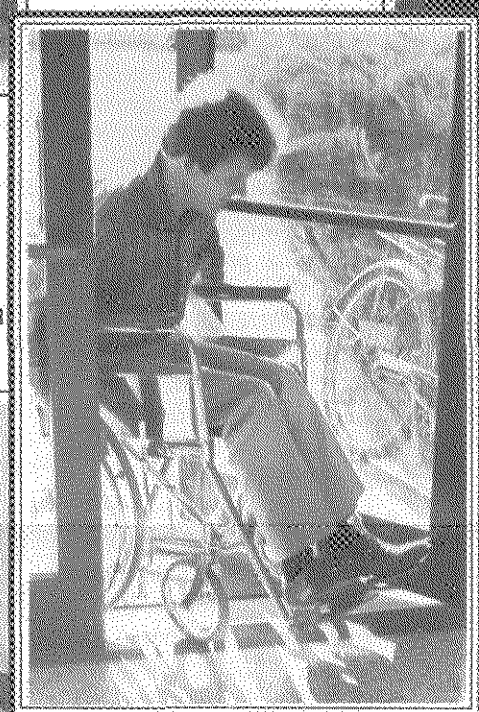


Joe Davenport moves about his office on crutches and finds it difficult to transport items.



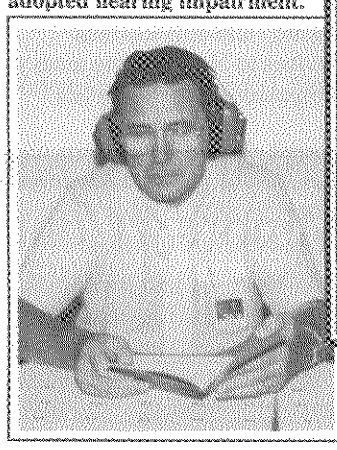
Irving Abel concentrates on a presentation, unable to hear or speak during this session.

Diane Wieting finds herself "trapped" between the exterior and interior doors leading to the ladies' room.

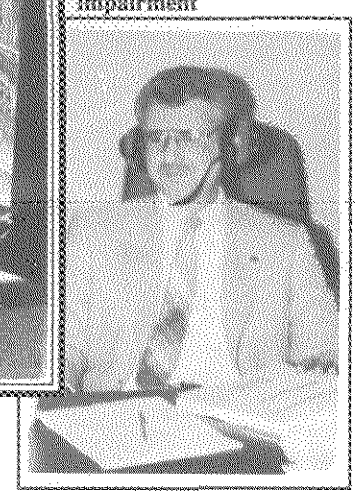


Roger Ferguson masters the art of opening an exterior door though he chose to be a wheelchair-user.

Bill Derby notices an increased ability to concentrate with his adopted hearing impairment.



Irwin Schauer finds it difficult to participate in a strategic planning meeting with his adopted hearing impairment



Diane Wieting, staff assistant to the Director for Space, confined herself to a wheelchair for the day. "I became very aware of curbs and doorways. "It took me a little longer to do things and to get places, " she admitted. Wieting needed to rearrange a few things in her office to accommodate the chair. "I developed a different strategy for the day. I tended to accumulate things--like questions for my boss--and do them in a single visit rather than as they occurred."

Wieting rated her trip to the restroom as the boldest challenge of the day. "The facility on my floor was certainly not designed for the disabled," she contends. The trip entailed opening the heavy door only to be faced with a second door immediately to the right. The wheelchair got caught between the two barriers. She yelled for help, then managed to free herself and accomplish her self-imposed goal unassisted.

Geoff Tennille, too, found the bathroom facilities burdensome from a wheelchair. Tennille, a mathematician in the Computer Applications Branch and president of the Langley Activities Association, noted there were only two handicapped restrooms and in neither could you close the door of the stall once inside. In regard to his job, Tennille found he could accomplish most of his tasks while confined to the chair. Halls of his building were plenty wide and he could easily maneuver until the elevator broke. Without it, he was confined, not only to the wheelchair, but also to the second floor.

There were some inconveniences, Tennille admits. The doors in the Analysis and Computation Division (ACD) are big and heavy. Though most have windows, they are too high for someone in a wheelchair to see through--or someone preparing to barrel through the door to see a disabled person struggling on the other side. "I had an audience when I went to the water fountain," said Tennille. No matter what approach he tried, water spilled onto his shirt.

Roger Ferguson, an engineer in the Facilities Engineering Division, was able to conduct most of his business unfettered though he, too, had chosen to be a wheelchair-user. "There were nagging problems," he said. "Although I could get around in Building 1209 without a great deal of problem, the office cubicle arrangement provided some challenges. The passageway into many cubicles was encumbered by a coat rack or file cabinet. Once inside, a little ingenuity was required to retrieve items from the top shelf."

Ferguson feels obstructions at a construction site would hamper his site work and field investigations if his adopted condition were permanent. "Going a block down the street was more tiring than I had imagined," he admitted. But he did it all and even attended the debriefing session in the chair--having rolled all the way from the cafeteria parking lot. "I became aware of the time pressure, everything took so much longer. I could do most of the same things, but I had to plan so much better, organize so much more."

Irwin Schauer, on the other hand, was most frustrated in his job as chief of the Personnel Division, having adopted a hearing disability. "I felt both a sensory and social deprivation." Wearing flight line ear protectors, ear plugs and a great deal of cotton in his ears, Schauer was able to block out about 90 percent of his hearing. Like Derby, he was instantly caught up in an awareness of self. "I could hear myself--my heartbeat, my breathing, my own footsteps. I felt an immediate focus inward."

Schauer also noted a very significant drop-off in social interaction. "It became easier for people to avoid communicating with me rather than to put everything in writing." Schauer contended that a severe hearing impairment would handicap him in performing his job. "However, that disability would not prevent someone from successfully performing certain other professional, technical and clerical jobs around the Center," he said.

Irving Abel, chief of the Structural Dynamics Division, went one step further. Geared up so that he could hear nothing, he also assumed the role of a mute. He had chosen his disability, and then he found it very difficult to function in his position. As scheduled, he attended the High-Speed Civil Transport ORAL Review. As a deaf-mute, he was severely hampered at the meeting. "I read the charts in half the time it took the presenter to present them. All I could think of was 'Why are they talking so long?'" Abel realizes that 90 percent of his job is communicative. "I do not think I could function in my present job with this disability."

Jack Hughes, supervising engineering technician in the Fabrication Division, also had trouble on the job with his adopted hearing impairment. Hughes took his task very seriously and began almost immediately after adopting his disability on Wednesday afternoon.

Hughes practiced at home with his family, noting how his life would be changed if he could not hear. But at work, he was severely frustrated. "I tried," he said, "but I really didn't make it. The phone was a constant thing. In my job I need to communicate. I just couldn't function in my current role."

He tried again at lunch time. His sincere effort raised another concern. While enjoying the lunch he had brought from home and trying to cope in his self-imposed world of silence, his eyes fell on the fire alarm. "It's audible," he thought, terrified. "There are no lights to warn me should there be a fire." At Langley, the hearing impaired are coupled with a partner--a buddy system to solve this dilemma. On Thursday, October 5, Jack Hughes was all alone. Very few people knew of his adopted disability. Hughes felt very vulnerable. He became very aware.

Langley Takes Two R&D Awards *(Continued from page 1.)*

Braille Mouse Helps Blind Use Computers *-by Walter Rankin*

The principle application of Doug Garner's Braille Mouse is to enable a sight-impaired operator to read the material from a computer monitor in the form of Braille characters. The Braille Mouse gives the blind an opportunity to fill highly technical jobs involving computers and word processors.

Garner's instrument consists of a "mouse" similar to those typically used with computers. The mouse has a single Braille "cell" on its surface. This cell contains six pins which may be raised in any combination of six individual actuators to create any character of the Braille alphabet. When the mouse is moved left to right, each screen character is addressed by the cursor, converted to its equivalent Braille character, and presented to the operator through the appropriately raised pins of the cell.

The mouse only detects horizontal motion; thus, the blind operator cannot accidentally wander off the line being read. The operator can reverse the direction of reading, however, to go back and check a character that might have been misread. The entire text content of the screen is read out as if it were a single, continuous line of print. To return to the next line of print, the operator simply lifts the mouse and returns it to the left side of the working area to continue.

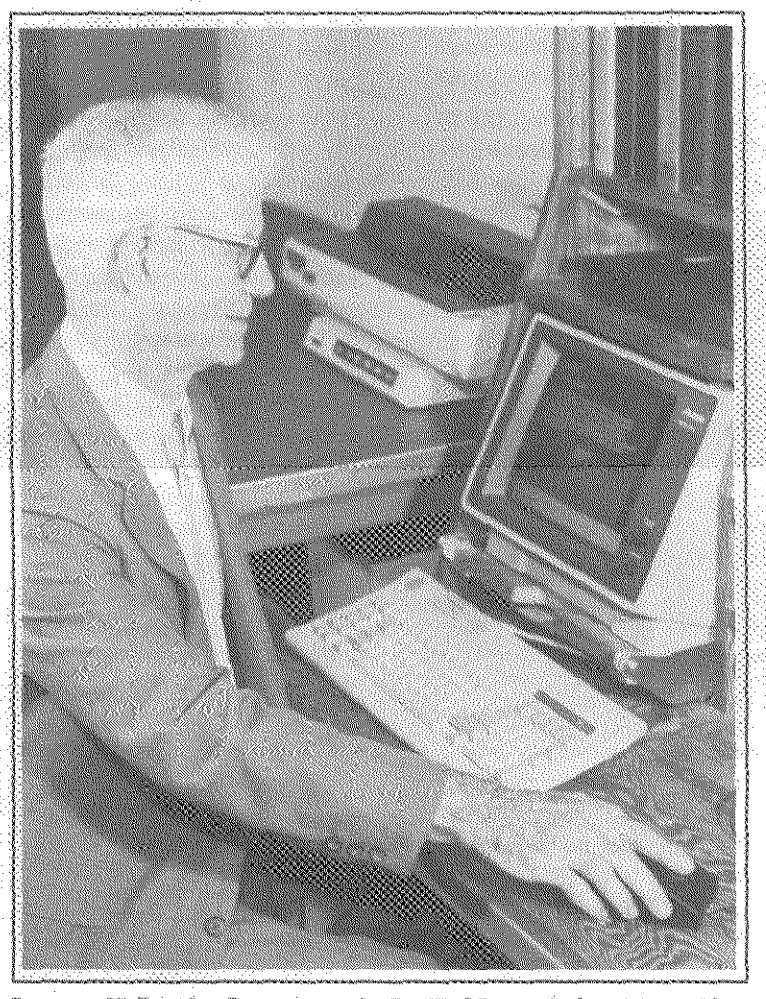
Garner originally developed the Braille Mouse for the Research Triangle of North Carolina as an economical way to translate text which had been recorded on magnetic-tape cassettes into a readable Braille form for the blind. The Braille Mouse reads these cassettes after the material has been downloaded into a buffer memory attached to the cassette player.

Recording material on cassettes is less costly than typing Braille characters onto heavy bond paper. The light-weight cassettes are also less expensive to ship than bulky Braille books.

While similar devices are available, none is as practically priced. According to Garner, the Braille Mouse "costs $200, about one-twentieth of the cost of some similar products." The Braille Mouse is compact and easily operated, allowing the blind operator to access a standard computer or word processor in a natural way, closely simulating the process of reading a Braille text.

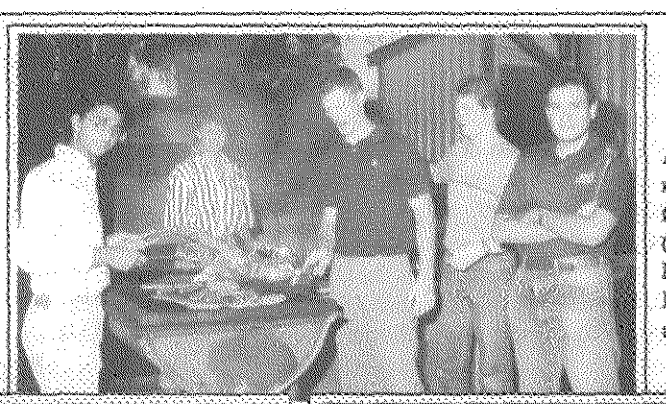
In the 22 years of NASA's participation in the R&D 100 competition, 81 NASA developments have been selected, contributing significantly to the recognition of NASA as a source of technical excellence. Langley has earned 17 of NASA's 81 awards. Overall, NASA ranks third on the list of R&D 100 award recipients.

The R&D 100 winners were honored at an awards banquet September 28 at the Museum of Science and Industry in Chicago. The banquet marked the beginning of a month-long exhibit of products for scientists, engineers, educators and the general public.

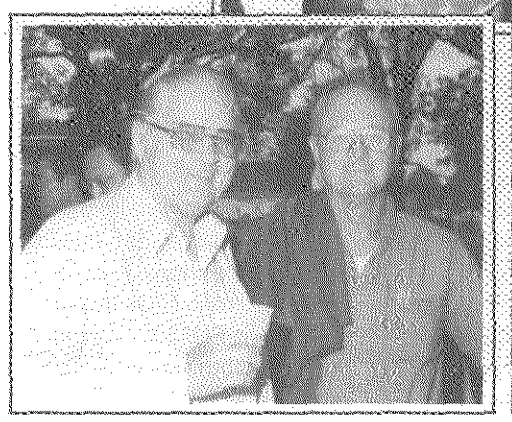


Inventor H. Douglas Garner uses the Braille Mouse, designed to enable the blind to read material from a computer monitor in Braille form.

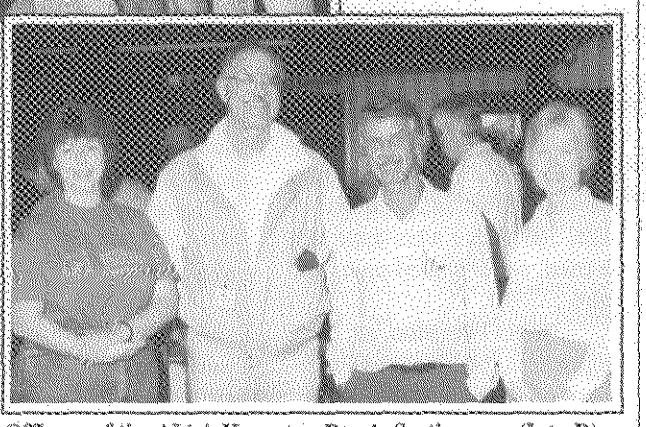
AIAA Oyster Roast



AIAA Student Branch members pause from their assignments. Shown (L to R) are Prasun Desai, Rachel Jasinsky, Tim Holden, Sean Sweeney and Rogard Ross.



Langley alumni John Duberg and Mac MacConochie attended the annual affair held September 19 at NASA Langley.



Officers of the AIAA Hampton Roads Section are (L to R) Linda Bangert, treasurer; Jim Youngblood, secretary; Ferd Grosveld, vice chairman; and Karen Credeur, chairman.

Contractor News

Langley Contractor Named SBA Minority Entrepreneur for 1989

The president of NASA's 1987 Minority Contractor of the Year has been chosen Virginia's Outstanding Minority Entrepreneur for 1989.

Dr. Sudhir C. Mehrotra, president of Vigyan, Inc., of Hampton, was presented this award October 5 by Catherine S. Marschall, Director of the Small Business Administration's (SBA) Richmond District Office.

Vigyan, Inc., was established in 1979 with a staff of three researchers. With its current 110 employees, the firm has enjoyed an annual growth rate of 60 percent over the last seven years. In addition to corporate headquarters in Hampton, a regional office is located in the Washington metropolitan area.

Vigyan provides research, development, engineering, information system development and systems integration services to NASA, the Environmental Protection Agency, and the Departments of the Army, Navy and Air Force. The firm provides research and development services to NASA in the areas of computational fluid physics, aerodynamics, structures, space systems and control of flexible and large space structures. Vigyan owns and operates a 3-ft. by 4-ft. diagnostic wind tunnel as well as a MicroVax II computer system which facilitates rapid verification of concept.

The firm holds six U.S. patents and has received twelve Small Business Innovative Research (SBIR) Phase I grant awards and six Phase II awards. The company has published over 260 technical papers and professional journals, and has won 22 achievement awards and certificates of recognition from federal agencies.

Local Firm Named NASA's Minority Contractor of the Year

NASA Administrator Richard H. Truly presented the 1989 NASA Minority Contractor of the Year Award to Analytical Services & Materials (AS&M), Inc., a Hampton firm providing services to Langley.

Dr. Jalaiah Unnam, president of AS&M, accepted the award Tuesday, October 3, during ceremonies at NASA Headquarters honoring Minority Enterprise Development Week. AS&M was cited for "outstanding performance, entrepreneurial spirit and unique commitment in providing support to the National Aeronautics and Space Administration."

Unnam stated "We appreciate the opportunity provided to us by NASA Langley, and we share NASA's commitment to excellence in the advancement of aerospace science and technology."

AS&M is located in Hampton, just outside Langley Research Center. The growing research and development firm is involved in basic and applied research in the major areas of aeronautics and space technology, chemistry, advanced materials, structural mechanics, electronics, instrumentation and computer system integration.

The firm has also been awarded the Small Business Administration's Award for Excellence and was Langley's nominee for the Small Business Prime Contractor of the Year Award.

-AS&M photo

NASA Administrator Richard H. Truly (left) congratulates Dr. Jalaiah Unnam, president of Analytical Services & Materials, the firm named NASA's Minority Contractor for 1989.

People & Places

Health Corner

Breast Self-Exam Seminar Planned

The Office of Occupational Health Services will hold a brown bag seminar on Breast Self-Examination Friday, October 27, from noon to 1 p.m. in the H.J.E. Reid Conference Center, Building 1222.

The seminar will be presented by Pamela Gebhart, head of the Mammography Department, Sentara Hampton General Hospital, and Sharon Hartsell, chief nurse practitioner, Occupational Health Clinic. During the program, the use of the MAMMACARE Kit, available through the Learning Center, will be explained.

Attendance is open to employees, retirees, contractors and their families. Although the program is directed mainly to the female population, male employees may attend.

Attendees are encouraged to bring their lunch. Civil service employees who attend should charge the additional half-hour to Job Order A-1619.

For more information, contact Sharon Hartsell, ext. 43198.

Employees Support Bloodmobile

The American Red Cross Bloodmobile visited Langley on September 28. A total of 285 units of blood were donated by Langley employees, retirees and contractors.

Achieving gallon status were:

11 gallons---Robert F. Berry and Ceylon C. Short Jr.;

10 gallons---Charles G. Marple;

8 gallons---Steven K. Bene and Richard Lyeth;

7 gallons---Edward E. Crum;

6 gallons---Robert M. Connell Jr., Rodney D. Russell, Michael T. Stubbs and Conrad M. Willis;

5 gallons---Cadd T. Moore III, Erby C. Harris and James C. Elliso;

4 gallons---Steven X. Bauer, Mark W. Wynkoop and Becky M. Sample;

2 gallons---Jimmy C. Case, Wayne George, Ronald D. Staples and Bobby Kessler;

1 gallon---Ty D. Moen, Ellen M. Brantley, Jeffrey J. Conover, David K. Burnette and William P. Chambers;

First Timers---Robert L. Williams II, John C. Martin, Nathan V. Van Hooser, Kimberly L. Benton, David M. Cooke, Thomas M. Walker, Anthony W. Robbins, Steve J. Hughes, Brian McDonald, Deborah M. Wahls, Alan R. Smart and Kamran Fouladi-Semnani.

NASA coordinator for the Bloodmobile visit was Annette Forrest; Red Cross coordinator was Marilyn Asby.

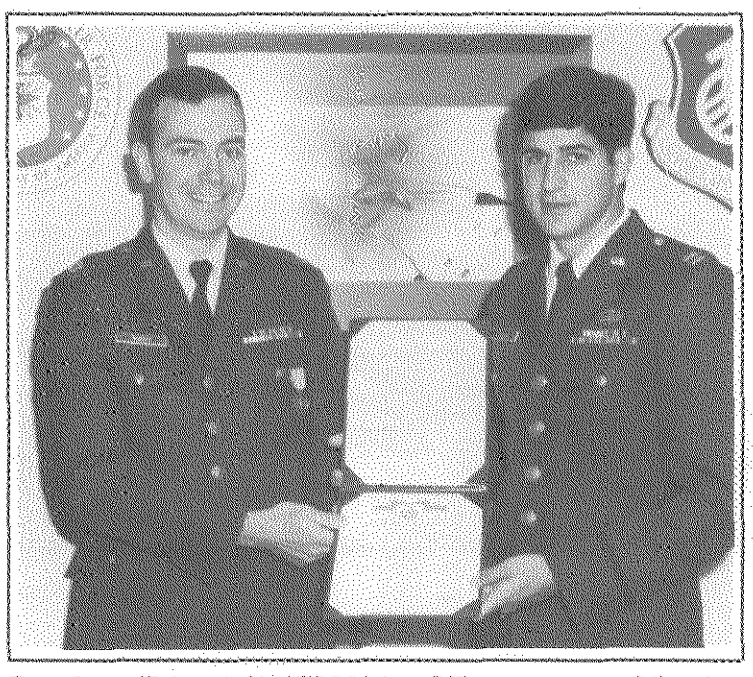
The next Red Cross Bloodmobile at Langley will be Wednesday, November 29. Plan to participate. Only you can donate this gift of life.

In Memoriam

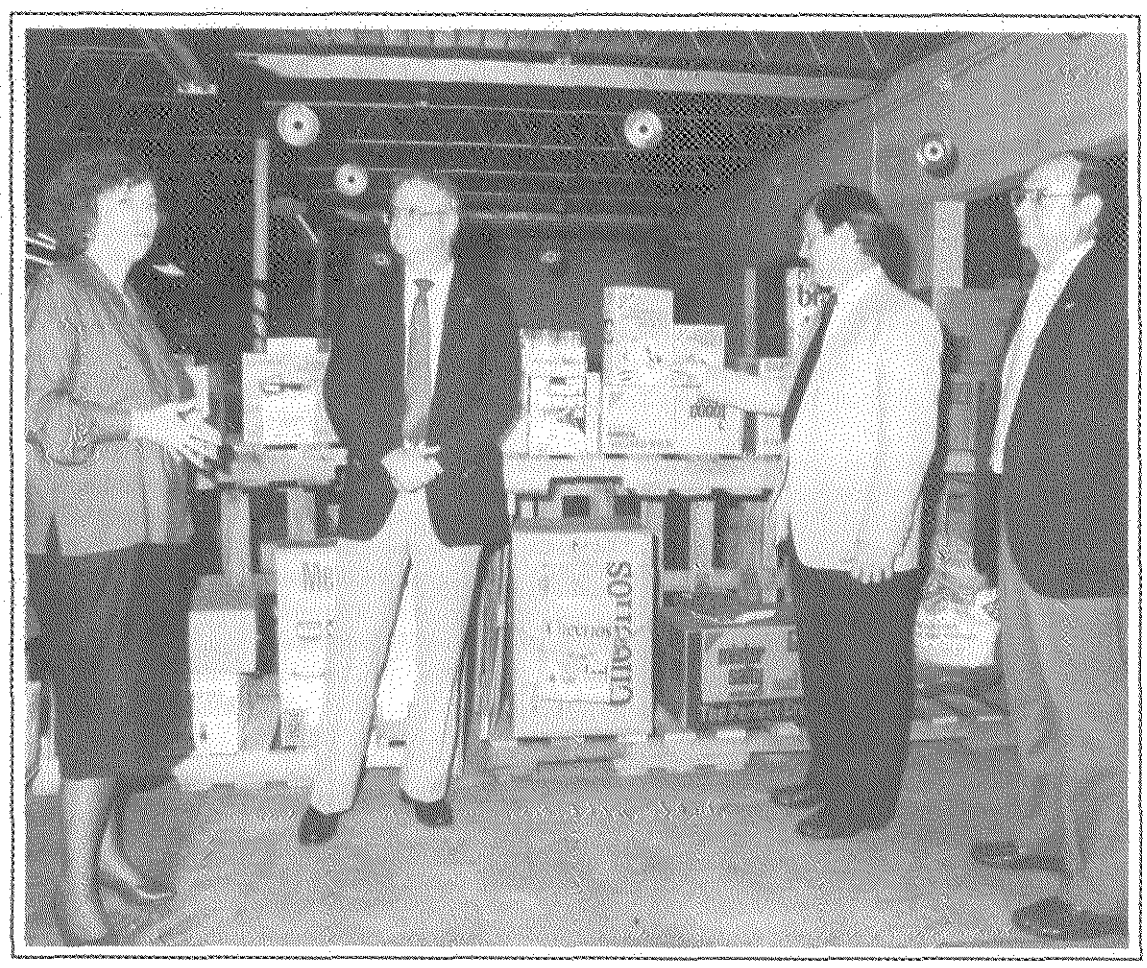
Sympathy is extended to the families of:

Mrytle H. Wells, who died September 10. Wells retired from Langley as secretary of the Flight Dynamics and Control Division after 20 years of service.

William H. Mayo, who died September 24. Mayo retired from the fire department at NASA Langley after 31 years of service



Capt. James Hubert (left), AFSC Liaison Office, was presented the Air Force Commendation and Achievement Medals by Lt. Col. Michael Phillips at a ceremony on September 18. Hubert, shown with Capt. Mark Frassinelli, was awarded the medals for his work at the Wright Research and Development Center in the areas of crew escape and protection.



-photo by Terry Shepard

Langley staff members get a "behind the scenes" look at the provisions stored for distribution by the Foodbank of the Virginia Peninsula (FVP). FVP Director Cindie Clevenger, left, talks with John Garren, chief of the Flight Management Division; Darrel Tenney, chief of the Materials Division and co-chairman of the CFC Campaign; and Jim Arrington, assistant chief Space Systems Division and Chairman of Langley's Combined Federal Campaign.

Who benefits from CFC contributions?

CFC Provides Basic Needs--Like Food

-by James Ford, Fort Eustis

Did you know that 20 percent of all the food in this country is wasted each year? This is enough to feed 49 million people three times a day for an entire year!

"This is why foodbanks are so important," said Cyndie Clevenger, director, Foodbank of the Virginia Peninsula. "Our goal is to help eliminate some of the wasted food in an attempt to feed the community's hungry."

The Foodbank of the Virginia Peninsula (FVP) is a private, non-profit organization that works cooperatively with business, religious, social service and community organizations in collecting and distributing food and human-care products to care for the needy, the children, the elderly and the ill throughout the Peninsula, adjacent counties and cities.

Fifty thousand individuals on the Peninsula go hungry several days out of the month, Clevenger said. This fact emphasizes the Peninsula's need for emergency food assistance. Through the foodbank's 180 member-agencies, 20,000 people are helped monthly. Member-agencies are those charitable, non-profit organizations, such as churches and the Salvation Army, who receive food from the foodbank and dispense meals and emergency food directly to those who need it.

Clevenger added that about 10,000 of the 20,000 foodbank recipients are children. Approximately 25,000 children in the area need assistance.

"We (FVP) are all about human care needs--caring for people in our community and ensuring that the quality of life is the best that it can be," she said.

Funding to achieve this, Clevenger explained, comes from a variety of sources. The foodbank, which doesn't receive government funding, receives about 30 percent of its operational funds from Combined Federal Campaign and United Way donations. Last year, $8,109 was donated through the campaigns. Another 30 percent comes from member-agencies sharing maintenance costs, and 40 percent is derived from individual, corporate and civic donations.

It's difficult to work, study or even smile if you haven't eaten lately. The Foodbank of the Virginia Peninsula is just one of the agencies--local, national and international--supported by the Combined Federal Campaign. Your one donation helps them, all year long.

Halloween Party

"Fox Fire" with Willie Williams

October 27

Activities Center

4 to 8 p.m.

$1 cover charge

Happenings

SPECIAL LAA SOCIAL. Adult Halloween Party will be held Friday, October 27, from 4 to 8 p.m. in the H.J.E. Reid Conference Center. "Fox Fire" with Willie Williams will be featured. $1 cover charge. Costume contest for adults only. Prizes awarded for the prettiest, most original and most frightful costumes.

TOASTMASTERS will meet Wednesday, October 25, at 11:30 a.m. in Building 1218, Room 205. Guests are welcome. Time in attendance up to one hour may be charged to A-1619. For additional information, call Steve Yaros, ext. 43050.

COUNTRY-WESTERN DANCE CLUB starts a new season Saturday, October 21, at 7 p.m. in the H.J.E. Reid Conference Center. Dance lessons for novices will be from 7-7:45 and continuous dancing thereafter until 11:30 p.m. Call Sam Sokol, ext. 41863, for more information.

FINAL FALL NASA INTER-CENTER RACES are 2-Mile race Oct. 23 and 10-KM race Oct. 26. Both start at 5 p.m. on Doolittle Road. All NASA employees, retirees, on-site contractors and co-ops at work earn points for Langley. Call Richard Shearer, ext. 47036.

BOOK SALE. The Visitor Center Souvenir Counter will hold a book sale October 23-29. All books 50 percent off! Wonder what to get that aerospace buff on your Christmas list? Shop the Souvenir Counter and browse through the bargains.

LOST: LIBRARY BOOK. If you have *Introduction to Laser Physics* by Koichi Shimoda, notify the Technical Library.

WANTED: ROOMMATE. Male to share townhouse in York Crossing; 1/2 mo. rent plus 1/2 utilities; 2 BR, 1 1/2 BA, DR/Kit comb. w/FP, LR, W/D, A/C. Available Nov. 1. Call 898-5113 after 5 p.m.

WANTED: ROOMMATE. Female to share spacious apartment in Hampton; 1/2 mo. rent plus 1/2 utilities; 2 BR, 2 BA, W/D. Available Nov. 6. Call 766-0663.

NEEDED: CARPOOL from Lightfoot, I-64 exit 55. Call Karl Moeller, ext. 41827.

NEEDED: GOOD HOMES for white kittens. Call 838-0312.

FOR SALE: AUTOMOBILE. 1974 Dodge Dart, 2-DR, AT, rebuilt engine. Excellent running car. $500. Call ext. 44261 or 898-6556 after 5 p.m.

Retirement Parties

Ron Smith will be honored at a retirement party, Tuesday, October 24, in the H.J.E. Reid Conference Center. Festivities begin with a cash bar at 4:30 p.m., followed by heavy hors d'oeuvres. Cost is $9 which includes gift. For reservations, contact Bettie Messier, ext. 43858, by October 20.

Kenneth N. Cole will be honored at a retirement dinner Saturday, October 28, in the H.J.E. Reid Conference Center. Cost for the buffet dinner and gift is $12/person or $23/couple. Contributions of $2 for gift are welcome. Cash bar social begins at 5 p.m.; dinner is at 6. Checks may be made payable to Gloria S. Evans, Mail Stop 387, by October 23.

1990 Calendars Available from Stock

Requests for 1990 calendars can now be submitted to the Stockroom, Mail Stop 382, on NASA Langley Form 55. Stock numbers for calendars are listed below:

7510-01-225-9211	**Calendar Pad**, Flipover; size 3" x 3-5/8"
7510-01-225-9215	**Calendar Pad**, Executive flipover; 3-5/8" x 5-7/8"
7510-01-241-0544	**Wall Calendar**, displays three months at a glance; 11-5/8 x 8-7/8"
7530-01-231-6226	**Looseleaf Appointment Book Refill**, daily and monthly calendar sheets; 6-1/2" x 5-1/2"
7530-01-233-2433	**Weekly Appointment Book**, features two pages per week, columns for appointments and reminders are marked off in 15-minute intervals; 8-1/2" x 11"
7510-01-241-0548	**Desk Blotter**, monthly sheets ruled and squared for each day; 17" x 22"

Each branch secretary should submit branch and section requirements to reduce the number of requests. Other stock supplies **should not** be ordered on the same request.

Civil Servants Take Note: Time to Schedule Leave

The current leave year ends January 13, 1990. "Use or lose" leave **must** be used by that date to avoid forfeiture.

It is the joint responsibility of supervisors and employees to effectively plan and schedule annual leave **throughout** the leave year. This will ensure a reasonable vacation period and prevent a "use or lose" situation at the end of the year. Supervisors must approve annual leave if work load permits; however, if the leave must be denied, the supervisor and employee should work together to reschedule the leave to the satisfaction of the employee.

Approval of an exigency of the public business must be obtained prior to cancellation or denial of leave if the leave is subject to forfeiture. In order for this leave to be considered for restoration, it must have been scheduled and approved, or requested by the employee, in writing (via Standard Form 71), before the beginning of the third pay period prior to the end of the leave year (December 1, 1989).

In 1988, the Center Director announced that requests for exigencies would be thoroughly reviewed and the number of approved exigencies would be limited. Therefore, supervisors and employees should schedule "use or lose" leave as soon as possible to ensure the opportunity to use the leave and avoid forfeiture.

Researcher News

BULK RATE
POSTAGE & FEES PAID
NASA Washington, DC
Permit No. G-27

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

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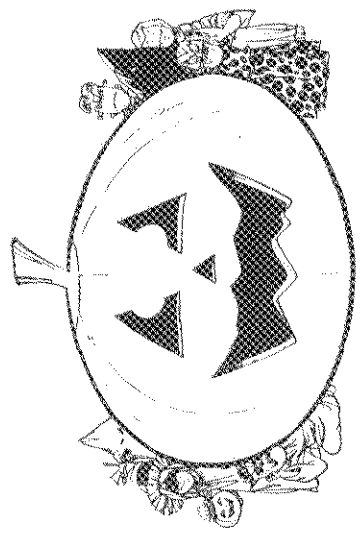
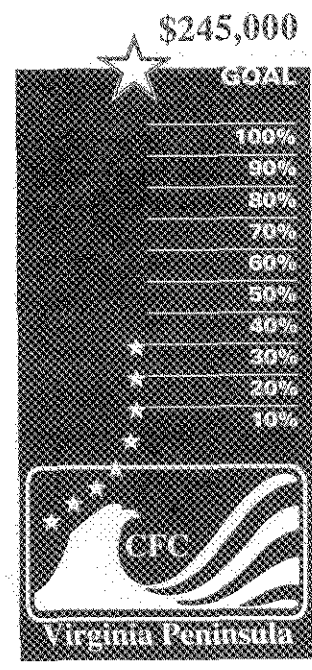




-photo by Don Ward

Langley Deputy Director Paul Holloway (left) and Combined Federal Campaign Chairman Jim Arrington conclude Langley kickoff activities by cutting a ceremonial cake. The Langley Research Center has set a goal of $245,000 for the 1989 CFC campaign.

A one-day solicitation was held Thursday, October 5. As of Researcher News press time, Langley key persons had collected $73,833.70, which represents 30.14 percent of goal.

Reminder:
Set your clocks **back** one hour on Sunday, October 29!

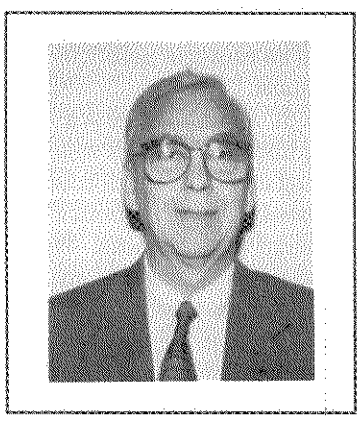
NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 3, Issue 22 November 3, 1989
Bi-weekly Employee and Contractor Publication

Langley Colloquium and The Sigma Series

FAA Executive to Discuss Aging Aircraft Program



The Aloha Airlines accident in April 1988 triggered a major national effort by all elements of the aviation industry to examine aging passenger aircraft and to define a program to ensure the continued safe and economical operation of aircraft that have been flying for many years.

Owen E. Schrader, former Langley aerospace engineer and now manager of the Aging Aircraft Program for the Federal Aviation Administration (FAA), will review the Aloha accident and the results of the accident investigation on Monday, November 13.

At 2 p.m., Schrader will give his talk, "The FAA Aging Fleet Program," to NASA employees, contractors and retirees during a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 7:30 p.m., he will present the same lecture at the Radisson Hotel, Hampton, as part of The Sigma Series. The Sigma Series is a series of public lectures sponsored by the Daily Press, the City of Hampton and NASA.

In his lectures, Schrader will discuss the aging aircraft program, including planned research and proposed new rules for passenger aircraft.

During his career at Langley from 1962 to 1982, Schrader was associated with the Advanced Transport Technology Project Office and the Aircraft Energy Efficiency Project Office. Since 1982, he has been with the FAA's Northwest Region in Seattle where he initially worked as a project engineer on the Boeing 747. In 1986, he was appointed to his present position in the Transport Airplane Directorate.

Earthquake Causes Minor Damage at Ames

NASA Aircraft Takes Damage Assessment Photos

NASA's ER-2 high-altitude research aircraft was used to take aerial photography of areas affected by the October 17th San Francisco-area earthquake. In general support of President Bush's request that federal agencies support earthquake recovery activity, the ER-2 took photos of the damage area from Santa Cruz to Marin County.

Operated by Ames Research Center, Mountain View, California, one of the areas affected by the earthquake, the ER-2 flies at an altitude of 65,000 feet and can provide broad area coverage and high-resolution photography. Camera equipment on board would be able to see large-scale natural damage such as landslides or unusual water flow. It also may be able to detect changes in linear features such as fault lines.

Ames reported extensive minor damage, including some flooding from broken pipes, and structural damage to two buildings. The Center was closed on the day following the quake, except for essential personnel. There were no known personal injuries at Ames.

Copies of selected earthquake damage assessment photographs will be made available to local, state and federal authorities.

NASA/NOAA Send VLBI to Study Quake Movement

NASA and the National Oceanic and Atmospheric Administration (NOAA) have deployed mobile Very Long Baseline Interferometry (VLBI) systems to the San Francisco Bay area to measure the crustal motion associated with the October 17 earthquake

The mobile VLBI units will measure, to an accuracy of approximately one centimeter, the positions of survey monuments at the Presidio, Fort Ord and Point Reyes, California, relative to points sufficiently distant from the earthquake to be unaffected by it. The survey monuments were installed under a multi-agency program specifically to monitor crustal motion in California. Measurements since 1983 have shown steady motion of a few centimeters per year as the Pacific Plate moves past the North American Plate. The measurements collected should detect any change in this pattern caused by the earthquake. The much stronger earthquake of 1906 produced suraface motions of several meters in this same region.

The mobile VLBI units were developed by NASA and are operated for the Crustal Dynamics Project of NASA's Office of Space Science and Applications and NOAA's Climate and Global Change Program by the National Geodetic Survey Division of NOAA. They are maintained at the Mojave Base Station, near Barstow, California.

The mobile units consist of small aperture radio telescopes, Hydrogen Maser atomic clocks, highly sensitive microwave receivers, tape recorders and other electronic instruments to record the faint signals emitted by quasars billions of light years from Earth.

Second Flight of Langley's SILTS and SEADS A Success

-by Allan C. Hanrahan

STS-28 was the second flight of the Shuttle Infrared Leeside Temperature Sensing (SILTS) and the Shuttle Entry Air Data System (SEADS) experiments, both developed by the Langley as parts of the agency's Orbiter Experiments (OEX) program.

The OEX program uses Shuttle orbiters as atmospheric entry research vehicles. Each OEX experiment has been designed to gain information without interfering with the prime mission of a given Shuttle flight. OEX experiments do not ride in the Shuttle payload bay; they are placed within the orbiter structure wherever sensors are needed for data collection.

The SILTS experiment was first flown on STS-61C, Space Shuttle Columbia, January 12, 1986.

Results from this second flight will provide data to be used in advancing the technology for predicting how much thermal protection is required on the upper surfaces of advanced entry vehicles during the reentry.

The data were obtained by an infrared camera (radiometer) located in a pod at the tip of the vertical tail of the orbiter. The data consists of high-resolution infrared imagery of the upper (leeward) left wing surface.

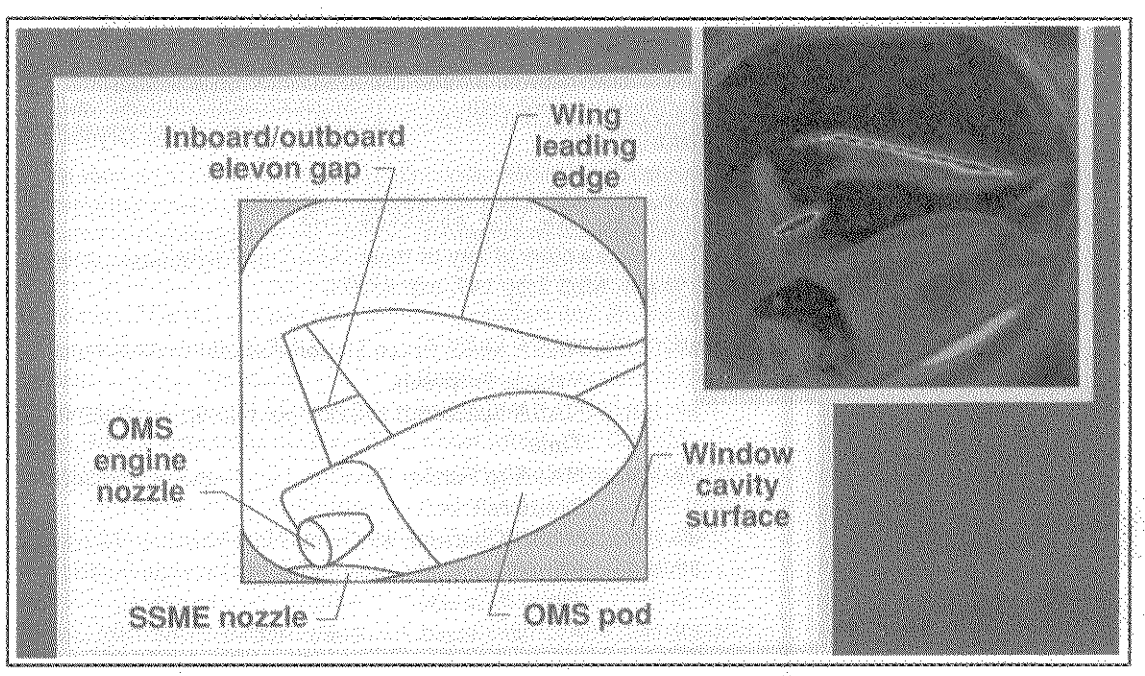
Obtained under flight conditions which cannot be duplicated in ground-based facilities, the measured data will increase the knowledge of reentry aerothermodynamic phenomena.

The top section of the orbiter vertical stabilizer houses the equipment. The housing incorporates the camera, a control and data module, and a window coolant system. The camera viewed the upper surface of the orbiter left wing through a window that is transparent to the infrared region of the spectrum and that is cooled by the injection of gaseous nitrogen into the window cavity.

The camera measures the amount of infrared radiation emanating from the surface. Radiation levels can be related to surface temperatures.

The camera output data were recorded on an onboard tape recorder and processed (i.e. reduced and analyzed) postflight to produce a detailed thermal map of the leeside surface temperatures. These temperatures indicate the magnitude and distribution of aerodynamic heating experienced by the leeside surfaces in flight.

The principal technologists for SILTS are Langley's E. Vincent Zoby and David A. Throckmorton, both of the Space Systems Division.



SHUTTLE REENTRY TEMPERATURES EXAMINED IN SILTS EXPERIMENT. Data is obtained by a camera located in a pod at the tip of the vertical tail of the orbiter Columbia, looking down at the left wing. Notable features in this image are the reinforced carbon-carbon wing leading edge, the gap between the inboard and outboard elevons (control surfaces), and the orbital maneuvering system (OMS) pod. Shading of the image indicates the level of infrared radiation emitted from the orbiter's surface. Radiation levels can be related to surface temperatures.

The SEADS experiment was also first flown on STS-61C, and was developed to obtain more precise measurements of air data, angle of attack and angle of sideslip versus time.

The key to the feasibility of incorporating the system was development of a technique for penetrating the orbiter's reinforced carbon-carbon nose cap. This was accomplished by designing, fabricating and testing several concepts to determine which was most suitable without detriment to the nose cap structural integrity in the thermal environment. The penetration components are installed in a nose cap modified for that purpose.

The air data system consists of an array of 14 penetration orifice plugs, instrument tubing, dual-pressure transducers and associated supporting members and bulkhead feed-throughs. On this second flight the pressure transducers performed as designed, which was to provide accurate measurements from an altitude of approximately 90 kilometers (56 miles) to touchdown.

The principal technologist for SEADS is Paul M. Siemers III, of the Space Systems Division.

News Briefs

JOHNSON SPACE CENTER, Houston, Texas --- NASA has released a request for proposals (RFP) for definition studies of a new vehicle that would serve as a lifeboat for Space Station Freedom, providing the capability for assured crew return from space. Deadline for proposal submission is November 16, 1989. The Assured Crew Return Capability (ACRC) System is conceptualized as a vehicle, continuously berthed at Space Station Freedom, for crew return to Earth in event of a medical emergency or other contingencies which cannot be supported by the Space Shuttle, for any reason, including grounding of the Shuttle fleet. The RFP encourages the use of existing technologies for a simple and reliable ACRC vehicle.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA will launch a spacecraft on November 9, to study the origin and dynamics of the universe, including the theory that the universe began about 15 billion years ago with a cataclysmic explosion--the Big Bang. The Cosmic Background Explorer (COBE) spacecraft will be boosted into an Earth polar orbit from Vandenberg Air Force Base, Calif., aboard the final NASA-owned, NASA-launched Delta vehicle. By measuring the diffuse infrared radiation (cosmic background) that bombards Earth from every direction, COBE's instruments will help clarify such matters as the nature of the primeval explosion--which started the expansion of the universe and made it uniform--and the processes leading to the formation of galaxies.

HEADQUARTERS, Washington, D.C. --- NASA has authorized further development for two unmanned scientific spacecraft that would explore interplanetary space and study extragalactic light sources, such as quasars. These studies were submitted to NASA under the Explorer Concept program, designed to develop intermediate-size scientific experiments. The two programs are the Lyman Far Ultraviolet Spectroscopic Explorer (FUSE) and the Advanced Composition Explorer (ACE).

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- Continuing observations by the Total Ozone Mapping Spectrometer (TOMS) have confirmed that the ozone hole over the Antarctic this year has equalled the record-setting hole observed in 1987. Scientists at Goddard have been closely monitoring ozone levels over the Southern Hemisphere with the TOMS, an instrument on board NASA's NIMBUS-7 Satellite. The depth of the ozone hole each year will be determined by meteorological conditions, such as temperature and winds.

JOHNSON SPACE CENTER, Houston, Texas --- Medical consultations between astronauts in space and NASA physicians on Earth will become a routine part of future Space Shuttle flights to help improve the understanding and provide timely treatment of initial space motion sickness symptoms. A private medical communication will be scheduled between Shuttle crew members and Mission Control Center flight surgeons during the pre-sleep periods on the first two days of each flight beginning with STS-34. Additional consultations may be requested by either the crew or the flight surgeons.

Aldrich Named AA for OAST; Crippen to Head Shuttle

NASA Administrator Richard H. Truly has named Arnold D. Aldrich associate administrator for the Office of Aeronautics and Space Technology (OAST) and Captian Robert L. Crippen, USN, director of the Space Shuttle Program.

In his new position, Aldrich will be responsible for the direction of NASA's aeronautics and space technology programs as well as for the institutional management of NASA's Ames, Langley and Lewis Research Centers. Adrich is currently director, National Space Transportation System (NSTS), and provided the program leadership in the safe and successful return to flight of the Shuttle.

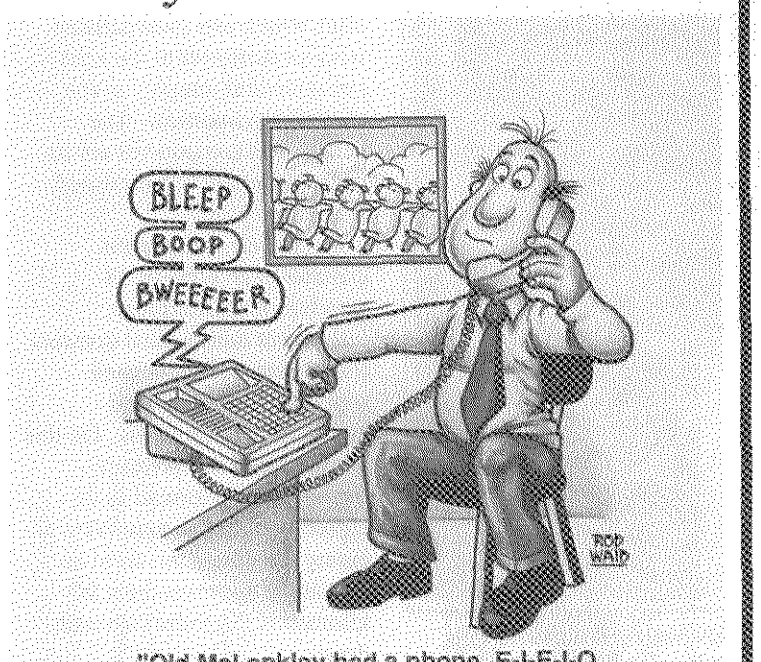
In his new role, Crippen will have full responsibility for the operation and conduct of the Space Shuttle program and will report directly to Dr. William B. Lenoir, acting associate administrator for Space Flight. Crippen is currently deputy director, NSTS Operations.

Administrator Truly commented, "I'm delighted that NASA has two outstanding executives in Arnie Aldrich and Bob Crippen who are so well prepared to take on these important new responsibilities. It speaks well for the inherent strength of the NASA organization. These management changes bode well for a strong future in NASA's aeronautics and technology programs, as well as insure stability in the Space Shuttle leadership."

Adrich has been associated with the U.S. manned space program almost since its inception, joining the NASA Space Task Group, the forerunner of NASA's Manned Spacecraft Center in 1959 after graduation from Northeastern University.

Crippen, a native Texan and a graduate of the University of Texas, is a former Navy carrier pilot and became a NASA astronaut in 1969. Crippen has the distinction of having flown on a record four Shuttle missions.

Lankley

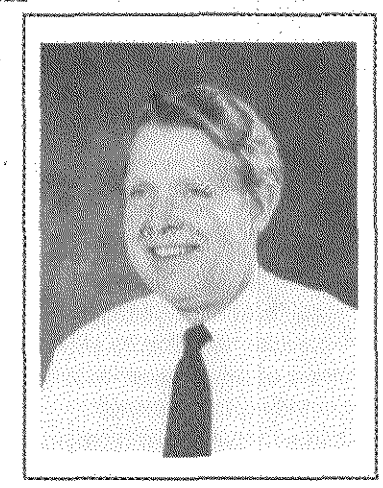


"Old McLankley had a phone, E-I-E-I-O,
with a pick-pick here and a pick-pick there..."

Editorials

Langley

Headquarters Forum



From Webster's dictionary: "Sabbatical--A leave for rest, travel or research." Many of you are aware that I was away for most of the summer. I spent eight weeks, from the middle of June to the middle of August, in a graduate program at St. John's College in Annapolis, Maryland. It was an excellent mini-sabbatical.

St. John's College is a small liberal arts school with an unusual curriculum. All courses are based on readings from a list of about 100 great books. There are no lectures. Students read the assignments and then discuss them in groups of ten to 15 students with one or two faculty members. These discussions provide the opportunity both to learn and to contribute.

The focus of my courses was science and mathematics. We read from Plato, Aristotle, Bacon, Galileo, Descartes, Newton, Darwin, Freud, Einstein and others! It was most interesting to study the history of science and to note the different scientific approaches of the early Greeks, Bacon and Newton, and Darwin and Freud. The reading was intense but very worthwhile.

The purpose of a "sabbatical" is not only educational but also to provide a break in the normal routine. I think it is important for all of us to "take a break and recharge the batteries" now and then. The eight weeks I spent at St. John's gave me the opportunity to view the Center from a more objective perspective. I returned to Langley refreshed and with renewed energy to tackle the opportunities and challenges of Fiscal Year 1990!

Let me put in a plug for the Langley Training Office, which alerts us to opportunities such as the St. John's offering. Training recommends many excellent educational as well as personal and professional growth opportunities for our employees. I urge you to talk with your supervisor and with the specialists in the Training Office. Take advantage of these opportunities to further your education and to gain new perspectives.

I also want to thank Paul Holloway and Sid Pauls for an outstanding job of managing and directing the Center while I was away. With the assistance of the senior staff, who also carried some extra tasks, they kept the Center in good shape, and I returned to find Langley strong and healthy. I am fortunate, indeed, to have such a fine Deputy and Associate.

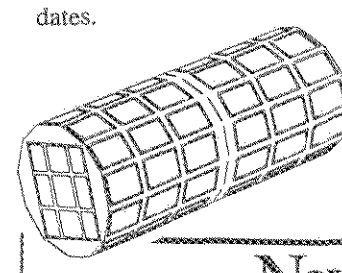
Richard H. Petersen
Director

Car Passes Available for STS-32

Car passes for both the launch and landing of STS-32, the mission that will retrieve Langley's Long Duration Exposure Facility (LDEF), are available on a first come-first served basis.

Launch is now scheduled for December 18 from Kennedy Space Center, Fla., and landing, December 28, at the Dryden Flight Research Facility, Edwards, Calif.

Contact Ann Suit, ext. 43305, Mail Stop 154, for passes. Should the launch slip, passes will be available for the rescheduled launch and landing dates.



Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-157.....NASA Seeks Space Station Assured Crew Return Vehicle Proposals
89-158.....NASA Spacecraft to Look out into Space, Back in Time
89-159.....NASA to Further Develop Two Explorer Scientific Spacecraft
89-160.....NASA Confirms '89 Ozone Hole Matches '87 Record
89-161.....Private Medical Consultations to Become Space Flight Routine
89-162.....Aldrich Named Associate Administrator for Aeronautics and Space Technology; Crippen to Head Shuttle Program
89-163.....NASA's ER-2 Aircraft Taking Earthquake Damage Assessment Photos
89-164.....NASA and NOAA Send VLBI to Study California Earthquake Movement

News Researcher

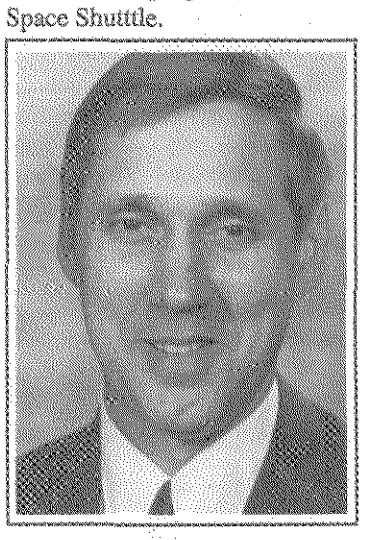
The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough
Editor . . . . . Marny S. Skora
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Scientist and Supercomputer Speed Shuttle Analysis

A Langley scientist's new method of exploiting supercomputers in the structural analysis of aerospace vehicles brings honors to him and important improvements in design evaluation of such programs as the Space Shuttle.



Working with the world's most powerful computer, the Cray Y-MP, Dr. Olaf Storaasli and two colleagues developed a new method to vastly speed the machine's ability to solve engineering equations. This innovation relates directly to how quickly NASA problem-solvers can determine where excessive stresses and strains occur, such as with the O-ring failure on Challenger.

The achievment will be recognized by a Cray Research, Inc. Performance Award to be presented at the Supercomputing '89 conference in Reno, Nevada, November 13. The event is sponsored by the Institute of Electrical and Electronic Engineers and the Association for Computing Machinery. The award will be presented jointly by the Chairman of the Board and the President of Cray Research. Sharing the honors with Storaasli are Dr. Duc Nguyen and Tarun Agarwal of Old Dominion University. Storaasli is a research scientist in the Structural Mechanics Division.

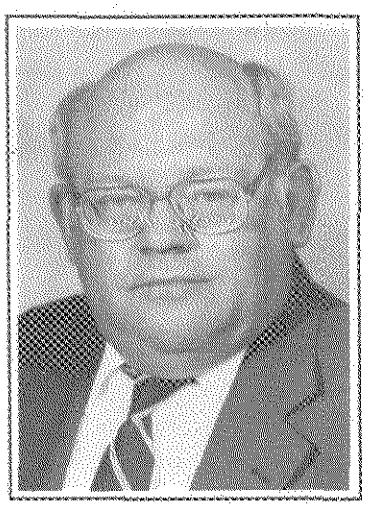
The Cray is the only computer in the world capable of handling over one billion mathematical operations per second and that rate had been unachievable for engineering and scientific problems until very recently.

Working with the newest Cray hardware, Storaasli and his colleagues designed software to simultaneously harness the ultra high speed of the Cray Y-MP, which has eight processors arranged in parallel. To that capacity, the new software added vectoring--which is a way to feed instructions to the processors in a series of continuous chains or stacked arrays. This electronic marriage is known as parallel-vector processing and the multiplication effect it provides speeds up overall computational power. This process is what yielded the award-winning rate of 1.5 billion operations per second for equation solution.

What does the future hold for these applications? Next, the new techniques will be focused on the study of very complex three-dimensional aircraft wing and fuselage intersections and high-speed transport aircraft.

Pitts to Receive Flight Safety Foundation's de Florez Award

Felix L. Pitts, group leader in the System Validation Methods Branch, has been selected to receive the 1989 Admiral Luis de Florez Flight Safety Award. The de Florez award, administered by the Flight Safety Foundation (FSF), recognizes individual contributions to aviation safety made through basic design, device or practice.



Admiral Luis de Florez, former president of the FSF, was one of the outstanding devotees of the 20th century in aviation design, training, computer technology, flight simulation and aeronautical research and development.

Pitts was nominated by NASA Administrator Richard H. Truly for his contributions to improving aviation safety through characterizing the electrodynamics of aircraft interactions with lightning. He will be presented the award November 8 during the FSF 42nd Annual International Air Safety Seminar in Athens, Greece.

Pitts began his NASA career in June 1962 as an aerospace technologist. An expert in electronic systems engineering and lightning characterization and effects, Pitts patented the electronic strain level counter in 1973 and has authored 15 publications on lightning research.

NASA Aircraft Takeoff Monitor System May Enhance Flight Safety

-by H. Keith Henry

NASA is working with the aviation industry to give pilots a simple, yet powerful, new tool to increase safety during the critical takeoff period.

NASA's invention, called the Takeoff Performance Monitoring System (TOPMS), was presented to industry and government representatives in a workshop held October 24-25 at Langley. TOPMS (pronounced "TOPE-ums") is designed to help pilots make the "go/abort" takeoff decision by summarizing valuable safety-related information in a single, easily understood display.

Statistics compiled over the years indicate that most aircraft takeoff accidents are attributable to some deficiency in aircraft performance. Current cockpit systems, however, do not provide a comprehensive "go-no go" decision aid during the takeoff roll.

TOPMS provides continual "real-time" information updates during acceleration down the runway, presenting the aircraft's progress relative to a normal takeoff for that aircraft and existing flight conditions (such as aircraft loading, weather, and wet or dry pavement). The system indicates graphically the aircraft's position on the runway, the points at which liftoff and other events should occur, whether the engines are working properly and if acceleration is adequate. The pilot can fine-tune takeoff based on this summary of information generated by the airplane's flight computer and presented on a TV-like electronic screen.

If performance falls critically short of normal, however, TOPMS advises the pilot to abort the takeoff by means of a red "situation advisory flag" shaped like a stop sign, which appears at the end of the runway graphic.

For example, if an engine fails, the appropriate engine indicator turns red and the runway graphic shows the pilot where he can bring the airplane to a complete stop if he elects to abort. When the pilot begins an abort, the overall display drops takeoff information and adds indicators for predicted stop points on the runway.

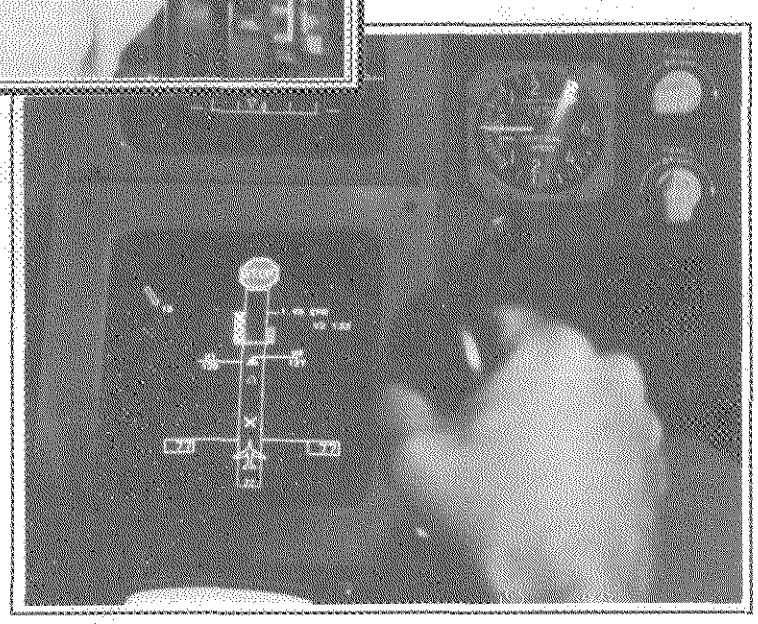
Before and during takeoff TOPMS temporarily replaces the flight deck navigation display. Immediately following main wheel liftoff, the TOPMS display disappears and normal map and navigation data return.

Researchers have made more than 1,000 simulated takeoff runs with TOPMS in a transport-type ground simulator at Langley, where the system's math logic was exercised and display graphics were developed and tested. In addition, more than 50 actual takeoff or aborted takeoff runs have been conducted in a NASA jet transport, confirming that TOPMS can operate in realistic flight conditions, that it is compatible with aircraft sensors and systems and that it can be isolated from normal aircraft vibration. Flight test conditions have included excess drag, reduced thrust and simulated engine failures at various speeds.

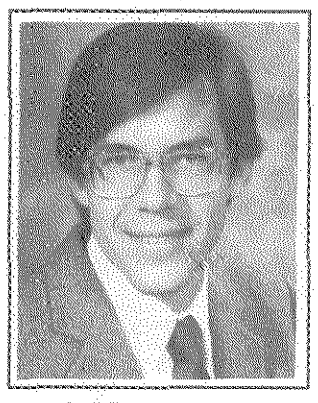
TOPMS was formulated and analyzed at Langley as part of a cooperative agreement with the University of Kansas. The system is a former winner of R&D Magazine's "100 best inventions of the year" competition. The inventors of TOPMS, Langley aerospace engineers David B. Middleton, Dr. Raghavachari Srivatsan and senior NASA research pilot Lee H. Person, Jr., were granted a patent earlier this year.

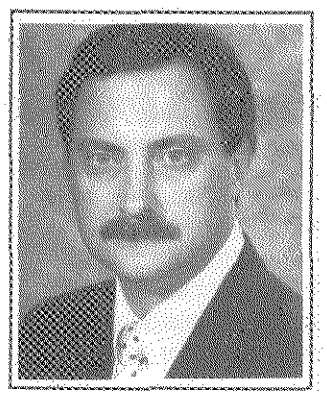
-photos by Fred Jones

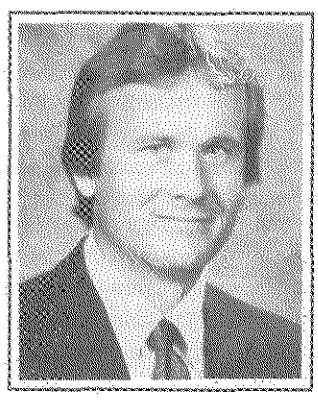
This view, over the pilot's shoulder, shows the takeoff performance monitoring system (TOPMS) display during a simulated takeoff. The runway is represented by the vertical rectangle and the airplane by an airplane-shaped graphic.



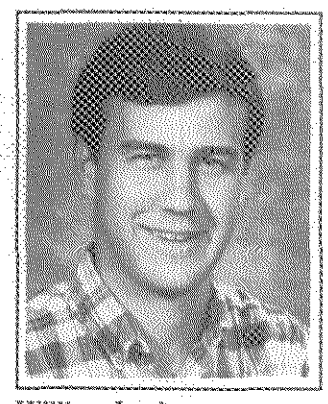
This TOPMS heads-down display appears on a TV like screen on the pilot's instrument panel. The airplane has reached 85 knots airspeed in its takeoff roll when the right engine fails. The engine-pressure-ration (EPR) bar on the right side has diminished in length and turned red. At the same time, a "situation advisory flag" (STOP sign) has appeared at the far end of the runway, advising an abort.


Martin Mlynczak


John Korte


Wendell Belvin

Vicki Johnson


William Luck

Langley Employees Earn Advanced Degrees

Twenty-one Langley Research Center staff members have received advanced degrees through the Center's Graduate Study Program during fiscal year 1989.

The program, established in the 1940s, provides Langley scientists, engineers and administrators an opportunity to improve their proficiency in aeronautical and space research and earn advanced degrees while working at Langley. Approximately 1,350 employees have been awarded master of science or doctoral degrees through the program.

Four employees received doctoral degrees through various universitites:

Martin Mlynczak, Atmospheric Sciences Division, received a doctor of philopsophy in atmospheric sciences from the University of Michigan; **John Korte**, Facilities Engineering Division, received a doctor of philosophy degree in aerospace engineering from North Carolina State University; **Wendell Belvin**, Structural Dynamics Division, received a doctor of philosophy degree in aerospace engineering sciences from the University of Colorado; **Vicki Johnson**, Advanced Vehicles Division, received a doctor of philosophy degree in aerospace engineering from the University of Kansas.

Master of science dgrees were awarded to seventeen employees:

William Luck, Flight Electroncis Division, received a master of science in electrical engineering from Purdue University; **Stephen Sandford**, Flight Electronics Division, received a master of science in optical science from the University of Arizona; **Christopher Glass**, Structural Mechanics Division, received a master of science in mechanical engineering from Old Dominion University; **James Townsend**, Fluid Mechanics Division, received a master of science in computer science from the College of William and Mary;

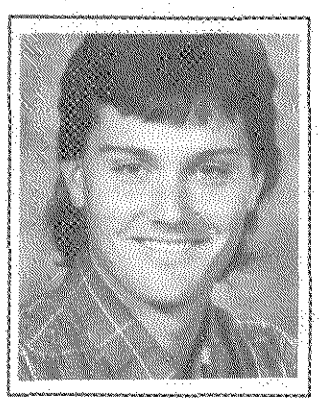
George Beeler, Fluid Mechanics Division, received a master of science in fluid mechanics and thermal sciences from George Washington University; **James Reeder**, Materials Division, received a master of science in mechanical engineering from Standord University; **Terence Abbot**, Flight Management Division, received a master of science in computer science from the College of William and Mary; **Charles Monroe**, Facilities Engineering Division, received a master of science in mechanical engineering from Duke University; **Carol Wieseman**, Structural Dynamics Division, received a master of science in aeronautics from George Washington University; **David Hinton**, Fluid Mechanics Division, received a master of science in flight sciences from George Washington University;

Sally Johnson, Information Systems Division, received a master of science in computer science from Old Dominion University; **Erik Ellis**, Information Systems Division, received a master of science in statistics from the University of Wisconsin-Madison; **Jonathan Ransom**, Structural Mechanics Division, received a master of science in engineering mechanics from Old Dominion University; **Paul Schutte**, Fluid Mechanics Division, received a master of science in computer science from the College of William and Mary;

Elizabeth Lee, Structural Dynamics Division, received a master of science in aeronautics and astronautics from Purdue University; **Frank Peri**, Systems Engineering Division, received a master of science in electrical engineering from Georgia Institute of Technology; **Taumi Daniels**, Instrument Research Division, received a master of science in electrical engineering from Georgia Institute of Technology.

The Training and Education Section congratulates these individuals on the long hours and hard work necessary for their academic accomplishment. Such work not only brings additional expertise to Langley, but also enhances the individual's professional growth and career development.

For information on the Center's Graduate Study Program, call the Training and Education Section, ext. 42594.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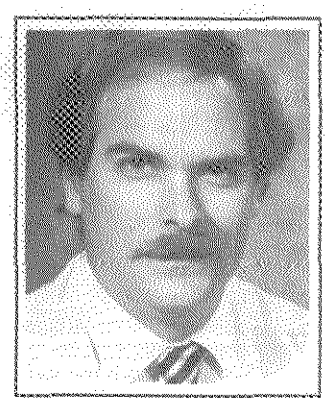
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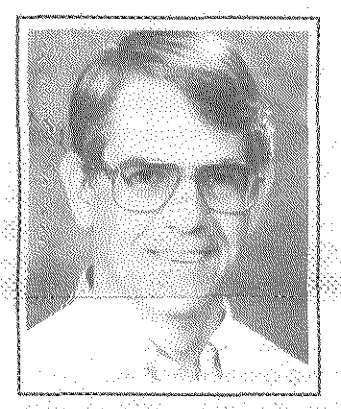
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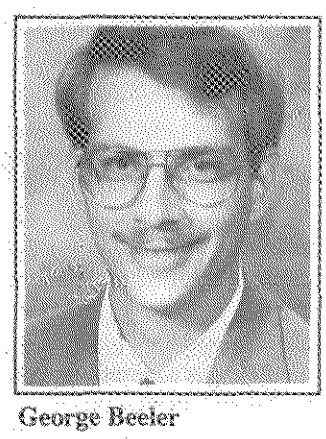
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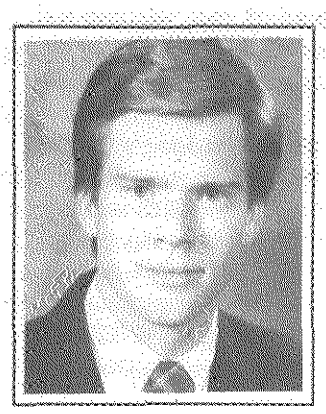
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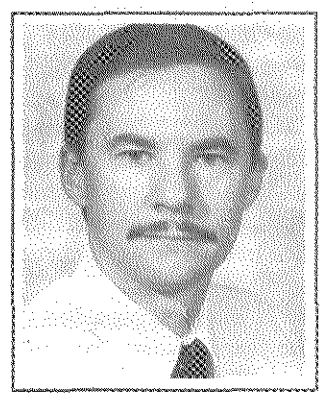
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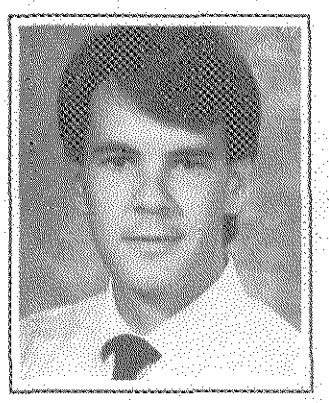
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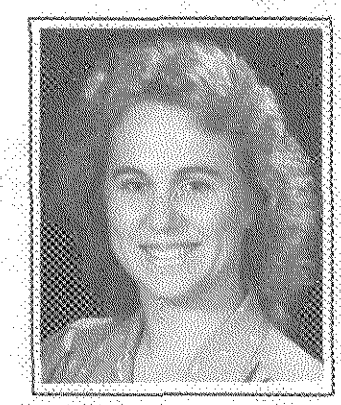
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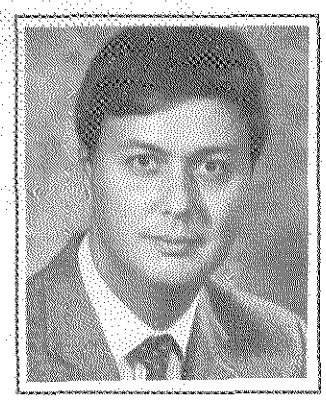
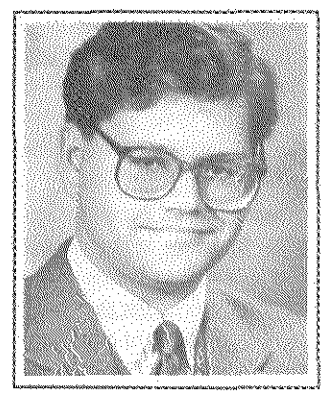

David Hinton

Sally Johnson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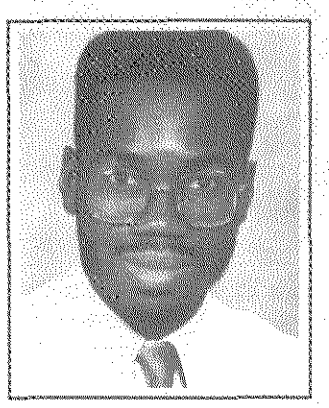
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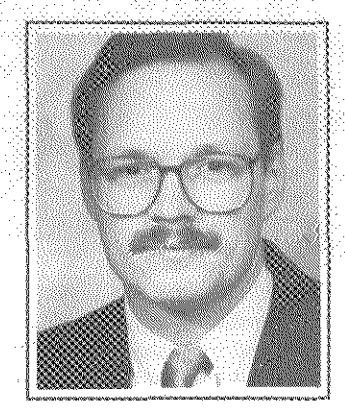
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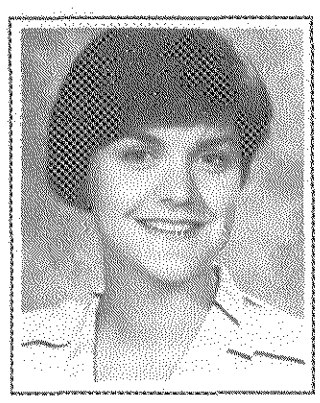
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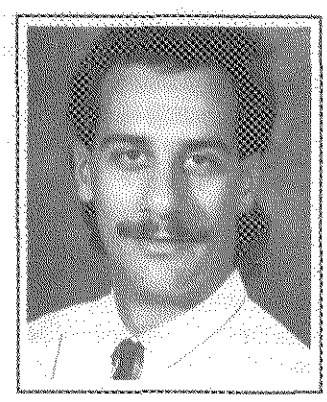
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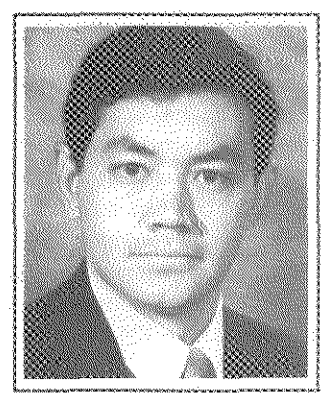

Taumi Daniels

People & Places

Health Corner

Death, Taxes and the Flu Season

-Richard D. Hansen, M.D.

It's here again! Starting this month the hacking cough, high fever, aching bones, sore throat and general misery of the annual influenza season will be upon us.

Millions will be affected. Countless work and play hours will be lost. Over 10,000 excess deaths will be recorded by the statisticians, most among the very young, the very old and those who already are weakened by heart and lung disease or immune deficiencies. Still 10 to 20 percent of the deaths due to complications of the "flu" will be in young, vigorous working-age people, such as those of you reading this.

The tragedy of all these losses are that they are preventable. For those of you here at Langley, they are preventable at **no cost.** The annual flu season is largely preventable by simply taking the annual flu shot!

Unfortunately last year's immunization is like last year's taxes--just a fading memory. (Just try telling the IRS folks you don't have to pay taxes this year because you already paid last year.) Something called "antigenic drift" remodels the influenza virus so each year's vaccine has to be redone and taken again. Fortunately, a number of people spend their summer and early fall gathering influenza viruses all over the world and then replicating them to produce the new vaccine we offer to you late each fall. That new vaccine to protect you is now available at the Occupational Health Clinic for all Langley employees and contractors--once again, at no cost to the individual.

The protection you receive from the flu shot is threefold: it minimizes or completely prevents influenza in the protected individual, decreases the spread of the disease among your fellow workers and prevents your carrying the virus home where those at higher risk of death from severe flu or its complications are likely to reside.

The side effects of modern flu vaccines are insignificant--a day or two of redness and slight tenderness at the injection site occur in 30 percent of those who get the injection. This is a small price to pay to avoid a week or more of high fever and misery! You cannot get the flu from the flu shot. If, in the past, the killed and inactivated virus in the vaccine made you sick, then guess what the live, wild flu virus will do to you if you are unprotected and contract it!

The only people who should avoid the flu immunization are those who are highly allergic to chicken eggs; i.e., get hives or asthma when they eat eggs. In keeping with a long standing NASA policy, women who are pregnant will not be offered the flu shot and should obtain it from their own obstetrician.

The Occupational Health Clinic will offer the flu shot to individuals Monday through Friday from 7 a.m. to 4 p.m. To save you work time, we will also come to your building by invitation to give the shot to groups of ten or more. For this "house call" service, have your building coordinator call ext. 43192 to arrange a mutually agreeable time.

Get your flu shot this year for your own, your co-workers' and your loved ones' sake....Let's make this a flu-free season!

Positions Open

89-81: AST, Facility Systems Safety, GS-801-11 or 12; Director for Systems Engineering and Operations, Systems Safety, Quality and Reliability Division, Safety Engineering Branch, Facility Systems Safety Section. Open to Federal Government Wide and Reinstatements. Closes November 6.

89-83: Resources and Contracts Manager, GM-501-13 or 14; Director for Systems Engineering and Operations, Fabrication Division, Resources and Contracts Branch. Open to LaRC. Closes November 7.

89-84: Electronics Technology Manager, GM-1601-13 or 14; Director for Systems Engineering and Operations, Fabrication Division, Electronics Technology Branch. Open to LaRC. Closes November 7.

Notes of Thanks

Nancy Murawski writes: "I want to thank all my friends for making my farewell party so special. I am excited about my new opportunities, but will miss each of you very much. You all have been like an extended part of my family and I thank you for showing how much you cared for me too!

Nathaniel (Ray) Spaulding writes: "As I am enjoying my retirement, I would like to express my thanks to all of my friends and co-workers for the wonderful retirement social and gifts. I will always cherish the memory of that evening and my many friends and associates at Langley."

At the VC during November

Beach is Acting Director for NASP; Returns to Langley to Discuss National Aero-Space Plane

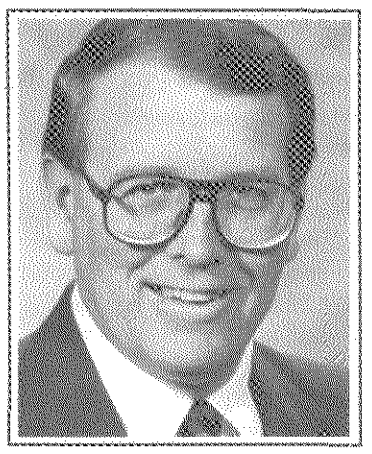
A plane takes off from a conventional airport, reaches a speed of up to Mach 25 (17,500 mph) and flies directly into orbit. This aircraft technology is currently being developed at Langley as part of the National Aero-Space Plane Program (NASP).

Dr. H. Lee Beach Jr., Langley's deputy director for aeronautics, is presently serving as acting director for the NASP office at NASA Headquarters. Beach will discuss the program in a free lecture, "The National Aero-Space Plane: Earth -to-Orbit Technology," on November 9 at 7:30 p.m. in the Visitor Center theater.

Beach will examine the technology that has been developed in the last 20 years, including advances in key specialties such as propulsion and computers. He will also discuss NASP's potential to operate as a transportation vehicle and cargo transporter for Space Station Freedom.

Beach began his NASA career in 1970 as a research engineer in hypersonic propulsion and, in 1985, went to NASA Headquarters to serve as acting deputy director for aeronautics in the Office of Aeronautics and Space Technology. He was named Langley deputy director for aeronautics in 1986.

Effective October 11, 1989, Beach is acting director for the NASP Office at NASA Headquarters. He is responsible for NASP coordination, advocacy, resources management, technology oversight, program reporting activities and NASP Interagency Office management.



NASP is a joint NASA/Department of Defense program.

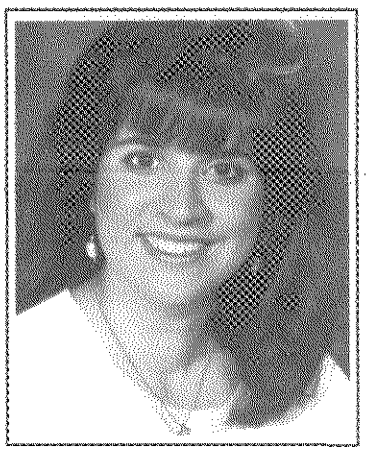
As part of the Visitor Center's fall theme saluting aeronautical research, an 80-foot model of NASP will be on display at the Center. It was designed and constructed by engineering students at Virginia Tech University and unveiled at the 1989 Paris Air Show.

Researcher Discusses Influence of Heavy Rain on Aircraft

Langley has recently modified the Aircraft Landing Dynamics Facility (ALDF) to test aircraft in heavy rainfall. Gaudy Bezos, aerospace technologist, will lecture on "The Influence of Heavy Rain on Airfoil Performance" at noon on November 8 in the Visitor Center theater. The free lecture is co-sponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

Bezos will describe the facility modifications, including the design and installation of the wing hardware and rain simulation system. She will also present the most recent research data obtained from experimental investigations conducted at the simulations system.

Bezos works in the Subsonic Aerodynamics Branch, Applied Aerodynamics Division and is currently the project engineer for the ALDF Heavy Rain Effects Test.



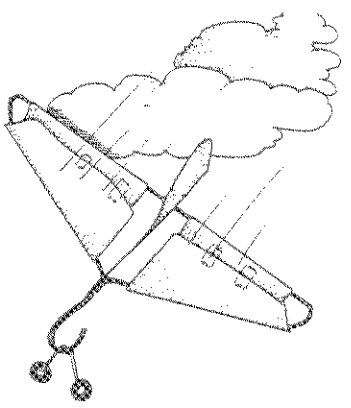
Children's Program to Demonstrate the Wonders of Flight

Do your children ever wonder why things fly? Do they watch in amazement as planes, birds, helicopters, balloons, parachutes, kites and the Space Shuttle seem to defy the laws of nature?

To unravel the mystery of flight, the Visitor Center is offering a free children's program, "Fun in Aviation," on Saturday, November 25, at 10 a.m. in the Visitor Center theater.

The hands-on program, designed for children in grades 4 through 6, will demonstrate the principles of flight. The children will construct experimental aircraft, conduct test flights and record flight information during the hour-long program.

To register for the program or for further information, call the Visitor Center at 864-6000. Due to limited seating, advanced reservations are required.



Senior Management Research Review

The Senior Management Research Review will be held Monday, November 20, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	Scanning Electron Acoustic Microscopy (SEAM)	John Cantrell (Electronics/IRD)
9:45	Closed-Loop Control Test on Mini-Mast	Raymond Montgomery (Flight Systems/GCD)
10:00	A Determination of the Surface-Level Source/Sink Distributions of Climatologically Important Trace Species from an Airborne Platform	John Ritter (Space/ASD)
10:15	Active-to-Passive Transition in the Oxidation of Silicon Carbide and Silicon Nitride in Air	Wallace Vaughn (Structures/MD)
10:30	Full-Scale Study of Heavy Rain Effects on a Transport-Type Wing Section in a Landing Configuration	Earl Dunham (Aeronautics/AAD)
10:45	Navier-Stokes Algorithm for F-18 with Actuated Forebody Strake	Robert Biedron (Aeronautics/AS&M, Inc.

Happenings

SPECIAL LAA SOCIAL will be held Friday, November 17, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. J&M Entertainment featured. $1 cover charge.

FEDERAL ALMANAC. Orders are now being accepted for the 1990 Federal Almanac. Cost is $5.50. Place your order at the LAA Office by January 5. Call Frankie Ward, ext. 46369.

TOASTMASTERS will meet Wednesday, Nov. 8, at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are welcome. Time in attendance up to one hour may be charged to A-1619. For additional information, call Steve Yaros, ext. 43050.

RECYCLING. A center-wide recycling program is being started. If you are currently recyling for yourself or your building coffee fund, are interested in learning more about recycling or would like to start, attend a brown bag seminar on recycling Nov. 16, from 11:30 a.m. to 12:30 p.m., in the executive dining room of the NASA cafeteria. Call Karen, ext. 41492, for more details.

SCI-CON 11, Tidewater's oldest and largest Science Fiction Convention, will be held Nov. 10-12, at the Holiday Inn Executive Center, Newton Road, Va. Beach. Activities include movies, panels, games, costume contests, art show. For details, contact John Kaiser, ext. 47380.

VPI BUS TRIP. See VPI play NC State Saturday, Nov. 18. $40 includes bus trip and game ticket. For information and reservations, call Joe Drewery, ext. 45843 or 722-4443.

ST. JOHN'S BAZAAR, Wednesday, Nov. 8, 9 a.m. to 4 p.m. Parish house, corner of West Queen's Way and High Court in Olde Hampton. Lunch served until 1 p.m. Crafts, Chirstmas items, clothing, jewelry and much more.

AEROBICS CLASS. The LAA Fitness and Exercise Club is organizing a low-impact aerobics class to meet on Center three times per week. First class will be held Nov. 6 at 4:45 p.m. in the cafeteria, Building 1213. Reasonable cost. For more information, call D. Newsome, ext. 44274, or D. Speller, ext. 46636.

ALUMNI ASSOCIATION will hold a luncheon Tuesday, Nov. 14, 11:30 a.m. in the private dining room of the NASA cafeteria. Neil Driver will speak on aircraft noise suppression: "Overview and Status of the NORDAM dbs Ejector Suppressor Project.

VA CHORAL SOCIETY opens its 59th season with two performances of Brahm's German Requiem 8 p.m. Nov. 17 at Odgen Hall, Hampton University and Nov. 20 at Christ and St. Luke's Church, Olney Road and Stockley Gardens, Norfolk. For information, call 591-0439.

FOR RENT: ROOM. Nice location on water in Hampton. Share bath; W/D; kitchen priveleges. $50.week. Call 827-8900, ext. 218, or 722-2440.

FOR SALE: HOUSE with detached garage apartment in Wythe. Cozy two-bedroom starter home. LR w/FP, DR, kit. and pantry, sunroom, screened porch, 1/2 basement w/utility room. Below appraisal. Reduced to $73,900. Call 723-3610.

FOR SALE: AUTO. 1966 Mustang, 200 cu. in. 6-cylinder, auto. trans. AC, AM/FM radio/tape w/speakers. $1,900. Call JoAnn at 864-1596.

Tidbits from Training

GWU Offers Master of Public Administration Degree Program

Beginning in November, George Washington University will offer a master's degree program in public administration with a concentration in managing in public organizations for municipal government employees and qualified members of the general public in the Greater Hampton Roads area. The degree program prepares students for professional careers in public service, and is designed to provide practitioners an in-depth knowledge in the management of public organizations.

The program is offered by the School of Government and Business Administration and is administered by the Division of Continuing Education, Hampton Roads Center.

Classwork is geared toward adult professional learners and consists of both individual projects and group work. The degree program is a reality-based program which balances theory with practice and emphasizes team skills. Content may be adjusted to accommodate the learning needs of municipal managers.

For more information on the program, please contact George Allison, ext. 42594.

WANTED: ROOMMATE. Male to share townhouse in York Crossing; 1/2 mo. rent plus 1/2 utilities; 2BR, 1-1/2 BA, DR/kit comb. w/FP, LR, W/D, A/C. Available Nov. 1. Call 898-5113 after 5 p.m.

FOR SALE: COAT. Full length leather coat, nearly new, size 10. Call 868-6245 evenings.

WANTED: ROOMMATE. Male to share condo in Newport News. 1/2 mo. rent plus 1/2 utilities. 2BR, BA, kit w/FP. Available now. Call 827-9110 after 4 p.m.

LOST: RING. Lady's gold/onyx college ring from ODU lost between 1148 and Photo-Graphics. Reward. Call Jean ext. 43103.

BLOODMOBILE--NOVEMBER 29

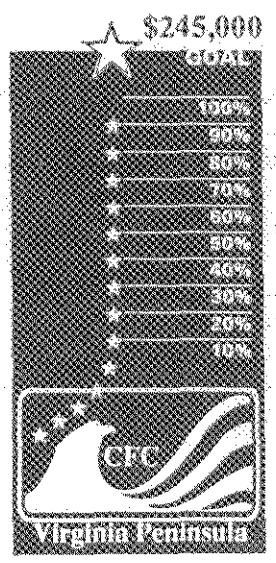
Military Month at Colonial Williamsburg
Reduced-price admission tickets for all federal employees, families and guests November 1-30. Coupons available at the LAA Office.

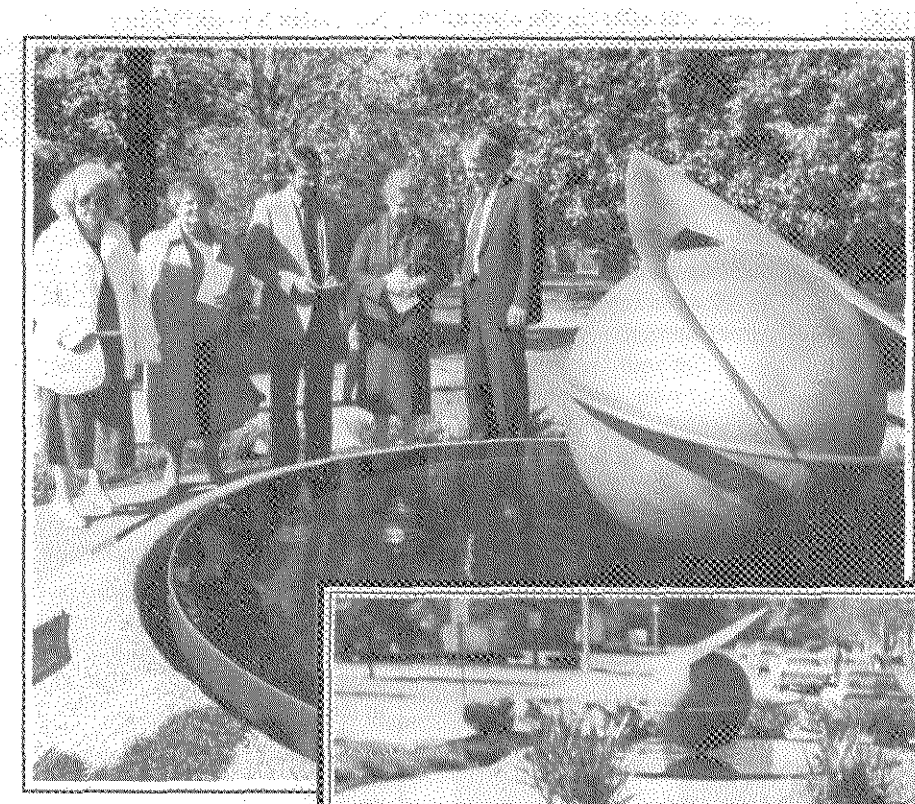
BULK RATE
POSTAGE & FEES PAID
NASA Washington, DC
Permit No. G-27

Official Business
Penalty for Private Use $300

National Aeronautics and
Space Administration
Langley Research Center
Hampton, Virginia 23665-5225

News Researcher





"The eight people this monument honors--mechanics and pilots, technicians and engineers--represent the tightly woven fabric of talent that has sustained and supported over 70 years of successful, and highly productive, research at Langley....They lost their lives in pursuit of our mutual dreams for a better world."

R. H. Petersen

Following the dedication of the Mall Memorial, Center Director Richard H. Petersen (right) views, with family members of the deceased, the plaques which honor those who gave their lives serving Langley. Present for the dedication ceremony were (L to R) Elise H. Maxwell, wife of Thomas B. Maxwell; Rebecca Smith, sister of Mrs. Maxwell; William Kelly Alford and Mary Alford, son and wife of William L. Alford. The Memorial, dedicated October 23, was designed by John Mouring.

-photos by Carol Petrachenko

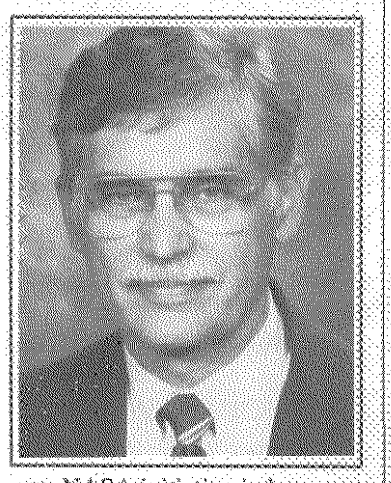
NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 3, Issue 23 November 17, 1989

Biweekly Employee and Contractor Publication

Ocheltree Named IRD Assistant



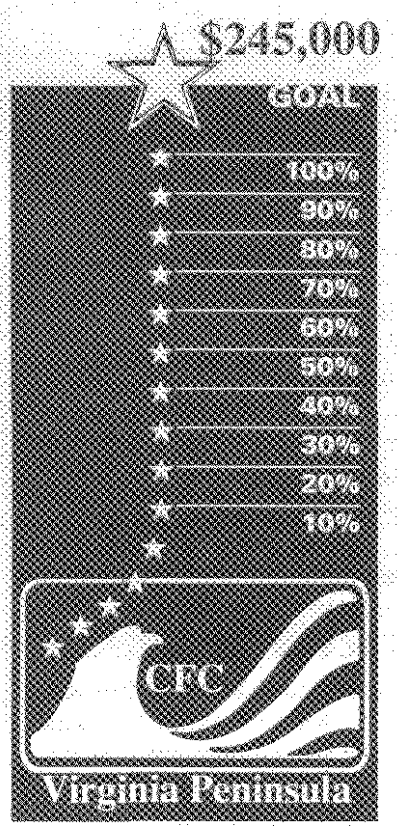
Stewart L. Ocheltree has been selected assistant chief of the Instrument Research Division (IRD). He replaces Joseph Guarino, who retired in 1988.

Ocheltree will directly assist in managing all aspects of the research, development, operation, and administration of measurement science and instrument technology which support Langley's aeronautics and space research activities. Prime among the division's focus is advanced hypersonic research measurement important to the National Aero-Space Plane.

The NASP is viewed as the next major evolution of flight. Current program objectives are to develop new hypersonic flight technologies and build a research aircraft to test them. Intended applications include vehicles which can fly passengers at speeds over 7,000 miles per hour to intercontinental destinations in two hours or less. Other planes will speed into Earth orbit from conventional airports at 25 times the speed of sound (Mach 25), work in space, then return for normal landings. Ocheltree will continue his work in this area as a division representative on both the Department of Defense/ NASA NASP project and on a new NASA initiative in hypersonic research. He is currently serving on the NASP instrumentation task force and the NASP aerodynamics Technology Maturation Team.

Ocheltree began his NASA career in 1957 as a research engineer in the Instrument Research Division and became head of its Gas Parameters Measurement Section in 1964. He was named head of the Physical Measurements Section in 1969, and moved up to head the Measurement Physics Branch in 1970. During these periods, he has specialized in electronic instrumentation, laser and optical sensing for wind tunnel and environmental measurements, and solid state electronic devices and sensors.

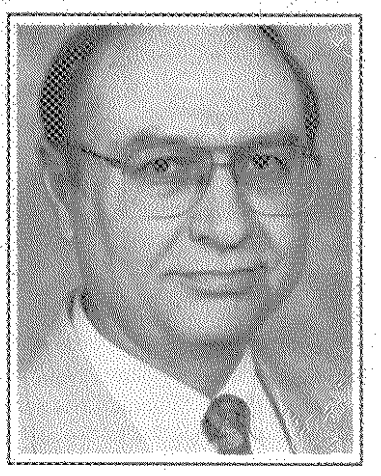
LaRC Does it Again; CFC Goes Over the Top



Another successful Combined Federal Campaign (CFC) is coming to a close, and the Langley Research Center has continued its tradition of always exceeding its goal.

As of **Researcher News** press time, Langley personnel and affiliated organizations have donated $252,602.75 to the 1989/1990 campaign. This figure represents 103 percent of our goal of $245,000 for this year.

Your support continues to show that LaRC is a leader on the Peninsula and that we care about our community. Our successful campaign is due to the combined efforts of many. On behalf of the Langley CFC committee, I thank all who volunteered their time and effort for this worthy cause. As a result of your support and those who so generously contributed, we will share in making a difference in the lives of many people.

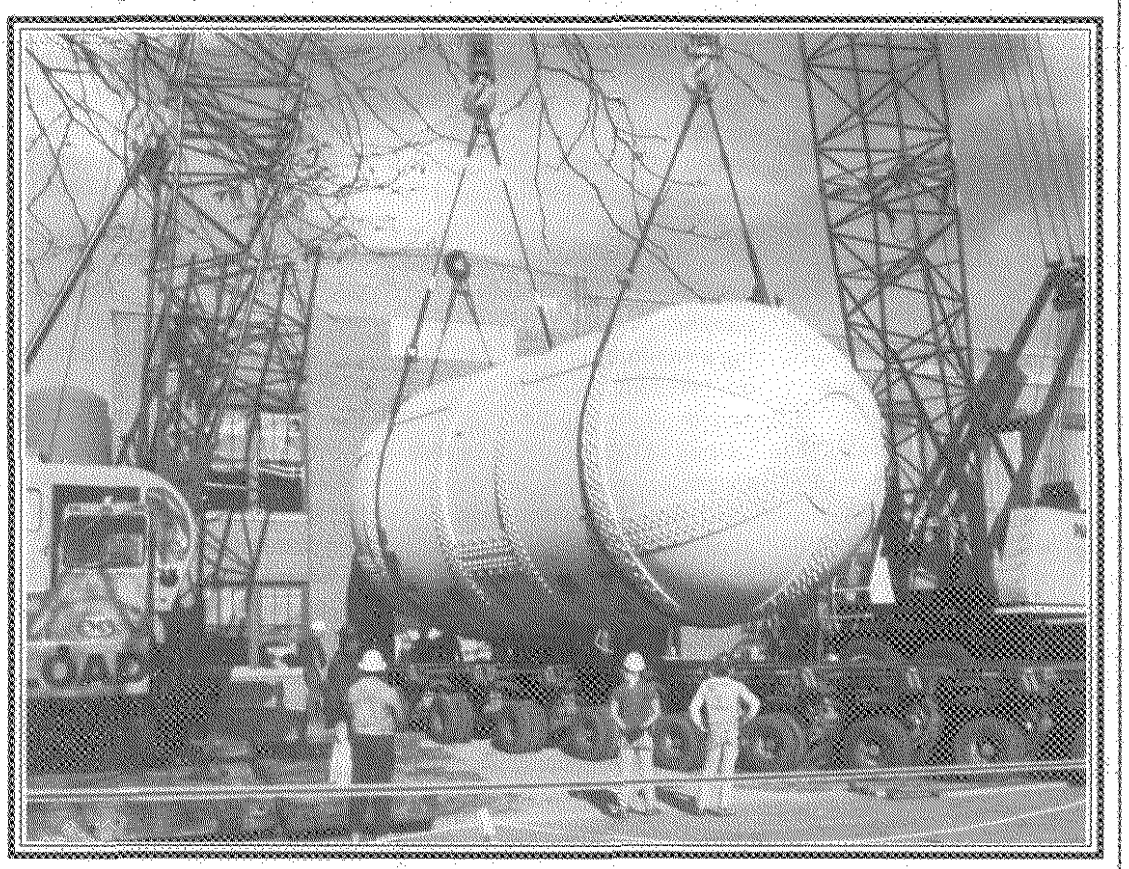


Again, thank you for your support.

Jim Arrington

Jim Arrington
CFC Chairman

Langley Landmark Relocated



-relocation photos by Carol Petrachenko

"The Variable-Density Tunnel (VDT) is not just Langley's most important landmark, but the most significant landmark in all of NASA!" says a National Park Service archaeologist. The VDT chamber, hoisted through the roof of Building 582, is lowered by two cranes onto a flatbed truck for relocation to the grounds of the H.J.E. Conference Center for public display. See VDT relocation story on page 3.

Truly Updates Aeronautics and Space Programs for Press Club

Four months after becoming NASA Administrator, Vice Admiral Richard H. Truly issued an upbeat assessment of the agency's many programs and said an analysis of future manned missions to the moon and Mars "is proceeding exceedingly well."

While the moon and Mars missions "will be technically demanding and not without risk, they are well within our reach," Admiral Truly said at a National Press Club luncheon in Washington, D.C.

"These expeditions will stimulate new technologies and enhance our nation's long term productivity," Admiral Truly said. "They will improve national competitiveness. They will advance scientific knowledge and lead to discoveries about our solar system, Earth and life itself."

The NASA leader's broad-brush review of current NASA programs included the following highlights:

***Aeronautics**--NASA technology has enabled the U.S. aerospace industry to maintain "an unqualified lead in world markets." To help maintain this position, NASA has revived research on a high-speed civil transport--research that will lead to "environmentally sound, supersonic travel for the future."

***Space Science**--The recent launches of the Galileo and Magellan space probes usher in an extraordinary era of space science missions. Over the next five years, NASA will launch 37 space missions that will "radically change our understanding, not only of the universe but also of ourselves."

***Mission to Planet Earth**--Using "superior new instruments," we can take a comprehensive look at the entire global system--lands, oceans, ice and atmosphere. This program is taking shape and promises to provide data that "will be coordinated in a decades-long effort to better understand our fragile Earth."

***Space Shuttle**--With six successful missions since the return to flight, NASA is moving confidently to safely increase the Shuttle's flight rate. The Shuttle is "unquestionably a far safer and much more reliable vehicle" and will be critical in the construction of Space Station Freedom.

***Space Station Freedom**--The "cornerstone of our future in space," Freedom is the largest international cooperative space project ever undertaken. It is an essential step toward moving again beyond Earth orbit and into the solar system, providing new insights into the human body and psyche as we cope with longer durations of space flight; allowing us to test exploration technologies; and permitting the assembly and service of space vehicles.

Last July 20, the twentieth anniversary of the Apollo 11 moon landing, President Bush committed the United States to return to the moon and then explore Mars. NASA is supporting the efforts of the National Space Council, chaired by Vice President Quayle, to determine what resources will be required and to set a realistic timetable to meet these goals.

Admiral Truly said the benefits of future missions to the moon and Mars are difficult to quantify and include such intangibles as knowledge, success and pride. "Each time we go to the frontier and beyond," he said, "we bring back more than we hoped for. This time we have the chance to bring back more than we can imagine."

He also said manned space exploration will stimulate science and engineering education in the United States. "I feel strongly that NASA has a special responsibility in education for a very special reason. Our programs--airplanes, spaceships, moon, Mars and astronauts--can get to kids."

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly took his launch skills to an elementary school and personally helped a new reading program get off the ground. Meeting with about 340 students at the Rock Creek Forest Elementary School, Montgomery County, Md., Truly helped initiate the "Launch into a Good Book" program, which is designed to encourage reading among elementary school children. The program features audio cassettes with prominent people reading book passages. The students can read along and practice their skills.

HEADQUARTERS, Washington, D.C. --- The Lockheed Engineering and Sciences Co. (LESC), Houston, has been named recipient of the 1988-89 NASA Excellence Award for Quality and Productivity. NASA Deputy Administrator J. R. Thompson announced the selection at the Sixth Annual NASA/Contractors Conference in Huntsville, Ala. He said that, for well over 23 years, LESC has applied the highest level of talent, proficiency and consistency in supporting all the major manned space flight programs.

HEADQUARTERS, Washington, D.C. --- Dr. Lennard A. Fisk, NASA's associate administrator for Space Science and Applications, recently appointed two Spacelab payload specialists to participate in Spacelab missions to be flown aboard the Space Shuttle. Dr. Millie Hughes-Fulford will be a prime payload specialist for the Spacelab Life Sciences-1 (SLS-1) and Dr. Stanley N. Koszelak will serve as the U.S. backup payload specialist for Spacelab-J. SLS-1 is the first mission to use Spacelab, a laboratory that fits in the Space Shuttle cargo bay, as a dedicated biological research facility and is scheduled to fly in August 1990. Spacelab J is scheduled for June 1991.

Editor's Note: Surveys indicate that our readers are interested in NASA News Releases summarized here. To obtain a copy, contact Edith Watts, Mail Stop 146, ext. 43293. Kindly request information by release number and headline. See Current News Release box below.

NASA Selects Ball Corp. for Contract Negotiations

NASA Langley Research Center has selected Ball Corporation of Boulder, Colo., for negotiation of a contract to develop a set of instruments that will be flown on NASA polar orbiting platforms as part of the Earth observing system (Eos). The Eos is a major space initiative whose goal is to advance scientific understanding of the Earth by providing global, simultaneous interdisciplinary data for the Earth's land masses, oceans and atmosphere.

The two-phase contract is estimated at $31.1 million. Phase One, a cost-plus-fixed-fee contract, is for 16 months and is estimated at $240 thousand. Phase Two, a cost-plus-award-fee option, will be for 106 months and is estimated at $30.8 million. The contract became effective November 1, and the work is being performed by the Ball Electro-Optics/Cryogenics Division in Boulder.

The instrument system, known as TRACER (Tropospheric Radiometer for Atmospheric Chemistry and Environmental Research) will measure the global distribution of carbon monoxide at multiple levels in the troposphere, the lowest portion of the Earth's atmosphere. These data will be used to increase the understanding of global tropospheric chemistry, reduce the large uncertainties in the strengths of the sources of carbon monoxide, define global scale atmospheric motion, and clarify the interactions between the chemistry and the horizontal and vertical atmospheric motion.

Ball Corporation will design and fabricate the instrument system, including a mass model, brassboard aircraft model, engineering/servicing model, protoflight model and spares; develop and validate all flight and ground support software; and provide spacecraft integration, launch, post-launch and servicing mission support.

Newspaper Staff Values Your Opinion

The staff of the *Researcher News* will be conducting a **random** survey as part of our continuing effort to serve the employees, contractors and retirees of the Langley Research Center.

The goals of this short survey are to learn more about our readers, to ascertain your reading likes and dislikes, and to assess the performance of this publication in bringing NASA and Langley news to you.

Approximately ten percent of our readership will be selected at random to participate. Should you receive a *Researcher News* questionnaire, kindly complete the form as quickly as possible and return it to the Editor as indicated.

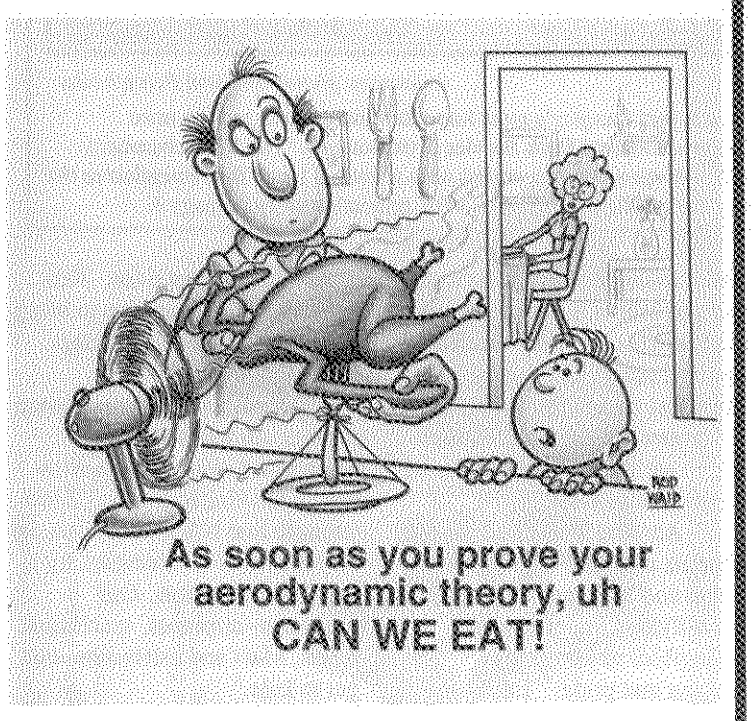
Thank you, in advance, for helping us serve you better!

Need Your Help!

The exhibit planners for the new Virginia Air and Space Center are seeking a copy of the aircraft spotters handbook, *Ground Observers Corps Guide*, issued by the Civil Air Defense in the World War II era.

If you have a copy you would like to loan or donate to the Center, contact Ray Goodman at 864-1591.

Lankley



Positions Open

89-90: Laboratories Operations Manager, GM-1601-13 or 14; Director for Systems Engineering and Operations, Operations Support Division, Laboratories Operations Branch. Open to LaRC. Closes November 21.

89-91: Program Analyst, GS-345-12 or 13; Director for Systems Engineering and Operations, Facilities Program Development Office. Open to LaRC. Closes November 21.

89-94: Electronics Engineer, AST, Electronic Instrumentation System, GS-855-14; Director for Electronics, Flight Electronics Division, Flight Instrumentation Branch. Open NASA-wide. Closes December 1.

89-95: Payroll Supervisor, GS-544-7 or 8; Director for Management Operations, Financial Management Division, Financial Services Branch, Payroll Section. Open to LaRC. Closes November 24.

Positions Filled

Billy W. Beasley Sr. has been selected Supervisory Electrical Engineering Technician, Electrical Support Branch, Operations Support Division, under CPP 89-64.

Douglas B. Price has been selected Supervisory Aerospace Engineer, AST, Navigation, Guidance and Control, Spacecraft Controls Branch, Guidance and Control Division, under CPP 89-56.

John W. Cox has been selected Supervisory Aerospace Engineer, AST, Aerospace Flight Systems, Space Systems Engineering Branch, Systems Engineering Division, under CPP 89-52.

Jacqueline G. Smith has been selected Administrative Officer, Structural Dynamics Division, under CPP 89-51.

William R. Jones has been selected Electronics Engineer, AST, Electromagnetics Systems, Guidance and Control Division, under CPP 89-53.

David A. Hinton has been selected Aerospace Engineer, Vehicle Operations Research Branch, Flight Management Division, under CPP 89-54.

Michael S. Lewis has been selected Aerospace Engineer, AST, Navigation, Guidance and Control Systems,Advanced Transport Operating Systems Program Office, under 89-55.

Carol M. Forrest has been selected Administrative Officer, Space Systems Division, under CPP 89-57.

Elizabeth Napier has been selected Secretary, Hypersonic Technology Office, under CPP 89-58.

Thomas J. Lash has been selected Lead Electrical Engineering Technician, Systems Development Branch, Systems Engineering Division, under CPP 89-60.

Effie L. Nicosia has been selected Technical Information Specialist, Technical Library Branch, Research Information and Applications Division, under CPP 89-61.

William C. Edwards has been selected Electronics Engineer, AST, Measurement and Instrumentation Section, Laser Technology and Applications Branch, Flight Electronics Division, under CPP 89-66.

To Help People
CFC
Virginia Peninsula

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 146, ext. 43293.

89-165.....Truly Updates Aeronautics and Space Programs for Press Club
89-166.....Administrator Truly Gives Boost to Reading Program

89-167.....NASA Aircraft Takeoff Monitoring System May Enhance Safety
89-168.....NASA Presents Excellence Award to Lockheed

89-169.....NASA Appoints Spacelab Payload Specialists

News Researcher

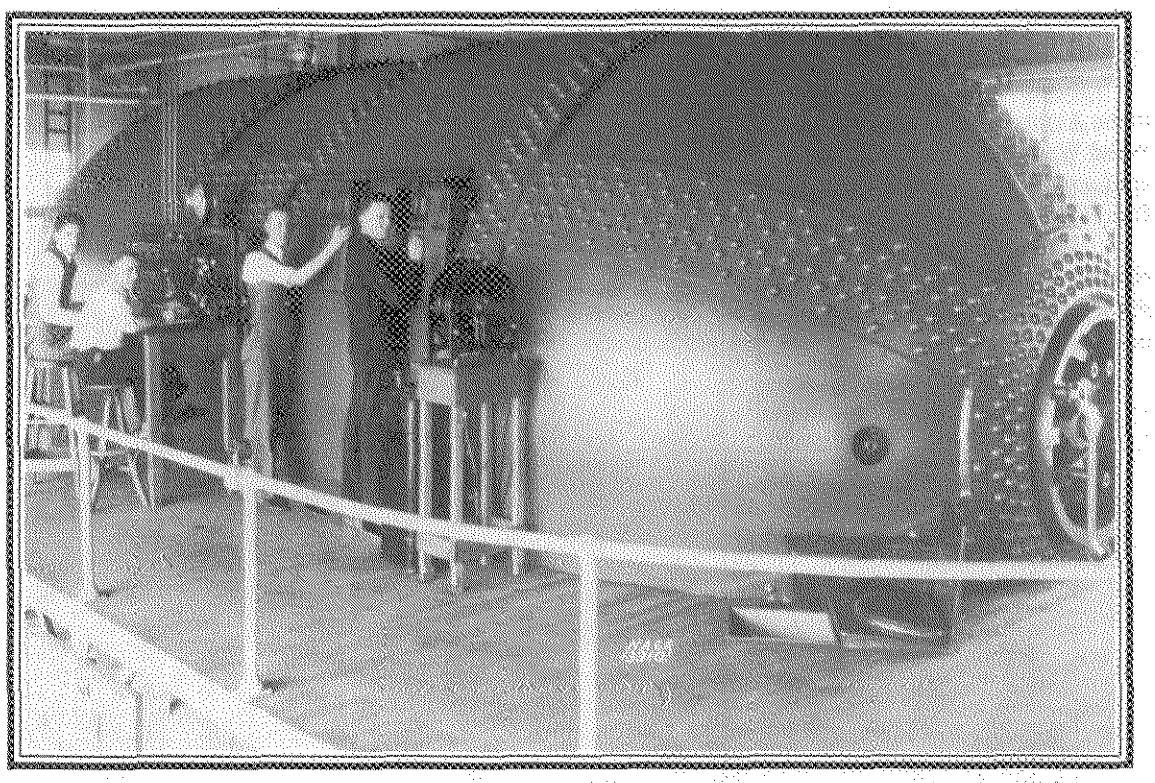
The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

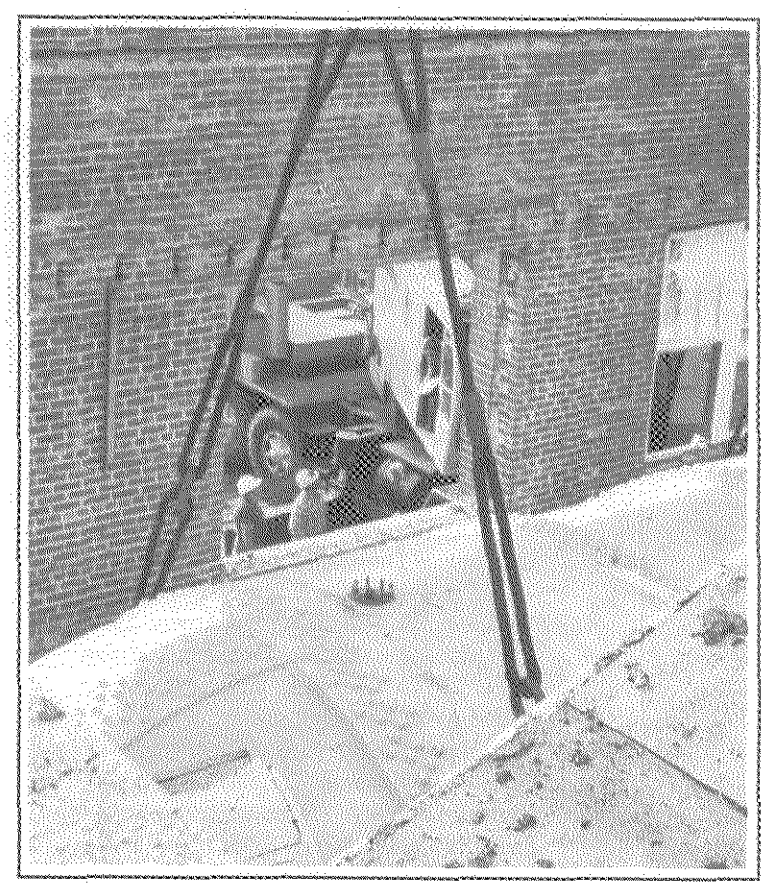
Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.



-NACA photo

VDT PUT NACA ON THE MAP. Many of the early contributions to the improvement of aircraft advanced by the National Advisory Committee for Aeronautics (NACA) originated in the variable-density tunnel (VDT) at Langley Research Center. The results yielded by the VDT were so superior that the idea, devised by Max Munk, was taken up by others, both here and abroad.



NO WAY OUT BUT UP, A portion of the roof of Building 582 was removed to allow the removal of the variable-density tunnel.

VDT Relocated

Langley's 'Watermelon' Prominently Displayed

Sixty-six years from the date of its initial operation, Langley's Variable-Density Tunnel (VDT) chamber, an artifact raised to the level of a National Historic Landmark, has been relocated to the grounds of the H.J.E. Reid Conference Center.

"Langley first built its reputation as an outstanding aeronautical research institution on the strength of the variable-density wind tunnel," says Langley historian James Hansen in *Engineer in Charge*. Proposed by Max M. Munk, in 1921 and fully operational two years later, this revolutionary piece of experimental equipment permitted small-scale models to be tested at actual full-scale flight values in the low-speed range. "The test results it yielded were so superior to those obtained with any previous tunnel design, that they made the NACA a world leader in aerodynamic research," lauds Hansen.

Prior to the VDT, wind tunnels of substantial size all over the world were operating at normal atmospheric pressure. This meant that the experimental results obtained using scale models in the tunnels were open to question because test conditions did not match those encountered in the actual flights of full-scale aircraft. Because test models were at a smaller scale, the aerodynamic effects were different. To compensate, Munk designed the VDT to operate at a much higher than normal atmospheric pressure--in fact, at about 20 times normal atmospheric pressure.

Munk proposed to place a wind tunnel in a chamber that could be pressurized. By compressing the air inside the tunnel, the dynamic scale of the models used was increased. It became possible to evaluate the lift and drag of wings in terms that more closely corresponded to conditions of full-scale flight.

The tank was built by the Newport News Shipbuilding and Dry Dock Co., Newport News, Va. It was built of steel plates lapped and riveted according to the usual practice in steam boiler construction; because of the size of the tank and the high working pressure, the construction was unusually heavy.

The VDT quickly established itself as the primary source for aerodynamic data at high Reynolds numbers, a scaling parameter that takes into account the size of the model, velocity, air density and viscosity. Models ranging from Zepplins to military airplanes were tested in the Langley tunnel. Langley's Donald Baals contends the main contribution of the VDT to aviation was the aerodynamic data it generated for a series of 78 airfoil sections. This information "found its way into the designs of spectacularly successful aircraft--the DC-3 transport, the B-17 Flying Fortress, and the famous twin-tailed P-38 that helped check the Japanese Zeros in World War II," add Baals and co-author William Corliss in *Wind Tunnels of NASA*.

The tunnel interior, destroyed by fire in August 1927, was rebuilt inside the pressure tank, and the VDT was again operational by December 1930. It provided another ten years of excellent data. When the Low Turbulence Pressure Tunnel (LTPT) went into operation in 1940, it replaced the VDT.

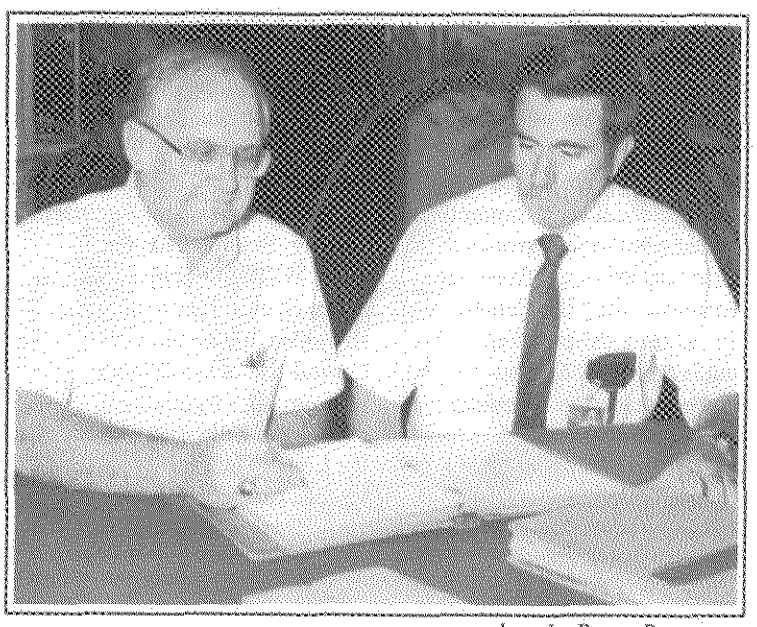
Bob McGhee, facility manager of the LTPT, calls the VDT the "best tunnel in existence between about 1923 and 1935." When McGhee came to Langley in 1963, the VDT chamber was no longer used to house a wind tunnel but was used as an air storage vessel to run other tunnels. "It was originally painted green and was affectionately referred to as the 'watermelon'," said McGhee. "In its second life, it provided us with 5,000 cubic feet of air storage at 300 pounds per square inch."

The VDT chamber was designated a National Historic Landmark by the Secretary of the Interior in December 1985. The purpose of landmark designation is to identify and recognize properties that possess national significance in the history of the United States.

William O. Moore III, supervisory engineering technician in the Operations Support Division, explained that the planned renovation of Building 582 made this an opportune time to remove the historic artifact from its original site and regain the valuable facility space for current and future requirements. John Mouring, Langley's master planner, calls the VDT a "strong, stand-alone visual statement." The new exhibit location, designed by Mouring, will permit access for a greater number of people.

Dr. Harry A. Butowsky, a National Park Service archaeologist whose research resulted in the establishment of LaRC's five landmarks, notes "the VDT is not just Langley's most important landmark, but the most significant landmark in all of NASA!"

DUO CRANES WORK IN UNISON TO REMOVE VDT. Carefully hoisted through the roof, the VDT chamber was then turned 90 degrees and loaded on a flatbed truck for its trip to the west area.

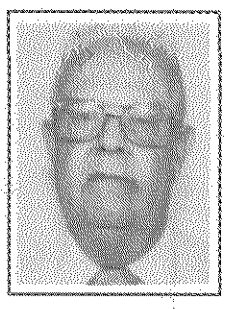


-photo by Peggy Pancoast

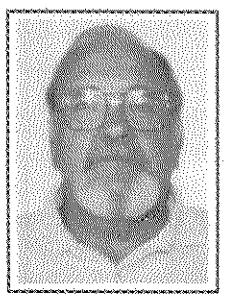
AND THAT'S THE END OF THE STORY. Willie Moore (right) and Bob McGhee make one final entry into the VDT log book.

Martha J. Norman

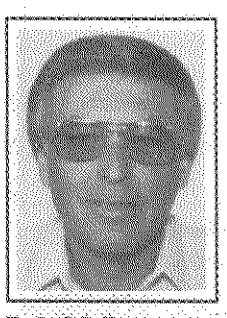
Jacqueline Miller



Ray Spaulding



Joseph F. Dixon



Dale M. Rodman

Recent Retirees

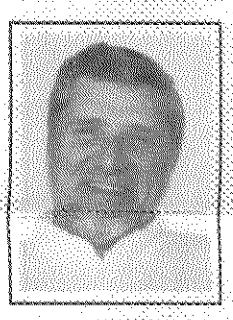
Martha J. Norman, Advanced Vehicles Division, retired July 28.

Jacqueline P. Miller, Flight Applications Division, and **John W. Young**, Guidance and Control Division, retired August 3.

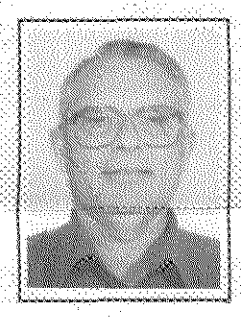
Nathaniel Ray Spaulding, Facilities Engineering Division, retired August 25.

Joseph F. Dixon, **Dale M. Rodman** and **Clyde W. Winters**, Projects Division, retired August 31.

James T. Davis, Facilities Engineering Division; **William R. DeShazor**, Projects Division; **Shirley M. Freeman**, Space Station Freedom Office; **James S. Harvey**, Fabrication Division; **Frederick J. Hines Jr.**, Operations Support Division; and **Ronald H. Smith**, Flight Applications Division, retired September 1.



Clyde W. Winters

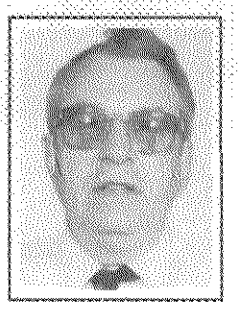


William DeShazor

Shirley Freeman

James S. Harvey

Frederick J. Hines



Ronald H. Smith

Sports News

Summer League Volleyball Champions Announced

Regular season champions in the Alpha Division are the Weed Wackers. Team Members are Laura Water, Mike Brewer, Bob Hess and Pam Hess.

Beta Division season co-champions are the Freedom Fighters and the Circuit Breakers. Members of the Freedom Fighters are Pat Troutman, Brent Robertson, Dan Vymetalik, Jonathan Cruz and Mike Heck. Circuit Breakers are Craig Hyle, Carlito Barnes, Bob Redman, Mark Jones and Reginald Brown.

Tournament champions in the Alpha Division are Set Elsewhere. Team members are Tricia Romanowski, Ran Cabell, Byron Meadows, Paul Bagby, Bill Dorogy and Frank Quinto.

Beta Division tournament champs are TNT. Team members are Wayne Hollenbaugh, Judi Hannon, Veloria Hicks, Bob Daugherty, Phil Robinson and Ken Learman.

Suds Win 1989 LAA C-League Softball Championship

The Suds softball team rebounded from a lackluster season to win the C-League softball crown. Team members are (front row, L to R) David Glass, Wayne Merson, Dave Seidel, Irv Schmidt, Brian Beaton; (back row) Vernon Dyke, Al Taylor, Jerome Cawthorne, Bill Kreiger, Ron Brown, Gary Wesselman, Vaughan Behun and Joe Owens. Not pictured ae Neale Kelly, Ken Gately, Robert Taylor, Jim Stewart, Peter Dunn and Dan Perey.

Bowling Stats Announced

	October 17	October 24	October 31
Team High Game	899 Scramjet	881 Ballers	890 Thunderbolts
Team High Series	2573 Strike Force	2501 Spare Change	2652 Thunderbolts
Male High Game	278 Bobby Huffman	231 Gene Wagner	225 Kenneth White
Male High Series	632 Bobby Huffman	583 Gene Wagner	606 O.J. Cole
Female High Game	208 Marilyn Aldrich	190 Marilyn Aldrich	187 Ruth Koren
Female High Series	542 Marilyn Aldrich	555 Marilyn Aldrich	473 Barbara Williams
Most Pins Over Avg.	+111 Bobby Huffman	+70 Vernon Boyd	+66 Greg Brauckmann

Speakers Bureau Spreads NASA and Langley 'Good News'

The Langley Speakers Bureau is a most effective means of informing the public about NASA programs and the accomplishments of the agency. Over 100 Langley employees volunteer their time, addressing topics as wide-ranging as space station, women pioneers in science and technology, and depletion of the ozone layer. These speakers are called upon to address local civic, community and educational groups as well as groups in the five-state area surrounding the Center.

During the past four months Speakers Bureau members made the following presentations:

Robert Baucom gave a presentation on Spinoffs and Composite Materials at a Virginia Tech Workshop;

Laurence Bement spoke on Explosion Joining for the American Welding Society;

Lee Beach presented "Hiring the Right Stuff" to the Southeastern Federal Recruiting Conference;

Lenwood Clark spoke on Space Station Freedom at Emery Riddle University and to the Hampton Kiwanis Club, the York Ruritan Club, the Mathews Ruritan Club, the Poquoson Rotary Club, the Hampton Roads Chapter of the Military Order of the World Wars and the Virginia Professional Engineers Society, Skyline Chapter;

William Cirillo spoke on Space Station Freedom to the Kiwanis Club of Mercury Central and at the Science Museum of Virginia;

Eric Dahlstrom spoke on the Lunar/Mars Initiative for a science fiction club;

Russel DeYoung spoke on Lasers to the Virginian Weslyn Chapter of the Science Club of Virginia;

Delma Freeman presented "Physics Applications to Current Research" at Tidewater Community College;

Ray Goodman gave a presentation on the Apollo Program to Chesapeake and Potomac;

Jim Hansen gave a presentation on the Apollo Program to the North Hampton Lions Club;

Vickie Johnson presented "Careers in Engineering" at the Chesapeake Center for Science and Technology;

Stanley Jones gave a presentation on Wind Tunnels at a Virginia Tech Workshop;

Lee Joyce spoke on Telecommunications at Denbigh High School;

Joel Levine spoke on the "Ozone Layer" for the Rotary Club of Hampton, "The Atmospheres of Neptune and Earth" for the Langley Alumni Association, and "Global Change" for the Science Museum of Virginia, the College of William and Mary Geology Seminar and the York River Chapter of the Sierra Club;

Greg Mekkes presented a lecture on the National Aero-Space Plane at the Virginia Aviation Museum;

Lee Person gave a presentation on the Apollo Program at the Virginia Living Museum;

Lester Rose spoke on Spinoffs from Aerospace Technology for the Mercury Lions Club;

John Samos gave a presentation titled "Peek into the Future" at Hofstra University, New York, and spoke on Space Technology Utilization for Persons with Disabilities at the Peninsula Center for Independent Living;

Cary Spitzer discussed "Recent Flight Tests" with the Hampton Roads Chapter of the Institute of Electrical and Electronic Engineers;

Lee Stewart gave a presentation on Vocational Skills and the Future for the South Carolina Vocational Education Association;

Ted Talley presented NASA--Past, Present and Future to the Chesapeake Astronomy Club;

Richard Wallsom gave a presentation on Building Large Space Structures for the Tidewater Builders Association;

Bob Wright gave an Overview of NASA to the Norfolk Sister City Association.

Many thanks to all of these individuals for sharing their expertise in support of the NASA and the Langley missions.

Speaking of Speakers

NASA Toastmasters will meet Wednesday, November 22, at 11:30 a.m. in Building 1212. Guests are always welcome. Time in attendance up to one hour may be charged to A-1619. For more information, contact Steve Yaros, ext. 43050.

People & Places

Associate Director of the Office of Personnel Management Claudia Cooley presents an Outstanding Federal Health and Fitness Program award to Pete Edgette (left), head of Occupational Health Services, and Frankie Robbins-Pivarnik (center), coordinator of the Langley Fitness Center.

Fitness Center Gets OPM Award

Langley's Fitness Center program was recognized as an Outstanding Federal Health and Fitness Program at an awards ceremony in Washington, D.C. on September 27. A total of 80 programs were nominated for the awards. Langley was one of seven finalists, each of which received a citation.

President Bush, in a letter to the recipients, stated that "Maintaining physical fitness is essential to a lifetime of good health. The agencies honored have distinguished themselves through innovative, comprehensive and realistic efforts to achieve that goal. Their programs benefit employees and help provide the American people with a healthier, more productive federal work force."

Pete Edgette, head of Langley's Occupational Health Services, added, "This award recognizes not only the work of the Fitness Center staff but the participants as well. The Fitness Center members should be proud of their dedication to greater health and fitness. Without the continued support of the members, this award could not have been achieved."

Retirement Party

Zane Pickney will be honored at a retirement party, Friday, December 1, in the H.J.E. Reid Conference Center. Festivities will begin at 6:30 p.m. Cost for the dinner and gift is $12/person. Contributions of $2/person for gift are welcome. For reservations, call Darlene Butler at ext. 43737.

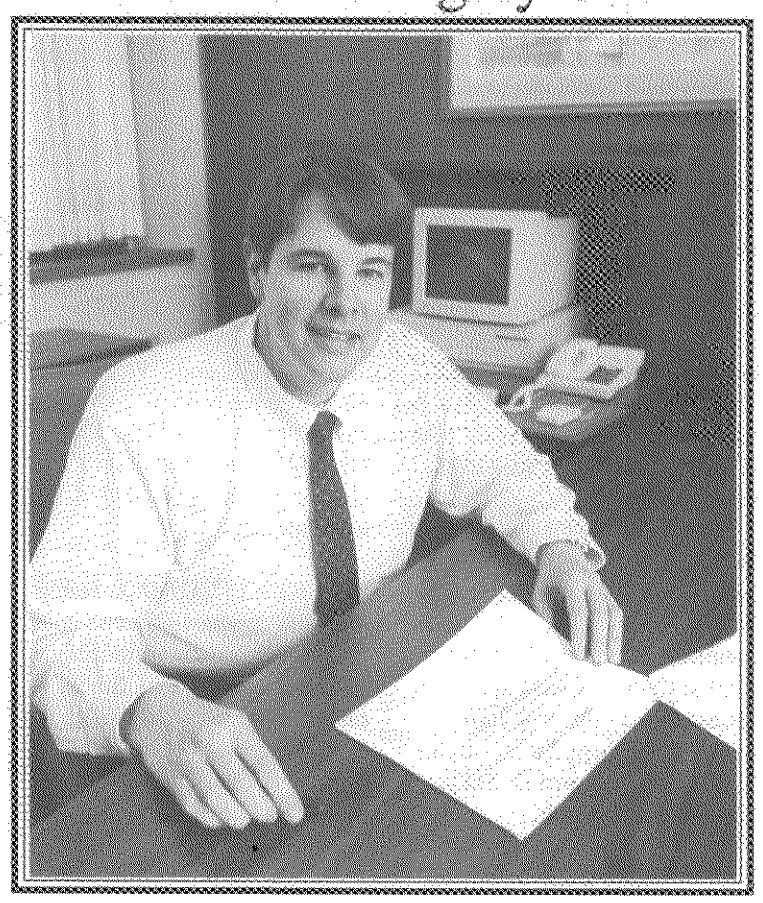
Note of Thanks

Carol Satterwhite writes: "I wish to express the heartfelt appreciation of all my family to each of you who so generously gave the "gift of life" to my uncle, James Harold Thrower, when the Bloodmobile visited the Center on September 29."

Holiday Gift Suggestion

A limited number of Busch Gardens Seasons Passes are available for sale at the LAA Office. Shop early and give a whole season of fun and entertainment to someone on your holiday gift list.

Headquarters Official Joins Langley Staff



Professional development is a priority at NASA. This is evidenced by the numbers of Langley managers, scientists and engineers "on loan" to Headquarters or other field centers. The intent is to benefit both the organization and the individual.

A turnabout situation is now benefitting Langley Research Center. John McCarthy, deputy director for Aeronautics at NASA Headquarters, is currently assigned to Langley. McCarthy has assumed the role of deputy director of Flight Systems.

Professional development is ideally a two-way street, said McCarthy. "I have been at Headquarters since 1980 and have worked closely with the field centers but have never had operational experience at any center."

A Sloan fellow at the Massachusetts Institute of Technology in 1987-88, McCarthy was looking for an opportunity for a different learning experience. "Coming to a center, viewing things from a different perspective with different types of management problems would be a good extension to my Sloan and Headquarters experience," said McCarthy.

McCarthy has interfaced with Langley senior staff often via his aeronautics position at Headquarters, especially in strategic planning and program development. This opportunity to become part of the Langley complement--if even for a short time--gives him the occasion to interact with middle management, who will ultimately implement agency directions.

McCarthy hopes to contribute his strengths in strategy and program planning to the Flight Systems Directorate and to share his experience on matters that occasionally mystify Center personnel regarding the budget process and the Congress, and clarify how Center actions impact each. "I view this an opportunity to discuss issues and directions openly and in a less threatening atmosphere. I am anxious to experience the institutional planning at LaRC first hand as it relates to the Agency's evolving integrated program planning. What are the real issues and implications at the Center and how can we ensure the most effective programs and processes for all concerned?"

Enthusiastic about the newest and a rapidly changing discipline at Langley, McCarthy feels his association with the Flight Systems directorate will give him a new perspective and a new technical area to explore. An aeronautics devotee to date, McCarthy's tour at Langley will involve him in space research and technology. He is excited to be involved in center discussions of Langley's potential role in the President's human exploration initiative which may dominate NASA's space efforts over the coming decades. On board since September 11, McCarthy has proposed a well-rounded experience for his six-month stay at Langley.

"I have known John for some time and have found him to be extremely perceptive and competent," said Jerry Creedon, director for Flight Systems. "In John's tour here, I am benefitting personally and the directorate and Center are benefitting from his insight and contributions. Additionally, I think John will grow by getting more detailed exposure to the technical areas at Langley, by becoming more familiar with LaRC procedures and culture, and by experiencing activities with a center perspective."

McCarthy credits Cecil Rosen, director for Aeronautics at Headquarters, for being an avid supporter of employee development. "Rosen looks at the long-term benefit for the individual and the organization, and encourages his staff to take advantage of key professional growth opportunities such as this one at Langley. He sees these training experiences as an opportunity to broaden experience and to enhance mutual understanding with the field centers," concluded McCarthy.

The Klate Holt Company Logistics Administrative Support Services, recognizes the recipients of the Safe Drivers' Award. Awardees are (front row, L to R) Tommy Baytop Sr., George Appleholm, Charlie Jones, Theresa Deaver, Henry Jenerette, Roosevelt Higgs, Sherman Thomas; (back row) Wayne Campbell, Roger Reed, Roy Harvey, John Bailey, Milford Gray, Ed Jenkins, Bob Ellis, Bubba Council, Bob Booth and Dave Schuler. Congratulations to these safety-conscious drivers.

Happenings

SPECIAL LAA SOCIAL. Holiday Open House will be held Friday, December 8, from 3:30 to 8 p.m. in the H.J.E. Reid Conference Center. Band, free food and punch. No cover charge. Beverages available as ususal after 4 p.m. Join your co-workers to kick off the holiday season.

CHILDREN'S CHRISTMAS PARTY will be held Sunday, December 17, 2 to 4 p.m. Santa will visit. Admission by advance ticket only. Tickets are $2/child and are available at the LAA Office.

BASKETBALL BLAST II. See the L.A. Lakers take on the Washington Bullets, Saturday, December 9, at the Capital Centre. Leave Hampton about noon, game is at 7:30 p.m., return about 2 a.m.--all for $50/person. Contact D. Speller, 728-2628, for details.

NAGS MEETING. National Association of Government Secretaries will meet at 6:30 p.m., November 21, at the Holiday Inn Hampton. "Ladies, Defend Yourselves" will be the program presented by Citizens Against Crime. Call Reachie Hall, ext. 42128, or Shirley Davis, 42083, by November 17.

HELP! Will the person who borrowed a 4 x 5 Speed Graphic camera, ICN#464853, from Photo Lab, please call Sal at ext. 43526?

FOUND: JACKET. Man's London Fog jacket found in Building 1268A, Room 2120. Call ext. 46565 to identify.

WANTED: ROOMMATE. Male to share two-BR. apartment with AC and DW. Two minutes from NASA. Non-smoker please. $170 per mo. plus 1/2 utilities and chores. Contact Claudio, ext. 44788, or leave message.

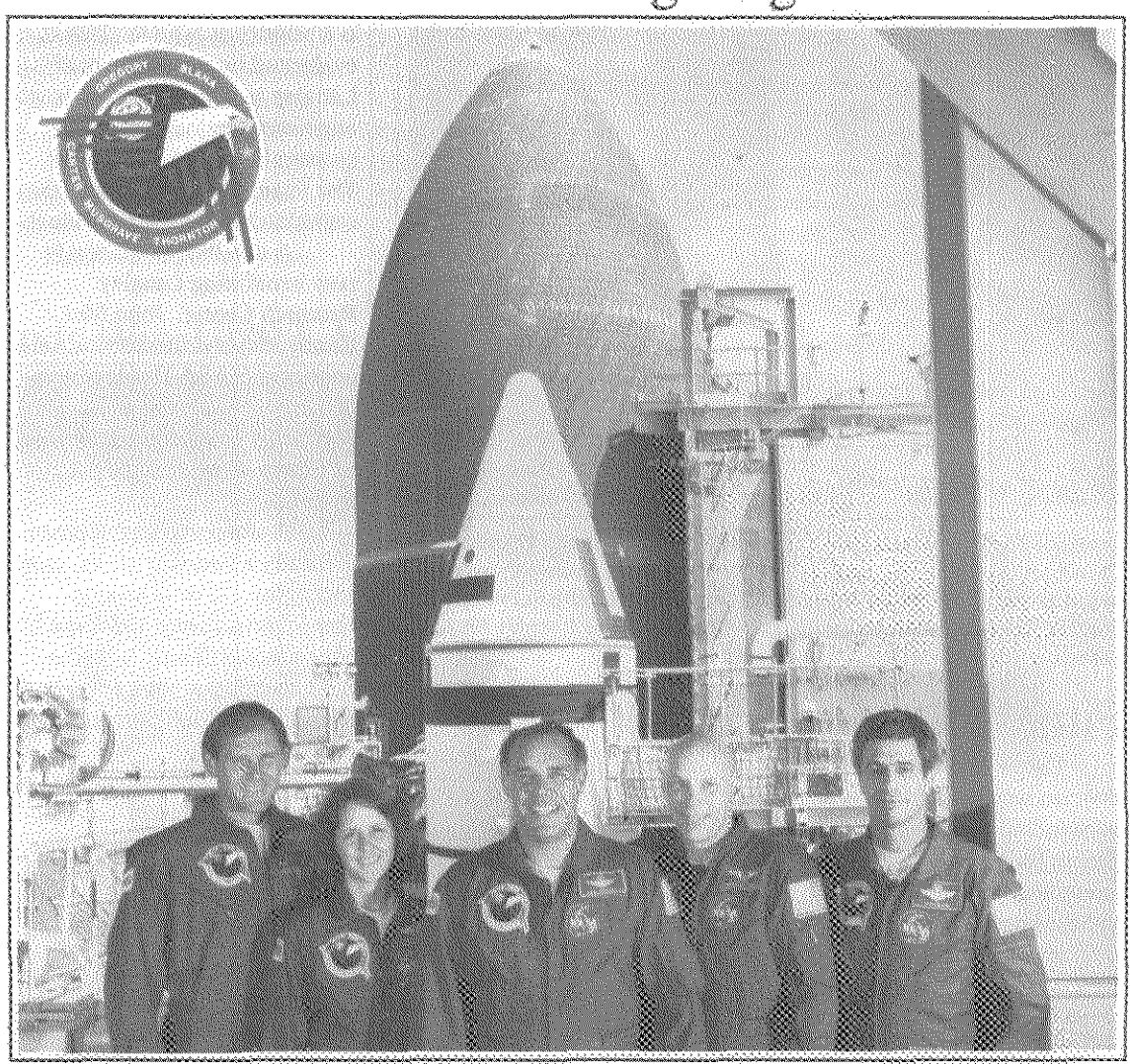
FOR RENT: CONDO. Hampton Club condo, 1 BR, end unit, 1st floor w/private entrance. W/D, security system, fitness center and pools. Deposit and lease required. $410. Call Simone at ext. 42565, or at 868-9130 after 4 p.m.

FOR SALE: AUTO. 1978 Datsun B210, 4-Dr., 51,000 miles. $850 or best offer. Call 723-8414.

FOR SALE: AUTO. 1966 Mustang, 200 cu. in. 6-cylinder, auto. trans. AC, AM/FM radio/tape w/speakers. $1,900. Call JoAnn at 864-1596.

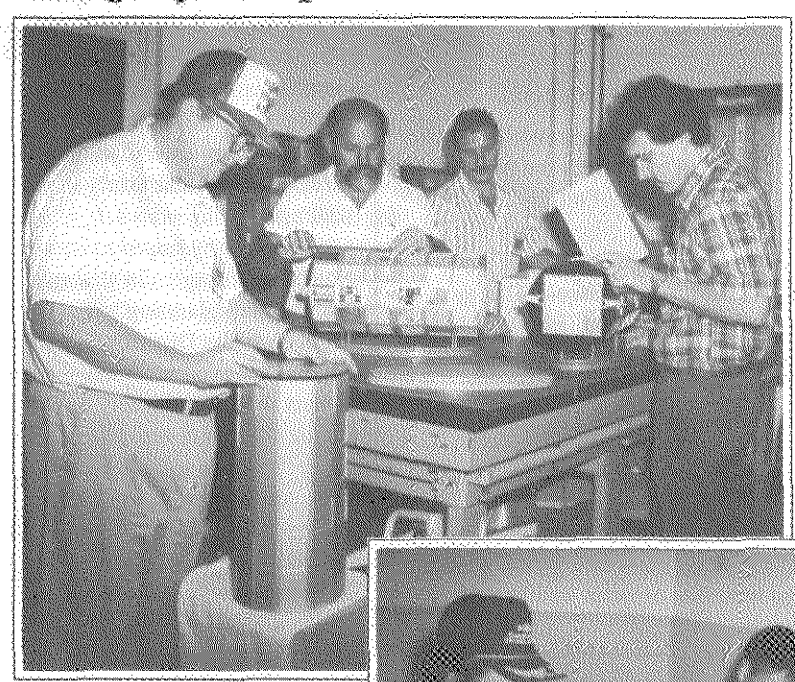
Upcoming Shuttle Missions

STS-33 Readies for Thanksgiving Mission



KENNEDY SPACE CENTER, Fla. --- The crew for Space Shuttle Mission STS-33 pose for a photo on the 215-foot level of launch pad 39-B during a visit to KSC. STS-33 is a Department of Defense-dedicated mission scheduled for launch no earlier than November 26. From left are Mission Specialists Sonny Carter and Kathy Thornton; Commander Frederick Gregory; Mission Specialist Story Musgrave and Pilot John Blaha.

Langley Prepares for LDEF Retrieval, STS-32



Fabrication Division technicians are reliving the early 1980s when the Long Duration Exposure Facility (LDEF) was built at Langley. Today's assembly-line production of LDEF model building has created a sense of excitement for the planned retrieval of LDEF by Space Shuttle Columbia in December during the STS-32 mission. LDEF has been in Earth orbit since it was deployed by Space Shuttle Challenger April 7, 1984.

-photos by Carol Petrachenko

Six LDEF models have been constructed for project spokespersons to use in explaining the 57 science, technology and applications experiments to news media during mission and post-mission operations at Kennedy, Johnson, Dryden and Langley. Engineering technicians working on the 1/20th-scale models are (L to R) Thomas M. Desmett, Donald L. Smith, James D. Adkins and Ronald G. Hermansderfer of the Composites Section. Not pictured are Mark I. Hudgins, John W. Oakley and William D. Castle of the Composites Section.

Engineering technicians completing work on the 1/10th-scale model are Michael C. Greenwood; Gary A. Wainwright; Benjamin F. Guenther, lead technician; and Thomas J. Abbott of the Composites and Models Development Section.

Researcher NEWS

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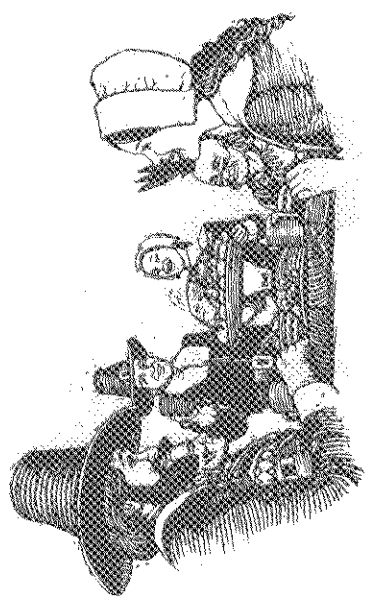


NASA
National Aeronautics and Space Administration
Langley Research Center

Langley Researcher News

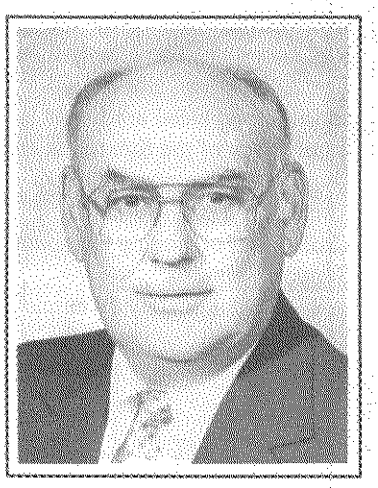
Volume 3, Issue 23 December 1, 1989
Bi-weekly Employee and Contractor Publication

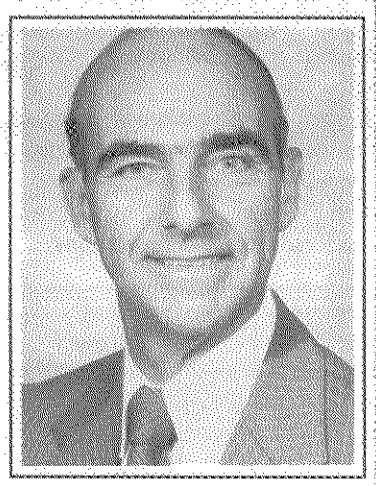
Mason, Barr Head Operations Support Division

Roy W. Mason, who began his service to NASA 34 years ago as an apprentice, has been selected to head the Operations Support Division. He replaces Ken Cole, who retired in September. Ramon P. Barr, a 28-year NASA veteran and apprentice graduate, has been named assistant chief, replacing Calvin C. Berry, who also retired in September.

Mason will plan and direct the technical support for research test facilities, systems and equipment of the Center. He will formulate policies to manage a work force of 400 employees and administer contract services involving 300 persons for operations and maintenance of complex industrial, electrical and mechanical systems. He will also be responsible for developing methods to improve efficiency and productivity as a means of reducing operating costs.

Mason began his career in 1955 when he joined NASA's predecessor organization, the National Advisory Committee for Aeronautics, as an apprentice electrician. He served as an electrical engineering technician until 1970, when he was promoted to supervisory engineering technician with the Lunar Landing Research Facility. In 1972, Mason became supervisor of technicians in the Aircraft Noise Reduction Laboratory during its development stage. In 1980, he was named manager of the Laboratories Operations Branch. His career has involved important research projects. Among them was the rendezvous docking simulator where spacecraft docking techniques were investigated for the Gemini Project. He was also assigned to the training facility where Apollo astronauts learned lunar landing skills.


Roy W. Mason


Ramon P. Barr

Barr will participate directly in all aspects of the organization's support of technical services to Langley research facilities. Additionally, he will serve on panels and committees concerned with technical, operational and administrative issues. He will also coordinate personnel classification and appraisal actions, focus on safety matters and ensure equal opportunity goals are met.

Barr joined Langley as an aero-lab mechanic trainee in 1961 and entered the apprentice school in 1962; he graduated in 1966 as an experimental facilities mechanic. In 1973, he was promoted to engineering technician group leader at the Scramjet Test Facility. In 1975, he was named supervisory engineering technician at the Hot Gas Radiation Research Facility and, in 1979, to the Structures and Materials Laboratory. From 1980 to 1985, he was head of Technical Support Section C and, later, Section D. Prior to his new position, he was head of the Tunnels Operation Branch.

Langley Colloquium

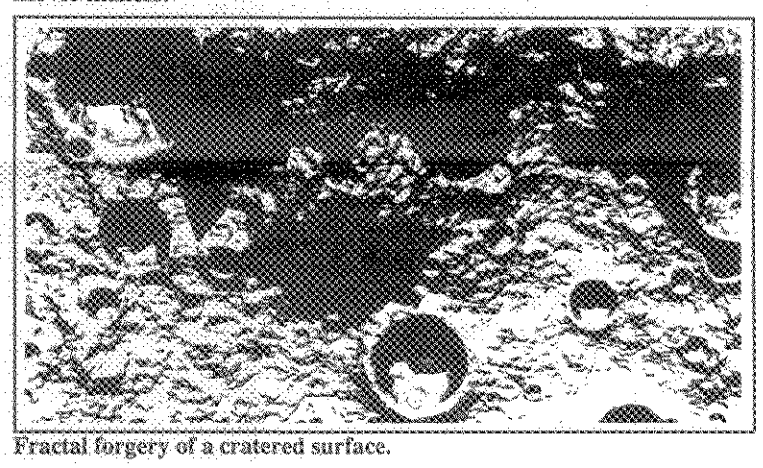
IBM Physicist Speaks on Fractals

Fractals, a development that came from contemplation of complicated shapes like snowflakes, are a new language for the description of nature.

Insensitive to magnification, fractals can capture the essence of natural shapes from mountains, clouds and trees, to unimagined, but strangely familiar, new worlds of breathtaking beauty. Since its invention by Benoit Mandelbrot in 1975, fractal geometry has revolutionized the application of non-Euclidean geometric constructs to science. It is now widely accepted as the appropriate descriptive language for the irregular shapes of nature. As a creative language, the imagery of fractals has stimulated renewed interest in science, computation and mathematics by visual designers, artists and movie makers.

Dr. Richard F. Voss, a physicist at IBM's Thomas J. Watson Research Center in Yorktown Heights, New York, will discuss "Fractal Forgeries: From M-Sets to Mountains and Music" at a Langley colloquium Monday, December 11. The lecture to employees, contractors and retirees will be held in the H.J.E. Reid Conference Center, Building 1222, at 2 p.m., followed by a question and answer session and an informal discussion.

Voss, a native of Minnesota, is a recognized pioneer and popular lecturer on fractals. **Science News** has referred to his presentation as a "scientific Doug Henning show" and his lecture relies heavily on computer-generated images, animation and music to provide an intuitive introduction to fractals.


Fractal forgery of a cratered surface.

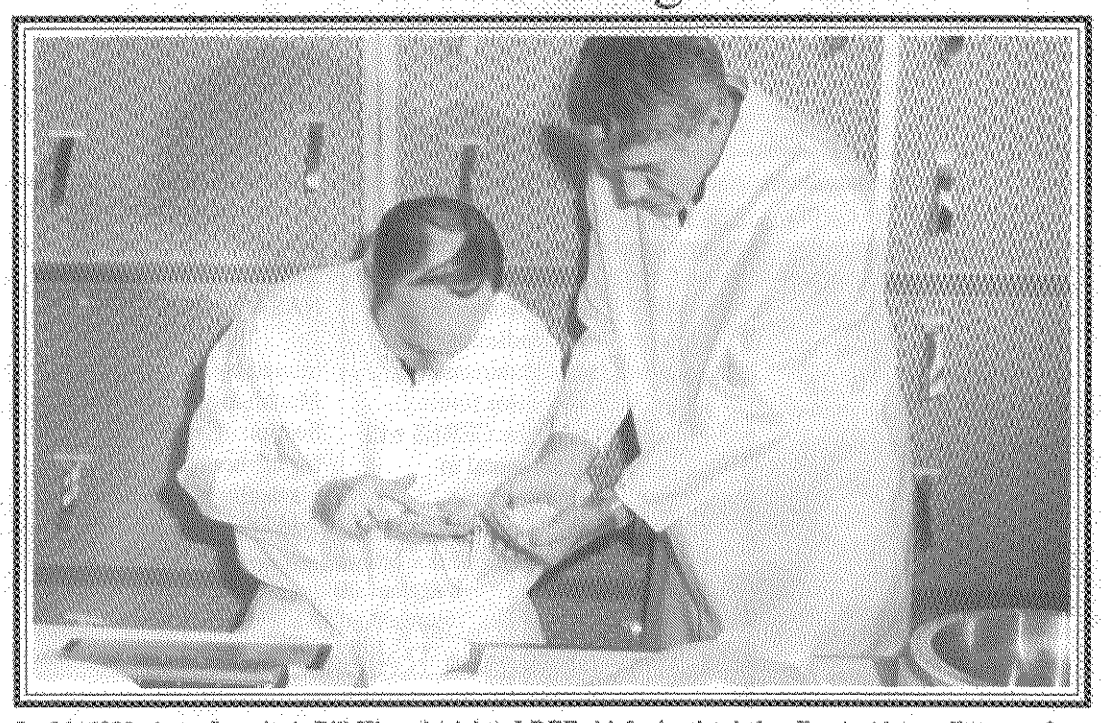
Space Exposed Tomato Seeds Are Coming Home

NASA is offering 12.5 million tomato seeds to budding student gardeners in the first experiment ever to study the effects of long-term space exposure on living tissue.

It has been more than five and a half years since the Space Shuttle deployed million of tomato seeds, housed in the Long Duration Exposure Facility (LDEF), into Earth orbit. Next month during Space Shuttle Mission 32, NASA plans to retrieve the 11-ton, free-flying satellite. LDEF carries 57 experiments concerned with the exposure of materials to the space environment, one of which is SEEDS.

SEEDS (Space Exposed Experiment Developed for Students) is a cooperative educational partnership among NASA Headquarters Education Affairs Division, Washington, D.C., NASA Langley, and the George W. Park Seed Co., Greenwood, S.C. The project is designed as a classroom experiment for U.S. students in grades 5 through university to conduct open-ended research.

NASA Administrator Richard H. Truly said, "Because this is the first opportunity for long-duration space exposure of living tissues, every classroom experiment will be significant. I hope millions of students will experience this hands-on, one-of-a-kind experiment and learn that science is fun."


In this 1983 photo, Langley's Bill Kinard (right), LDEF chief scientist, helps Jim A. Alston, director of research for Geo. W. Park Seed Co., prepare tomato seeds for flight on the LDEF.

The SEEDS project has the potential to directly involve four million students and 40,000 educators, in 250,000 classrooms.

After LDEF is retrieved, the flight seeds will be returned to Park Seed Co. where an equal number of control seeds from the same lot have been maintained in a ground-based facility.

Following preliminary growth tests conducted by plant scientists, these seeds will be distributed in late February. Each seed kit will contain 50 flight seeds and 50 control seeds, instructional materials and computerized data collection and reporting booklets.

Students will conduct classroom experiments, including experiment design, data gathering, sample comparison and final reporting results. Upper elementary and secondary levels could compare germination rates and times, seed embryos, phototropic responses and fruit products. Students also could consider the impact of varying environmental factors. Upper secondary and university students could perform chromosome experiments and population genetics studies.

The tomato seed was chosen because students in all geographic areas are familiar with the plant; it is relatively simple to germinate and grow; it is small enought to permit a large number to be flown in space; and it is proven to be very hardy. Rutgers tomato seeds are open-pollinated, nonhybrids and produce plants with comparatively little variation from generation to generation. Consequently, any changes in the space tomatoes' characteristics will be easy to detect. The Rutgers tomato seed was selected because it has wide adaptation and can be grown in every state.

The SEEDS project gives students the unprecedented opportunity to be involved in a national, first-of-a-kind experiment that encourages both active involvement and an interdisciplinary approach to designing their own investigations to involve decision-making, data-gathering and reporting of final results.

News Briefs

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- Preliminary measurements near Fort Ord, Calif., taken by mobile Very Long Baseline Interferometer (VLBI) systems, show abrupt crustal movement of approximately two inches caused by the Loma Prieta earthquake. This figure is close to the 3.2 inches predicted by scientists based on early models of the rupture. The measurements, taken immediately after the quake, are a special set in the series of geological measurements taken by the GSFC's Crustal Dynamics Project and the National Oceanic and Atmospheric Administration's National Geodetic Survey. The agencies have been monitoring sites along California's San Adreas fault since 1972.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly provided additional details on the consolidation of the Offices of Space Flight and Space Station into a single organization headed by Associate Administrator Dr. William B. Lenoir. The newly formed organization will be called the Office of Space Flight (OSF). George Abbey will continue to serve as the deputy associate administrator for the organization. It is planned that the Space Flight organization will include four major areas: Space Shuttle, headed by Acting Director Robert L. Crippen; Space Station Freedom, headed by Richard H. Kohrs; Space Flight Systems, headed by Joseph B. Mahon; and Human Resources and Institutions, headed by Richard J. Wisniewski.

KENNEDY SPACE CENTER, Fla. --- An investigation board at KSC has determined that human error caused the release of water from a Firex deluge system in Orbiter Processing Facility bay 2 on September 24 while workers were preparing the orbiter Columbia for its next mission. Water damage to the exposed flight hardware and associated ground support equipment is still being assessed, but appears to be minimal. This mishap is not expected to impact Columbia's readiness for STS-32 in December.

DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- NASA is using initial data from the first phase of a research program studying airflow during high angle-of-attack flight to validate computer codes and wind tunnel results that should significantly improve design capabilities for future aircraft. The High Angle-of-Attack Research Program at NASA Ames uses an F/A-18 Hornet aircraft on loan from the U.S. Navy. NASA expects the effort to provide information that will lead to increases in maneuverability and make high-performance aircraft safer to fly.

LEWIS RESEARCH CENTER, Cleveland, Ohio --- When the proposed National Aero-Space Plane (NASP) leaves the runway sometime in the 1990s, the fuel that powers it may be largely the result of the technology efforts being coordinated today by NASA Lewis. Researchers are focusing on "slush" hydrogen, a high-energy hydrogen slurry, as the primary propellant for NASP. It is denser than liquid hydrogen and requires smaller tanks for the same amount of propulsive capability. The tanks themselves can be lighter in weight because slush hydrogen requires an internal pressurization of only one pound per square inch. Also, slush hydrogen is a better coolant for the vehicle and engines than liquid hydrogen.

NASA Selects TRW Inc. for Eos Contract Negotiations

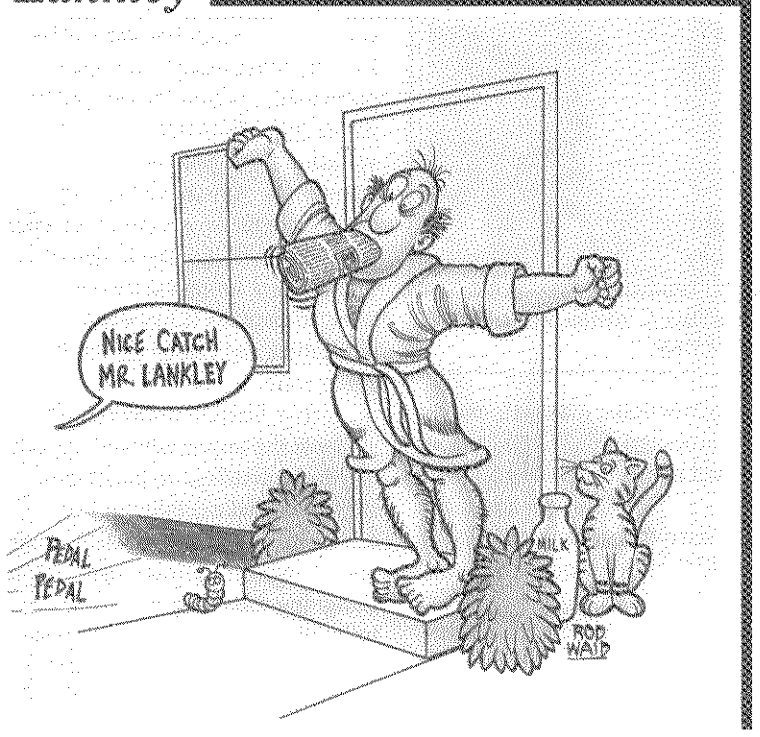
The Langley Research Center has selected TRW Inc., Redondo Beach, Calif., for contract negotiations to develop space flight instruments for NASA's polar orbiting platform, the European Space Agency (ESA) polar orbiting platform and Space Station Freedom as part of the proposed Earth Observing System (Eos). The goal of Eos is to advance scientific understanding of the Earth's land masses, oceans and atmosphere, their interactions and how the Earth's system is changing.

The two-phase contract is estimated at $37 million. Phase one, a cost-plus-fixed-fee contract, is for one year and has an estimated value of $700,000. The contract will take effect about January 15, 1990. Phase two, which will not be implemented until Eos is approved by the Administration and Congress, is a cost-plus-award-fee-option. It would be for eight years and would have an estimated value of $36.3 million. The work will be performed by TRW's Space and Technology Group, Redondo Beach. The company would design, fabricate and deliver up to six instruments for the Clouds and the Earth's Radiant Energy System (CERES) and provide support for integration, launch and mission operations.

CERES consists of a pair of identical broadband, scanning radiometers to be flown on each of three satellites. The CERES experiment will provide Eos scientists with a consistent database of clouds and fields of radiation. The radiation data will be provided as fluxes at the top of the Earth's atmosphere, at the Earth's surface and as flux divergencies within the atmosphere.

The CERES mission is important to the further understanding of Earth's global systems because clouds remain one of the main sources of uncertainty in understanding climate. Also, studies of clear skies can aid in understanding hypothesized climate forcing. Finally, the data the CERES will gather are fundamental to atmospheric and oceanic energetics and to extended weather forecasting.

Lankley



Tornado Claims Lives of Marshall Employees

Three employees of the Marshall Space Flight Center were killed when a tornado swept through Huntsville on November 15. The Marshall Center, however, was spared serios harm. Dead are James B. Summerour of the Structures and Dynamics Laboratory, and Thomas P. Fry and Alan D. Cruse, both of Boeing Computer Support Services.

Approximately 19 employees suffered either personal injury or have family members who were injured.

Some 25 MSFC employees suffered major damage to or total loss of their homes, while 54 have minor damage to their residences. The automobiles of ten employees were destroyed, while some 25 sustained major or minor damage to their vehicles.

Latest figures on the impact of the tornado in the Huntsville area show 17 dead, two missing, almost 500 injured and some 1,000 homeless.

Leave Transfer Program--A Life-line to Employees

The Voluntary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing a period of unpaid leave as a result of a medical emergency.

The program began as the Temporary Leave Transfer Program, authorized by Public Law 100-202, and scheduled to terminate September 30, 1988. President Reagan signed Treasury Appropriations Bill, Public Law 100-440, which extended the authority for the program through September 30, 1989.

The current program was established by Public Law 100-566. This law provides for a five-year experimental program of annual leave transfer for federal employees to other federal employees who have been deemed qualified.

To date, 19 employees have been approved for leave transfer at NASA Langley. These deserving employees have been given 5,150 hours of leave, donated by some 238 of their fellow employees.

The program has been well received on Center. Those who have received donations of annual leave are extremely thankful. Read the story told by Ken Jones on page 3.

The following employees are approved leave recipients:

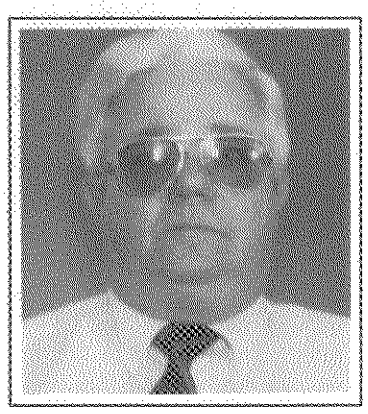
- Robert M. Connell, Jr.
- Randolph F. Culotta
- Janet L. Edmondson
- Kenneth M. Jones
- Karl I. Maddox
- Grace N. Rodman
- Bernard Spencer Jr.
- Catherine B. Worth

To donate annual leave, or learn more about the program, contact Linda Park, ext. 42610.

In Memoriam

Sympathy is extended to the family of Aubrey M. Raiford, Advanced Machining Development Section (AMDS), who died November 13. Raiford had over 33 years of service at NASA Langley.

"Mr. Raiford will be missed by all in the Advanced Machining Development Section. He will be remembered for his honesty and integrity in his dealings with all persons," said Dick Holt, ADMS head.



Aubrey M. Raiford

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 147, ext. 43293.

89-170.....VLBI Measures Earthquake
89-171.....Consolidation of Shuttle and Space Station Offices
89-172.....COBE Press Kit
89-173.....Findings Released on Orbiter Processing Facility Water Mishap
89-174.....Space Exposed Tomato Seeds Are Coming Home
89-175.....Research Flight Results May Aid Future Aircraft Designs
89-176.....NASA Heads Hydrogen Fuel Technology Effort for Aero-Space Plane

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

A story of thanks

Assistance Program Acknowledges Importance of Family

Optimistic Parents Glean the Good From a Tragedy

For Ken and Sue Jones, this holiday season brings a special reason to rejoice. Three-year-old Timothy has been cancer free since a bone-marrow transplant seven months ago.

The Joneses celebrate Thanksgiving every day and would like nothing more for Christmas than a guarantee that Timothy is cured.

Ken Jones, an aerospace technologist in the Advanced Aircraft Branch, explains that he and Sue are "cautiously optimistic," take each day--one day at a time, and are fully supportive of the Center's Voluntary Leave Transfer Program. Through this program, Jones has received over 600 hours of leave, donated by friends as well as Langley employees he has never met. The donated hours have made it possible for the family to be together during much of Timothy's periods of hospitalization. "There was never any question that I would have to take off work and be with my family," said Jones. "The Leave Program assured me of a paycheck, and lessened the financial strain of this stressful situation."

Young Timothy was diagnosed with neuroblastoma, a rare form of childhood cancer, at 13 months. The initial indication was a swelling under Timothy's left eye that appeared in October 1987. A CAT scan on a Friday revealed a tumor under the eye. Over the weekend, three new tumors appeared on the top of the child's head. Further tests on Monday showed several bone lesions and masses throughout his tiny body. Monday afternoon, Timothy began to vomit violently and was rushed to the Medical College of Virginia (MCV) in Richmond and admitted to the pediatric oncology unit.

Neuroblastoma is a particularly aggressive form of childhood cancer that often originates in the adrenal gland and spreads throughout the body; it has about a five percent survival rate. Traditionally diagnosed in children two to four years of age, it is generally found in white males. "Interestingly," said Jones, "if it is detected early--before the child is a year old--the survival rate increases to 50 percent. As soon as you cross over that one-year threshold, the survival rate drops to five percent."

During the past two years Timothy and his parents have endured twenty-two hospitalizations for chemotherapy, surgery to remove an abdominal tumor the size of a lemon, radiation treatment and, finally, a bone-marrow transplant.

The transplant involved surgery to remove 20 percent of Timothy's bone marrow. This bone marrow was flown to the University of Florida at Gainesville for purging to remove any remaining neuroblastoma cells. The marrow was then flown back to MCV and kept in cryogenic storage until Timothy was physically ready to undergo another surgery.

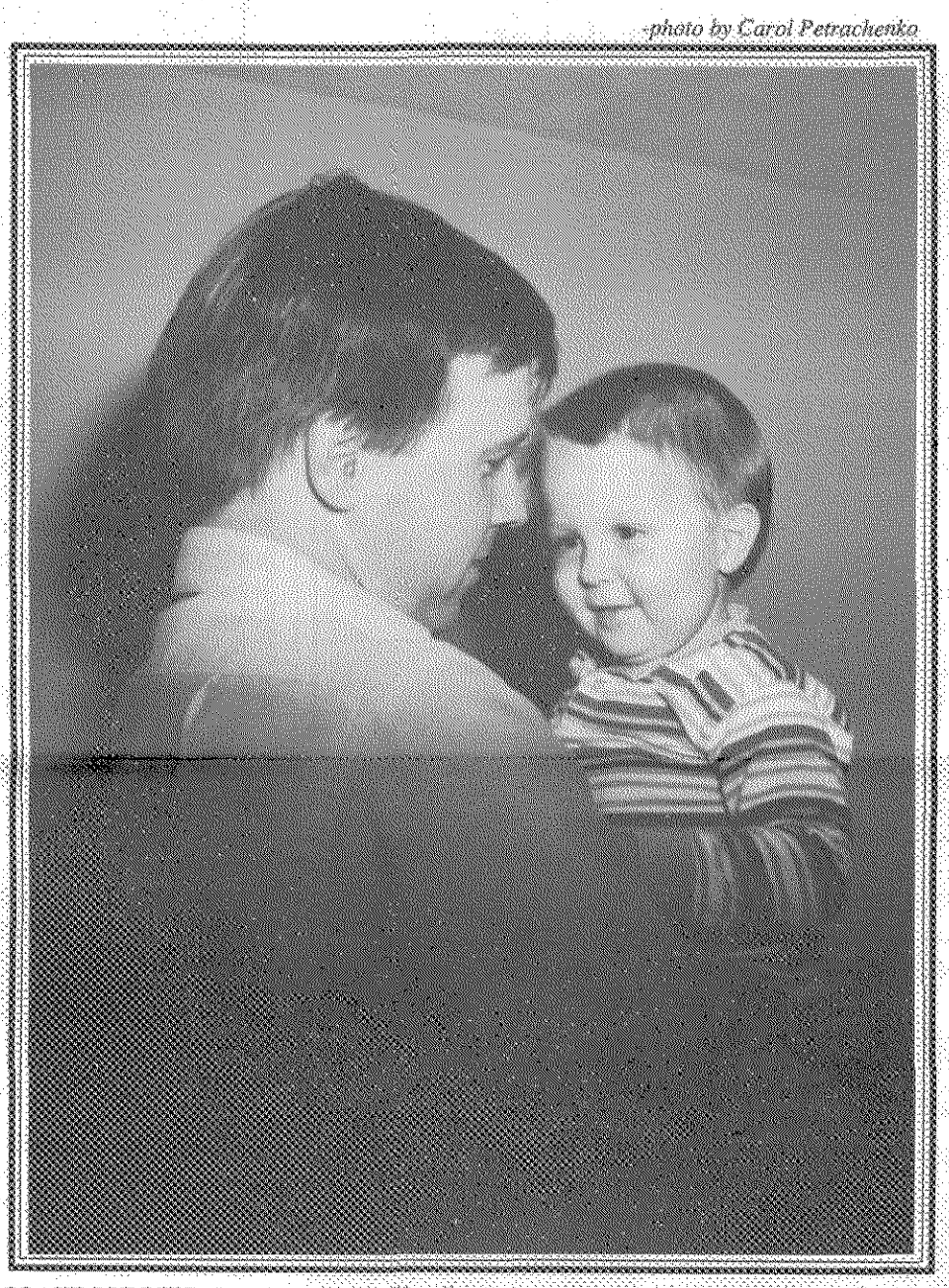
On Friday, April 14, Timothy underwent the medical procedure to replace his cleansed bone marrow and the recovery process began. Continually optimistic, the Joneses had to witness Timothy's most difficult period. Due to his low white blood count, Timothy was especially susceptible to infection and experienced fevers of 104 degrees; his parents packed his tiny body in ice. In addition, he was afflicted with severe sores of the mouth and gastro-intestinal tract. He was given morphine for pain. And transfusions of red blood and platelets were required amid a concern over an ample, safe blood supply.

It's now been seven months and things are looking up. Timothy's white blood count (WBC) is 4.6--up from .1 after the transplant. Normal WBC is between 5 and10. He still gets red blood cell transfusions every three weeks. Sue Jones admits it is still difficult each time Timothy is due for a test. "I dread it when the phone rings, knowing the results are in." Usually optimistic, the Joneses can't help but be brought back to the day Timothy's illness was diagnosed each time they await test results.

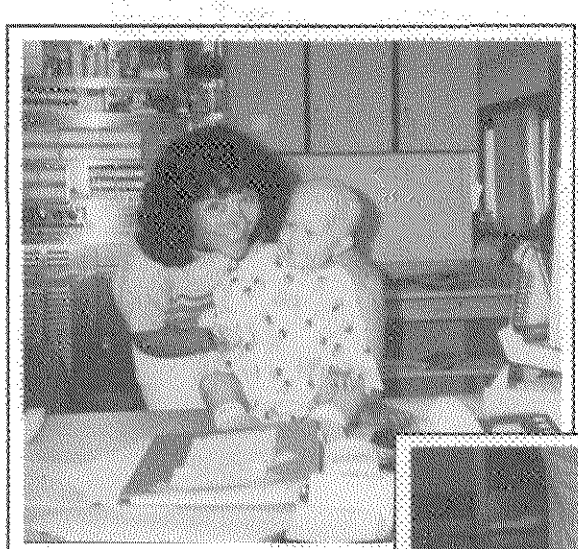
Over the two-year period, Jones has been away from his Langley job for months at a time--one month during intense chemotherapy right after diagnosis and another month during the bone-marrow transplant. He also needed to be with his family at the hospital several days a week following each of these episodes. "The whole chain of command at Langley has been very supportive," says Jones. "I was in the middle of a number of projects (when the crisis hit) and my co-workers picked up my work. After using all my leave, news about the Voluntary Leave Transfer Program was brought to me by my group leader and branch head. I'll never be able to thank all those who have helped me during Timothy's illness--many I'll never even know. I hope learning a little something about Timothy will make those donors aware of how grateful Sue and I are."

All the while, the Joneses, who have no family in the area, have been supported by members of their church, Deer Park Baptist. Church members brought meals all the way to Richmond every night during Timothy's hospitalization. "My Langley co-workers brought dinners on the weekends. We have certainly been blessed," concludes Jones.

-photo by Carol Petrachenko

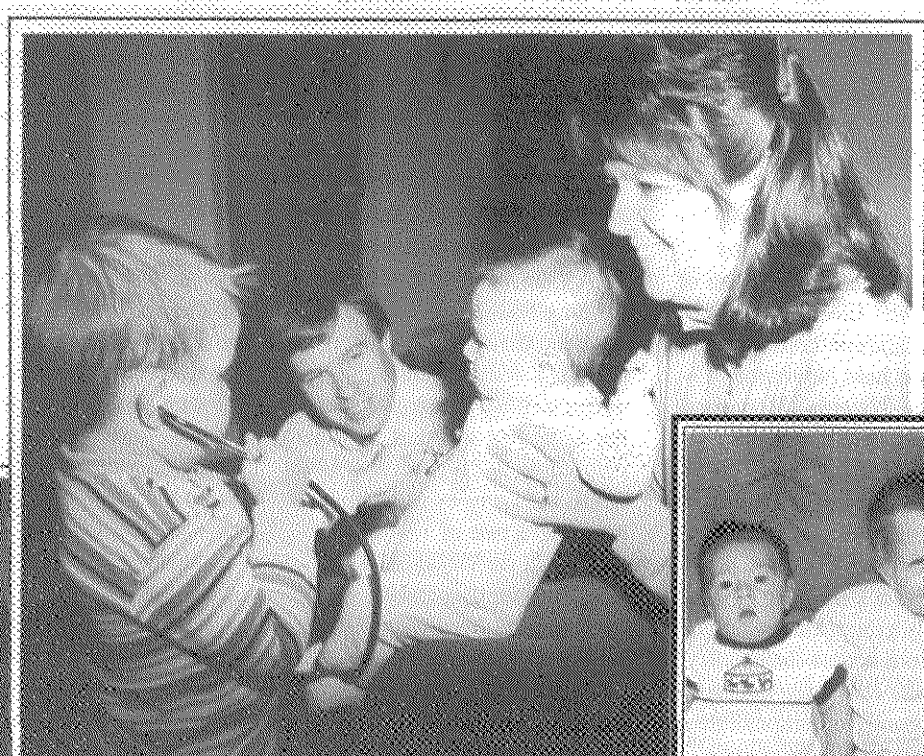


BRAVE BUDDIES. Langley engineer Ken Jones shares a special moment with son Timothy.



It's no surprise that Timothy captured the hearts of the staff at the Medical College of Virginia where he was hospitalized for months at a time. Timothy is right at home at the nurses' station in the bone-marrow transplant unit with head nurse Abbi Backon.

A favorite treat for Timothy while in the hospital was to ride through the halls in a wagon pulled by his mom. Kids are just kids!



-photo by Carol Petrachenko

Timothy seems to have a preoccupation with medical paraphernalia. He has his own stethoscope with which he examines three-month-old Christopher held by his mother, Sue. Dad, Ken, watches the procedure.

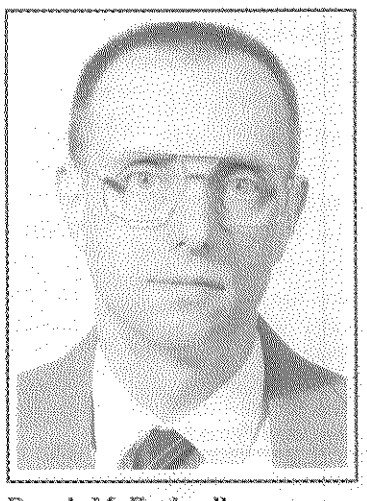
It's great to have a brother!

Langley Engineers Cited for Roles in Aero-Space Plane Development

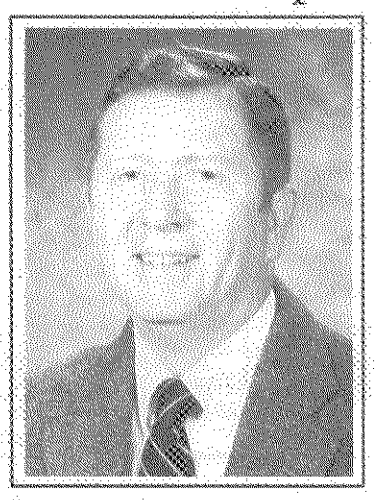
Four Langley research engineers have been honored for important contributions to the National Aero-Space Plane (NASP) development effort by the NASP Joint Program Office.

In ceremonies conducted during the Seventh NASP Technology Symposium, held October 23-27, at Lewis Research Center, Cleveland, Ohio, Dennis M. Bushnell, R. Wayne Guy, Charles R. McClinton and Allen H. Whitehead Jr., were each presented the Gene Zara Award for outstanding contributions to the NASP Program.

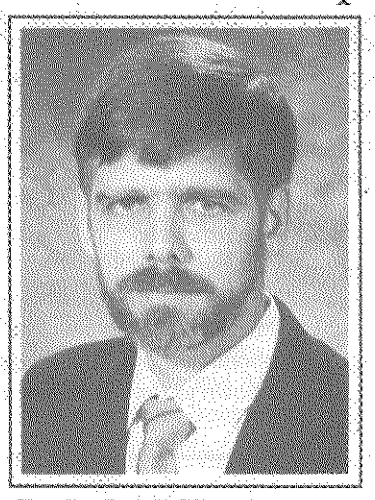
Award winners are selected from among the national team of government, industry and university researchers who are seeking creative solutions to the difficult technological challenges which confront the NASP Program. The award is named after a Wright Research and Development Center researcher whose dedication to the program fostered a continuing spirit of enthusiasm. Zara's participation in the project was cut short by his death from cancer in 1988.



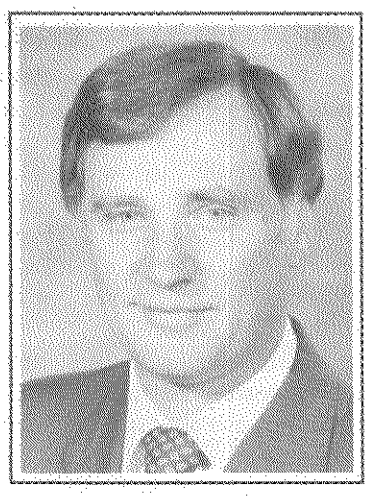
Dennis M. Bushnell



R. Wayne Guy



Charles R. McClinton



Allen H. Whitehead Jr.

The NASP is viewed as the next major step in the evolution of flight. The program objective is to develop the hypersonic flight and air-breathing propulsion technologies for vehicles which can take off like conventional aircraft and fly directly into Earth orbit under their own power, perform work in space and then reenter to a normal runway landing. It is anticipated that two experimental research aircraft will be built for in-flight development of the NASP technology.

Bushnell's leadership in the boundary-layer transition research effort resulted in significant improvements in transition estimation accuracy for the NASP-class vehicle. Guy plays a prominent role in Langley's scramjet engine testing. Complete engine tests, performed under his direction in Langley facilities, have done much to confirm the operability and performance potential of NASP engine concepts. McClinton led the government's Performance and Mission Analysis Team during the recent NASP Engine Concept Review. He now heads the Langley Hypersonic Propulsion Numerical Analysis Group which calibrates and applies computational fluid dynamic codes for analysis of NASP propulsion flow paths. Whitehead has led both the Aerodynamics Technical Support and the Aerodynamics Technology Maturation Teams. His close working relationship with the Air Force has epitomized the national team concept of the NASP effort.

The four new recipients join six previously chosen Langley honorees: Selected in 1988 were C. L. W. Edwards, Donald R. Rummler and Ernest A. Mackley. J. Philip Drummond, James L. Hunt and Howard G. Maahs were recognized at the Sixth NASP Technology Symposium held earlier this year in Monterey, California.

-photo by Bob Reynolds

Langley researchers (L to R) Andrea Overman, Dr. Craig Streett, Dr. Jay Lambiotte and Geoffrey Tennille pose behind Voyager, Langley's CRAY-2S computer.

Langley Group Cited by Cray Research, Inc.

A group of Langley researchers were honored by Cray Research at the Institute of Electrical and ElectronicEngineers (IEEE)Supercomputing '89 Conference held November 13-17 in Reno, Nevada. Honorees were Dr. Jules J. Lambiotte, Andrea L. Overman and Geoffrey M. Tennille, Computer Applications Branch; and Dr. Craig L. Streett, Theoretical Flow Physics Branch.

This group was one of twenty from across the country that met the challenge issued by Cray Research to demonstrate an operational applications code that achieves a sustained computation rate of over one billion floating point operations per second (one GigaFLOP).

The Langley group exceeded the GigaFLOP rate on the Center's four processor CRAY-2S, Voyager, and was the only code honored that did not need the eight processor CRAY Y-MP, which is estimated to have two to three times the aggregate speed of Voyager. According to Lambiotte, head of CAB, the Langley group achieved a rate of 1.01 GigaFLOPS on Voyager. This rate was particularly pleasing since even experts from Cray Research were initially doubtful that such a rate could be achieved on a CRAY-2S. Lambiotte accepted the award from John Rollwagen, chairman and chief executive officer of Cray Research, Inc.

To achieve high computational rates, a code must be both highly vectorized for performance on a single processor as well as multitasked (split) across all the available processors. The code that was optimized simulated the flow between two concentric cylinders, with one rotating with respect to the other (Taylor-Couette flow) and was developed by Streett. It is a classic model for the study of instability of curved and rotating shear flows.

CRAY supercomputers are the only general purpose computers available that have the capability of running codes at such fast rates. Research is currently underway into massively parallel computers that may eventually be capable of running codes at ten or more GigaFLOPS.

Retirement Party

Willie Curtis will be honored at a retirement party Wednesday, January 10, at the Langley Officers' Club. Festivities begin with a cash bar at 5 p.m., followed by heavy hors d'oeuvres. Cost is $12/person or $22/couple. Contributions for gift only are welcome. Checks may be made payable to Susan K. Miller, Mail Stop 185, by December 15.

Runners Club

Langley Runners Club will hold the Interdirectorate Team 5 KM road race Thursday, December 7, starting at 4:45 p.m. on Doolittle Road. Teams consist of four or more runners from each directorate or contractor. There will also be a women's division. For more information, call Richard Shearer, ext. 47036.

The Home Place

FOR RENT: CONDO. Hampton Club. 2BR furnished condo, second floor with W/D, security system, fitness center and pool. Deposit and lease required. $500/mo. Available January 1. Call Pamela, ext. 41307 or 868-6933.

FOR RENT: TOWNHOUSE. Denbrook Station. 3BR, 1-1/2 BA, all appliances, W/D, fireplace. Near I-64 and Rt. 17. $525/mo. Call 868-6427

FOR RENT: CONDO. Hampton Club. Furnished studio unit, fitness center, pool, jacuzzi. $430/mo. Call 868-6427.

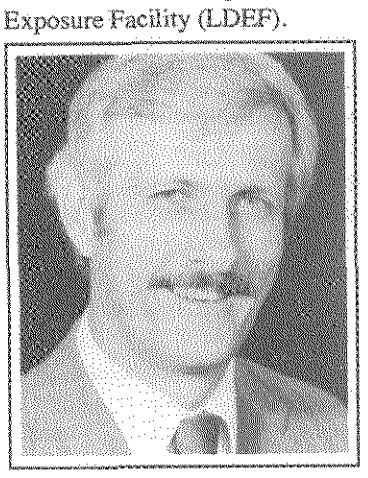
Harvey's Janitorial Service, Inc., recognizes employee teams who have excelled on their Facility Evaluation Reports. The award committee convened on October 2 and selected Crew #4 for the Crew of the Month for October. This crew obtained a score of 94.16 out of a possible 95 points and received a letter of commendation for the outstanding manner in which they maintain Building 1251, one of the three largest on Center. Team members are (L to R) Gloria Martin, Sylvia Debroux, Joyce Johnson, Alfonzo Poston and Gracie Dunston.

People & Places

At the VC during December

Clark to Discuss LDEF Recovery

The December mission of the Space Shuttle Columbia (STS-32) will have special meaning for scientists at Langley. One of Columbia's missions is to retrieve the Long Duration Exposure Facility (LDEF).



Lenwood Clark, senior project engineer, will give a briefing on Columbia's recovery mission in his presentation "LDEF and its Recovery: A Critical Mission" on December 7 at 7:30 p.m. in the Visitor Center theater.

LDEF, an 11-ton satellite containing 57 experiments designed to test the effects of prolonged space exposure, was developed and managed by Langley Research Center. Clark served as LDEF's experiments manager and will discuss its development, experiments and recovery mission in his lecture.

LDEF was placed in orbit by the Space Shuttle Challenger on the STS 41-C mission in April 1984. Plans called for recovery of LDEF after nearly a year in orbit. Due to Shuttle manifest changes and the loss of the Challenger, the mission was extended to late 1989.

The mission is extremely critical because it will provide a wealth of information that will be used in the design of future spacecraft, such as the Space Station Freedom.

Visitor Center Announces Extended Hours for Shuttle Coverage

The Visitor Center will feature live coverage of STS-32, Space Shuttle Columbia's retrieval of the Long Duration Exposure Facility (LDEF).

The Visitor Center will remain open during the evenings of December 18 for the launch, December 21 for LDEF's retrieval and December 28 for the landing of Columbia. Should the mission be delayed, the Visitor Center will adjust its schedule to provide live coverage.

The latest information regarding STS-32 will be available via telephone. Dial extension 42111 (864-2111 off-Center) for complete and up-to-date information as it becomes available from Kennedy Space Center. Information will also be posted on Center TV monitors.

Fitness Center Holiday Hours

The Langley Fitness Center will be open during the holidays, but center hours will be modified. The center will be open:

December 18-21 (Mon. to Thurs.)	7 a.m.to 4 p.m.
December 22 (Friday)	7 a.m. to 12 noon
December 26-28 (Tues. to Thurs.)	7 a.m. to 4 p.m.
December 29 (Friday)	7 a.m. to 12 noon

Langley's Child Development Center Holds Book Fair

The PTA of the NASA Langley Child Development Center is holding a Book Fair as a fund raiser through Friday, December 8. Over 200 books for infants and children up to 12 years of age will be on display at the Child Development Center, Building 1231A, near the Credit Union. The Center is open all day, however, the best time to come by for books is from 9 a.m. to 3 p.m. Two copies of each title will be available for cash and carry; additional books may be ordered. Books ordered at the Fair will arrive in time for Christmas giving. Books are supplied by "Creative Kids" of Oyster Point Square. A percentage of the gross receipts will go the the Child Development Center to buy new books and supplies for the facility. Contact Barbara Merrill or Kathryn Skinner, at 864-4827, for additional information.

Busch Gardens Season Passes

A limited number of season passes to Busch Gardens are available at discounted prices at the LAA Office. Give a whole season of fun and entertainment to someone special this holiday season. Call Frankie Ward, ext. 46369, for more information.

See the actual space suit worn by Apollo 15 astronaut David Scott as he explored the surface of the moon.

Visitor Center Salutes Astronauts

The astronauts--star voyagers--men and women, whose lifework composes the artwork of our dreams, are the subjects of a Visitor Center permanent exhibit, "The Astronauts." From the Mercury Project to the Space Shuttle, the lives of our modern pioneers are chronicled in fascinating detail.

The exhibit opens with the story of the first seven astronauts, John Glenn, Virgil Grissom, Alan Shepard, M. Scott Carpenter, L. Gordon Cooper, Walter Schirra and Donald Slayton. Trained in an intensive program at Langley, these military test pilots earned the right to be blasted into the unknown by 370,000 pounds of thrust. Gemini, Apollo and the Space Shuttle astronauts are featured along with the Mercury astronauts. Depicted are Americans of diverse ethnic backgrounds, men and women who have experienced the technological achievement of space exploration.

Back on Earth, visitors can share this technological achievement while touring the exhibit. See the actual space suit worn by Apollo 15 astronaut David Scott while on the lunar surface. The dust on the suit is moon dust. Scott spent 66 hours on the lunar surface, driving the first lunar roving vehicle and exploring the Handley Plain and Appenine Mountains.

Questions on the lives of 172 astronauts are answered by a specially programmed computer. Visitors can call up on the computer a complete biography of each astronaut. Who the astronauts are, where they were born and when they were chosen by NASA are a few examples of the information stored in the computer.

Come, discover and learn about the men and women who have captured the hearts and minds of Americans.

Senior Management Research Review

The Senior Management Research Review will be held Monday, December 18, from 9 to 11 a.m. in Building 1219, Room 225. Following the Director's comments and program directors' status reports, program accomplishments will be given by Langley scientists.

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	High Energy Aerobraking System Studies	Richard Powell (Space/SSD)
9:45	Multiple Paths to Laminar Breakdown in a Boundary Layer	Thomas Zang (Aeronautics/FLDMD)
10:00	Demonstrated Incompatibility of Airborne and ATC-Generated 4D Descent Profiles	David Williams (FlightSystems/FLMD)
10:15	Achieving Optical Interconnects with Laser Arrays that Switch	Herbert Hendricks (Flight Systems/ISD)
10:30	Aircraft Structural Integrity	Clarence Poe (Structures/MD)
10:45	Active Control of Panel Radiated Noise	Richard Silcox (Structures/ACOD)

Happenings

SPECIAL LAA SOCIAL. Holiday Open House will be held Friday, December 8, from 3:30 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Band, free food and punch. No cover charge. Beverages available as usual after 4 p.m. Usher in the Holiday season by celebrating with your co-workers.

CHILDREN'S CHRISTMAS PARTY will be held Sunday, December 17, 2 to 4 p.m., in Building 1222. Entertainment, refreshments, Santa will visit. Admission by advance ticket only. Tickets are $2/child and are available at the LAA Office.

NEW YEAR'S EVE DANCE. Sunday, December 31, 9 p.m. to 1 a.m., featuring "Sports Band." $35/couple. Includes favors, noisemakers, set-ups and buffet breakfast. BYOB. Tickets available at the LAA Office.

LAA BOARD. The Langley Activities Association Board of Directors will meet Tuesday, December 12, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222. Concerns to be brought before the board should be addressed to the appropriate chairperson.

FEDERAL ALMANACS. Orders are now being accepted at the LAA Office for the 1990 Federal Almanac. Cost is $5.50. Deadline is January 5. Call Frankie Ward, 864-6369, for more information.

LaRC ALUMNI LUNCHEON will be held Tuesday, December 12, at 11:30 a.m. in the NASA Cafeteria. Go through the lunch line and then to the private dining room. Jon Van Cleave will present a Scout Program Update.

NASA TOASTMASTERS will meet Wednesday, December 13, at 11:30 a.m. in Building 1212. This will be the last meeting of the year. Guests are welcome. For more information, contact Steve Yaros, ext. 43050.

AFCEA MEETING. An Armed Forces Communications and Electronics Association luncheon will be held December 7 at 11:30 a.m. in the Langley AFB NCO Club. Make reservations by December 5 by calling Capt. Brown, 764-6674, or Lt. Cherinka, 764-6699.

LOST: LIBRARY BOOK. *Introduction to Optical Electronics* by A. Yariv. Call ext. 41360.

WANTED: ROOMMATE. Male to share townhouse in York Crossing; 1/2 mo. rent plus 1/2 utilities; 2BR, 1-1/2 BA, DR/Kit comb. w/FP, LR, W/D, A/C. Available now. Call 898-5113 after 5 p.m.

WANTED: ROOMMATE. Male to share condo in Newport News; $220/mo. plus 1/2 utilities; 2BR, BA, Kit. w/FP. Available now. Call 591-8734 after 4 p.m.

NEEDED: CAR POOL from Williamsburg, Merchants Square area. Call Naga, ext. 41068 or 45498 or 221-0203. If no answer, leave message.

FOUND: CALCULATOR. Scientific calculator was found in parking lot between Bldgs. 1194 and 1195. Please call Effie, ext. 42394, to identify.

FOR SALE: DOLLHOUSE. Hand-built, beautiful colonial style; 50" x 21" x 40". Great Christmas gift. $250. Call Carolyn at 864-3783.

FOR SALE: BIKES. Boys 20" blue Schwinn Sting Ray, girls light blue 20" Schwinn Fair Lady; like new. $60 each. Call 898-8069 after 5 p.m.

Santa Says 'Don't Toy With Your Sight'

With Santa's big day arriving faster than you can say "Ho, ho, ho," The National Society to Prevent Blindness--Virginia Affiliate urges all Santa's helpers to check their lists twice for toys that could pose a hazard to children's eyes. Almost all eye injuries from toys can be avoided, the Society says, by selecting toys and games more carefully and teaching youngsters how to use toys safely.

No one wants to play the part of Scrooge during the holidays, but children's toys were responsible for more that 8,900 eye injuries last year alone, according to the Society.

Frank J. Carlomango, executive director of the NSPB Virginia Affiliate, says, "The gifts that Santa--and parents--leave under the tree this holiday should be carefully selected. Before making a purchase, adults should consider the child's maturity level and, remember, that toys purchased for one child often find their way into the hands of younger children.

The Society is especially concerned that parents and friends continue to purchase projectile non-toys for children. These include air- and spring-operated guns, slingshots, bows and arrows, and darts. "It's not easy to say 'no' to gift requests," says Carlomagno, "but children can be reassured that old St. Nick will come through with an even better--and much safer toy. Disappointment over an unfilled request will be forgotten, but an eye injury may be forever!"

Be on the lookout for potential hazards

To help toy shoppers make safe selections, the Society for the Prevention of Blindness offers the following holiday checklist:

*Avoid projectile items, such as guns that shoot darts or corks.

*Check toys for any sharp exposed edges, points, nails or screws.

*Examine dolls, stuffed animals or other cuddly toys for rigid interior frames that can poke through the outside coverings.

*Check for loose parts that can become unattached, exposing sharp metals or plastic.

*Avoid toys that shatter or are easily breakable.

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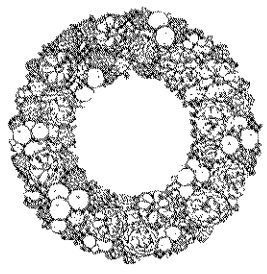
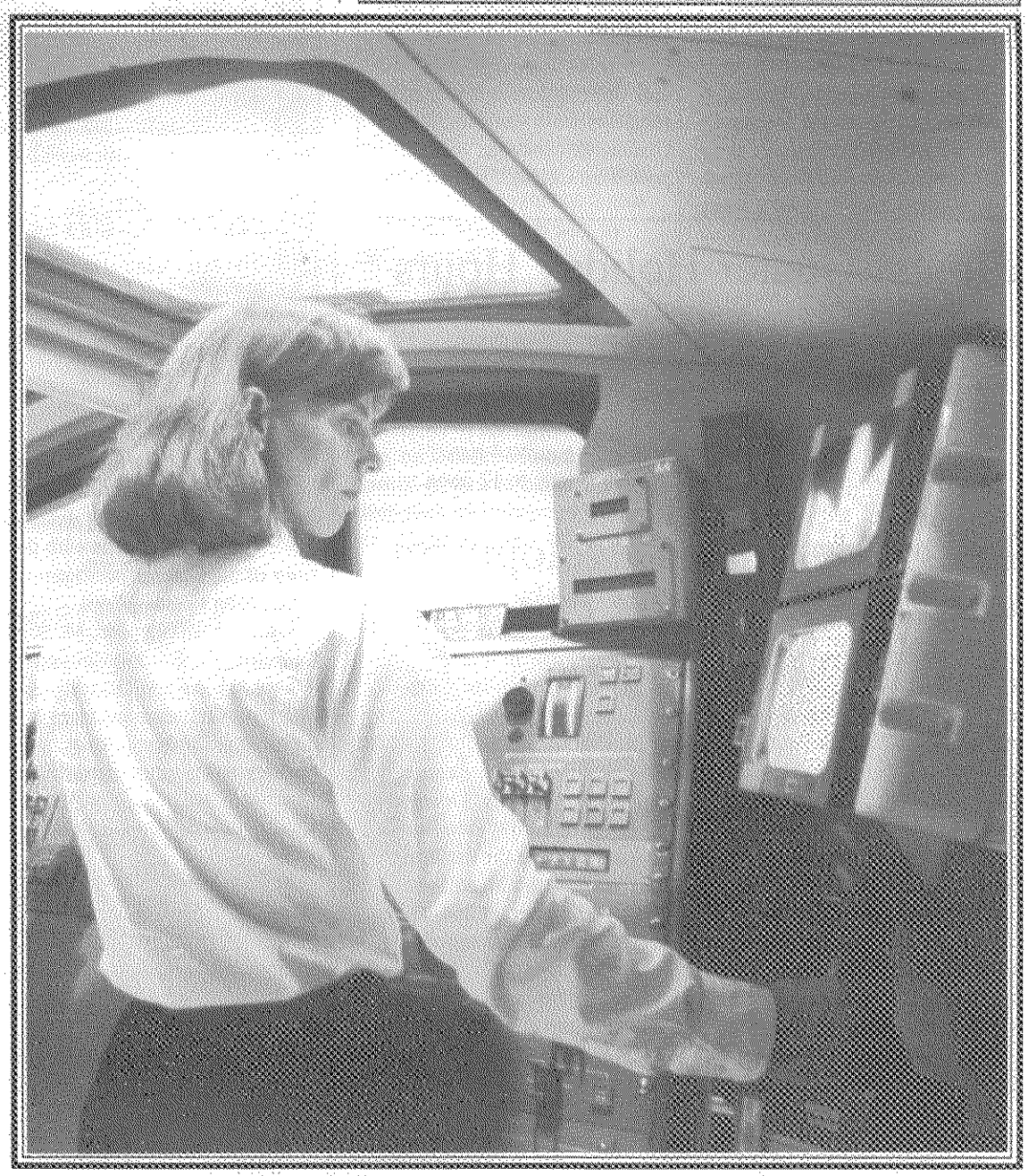
NASA Researcher





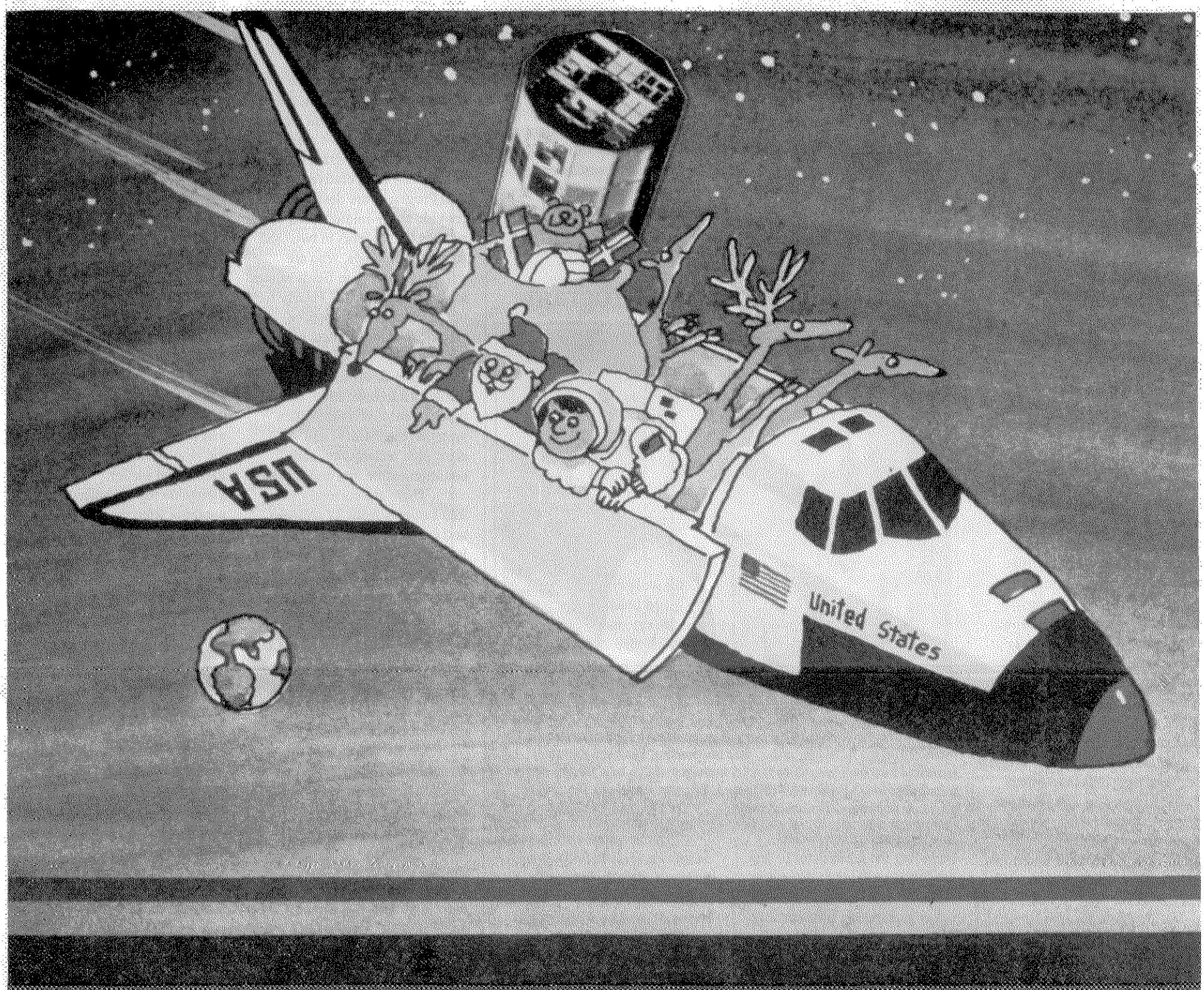
JOHNSON SPACE CENTER, Houston, Texas---Astronaut Bonnie J. Dunbar, STS-32 mission specialist, practices controlling the remote manipulator system (RMS) during a rehearsal of mission duties in the manipulator development facility (MDF). MDF is one of the trainers in the Shuttle mockup and integration laboratory at JSC. One of the primary objectives of STS-32 is the retrieval of the Long Duration Exposure Facility (LDEF) which has been orbiting Earth since April 1984. The final retrieval simulation will be held at JSC next week.

NASA
National Aeronautics and
Space Administration
Langley Research Center

News Researcher

Volume 3, Issue 25 December 15, 1989

Bi-weekly Employee and Contractor Publication



Langley is looking forward to an extraordinary Christmas present---return of the LDEF!. It will be especially joyous for the many Langley folks who have contributed their time and talents over the past 20 years--designers, builders, researchers, operators, all team members. We also express our gratitude to those from Langley and across the agency who will be working during the holidays to make STS-32 and the LDEF retrieval a success.

The holidays are a traditional time of inspiration and optimism; a time when faith, goodwill and hope for peace are manifested throughout the Earth. As Langley moves into a new decade, the world is moving suddenly toward unprecedented international cooperation. Let us hope that the world will be blessed with peace in the 1990s---so that the peoples of the world can join together to explore and expand their knowledge of the universe. In the words of Isaiah, "You shall go out in joy and be led forth in peace; the mountains and the hills before you shall break forth into singing." God bless each of you.

Pete
Richard H. Petersen, Director

Paul
Paul F. Holloway, Deputy Director

Sid
Sidney F. Pauls, Associate Director

News Briefs

HEADQUARTERS, Washington, D.C. --- The third meeting of the U.S./USSR Joint Working Group (JWG) on Solar System Exploration was held November 13-18 in Moscow. The Soviet delegation was headed by the director of the Vernadsky Geochemical Institute of the USSR Academy of Sciences. The U.S. delegation was headed by Samuel W. Keller, NASA associate deputy administrator. During the meeting, specialists of both sides noted that at the present time the continued exploration of the planet Mars is of primary interest. To increase the scientific return of these and other planetary missions, they agreed to coordinate scientific programs and studies planned in the Soviet Union and the U.S.

AMES RESEARCH CENTER, Mountainview, Calif. --- A DC-8 aircraft from NASA Ames conducted airborne research over the Pacific Ocean to support development of a satellite meteorology instrument scheduled for launch in the late 1990s. The GLOBE (Global Backscatter Experiment) survey flight measured the number and size distribution of atmospheric particles, called aerosols, over remote areas of the northern and southern hemispheres, especially over the tropics. The Nov. 6-Dec. 1 expedition of NASA, the National Oceanic and Atmospheric Administration (NOAA) and university investigators collected data between California and Japan, penetrating both polar regions. Fourteen flights surveyed areas believed to contain the lowest average global aerosol counts overall during periods of maximum and minimum dust concentration.

NASA Implements Drug Free Workplace Program

NASA, in support of President Bush's "National Drug Control Strategy," will implement its Drug Free Workplace Program, effective January 5, 1990.

The program places a strong emphasis on education, training and assistance through the NASA Employee Assistance Program. A limited number of employees will be subject to random drug testing as a means of ensuring a continuing drug-free workplace environment.

Under NASA's program, each employee who is an illegal drug user has the opportunity to voluntarily identify himself/herself and to receive counseling and rehabilitation.

An employee will not be disciplined for illegal drug use if the employee voluntarily requests help before he/she is found to be using illegal drugs by other means, such as random testing; successfully completes counseling or rehabilitation; and thereafter, refrains from use of illegal drugs.

Those employees subject to random testing occupy "sensitive" positions as defined in the NASA program and determined by agency management.

Included among NASA's sensitive positions are: senior-level management officials, including the administrator and his deputy; all center directors; flight-related personnel, such as astronauts, pilots, mission and payload specialists, flight controllers, test directors and other scientific, engineering and support personnel involved in the execution of manned and unmanned flight-related activities.

The program also includes, under certain situations, drug testing if there is reasonable suspicion of illegal drug use or an accident or unsafe practice. All drug testing will be conducted in accordance with the mandatory guidelines for Federal workplace drug testing programs issued by the Department of Health and Human Services.

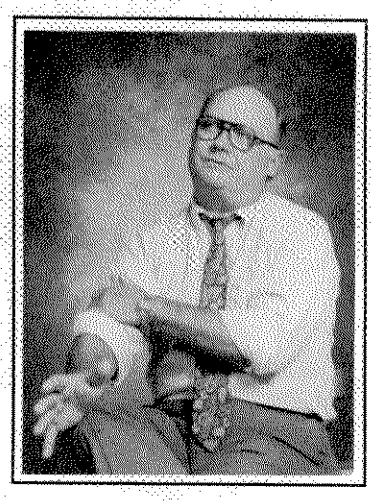
-photo by Carol Petrachenko

Center Director Richard H. Petersen is the first to sign an acknowledgement of receipt following notice that his position has been carefully reviewed and determined by NASA management to be a testing designated position. Also present is Peter J. Edgette, Langley's Drug-Free Workplace Program coordinator

Editorials

Langley

Headquarters Forum



As I studied a new co-op recruiting brochure recently, I was impressed by the quality of the brochure and also by the diversity of the co-op program itself.

Langley's experience with co-op programs dates back to 1952 when we hired our first co-op students. We have maintained a strong program ever since. The Cooperative Education Programs are designed to provide study-related work experiences for students in two- and four-year colleges, who are pursuing degrees in fields related to Langley research. Nearly half of the co-ops are aerospace, electrical or mechanical engineering majors; the other half are studying in fields such as business administration; computer science; physics; office systems, mechanical and electronic technology; and communication arts and design.

There are currently over 225 students from 27 colleges and universities earning and learning at Langley. This dynamic approach to education combines classroom learning with meaningful on-the-job training. Students who participate in co-op experiences graduate with a substantial amount of work experience in addition to a degree--a valuable plus in the job market.

On the flip side of the arrangement, co-op programs are an excellent recruiting tool for the Center. Upon their graduation, Langley generally hires about 88 percent of the total co-ops who work/study here. The co-op student has a feel for the working world and is ready to be an immediate asset to the organization.

What makes the co-op programs here at Langley unique is that the students themselves are the biggest promoters of the program. And Center personnel have been intuitive enough to allow the co-ops to market Langley to other students. Let me give you just one example.

Led by computer science co-op Tim Weatherford, a group of 30 students scripted, designed and provided photographs for the new recruiting brochure I mentioned earlier. "We work alongside top scientists; it's amazing what they let us do here," said Weatherford, a student from the University of Kentucky. "In the brochure, we tried to convey the valuable opportunity afforded co-ops by NASA Langley." The 20-page pamphlet, which will be available soon, is the product of six weeks of intense work. These co-ops saved the Center about $20,000 in addition to producing a quality recruiting campaign tool.

I applaud the efforts of all of Langley's co-op students and the staff of the Training and Education Section who work so closely with them. Our cooperative education programs are an integral part of the Center's culture and an important contribution to our accomplishments.

Sidney F. Pauls
Associate Director

Lankley

"Alright, that's it! You give our son back his toys and go play with your new ties!"

Scholarship Fund Supports Educational Ambitions of NASA Dependents

As the end of the calendar year draws near and many of you are looking at possible organizations to receive year-end donations, please consider the NASA Scholarship Fund, Inc.,

The NASA Scholarship Fund, a non-profit corporation, is established to award scholarships to qualified dependents of current and former NASA employees. The Fund has been in operation since 1982; at present, there are about six scholarships in place. Last year, 72 applications were received for three available scholarships. One of the recipients, Michael Fripp, is the son of a NASA Langley employee.

Your contributions are tax deductible and may be sent to the NASA College Scholarship Fund, Inc., Code AH12, NASA Johnson Space Center, Houston, Texas, 77058.

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Edith Watts, Mail Stop 146, ext. 43293.

89-177.....Global Experiment Measures Wind Velocity, Direction
89-178.....U.S./USSR Solar System Joint Working Group Met in Moscow
89-179.....NASA Announces Implementation of Drug Free Workplace Program

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia, 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Address contributions to the Editor, Mail Stop 115, telephone 864-6126. Articles are due at noon on the Tuesday following the date of this issue.

Managing Editor . . . . . Jean Drummond Clough

Editor . . . . . Marny S. Skora

Photographs . . . . . Photo Lab

The privilege of advertising articles in this publication is restricted to the staff and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Syncom Deploy and LDEF Retrieval Highlight Ten Day Columbia Mission

Highlights of Space Shuttle mission STS-32, the 33rd flight of the National Space Transportation System, will be deployment of a Navy synchronous communications satellite (Syncom IV) and retrieval of the Long Duration Exposure Facility (LDEF launched aboard Challenger on mission STS-41C in April 1984.

Syncom IV-F5 is the last in a series of five Navy satellites built by Hughes Communications Services Inc. It is designed to provide worldwide, high-priority communications between aircraft, ships, submarines and land-based stations for the U.S. military services and the Presidential Command Network. Syncom measures 15 feet long and 13 feet in diameter.

After Syncom deployment using the frisbee method, the crew will do a Shuttle separation burn maneuver away from the satellite. A solid rocket perigee kick motor along with several liquid apogee motor firings will boost the satellite to geosynchronous orbit.

The LDEF, a 12-sided, open-grid structure made of aluminum rings and longerons, is 30 feet long, 14 feet in diameter and weighs 8,000 pounds. Retrieval of the LDEF will be accomplished by the orbiter's remote manipulator system (RMS) arm. Once the rendezvous portion of the mission is completed, Mission Specialist Bonnie Dunbar will grapple the LDEF with the end effector of the RMS and maneuver LDEF into the five support trunnion latches in the payload bay of Columbia.

The LDEF experiments range in research interest from materials to medicine to astrophysics. All required free-flying exposure in space without extensive electrical power, data handling or attitude control systems. Many of the experiments are relatively simple with some being completely passive while in orbit. The structure was designed for reloading and reuse once returned to Earth.

Orbital data on the LDEF is provided to NASA by the North American Aerospace Defense Command (NORAD). Intensive C-band radar tracking will begin approximately 72 hours before launch to provide the accurate data required for orbiter and LDEF rendezvous.

In addition to Syncom IV-- and later LDEF- the payload bay of Columbia will carry the Interim Operational Contamination Monitor (IOCM). This is an automatic operation system for the measurement of contamination that may be present in the payload bay for the entire mission duration. It is designed to provide continuous measurement for collected particulate and molecular mass at preprogrammed collection surface temperatures.

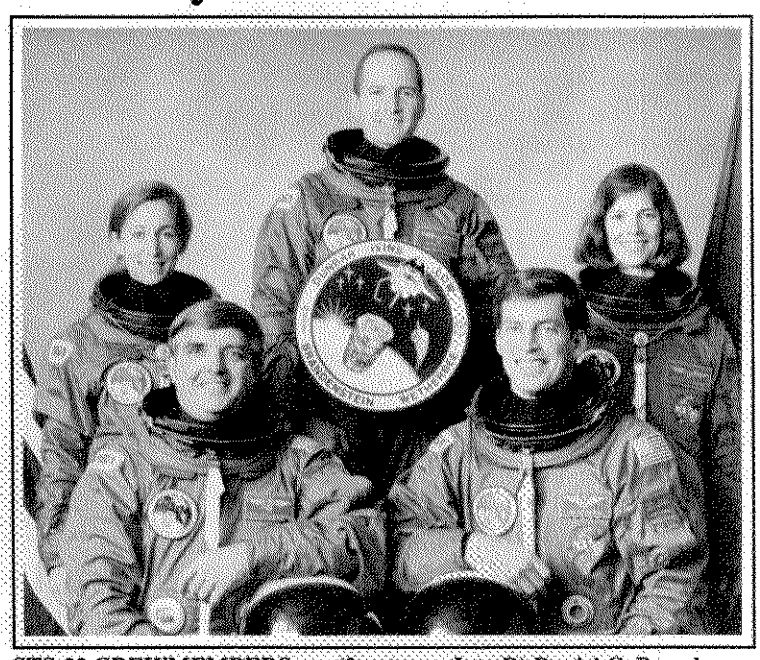
Columbia will also carry several secondary payloads involving material crystal growth, microgravity protein crystal growth, lightning research, in-flight cardiovascular changes and effects of microgravity and light on the cellular processes that determine circadian rhythms and metabolic rates.

As of Researcher News press time, liftoff of the ninth flight of Columbia is scheduled for 7:30 p.m. EST December 18, from Kennedy Space Center launch pad 39-A, into a 190-nautical mile, 28.5 degree orbit.

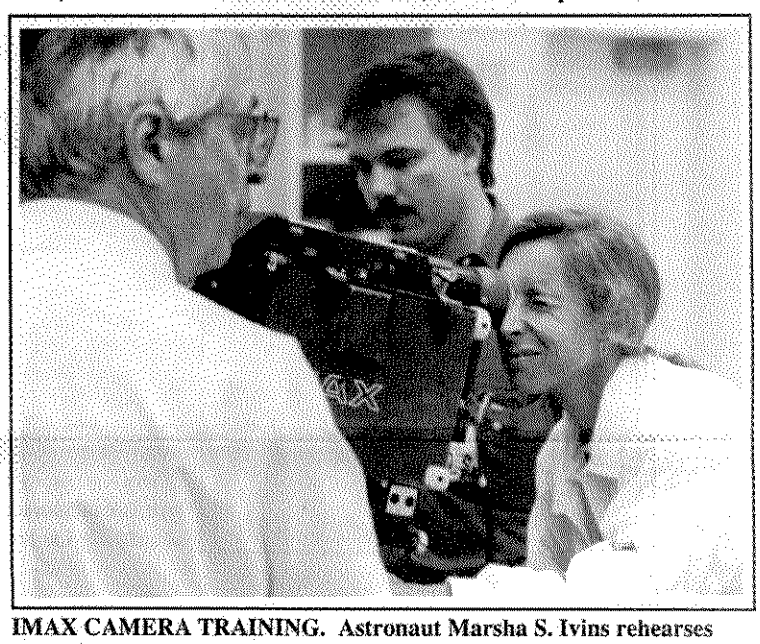
A final decision on launch time will be made approximately 12 hours prior to launch. The decision will be based on the latest tracking data for the LDEF and allow for appropriate adjustment of orbiter in-flight computers.

The launch window for this mission is dictated by vehicle performance, real-time LDEF rendezvous data and the reentry track of the external tank.

Landing is now planned for 5:04 p.m. December 28.



STS-32 CREWMEMBERS are (front row, L to R) Daniel C. Brandenstein, commander, and James D. Wetherbee, pilot; (back row) Marsha S. Ivins, G. David Low and Bonnie Dunbar, all mission specialists.



IMAX CAMERA TRAINING. Astronaut Marsha S. Ivins rehearses operating the IMAX camera during a training session in the Shuttle mockup and integration laboratory at the Johnson Space Center. Looking on are (L to R) Graeme Ferguson and James Neehouse of IMAX.

SILTS and SEADS to Soar Again on STS-32

-by Allan C. Hanrahan

STS-32 will be the third flight of the Shuttle Infrared Leeside Temperature Sensing (SILTS) and the Shuttle Entry Air Data System (SEADS) experiments, both developed by the Langley Research Center as parts of the agency's Orbiter Experiments (OEX) program.

The OEX program has as its objective using the Shuttle orbiters as atmospheric entry research vehicles. Each OEX experiment has been designed to gain information without interfering with the prime mission of a given Shuttle flight. OEX experiments do not ride in the Shuttle payload bay; they are placed within the orbiter structure wherever sensors are needed for data collection.

SILTS and SEADS are integral parts of the structure of the orbiter Columbia. They were previously flown on STS-61C and STS-28.

Results from this third flight of the SILTS experiment will provide additional data to be used in advancing the technology for predicting thermal protection requirements for the upper surfaces of advanced entry vehicles. Each pound of superfluous thermal protection eliminated equals another pound of payload for the same launch cost.

The data, collected under flight conditions which cannot be duplicated in ground-based facilities, are obtained by an infrared camera (radiometer) located in a pod at the tip of the vertical tail of the orbiter, and consist of high-resolution infrared imagery of the upper (leeward) left wing surface. The imagery can be related to surface temperatures. The camera output data is recorded on an onboard tape recorder and processed (i.e. reduced and analyzed) after the flight to produce detailed thermal maps of the leeside surface temperatures. These temperatures indicate the magnitude and distribution of aerodynamic heating experienced by the leeside surfaces in flight.

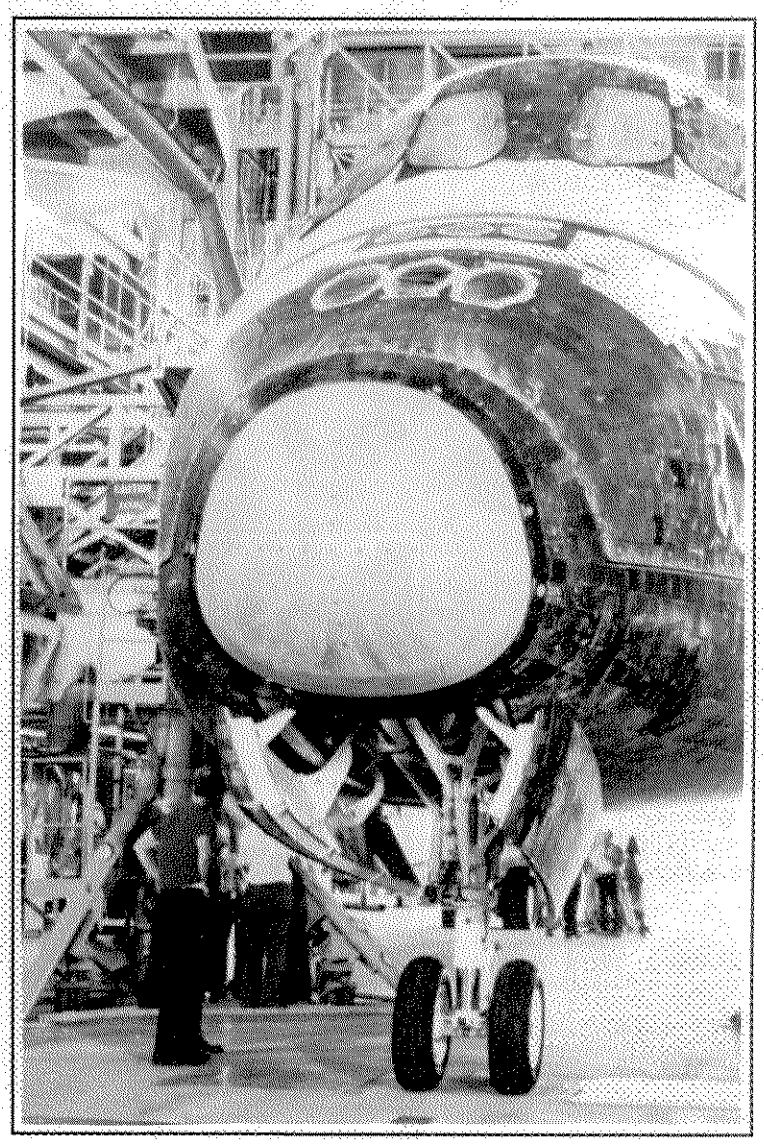
The principal technologists for SILTS are David A. Throckmorton and E. Vincent Zoby of Langley's Space Systems Division. According to Throckmorton from the SILTS data "we will be able to gain improved confidence and understanding in predicting the environment in which the orbiter operates. We improve the understanding of the requirement by confirming the environment. STS-32 will collect more of the same data that we got on STS-28," he continued. "We are expanding the data base. After this flight, we'll change the configuration and look at the leeside of the fuselage, instead of the (left) wing."

Paul M. Siemers III of Langley's Space Systems Division and principal technologist for SEADS reports, "We are going back up for more of the same. This will be the third of six flights. The reason for six flights is to assure the statistical data base required to demonstrate the capabilities of the SEADS flush orifice air data concept and to provide the research quality air data required in support of the OEX program."

SEADS is housed in the the orbiter's nosecap, and incorportes 14 penetration assemblies distributed about its surface, each containing a small port through which local surface air pressure is measured during entry.

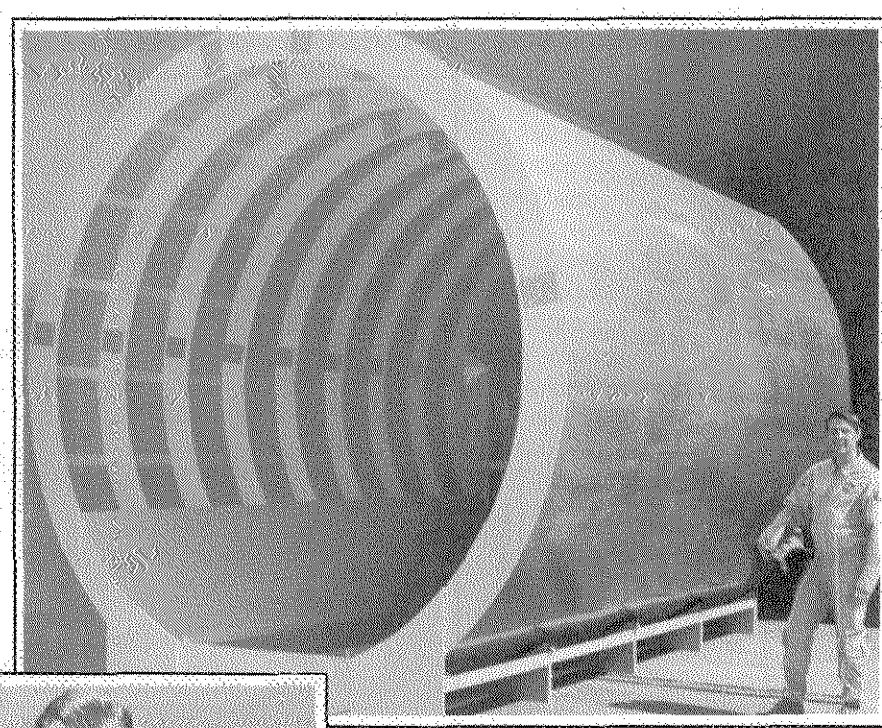
Measurement of the distribution of air pressure about the nosecap allows precise post-flight determination of air data: angle of attack, angle of sideslip and freestream dynamic pressure versus time.

Accurate knowledge of these factors, coupled with vehicle motion information (measured by a separate experiment), are required to determine orbiter aerodynamic flight characteristics. SEADS provides accurate data from an altitude of about 90 kilometers (56 miles) through landing.



PRE-FLIGHT VIEW OF SEADS. This view of the orbiter Columbia shows SEADS 14 penetration assemblies on the nosecap.

At Long Last, LDEF is (



Apollo astronaut Donn Eisele is dwarfed by the mockup of the original concept for a module that would occupy the cargo bay of the Space Shuttle and gather information about the environment of near-Earth space---a cylindrical meteoroid and exposure facility.

Marvin Finch, technician in the Metals Development Technology Section, displays an early model of the simple, essentially passive and relatively inexpensive meteoroid and exposure module that eventually evolved into the LDEF.

The Long Duration Exposure Facility (LDEF) Program evolved fron the most modest of beginnings, says Robert L. O'Neal, Langley retiree and former LDEF Project Manager. Proposed by LaRC scientists in 1970, LDEF was initially a simple, essentially passive, and relatively inexpensiv meteroid and exposure module.

When LDEF is retrieved by the Shuttle Columbia on STS-32, now scheduled for launch December 18, it will return unprecedented data that will be invaluable in the design of future spacecraft, such as Space Station Freedom. Having remained in space for five and a half years, its value has been substantially enhanced; in fact, LDEF contains five times the benefits in science and technology experimentation data than originally envisioned.

The original concept called for the design and construction of a module that would occupy the available volume of the Shuttle cargo bay, would be deployed into space by the Shuttle, left for six to nine months in orbit, be recovered by the Shuttle and returned to Earth for visual examination on the ground.

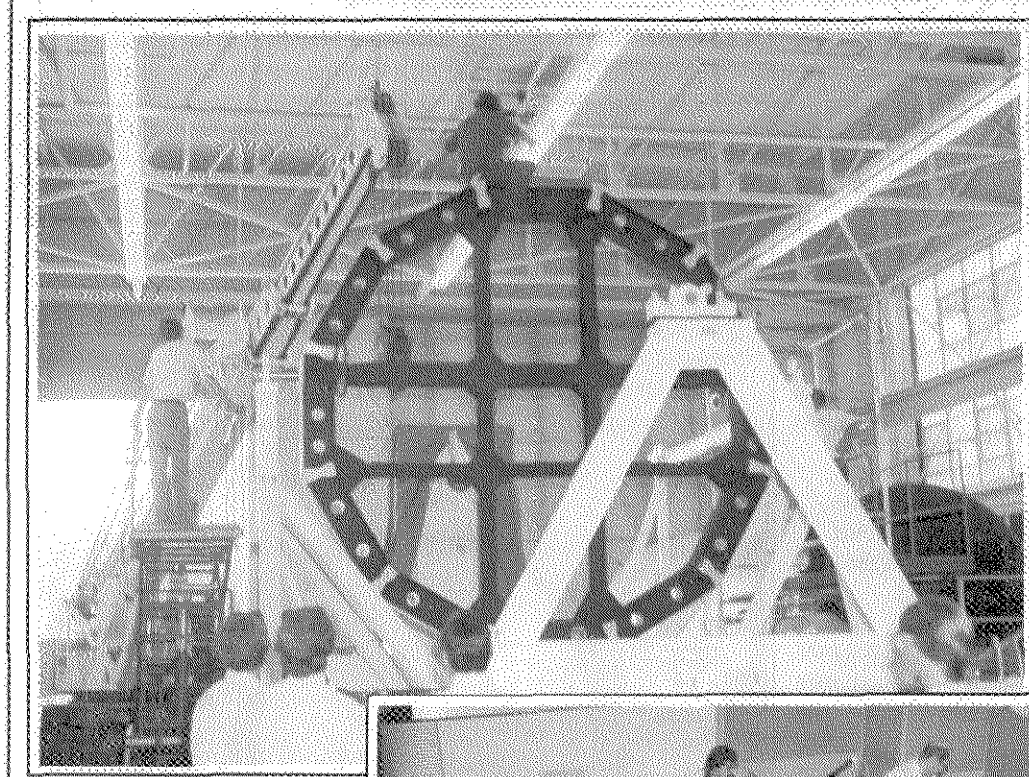
Langley's initial design was a cylindrical facility capable of providin meteoroid penetration and damage data on thick skin, thin skin and bumpe configurations, as well as information regarding meteoroid composition. The facility would investigate the near-Earth space environment and collec valuable scientific and technological data on the effects of this environmen on spacecraft materials and systems.

"The original exposure module was intended to measure the Shuttle-induced environments which payloads would experience during launch, while in orbit, and during reentry," said O'Neal. "It was intended to fly on the first Shuttle mission and be retrieved on the second. Much has transpired since those early days."

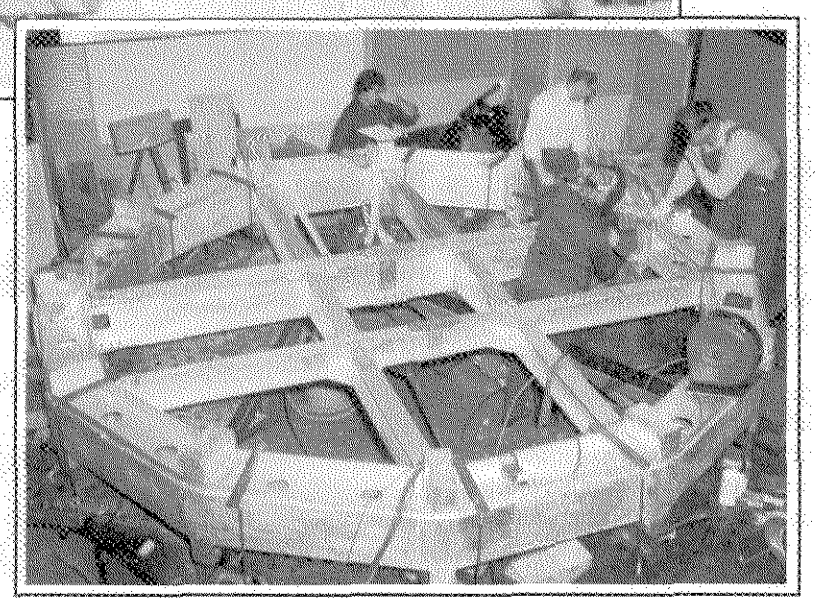
The Shuttle's ability to retrieve objects from space provided the key for the meteoroid and exposure module (MEM) concept. However, early i the study it was recognized that the benefits of the MEM concept were not limited to meteoroid experiments. Individual sections of the module could carry long duration exposure experiments, such as thermal coatings, optica surfaces, solar cells and other samples of interest. The MEM thus became LDEF and experiment opportunities were announced to researchers in all science and technology disciplines.

In 1974, when the LDEF Project was approved, 80 percent of the tra were intended to be meteoroid experiments. However, because of the demands for experiments in other disciplines, the meteoroid experiments soo occupied less that 20 percent of the trays. Then it became obvious that a meteoroid or any man-made debris striking the facility itself or any experiment tray would provide valuable data to the meteoroid investigation. In fact, it was agreed that the meteoroid investigators would search the recovered facility for craters before any experiment would be removed.

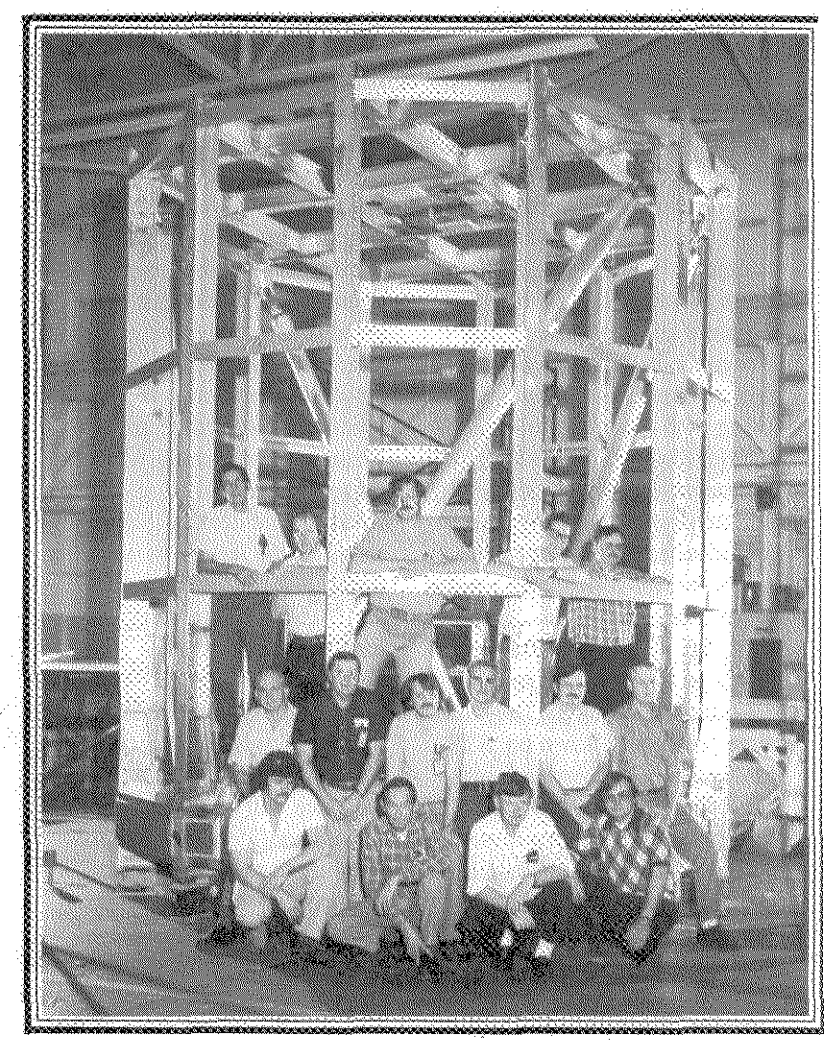
Although LDEF was not aboard, the launch of STS-1 on April 12, 1981, was viewed with special interest by the LDEF team who saw the



The center ring clearly shows the evolution from the rounded cylindrical form of early concepts to the 12-sided cylinder. The structure--30 feet long, 14 feet in diameter and weighing 8,000 pounds--was designed, fabricated and built at Langley.



The center ring frame is the heart of the LDEF. This critical portion of the structure involved especially complicated construction since it required welding of all joining surfaces.



LDEF was constructed in two sections. Each was built up from the center ring

Machine shop employees who worked on the initial build up of LDEF are (top row, L to R) Victor Wilson, Don Beasley, Gene Bowen, Luther Richardson, Roger Amick; (middle row) John Kenney, Al Shearin, Bruce McLemore, Wayne Barfoot, Mike Tall, Bobby Davis; (front row) Bruce Adderholdt, Sam Pollard, Linwood Burcher and Joe Davenport.

m a modest beginning . . .

ming Home!

mission as evidence that the Shuttle was, indeed, a reusable vehicle that could make routine access to and from space a reality. The success of the first Shuttle flight brought with it optimism for the LDEF Project, its launch on STS-41C and a projected flight readiness date of January 1, 1984.

"It was time to move out of the holding mode and start back to work on dormant LDEF activities," noted O'Neal. A number of experimenters desired to make changes in their experiments--to replace material and test specimens prepared several years before with newer, more advanced materials. However, only those experiments that needed to be reworked because of the delay in launch would be altered.

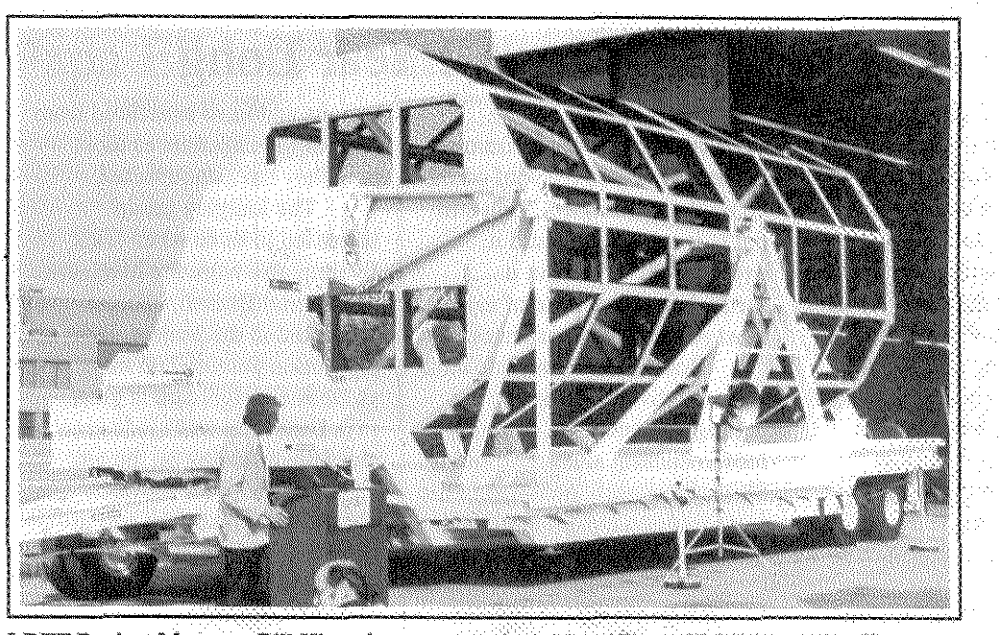
From concept to reality, LDEF had evolved from a round cylinder into the 12-sided cylindrical structure that has spent over five years in space. It is 30 feet long, 14 feet in diameter, and weighs 8,000 pounds. The spacecraft carries 86 trays in which 57 self-contained experiments are housed.

The Space Shuttle Challenger and its crew of five were launched from Kennedy Space Center on the morning of April 6, 1984. After a day of unpacking and checking out systems, the STS-41C crew deployed LDEF on the morning of the mission's second day.

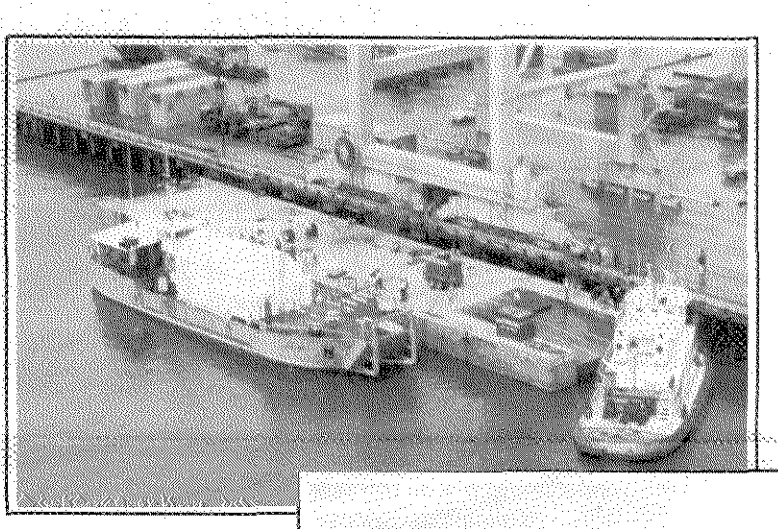
Placing LDEF in orbit was a relatively simple operation. Astronaut Terry J. Hart used the manipulator arm to latch onto a grapple fixture protruding from LDEF's side as it lay in the cargo bay. This activiated the experiments equipped with self-contained power supplies. Hart then attached the arm to a second grapple fixture, removed LDEF from the cargo bay, placed the spacecraft in its proper orientation and released it into Earth orbit.

The Space Shuttle Columbia with its crew of five is scheduled to retrieve LDEF during the STS-32 mission. This time astronaut Bonnie Dunbar will operate the manipulator arm to retrieve LDEF while astronaut Marsha Ivins photographs the LDEF during retrieval operations. Once the arm grasps LDEF, the crew will make the first set of observations after the facility's long stay in orbit by photographing and visually inspecting each experiment tray as the spacecraft is returned to the payload bay. LDEF will remain in the orbiter payload bay until the Shuttle returns to Kennedy Space Center via the ferry flight from its landing site at Edwards Air Force Base, California.

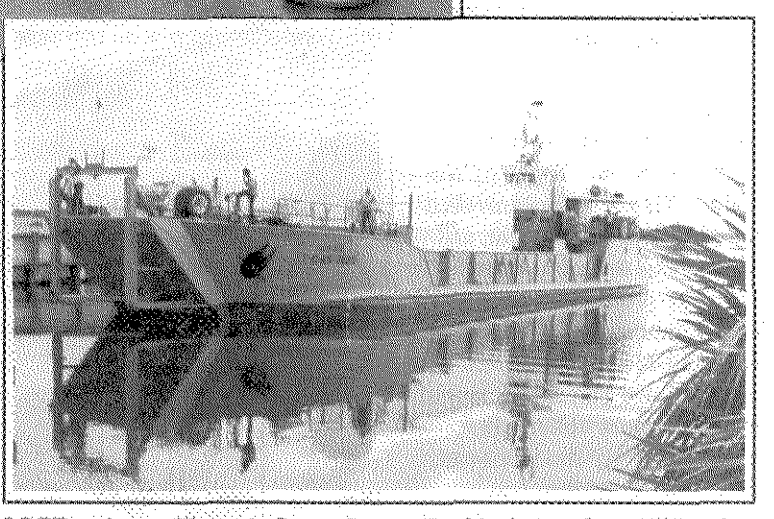
Although a few experiments have suffered some degradation because of their increased exposure to the space environment, the large majority of LDEF experiments have been substantially enhanced. The science experiments hold exciting revelations regarding evolution of the cosmos and biological effects of long-duration space exposure which will impact our knowledge of the human presence in space. LDEF technology experiments will establish a data base for use in designing spacecraft, such as Space Station Freedom. LDEF promises a treasure of information.



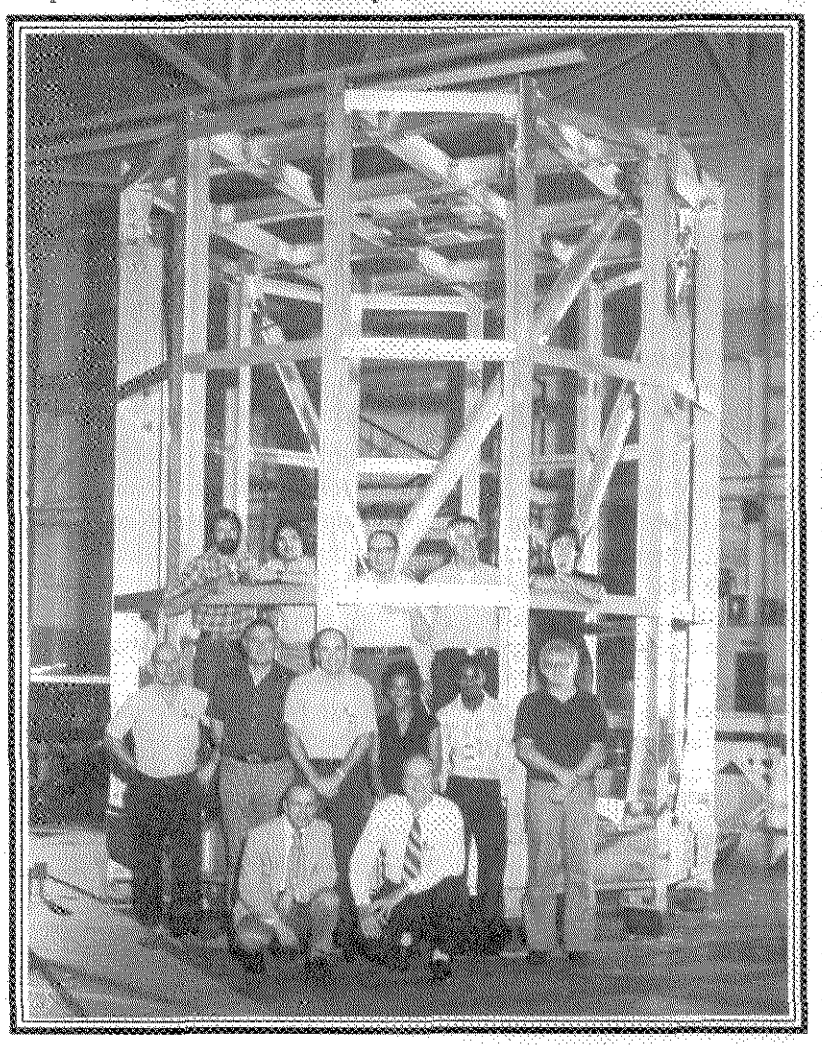
LDEF Project Manager Bill Kinard announces the initial rollout of LDEF in 1978. The completed structure is being moved from the Fab Shop to Building 1250 for installation of experiment trays filled with dummy masses to simulate the weight of the facility. It was then moved to Building 1293 for modal survey testing.



LDEF was transported by barge from the Newport News Marine Terminal to the Kennedy Space Center. Snug inside its special air-conditioned container, LDEF made the nine-day journey down the Intercoastal Waterway.

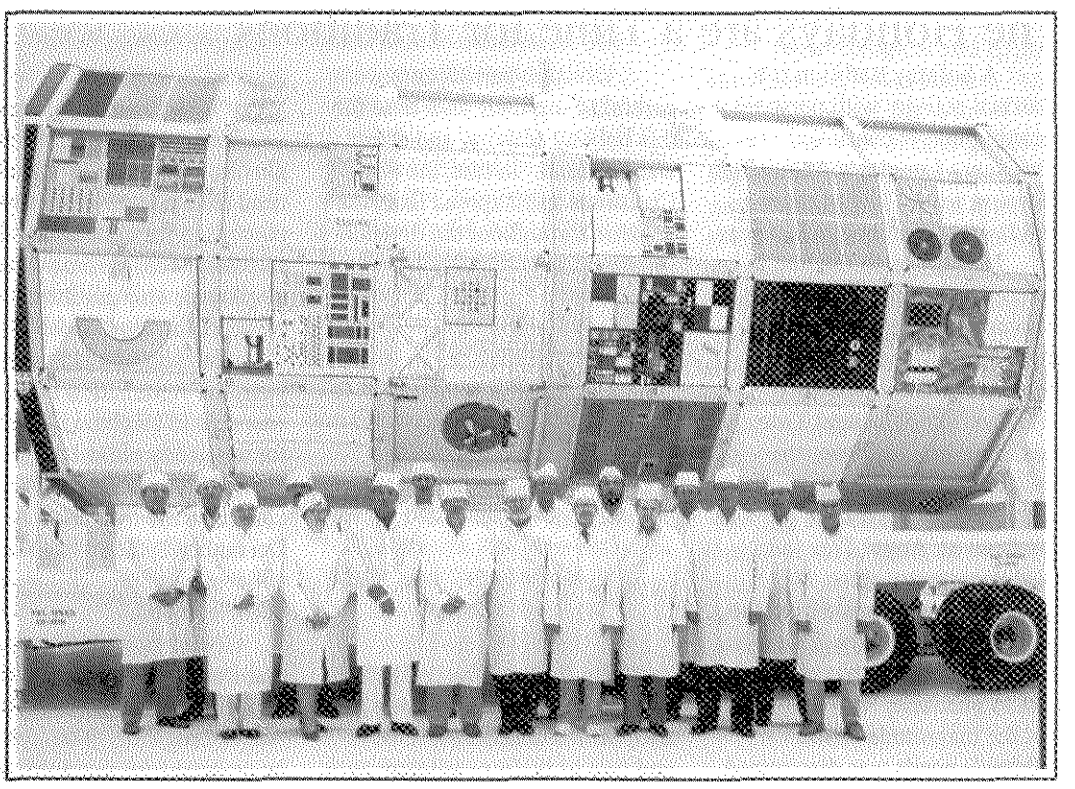


LDEF arrives at Kennedy Space Center, Florida, in late June 1983, to be loaded with the 57 experiments that have been chosen for this first long duration exposure mission.



ıe, custom fitted and drilled in Langley's machine and fabrication shops.

Fab Shop employees who worked on the initial build up of LDEF are (top row, L to R) Gerald Miller, Randy Woolard, John Tribble, Harry Slade, Richard Mason; (middle row) Gene Fullerton, Jack Barbour, Fred Davis, Antoinette Watkins, an unidentified co-op, Ashby Lawson; (front row) Jim Henry and Ellery Vandenbree.



In February 1984, technicians at the Kennedy Space Center pose in front of the LDEF after all of the experiments have been loaded onto the facility. Next step is integration into the payload bay.

Christmas in July

The Holiday Spirit Lingers All Year Long

Would you give up a week of your vacation time to do volunteer work? Would you pay your own way to travel to another state to do this work? Would you be willing to work from 6 a.m. till dark on a blistery hot summer's day when you could be relaxing at the beach?

This is precisely what four Langley employees from the Materials Division did this summer. The four travelled--at their own expense--to Hazleton, Pennsylvania, and helped build a church.

Materials Division chief Dr. Darrel Tenney admits that his leave time is very precious to him. "I had to think long and hard before I agreed to make the trip the first time. That was four years ago. Now I automatically mark that week on my calendar and look forward to it."

Tenney and Buddy Poe, Mechanics of Materials Branch, are fellow parishioners at Steven's Memorial Baptist Church in Newport News. Poe and his daughter and the Tenney family travelled with a group of about 15 to Kimberly, Idaho, in July of 1986. They worked for a week to help residents from this Missouri Trail community renovate their Church.

Exhiliarated by their earlier experience, the following year Tenney, Poe and the Stevens Memorial group joined a program called "Together We Build." This time they travelled to Southbury, Connecticut, and the task was to build a church.

The project was targeted for the summer of 1987. Volunteer groups from other states preceeded the Stevens Memorial group and more volunteers followed them. By summer's end, there was a new church in Southbury.

When the Tenney-Poe contingent arrived the roof had been roughed in but the building was not yet enclosed. The Langley duo assisted in framing in the building so the roof could be built and shingled. "I'm still not sure why I really did it," explains Tenney. "But it certainly has been one of my most rewarding experiences."

Both Tenney and Poe have amassed diverse skills such as putting up sheetrock, shingling a roof, installing aluminum siding. Skills not usually included in the expertise of a NASA engineer, both feel they learned valuable lessons and have benefitted from each of the experiences more than they have contributed.

The Langley group increased to three when Dick Everett, also from the Mechanics of Material Branch, became interested in the project. The promotion potential on this volunteer assignment is great, says Dick who was made crew chief the third day on the job!

Dick and his fourteen-year old daughter made the trip to Litchfield, Connecticut. This time a group of ten from the Peninsula joined over a dozen volunteers from Birmingham, Alabama. At the end of the summer of 1988 that Eastern community had the first new church built in the area in over a hundred years.

The people involved make the work week a real treat. "Everyone is there because they want to be," says Tenney. The volunteers are a mixture of blue collar workers and professionals, and there seems to be a shift in leadership involved. Tenney, Poe and Everett worked alongside doctors, architects, accountants, both men and women. Managers took direction from workers and learned skills from "experts"--those who had mastered the technique the year or the day before! There was work for everyone, no matter what age, strength, or skill level. And they had fun.

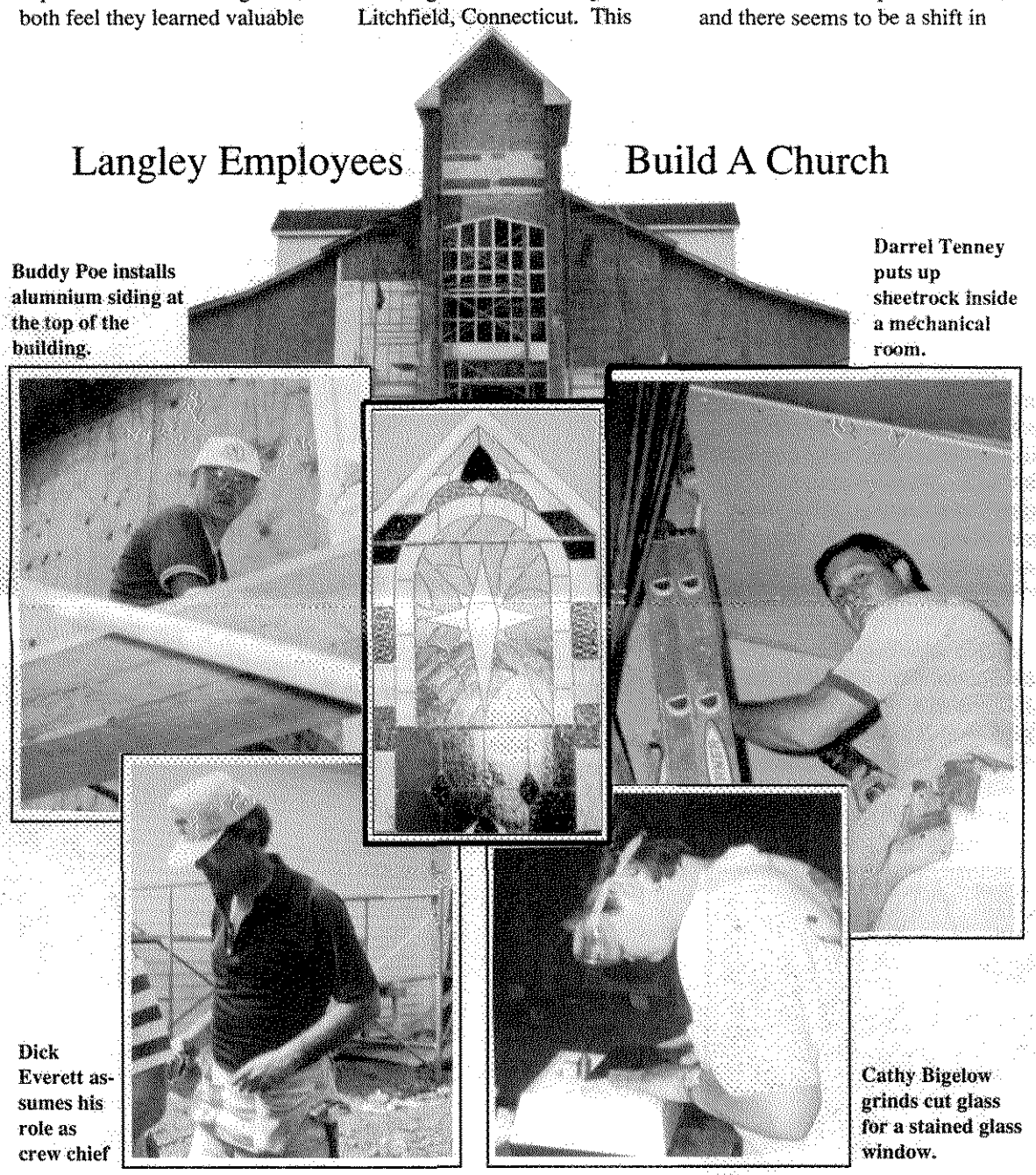
This July 22-29, the Langley trio was joined by a female, also from the Mechanics of Materials Branch . Cathy Bigelow brought her skill in stained glass design and production to the project in Hazleton. Bigelow pursues her stained glass hobby locally but now has four beautiful windows in a church in the mountains of Pennsylvania to her credit.

A typical day begins early. The volunteers are on the job by 6 a.m. and break for breakfast after working for an hour and a half or so. Back on the job, they stop only for lunch and dinner, which they eat on site, and then work into the evening. After dark, they clean up and gather for ice cream and good fun. "There's never any trouble getting to sleep at night," admits Everett.

This experience is a real break from what I do all year long," says Tenney. "I've learned so many skills. It's been a very valuable as well as personally rewarding experience."

The Crusade Baptist Church in Hazleton was constructed by over 500 volunteers over a four month period. The volunteers--men and women, young and old, skilled and unskilled, of various creeds--can be proud of their efforts to do something of significance for someone else. "The work was physically difficult," says Buddy Poe, "but infinitely satisfying."

Langley Employees Build A Church



Buddy Poe installs alumnium siding at the top of the building.

Darrel Tenney puts up sheetrock inside a mechanical room.

Dick Everett assumes his role as crew chief

Cathy Bigelow grinds cut glass for a stained glass window.

The Holidays are a Time for Traditions *-by Stanley W. Ward*

A holiday tradition is a seasonal activity with personal meaning that is continued year after year. Langley's Acquisition Division would like to share a holiday tradition begun last year.

In addition to the tree in the conference room, the door decorating contest and the annual Christmas party, the members of the Acquisition Division "adopt" Angel Tree kids. Initiated last year, the division started conservatively by taking tags for a little girl and boy from an Angel Tree in a local department store.

A representative from the division contacted the Salvation Army to find out what types of gifts to purchase. It was then that the magnitude of the children's needs was discovered. The kids didn't even have warm clothes for playing outdoors!

Division participants were careful to use their own time for this holiday activity, and effort was minimal. In fact, the Christmas spirit spread like wildfire throughout the division.

By the time the last gifts were purchased, the division had adopted ten children, five boys and five girls, from toddlers to teens. When the last check was received, the division had donated over $400.

With the funds, jeans, a sweatshirt, underwear, socks, gloves, wool hat, any special need (like a coat) and a toy was purchased for each child. In addition to cash, some division employees also purchased presents for "our" kids.

In spite of a late start last year, the Acquisition Division was able to brighten Christmas for ten needy children.

This year Acquisition continues the tradition. As of December 1, $160 has been collected and four children have been "adopted."

Next year, the Acquisition plans to challenge each division on Center to adopt their own Angel Tree kids. You, too, will be amazed how this spirit of sharing and caring enhances your holiday season.

VLM Presents 'Star of Wonder'

Since 1966, the planetarium of the Virginia Living Museum (VLM) in Newport News has presented a program each December on the possible astronomical phenomena that might have been the Christmas star, the star of the Magi. "Star of Wonder" has become a popular tradition with Hampton Roads residents over the years. But this year, for the first time ever, people all across the country will have the opportunity to enjoy the show.

The museum's director of astronomy, Jon Bell, has created a new "look" for the show by upgrading the soundtrack and visuals. Star of Wonder will be shown in planetariums across the country.

The new "Star of Wonder" features soundtrack by Barry Hayes, a Newport News native who currently produces soundtracks for the Science Museum of Virginia. Also featured are the voices of radio personalities Gigi Young (WNOR-FM) and Dwight Davis (WHRO-FM). The artistic staff of the Bishop Planetarium in Bradenton, Florida, produced the images to accompany the show.

"Star of Wonder" will run through January 7. Children under the age of four are not admitted. Showtimes are Monday through Friday at 3:30 p.m., Saturday and Sunday at 1:30, 2:30 and 3:30 p.m.; and also Thursday evenings at 7:30 p.m.

The planetarium and the museum will be closed on Christmas Eve Day, Christmas Day, and New Year's Day. Telescopic observations follow all shows, weather permitting.

People & Places

Visitor Center Extends Hours for Shuttle Coverage

The NASA Langley Visitor Center will feature live coverage of STS-32, Space Shuttle Columbia's retrieval of Langley's Long Duration Exposure Facility (LDEF).

The Visitor Center will reopen at 6 p.m. on December 18 for Columbia's launch, now scheduled for approximately 7:30 p.m.

On December 21, the Visitor Center will remain open for LDEF's complete capture and retrieval process. The process will conclude with the berthing of the spacecraft and is scheduled to be completed at approximately 1:15 a.m., December 22.

On December 28, the Visitor Center will remain open for Columbia's landing, now scheduled for approximately 5 p.m. If the mission is delayed, the Visitor Center will adjust its schedule to provide live coverage.

The latest information regarding STS-32 will be available via telephone. Dial extension 42111 or 864-2111 for complete and up-to-date Shuttle information as it becomes available from the Kennedy Space Center.

Ames Celebrates Golden Anniversary

1989 marks 50 years of major advances in U.S. space and aeronautics at NASA's Ames Research Center, Moffet Field, California.

Ground-breaking for Ames, the second-founded NASA center, took place on December 20, 1939.

With World War II looming, the country needed a second aeronautical research center. The California site, 45 miles south of San Franscisco "with good flying weather all year," was selected.

Since that time, Ames has grown to around 5,000 employees, with over 944 acres at two locations, and facilities worth a replacement value of $3 billion, including the 80- by 120-foot wind tunnel, the world's largest, and the Numerical Aerodynamic Simulator supercomputer system, slated to reach a trillion computations per second by the turn of the century.

Congratulations!

Harvey's Names Crew of the Month

Harvey's Janitorial Service, Inc., salutes employee teams who excel on their Facility Evaluation Reports. The award committee convened on November 2 and selected Crew #7 as Crew of the Month for October. They obtained a score of 94.28 out of a possible 95 points on their facility evaluations. They also received a letter of commendation for the efficient manner in which they maintain conference rooms and handle special requests. Crew members are (L to R) Josie Knight, Barbara Herbert, Nina Esquilin and Selina Lynch.

Deadline-Distribution Dates Announced

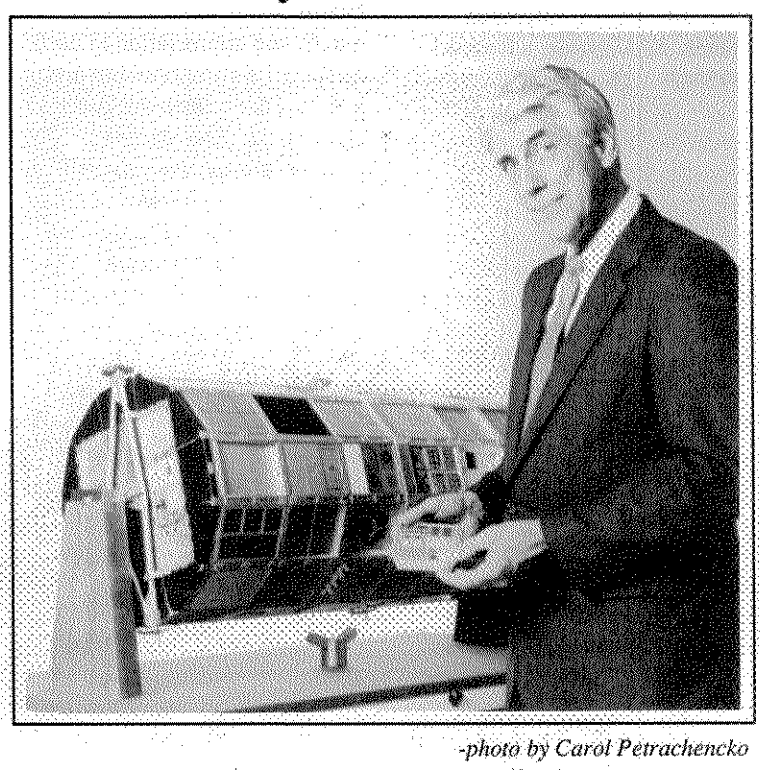
For your convenience, **Reseacher News** deadline and distribution dates for the first half of 1990 are listed below. Please clip and save.

Deadline	Distribution Date
January 2	January 12
January 16	January 26
January 30	February 9
February 13	February 23
February 27	March 9
March 13	March 23
March 27	April 6
April 10	April 20
April 24	May 4
May 8	May 18
May 22	June 1
June 5	June 15
June 19	June 29

Personality Profiles

Papa Elldeff Wants His Baby Back

-by Allan C. Hanrahan



-photo by Carol Petrachencko

"Bill Kinard. Without his push and enthusiasm the thing would never have materialized. More than any other person, he deserves the credit."

--Gene Love, former Director for Space

William H. "Bill" Kinard's last name begins with a syllable that rhymes, appropriately, with "fine." And a fine time it was that this writer had in talking with him, because Kinard is a man with a keen and sometimes self-deprecating sense of humor, a relaxed and patient manner --and a mission.

As former project manager and now chief scientist of the Long Duration Exposure Facility (LDEF), Bill Kinard's professional focus is on a school bus-sized object circling the Earth approximately 185 nautical miles up. LDEF is a veritable treasure trove of information that Kinard wants desperately to see retrieved in the coming days and presented as a Christmas gift to the owners of the 57 experiments on board--and to Langley as well.

". . . the implementation of the LDEF project is the responsibility of the Langley Research Center. Specifically, the Langley Research Center designed and built the LDEF structure; the Langley Research Center provided an overview of the development of all the experiments that are carried on the facility. Langley was responsible then for the integration of the experiments on the facility," said Kinard at a national news conference held in mid-November.

"We (Langley) have supported both JSC and KSC personnel in the preparation of the LDEF with the orbiter for launch, and, of course, are providing support with them now for the retrieval -- both for flight operations and also the KSC operations with it when we get it back.

"Langley is also responsible, then, for the deintegration of the facility, the removal of all the experiments, and we provide an overview on the data analysis, from all the experiments that are on board.

". . . there were 57 experiments that were built for the LDEF; . . . the experiments were mounted in trays. The trays were also built at Langley and shipped to the investigators . . . "

So, in his measured, South Carolina-cum-Tidewater Virginia accent, Bill Kinard spells it out: LDEF is Langley's; Langley is proud of it, and Kinard is proud of Langley.

That figures; Bill has been at the Center for about 34 years. As he tells it, "My career began in PARD (Pilotless Aircraft Research Division) and it sort of evolved over the years."

Born in 1932, Bill Kinard began life in Columbia, South Carolina. Eventually his family settled in the small town of Ninety Six where Bill graduated from high school before going on to Clemson where he earned his B.S. degree in mechanical engineering in 1954. (What Bill didn't reveal, but a coworker did, was that he was awarded an honorary doctorate by Clemson for all that he has accomplished while with NASA. One of his primary accomplishments, obviously, has been the conception and design of LDEF.)

After college, Bill took a job with Allis-Chalmers in Milwaukee, fully intending to someday open a tractor dealership. However, being called up to active duty in the Air Force for two years and being detached to NACA at Langley took him away from the tractor business but put him in the right place at the right time.

"I got out of the Air Force in 1957 and decided to stay here," Bill related. "That was a good time to come here. The space program was beginning and lay ahead, and it was good to see things begin to take off." (President Eisenhower would be signing The National Aeronautics And Space Act of 1958 and NASA would officially begin on October 1, 1958.)

"I've enjoyed it; I've enjoyed my whole career here. I'm not anxious to leave so I see no reason to quit, that is, retire."

Asked about his life sans career, Bill answered that there was his family, of course. "My wife, Rebecca Ann, is a native of Ninety Six. Then there is my son, a junior; my daughter, Kimberly Jane (Holland); and my grandson, Harrison William . . . I have enjoyed doing things with my family and, with that and work, there is not a lot of extra time.'

One of the reasons I've enjoyed it so much in this area is the water; I've been interested in boating. I had a houseboat for about 20 years -- up to three years ago -- and had a good time with that. But I realized one day I was getting too old to scrape barnacles so I bought a travel trailer--decided it was time to see other places. No long trips yet but we've taken a number of short ones."

However, it is doubtful Kinard will be taking any pleasure jaunts soon with LDEF scheduled for retrieval within days of this being read, and returned to KSC for the climax of its long and soon-to-be-celebrated career, although It needs be stated that LDEF's beginning was modest, with limited applications.

Meteorological and Exposure Module," said Kinard, "and then we realized that a lot of people and a lot of data gathering experiments could be coordinated in this; it is useful apparatus to get data . . . to get a broad data base, hopefully, for the whole world to take advantage of. To send it up and bring it back," he continued, "that's really a feature of LDEF. In the old days (of PARD and the research rocket firings at Wallops) you build something and then its gone. You get the data, and that's good, but what you had built doesn't exist anymore. With this (LDEF) you get that structure back and you see for yourself just what happened to it."

Happenings

NEW YEAR'S EVE DANCE. Sunday, December 31, 9 p.m. to 1 a.m., featuring "The Maxx Brothers Band" will be held in the H.J.E. Reid Conference Center. $35/couple, advanced ticket sales. Includes favors, noisemakers, set-ups and buffet breakfast. BYOB. Tickets available at the LAA Office. Call 864-6369.

LAA SOCIAL will be held Friday, January 5, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222

VA CHORAL SOCIETY will celebrate the music of the holiday season Friday, Dec. 17, at First Presbyterian Church in Hampton; Saturday, Dec. 16, at Bruton Parish in Williamsburg; and Monday, Dec. 18, at Trinity Lutheran Church in Newport News. All performances begin at 8 p.m. Admission is free, however, a free will offering will be received. For information, call the VCS at 591-0439.

NEEDED: CAR POOL from Williamsburg, K-Mart area. Call Naga, ext. 41068 or 45498, or 221-0203. If no answer, please leave message.

NEEDED: ROOMMATE. Male to share condo in Newport News. $220/mo plus 1/2 utilities. Call 591-8734 after 4.

Notes of Thanks

Pete Kelly, Clyde Winters, Dale Rodman and **Joe Dixon** write: "Our heartfelt thanks and appreciation to each of you who contributed to and attended our retirement party on October 25. The albums, plaques, photos and gifts will be a pleasant and constant reminder of our careers at Langley. Thanks for the wonderful memories and for your friendship."

Bill DeShazor writes: I want to thank all of my friiends who participated in my retirement party. At the same time, I must apologize for not attending due to a sudden illness. I am told my wife did a superb job as my stand-in. The gifts will be cherished and will bring many great memories.

As I have closed the door on a memorable career with NASA, I have opened the door to retirement, the door of friendships made over the years is the most prized possession I have. Please stay in touch."

FOR RENT: CONDO. Hampton Club, 2BR furnished. Deposit and lease required. $500/mo. Available January 1. Call 868-6427.

Retirement Party

Mary D. Henderson will be honored at a retirement party, Wednesday, December 20, in the private dining room of the Langley cafeteria. Cost for hors d'oeuvres and gift is $8/person. Contributions of $2 for the gift are also welcome. For reservations, call gloria Ragsdale at ext. 46915 or mail check to Mail Stop 441.

Av Week Videos

The following Aviation Week videos are available for loan by contacting Edith Watts, Mail Stop 146, ext. 43293.

- **o Vertical Flight**
- **o Paris Air Show**
- **o To Be An Astronaut**
- **o Red Flag**
- **o SDI: The Technical Challenge**
- **o Farnborough '86**
- **o Test Pilot**

Due to copyright regulations, these videos may not be duplicated but will be loaned on a first come-first served basis.

Tidbits from Training

Technical Co-op and Apprentice Programs are Valued Langley Resources

Each year as the holidays approach, employees at NASA call the Training and Education Section (TES) to find out how they can obtain information for their sons and daughters concerning the Apprentice Program. This year, to aid interested employees, TES has developed a new Technical Co-op brochure and a 21-minute video which explains both the Technical Co-op Program and the Apprentice Program.

Langley Research Center uses the Technical Co-op Program as a feeder for the Apprentice Program. Until recently, children of Langley employees were not permitted to enter the Technical Co-op Program. However, policy changes now permit sons and daughters of NASA employees to apply.

Approximately 40 co-ops are hired in January and begin work the following May. This program requires five semesters of college for completion. NASA pays tuition for four of the five semesters and provides part-time work during the last three semesters.

Upon graduation, these co-ops are given first consideration to enter the Apprentice Program. Co-ops enter as beginning third year apprentices. If you would like more information on these programs or wish to view the video, please contact Fred Thompson, ext. 42588.

Ski NASA

Thursday, January 18	Wintergreen
Thursday, January 25	Bryce Mountain
Thursday, February 1	Massanutten
Thursday, February 8	Wintergreen
Thursday, February 15	Massanutten
Thursday, February 22	Bryce Mountain
Thursday, March 1	Wintergreen

Bus leaves from Newmarket South at 5 a.m. and arrives at ski site at 9 a.m. Ski all day. Depart at 5 p.m.; home by 9 p.m. Cost is $43. For details, call Richard Bennett, 599-5585.

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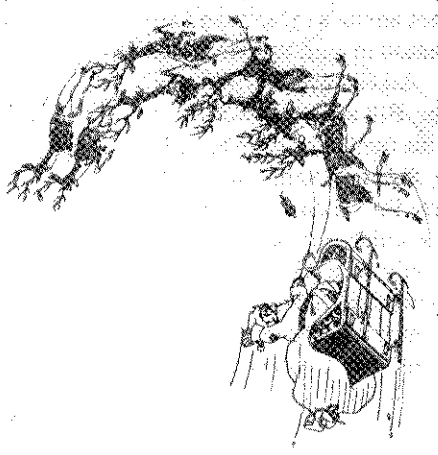

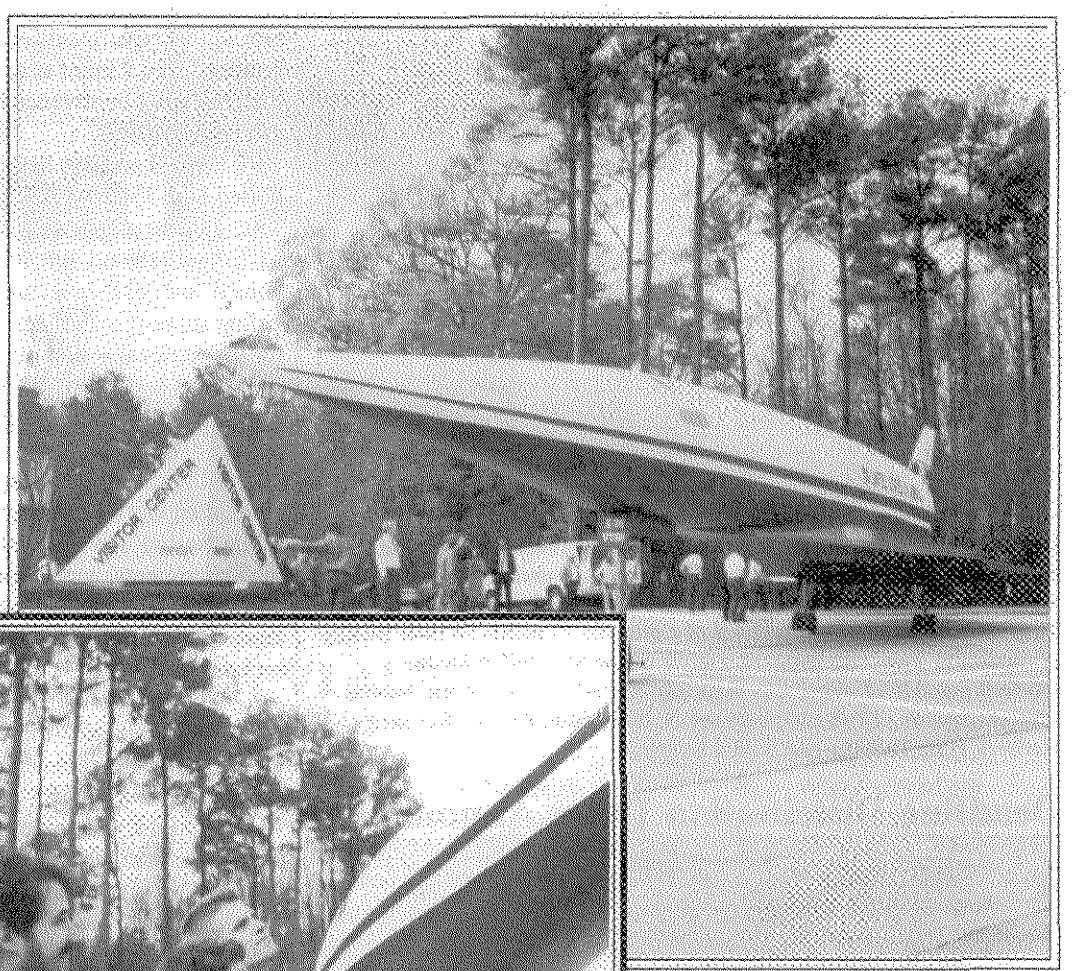

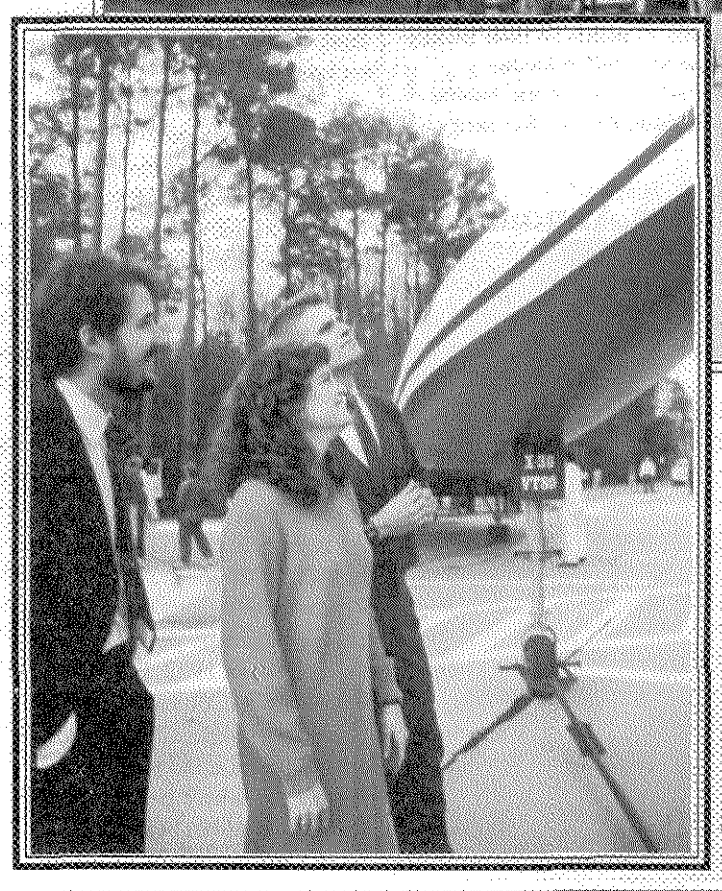

photos by Carol Petrachenko

Aerospace Plane Model Displayed at Visitor Center

An 80-foot mockup of the National Aerospace Plane (NASP), built by Virginia Tech engineering students, is on display at the Visitor Center.

Three Virginia Tech students, on Center for a special presentation of their project, examine the structure while it is being positioned outside the Visitor Center. The NASP scale model will be on display through mid-January.