NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

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Bi-weekly Employee and Contractor Publication

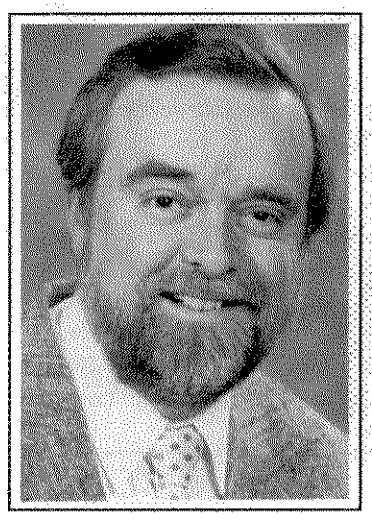
Whipple Named Langley Fab Division Chief

Douglas W. Whipple has been selected chief of the Fabrication Division. He replaces Joseph B. Davenport, Jr.

Effective December 31, 1989, Whipple is responsible for directing technical services to build research tests models, flight support hardware and laboratory test apparatus for Langley engineering and research organizations. He also directs the development of fabrication processes for unique materials and applications. Overall, he applies broad management skills to a work force of over 300 employees which comprises a manufacturing organization of five diverse elements. Technology developed within the division is transferred to U.S. industry.

The models created in the Fabrication Division play a vital role in the research conducted in the more than 40 wind tunnels at Langley. Scale models of advanced aircraft and spacecraft and their full-size component parts must be precisely crafted to demanding specifications to ensure accurate wind tunnel test results. Other models must meet similarly stringent standards for use in free-flying research applications.

Whipple will oversee fabrication and testing of aeronautical and aerospace automated flight control and data acquisition instrumentation for Langley test facilities and for operating research aircraft. Additionally, he is responsible for microelectronic design and fabrication of devices and apparatus for research on advanced airfoils, materials growth, energy conversion and high performance polymers.



Langley Satellites Map '89 Ozone Hole

Observations by NASA scientists at Langley Research Center have provided a more detailed view of this year's springtime loss of ozone over Antarctica. The data show that the 1989 "ozone hole," the area over the South Pole that shows significant ozone depletion, was nearly as deep as the record-setting phenomena in 1987 and that the vertical distribution of ozone loss was also quite similar. That distribution and data from another satellite instrument corroborate current theories of how Polar Stratospheric Clouds (PSCs) are instrumental for the chemical reactions that result in the ozone hole.

Vertical profiles of the Antarctic atmosphere from NASA's Stratospheric Aerosol and Gas Experiment (SAGE II) show that, in 1989, the recurring springtime ozone loss over Antarctica approached but did not surpass the record 1987 levels. Observations by the Stratospheric Aerosol Measurement Experiment II (SAM II) support current theories linking ozone destruction to chemical processing by PSCs.

The importance of ozone depletion stems from the chemical's role in atmospheric chemistry. In the upper atmosphere, ozone reflects a portion of the Sun's ultraviolet radiation, which has been linked to skin cancer in humans. Decreases in ozone allow more radiation to reach the Earth's surface, increasing health risks.

Dr. M. Patrick McCormick, Langley principal investigator for both satellite experiments, coined the term PSCs in a 1982 paper and has investigated stratospheric aerosols and PSCs for the past 11 years using data from the SAM II instrument aboard NIMBUS 7 and vertical profiles of ozone for the past five years from the SAGE II instrument aboard the Earth Radiation Budget Satellite.

McCormick said that in the absence of ozone-loss mechanisms, unperturbed profiles would show peak ozone values of approximately 130 nanobars (nbars) at altitudes near 18 kilometers (11 miles). SAGE II measurements for early October, 1981-1989, show varying ozone losses extending from 12 kilometers to 22 kilometers, altitudes at which PSCs are seen throughout winter. The greatest ozone loss occurred in 1987, when amounts dropped below five nbars at some altitudes (more than a factor of 25 down from normal values at that altitude). This year the loss was nearly as severe, with ozone amounts less than 10 nbars at these altitudes. In contrast, the 1988 ozone profile showed less ozone depletion that either 1989 or 1987, but nonetheless much more than in 1981. Some of the year-to-year variability in ozone depletion is likely driven by meteorological factors that are not well understood, factors which may also modulate PSC abundances.

McCormick said recent Antarctic field studies have shown that PSCs play a crucial role in perturbing the chemistry of the winter polar regions. Chemical reactions on PSC surfaces produce large changes in the amounts of destructive forms of chlorine which can, with the return of sunlight, lead to rapid ozone loss such as that observed during the Antarctic spring. Since the formation of PSCs requires extremely cold temperatures, variations in the stratosphere's temperatures from year to year can influence the number of PSCs present and hence the amount of ozone loss in a given year. *(Continued on page 2.)*

As of Researcher News press time, the launch of the Space Shuttle Columbia is scheduled for no earlier than Monday, Jan. 8.

NASA Combines Exploration and Technology Organizations

NASA Administrator Richard H. Truly has announced that he intends to merge two major agency offices to ensure tight coordination in the creation of plans for human exploration of the solar system and the actual development of new technologies required to accomplish the goal.

The organizations involved are the Office of Aeronautics and Space Technology and the Office of Exploration.

Truly said that the Office of Exploration, under the direction of Dr. Franklin D. Martin, assistant administrator, had successfully completed the preliminary studies of requirements to undertake sustained human exploration of the solar system. Last July 20, President Bush announced that it would be a goal of the United States to establish a permanent human presence on the Moon and use the experience gained there to begin exploration of the planet Mars.

"The time has come now not only to continue our analysis of exploration mission alternatives but also to begin actual pursuit of the innovative and enabling technologies that have been identified as necessary to proceed," Truly said. "These two efforts are closely related and we want them to advance virtually in lock step under a strong central management."

The heads of the two offices--Arnold D. Aldrich, associate administrator for Aeronautics and Space Technology, and Dr. Martin--have been asked to prepare the consolidation plan. The new organization will be headed by Aldrich.

The Office of Exploration was created 2-1/2 years ago on the recommendation of Dr. Sally K. Ride, a physicist and the first American woman to fly in space. Ride had directed a study to help determine the nation's next major goal in space.

The study group recommended that the country undertake one or more of four activities--expanded robotic study of the solar system, considerably stepped-up investigation of Earth processes to better protect the environment, establishment of a scientific outpost on the Moon and human exploration of Mars.

The study recommended that NASA create a "think-tank" office to do the preliminary studies in human exploration. This included identification of new technology required, as well as new space transportation capabilities.

It is anticipated that technology to be developed over the next two decades for solar system exploration will lead to advances in the private economy in artificial intelligence, robotics, telepresence and teleoperation, process automation, low-cost global and orbital transport, optical communication and data processing systems, supercomputers, wireless power transmission, closed-ecology biosphere operation, ultra high-strength, high-temperature and light weight materials and many others.

The development of innovative technology has been a responsibility of the Office of Aeronautics and Space Technology for a number of years. That office already is engaged in cooperative projects with the Department of Defense to develop advanced Earth-to-orbit transportation systems. One is the National Aero-Space Plane, which will take off from a runway, fly to orbit and land like a conventional plane.

Truly emphasized that the merger of the two offices would not diminish the agency's strong devotion to aeronautical research. "NASA has evolved from the nation's original aeronautical research organization, the National Advisory Committee of Aeronautics, and has worked on the cutting edge of aeronautics since its inception," he said. "Perhaps nothing we have done has benefitted the country economically as much as this research. Because of it, the U.S. aerospace industry has been able to maintain an unqualified lead in world markets."

During the merger process, particular attention will be paid to the institutional aspects of the new organization to ensure that it will have the personnel, equipment and facilities needed to carry out its new missions successfully, Truly said.

"The Office of Exploration has done a superlative job in helping the nation prepare to move into the next century in space," Truly said. "Now it is time to merge this first rate creative organization into the technology development mainstream. This move coincides exactly with the onset of the next phase of the solar system exploration effort which emphasizes technology development."

"Later, in the 1990s, Space Station Freedom will be in place and functioning and our technology programs will be well down the road," said Truly.

AMES RESEARCH CENTER, Mountain View, Calif. --- NASA Administrator Richard H. Truly has named Dale L. Compton director of Ames Research Center. Compton's appointment became effective December 20, the 50th anniversary of the center's groundbreaking. Compton, who succeeds William F. Ballhaus, has been acting director since Ballhaus' resignation July 15.

HEADQUARTERS, Washington, D.C. --- NASA has announced the selection of four additional universities and consortia as Designated Space Grant Colleges/Consortia in the National Space Grant College and Fellowship Program, bringing the total to 21. The four newly designated universities and consortia are University of Hawaii at Manoa, Iowa Space Grant College Consortium, New Mexico Space Grant Consortium and Tennessee Valley Aerospace Consortium. In fiscal year 1990, the 21 designated Space Grant Colleges/Consortia will each receive up to $225,000 per year, for at least five years, and are expected to obtain, as a minimum, matching non-federal funds. In addition, these designated institutions will receive $100,000 funding from NASA to support fellowships for undergrad and graduate students.

AMES RESEARCH CENTER, Mountain View, Calif. --- Using extensive light measurements made by the Pioneer 10 and 11 spacecraft, a NASA scientist has produced "celestial constants" that will be highly useful to astronomers and physicists. The new constants are the first "pure" measurements of the various kinds of background light in our solar system, galaxy and universe. Since much of the knowledge of the universe comes from visible light, the data will provide a benchmark in many fields of astronomy and physics. The Pioneer 10 and 11 photo-polarimeter measurements have provided the first observations of incoming light without interference of solar system light.

Senior Management Research Review

The Senior Management Research Review will be held Tuesday, January 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	Hypersonic ASE Method Reduces Thermal Heating Effects on Flutter	Michael Gilbert (Structures/SDyD)
9:45	Supersonic Free-Shear Layer Transition	Rudolph King (Aeronautics/FLDMD)
10:00	Improved Tracking and Monitoring Performance Achieved Through Use of Stereopsis and Color Cueing	Russell Parrish (FlightSystems/FLMD)
10:15	Study of a 2.1 um Tm:Ho:YAG Laser Under High Power Laser Pumping at 785 nm	Clayton Bair (Electronics/FED)
10:30	Propulsion/Avionics Module Configuration Assessment	Chris Naftel (Space/SSD)
10:45	Satellite Measurement of Marine Stratocumulus for Climate Research	Patrick Minnis (Space/ASD)

Severe Antarctic Ozone Hole Confirmed *(Continued from page 1.)*

SAM II has measured Antarctic PSCs over that past 11 years. During the same period, chlorine has increased through the release of man-made chlorofluorocarbon compounds into the atmosphere. The numbers of PSCs present in 1989 were near the 1987 levels but were much higher than 1988 levels, a pattern which conceptually matches the observed change in ozone levels. SAM II data also show that PSCs persisted well into October during the years of maximum ozone depletion, 1987 and 1989.

The SAGE II and SAM II data are combined with observations by the Total Ozone Mapping Spectrometer (TOMS), which measures total ozone levels to the ground or cloud top. The TOMS recorded a record low ozone level on October 5, the result of a nearly 45 percent decrease in ozone from early August. In contrast, in September 1988, the ozone hole was much weaker.

Dr. Mark Schoeberl of NASA's Goddard Space Flight Center, Greenbelt, Md., reported that, in August and September 1989, the polar vortex was extremely cold and undisturbed. According to the current theory of the ozone hole, these are the ideal conditions for the formation of PSCs.

Observations by the SAGE II and TOMS indicate that the 1989 ozone hole was comparable to 1987's record ozone hole. These instruments take different but complementary measurements. TOMS maps total ozone in a vertical column by "looking" straight down at the Earth's surface at latitudes up to 90 degrees South. The SAGE II vertical profile is obtained by scanning the Earth's limb, or illuminated horizon, from up to 80 degrees South latitude and measuring the ozone concentration at various altitudes.

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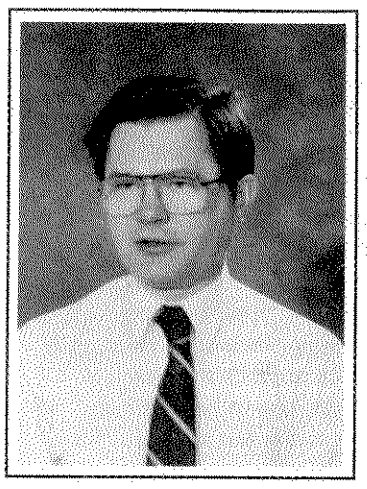
Headquarters Forum



"The rate of production of technical reports is now so high that the typical research worker is continually frustrated by his desire to keep informed of other workers' progress while working effectively on his own problem."

These words appear to have been written for today's research environment. However, they were first published over 35 years ago by Dr. Sam Katzoff, a former Chief Scientist at Langley, in the introduction of the booklet entitled **Clarity in Technical Writing.**

History has shown that Dr. Katzoff's concern is timeless. In fact, the march of technology has compounded the researcher's frustration by both broadening the range of subject matter which must be reviewed and providing word processing machinery which makes the writing of lengthy documents easy.

Dr. Katzoff's solution to the information-explosion of his day is also timeless. As his title indicates, it is the practice of clear writing. He places responsibility for clear, concise communication squarely on the shoulders of the technical writers themselves.

Authors should use easily recognizable words and reasonably short sentences. They should organize reports into focused, well-connected paragraphs. The purpose of a report should be simply to present information logically, and shortcomings should be discussed honestly. The author should always try to view his product from the viewpoint, as Dr. Katzoff puts it, of his "harried reader."

While this advice may appear to benefit principally the reader, the writer is also a beneficiary simply because his papers are read more and understood better than those of his more verbose colleagues.

In the approaching era of electronic publication, it will be more important than ever for technical writers to be aware of the virtues of clarity and brevity.

R. W. Barnwell
Chief Scientist

Alumni News

LaRC Alumni Announce Annual Meeting, Election of Board Members

The LaRC Alumni Association annual meeting and election of members to the Board of Directors will be held Wednesday, January 17, in the H.J.E. Reid Conference Center, Building 1222. A no-host social will begin at 6 p.m., followed by dinner at 7. The business meeting at 8 p.m. will review the past year's activities and elect ten Board members (nine for three-year terms; one for a two-year term.) To be eligible to vote, 1990 dues of $5 must be paid.

NASA Chief Historian Sylvia D. Fries will be guest speaker. Fries will discuss "The Evolution of NASA."

As announced in the December 7 mailing to current Alumni Association members, a retreat/reunion for ex-Center employees (both NACA and NASA) has been organized by the Social Committee. This **Langley only** affair is scheduled for March 23-25 in Durham, N.C. For details, call Abe Leiss, 877-2939, or Axel Mattson, 898-7462.

Current News Releases

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

89-182.....Compton Named Ames Research Center Director
89-183.....Highlights of 1989
89-184.....NASA Designates Four Additional Space Grant Colleges/Consortia
89-185.....NASA to Combine Exploration and Technology Organizations
89-186.....Pioneers Make First Measurements of Interstellar Light

Space Shuttle Information 864-2111

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 Langley at Forefront of Major Science Education Initiative

-by Craig E. Murden

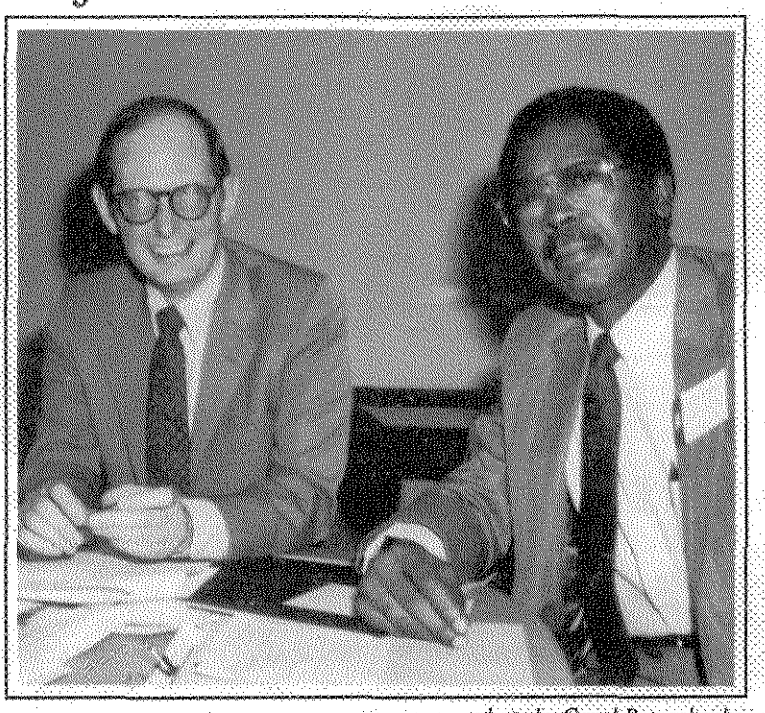
NASA Langley's role in a major educational initiative heralds a new focus on science and technology for Virginia students at all levels.

The thrust of this involvement is a partnership with the Commonwealth of Virginia in pursuing the objectives of the National Space Grant College and Fellowship Program, the aim of which is to promote a strong science, math and technology educational base from elementary through university levels.

The full cast of participants in this revitalization program was assembled for the first time when the Advisory Group of the Virginia Space Grant Consortium met recently at the Virginia Space Grant Office located in the Peninsula Graduate Engineering Center in Hampton. Under the directorship of Dr. Dennis Barnes, the Governor's Space Business Advocate and Associate Vice President for Governmental Relations at the University of Virginia, the group brings together senior representatives from education, business and research circles.

A central element in the project is to capitalize on the varied services and programs of the Langley Research Center and on the many relationships already in place between the Center and the lead educational institutions. The group intends to encourage actions in tune with the goals and missions at Langley since NASA activities are viewed as the cornerstone of the effort to heighten the focus on aerospace education, according to Barnes.

Representing NASA, which administers the federal grant program, is Langley's University Affairs Officer, Dr. Samuel Massenberg. At the consortium meeting, Massenberg outlined a comprehensive array of programs designed to get students involved in science and mathematics. Among them are live, interactive satellite television from Langley research laboratories to classrooms throughout the state; science and educational fairs at Langley; motivational video tapes of astronauts speaking to students; in-person astronaut visits to schools; a Virginia Space Camp and the direct involvement by retired Langley scientists and engineers as teachers and consultants. He also emphasized science and math training for kindergarten through grade twelve incumbent teachers and similar compulsory courses for all students majoring in education.



-photo by Carol Petrachenko

LANGLEY IN THE LEAD. Dr. Samuel Massenberg (right) meets with Dr. Dennis Barnes, the Governor's SpaceBusiness Advocate at the initial meeting of the Advisory Group of the Virginia Space Grant Consortium.

In addition to NASA Langley, the Consortium Advisory Group membership includes the lead institutions: University of Virginia, Virginia Polytechnic Institute and State University, the College of William and Mary, Hampton University and Old Dominion University. Other members are the State Council for Higher Education, the Governor's Office, the State Department of Education, the Center for Innovative Technology, the Virginia State Chamber of Commerce, the Science Museum of Virginia and the Virginia Air and Space Center.

The Consortium charter not only supports the national grant objectives but embraces a state program to raise the quality of aerospace-associated education and research at the state's colleges and universities. These Governor's Space Grant Fellowships will be competed for by masters and doctorate level students. Scholarships will also be awarded to undergraduate students. While science and engineering are expected to be major areas of study, encouragement will be given to all areas, including education, business law, social studies and interdisciplinary degree programs. Two factors have caused the broadening of eligibility criteria, says Massenberg: One, the recognition that the pursuit of space involves many educational disciplines beyond physics and math, and two, that future leaders need to appreciate the intricacies of science to make the increasingly critical decisions about its applications in space and on planet Earth.

Students Attend Aerospace Workshop at Langley

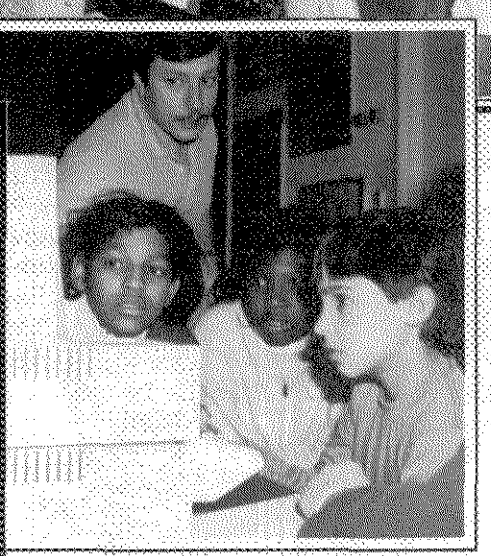
About 25 students from Hampton Roads spent part of their Christmas vacation tackling the challenge of flight. Students from Cooperating Hampton Roads Organization for Minorities in Engineering (CHROME) attended a two-day aerospace workshop at the Visitor Center December 27-28.

The workshop focused on the aerodynamics of flight and Space Station Freedom. Students toured a subsonic wind tunnel, conducted flight simulations and talked with researchers about their latest projects.

The highlight of the workshop was a computer simulation competition called "Project: Space Station." The students, divided into crews, were in charge of designing, launching, assembling and operating a space station, while dealing with schedules, budgets and public relations. Built into the simulation were unforseen opportunities and obstacles that needed to be dealt with by each of the crews.

CHROME, founded in 1983, is a non-profit partnership of public and private employers, secondary and higher education, and civic and professional organizations who recognize the need to identify, counsel and nurture qualified minority students to succeed in science, engineering, math and related technological fields.

Don Soloway, Information Systems Division, explains the end effector, a two-fingered device, on the robotic arm.



-photos by Carol Petrachenko

Assigned to crews, CHROME students accepted the challenge of designing, launching, assembling and operating a space station.

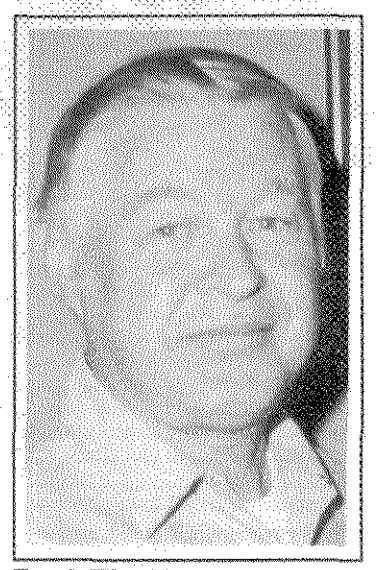
Klate Holt Recognizes Employees

The Klate Holt Co., Logistics Administrative Support Services, announces the winners of the Outstanding Unit Award, (front row, L to R) Alexander Edlow, Tommy Joyner, Tommy Baytop Jr. and (behind) Mike Wormley.

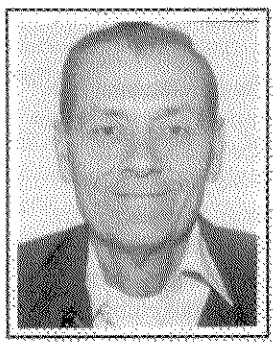
Harvey's Selects Crew of the Month

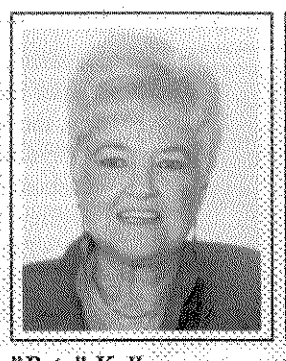
Harvey's Janitorial Service Inc., salutes employees who have excelled on their facility evaluations. The Awards Committee convened on December 1 and selected Crew #11, Frank Weschler, as Crew of the Month for November 1989.

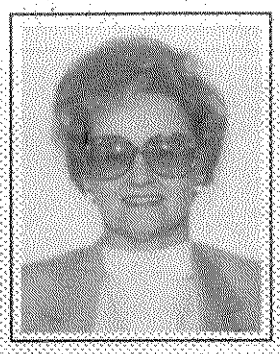
Weschler obtained a perfect score of 95 points on his facility evaluation reports. He also received two letters of commendation for his consistent outstanding efforts in providing high quality custodial service and conference support to the Center.

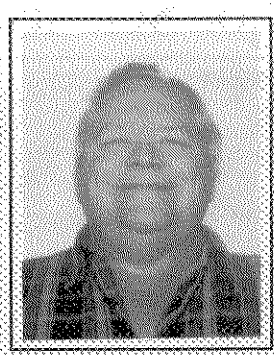


Frank Weschler


John Mulqueen


"Pete" Kelly


Gloria Champine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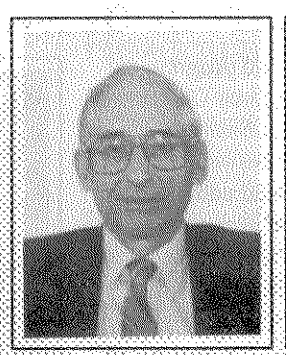
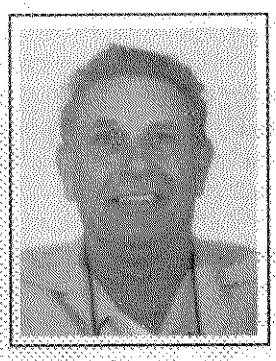
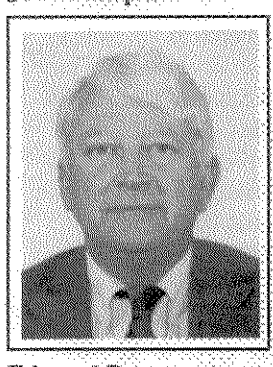
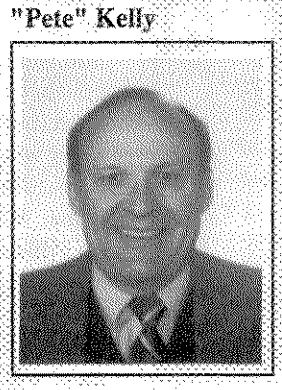

Ivan Beckwith

L. Robert Jackson


William Sanders


Edward Ray


Robert Stallings

Recent Retirees

John M. Mulqueen, Facilities Engineering Division; **Wilford E. Sivertson Jr.**, Flight Electronics Division; **Shimer Z. Pinckney**, Hypersonic Technology Office; and **Geneva M. "Pete" Kelly**, Scout Project Office, retired September 29.

James J. Buglia, Atmospheric Sciences Division; **Gloria R. Champine**, Equal Opportunity Program; and **Ronald Frank Hoyt**, Instrument Research Division, retired November 3.

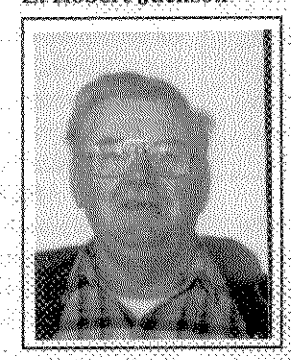
Ivan E. Beckwith, Fluid Mechanics Division, and **L. Robert Jackson**, Structural Mechanics Division, retired December 15.

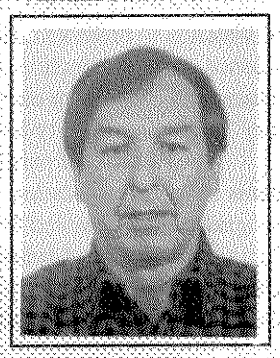
William E. Sanders, Fabrication Division, retired December 18.

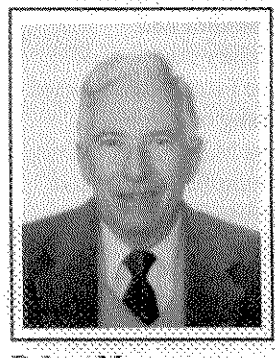
Edward J. Ray and **Robert L. Stallings Jr.**, Applied Aerodynamics Division; **Ray M. Burcher**, **Samuel D. Johnson**, **Robert T. Magee**, **James H. Parker**, Fabrication Division; **Irvin L. Hamlet**, Facilities Program Development Office; **John P. McPherson** and **Arthur L. Newcomb Jr.**, Flight Electronics Division; **William D. Grantham** and **James L. Williams**, Guidance and Control Division;

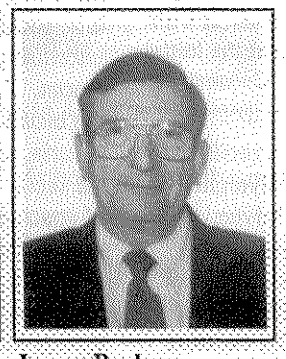
Charles D. Nichols, Information Systems Division; **S. Franklin Edwards**, Instrument Research Division; **Patricia J. Dinwiddie**, Interdisciplinary Research Office; **Mary M. Jenkins** and **Evelyn D. Wallace**, Management Support Division; **Charles E. Brown**, **Dave F. Crockett**, **Robert V. Garletts**, **Martin J. Gross Jr.**, **Archie D. Myers**, **Ted W. Noland**, Operations Support Division; **Nadine J. Batkins**, **Willaree R. Curtis** and **Lester J. Rose**, Research Information and Applications Division;

William L. Wells, Space Systems Division; **Harold N. Murrow**, Structural Mechanics Division; **Roger N. Messier**, **Rodney A. Smith**, **Joseph D. Pride Jr.** and **Clarence P. Young Jr.**, Systems Engineering Division; **George T. King Jr.**, Systems Safety, Quality and Reliability Division, retired December 29.

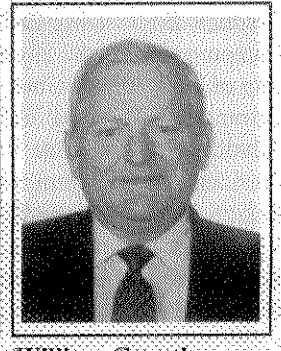

Ray Burcher


Samuel Johnson

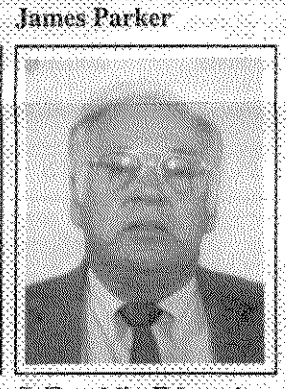

Robert Magee


James Parker

John McPherson

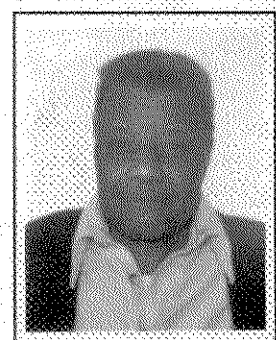

William Grantham

James Williams


S. Franklin Edwards

Mary Jenkins

Evelyn Wallace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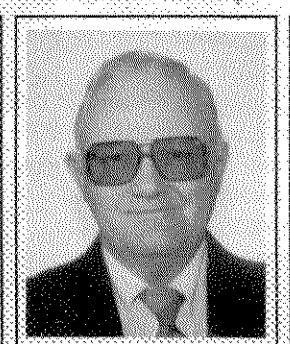
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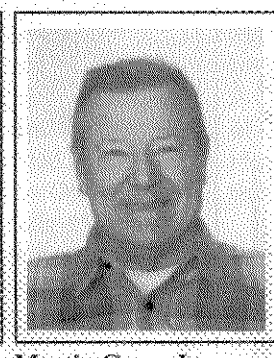
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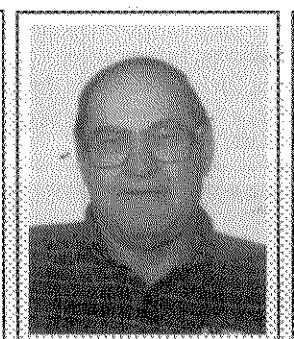
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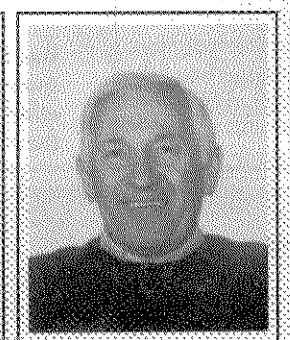
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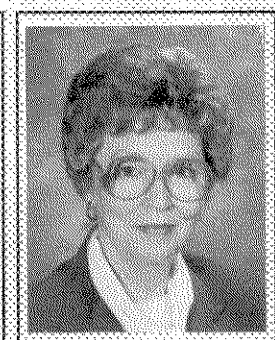
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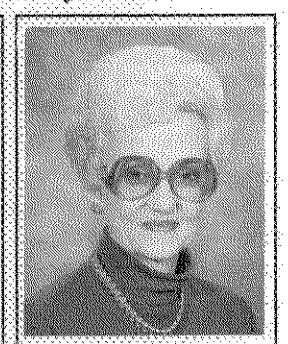
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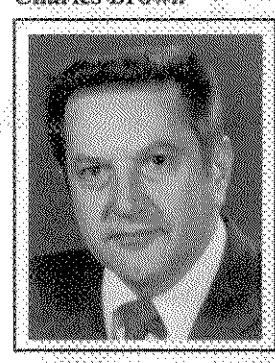
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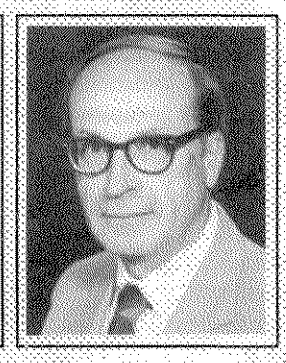
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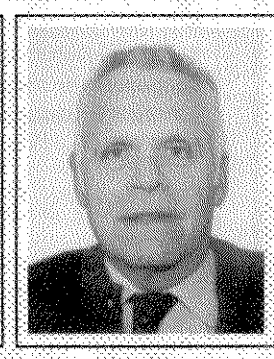
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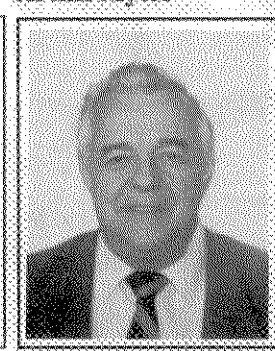
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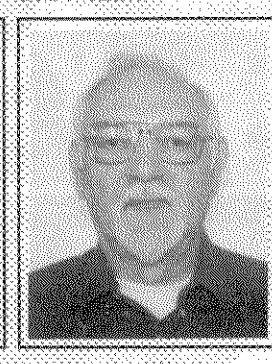
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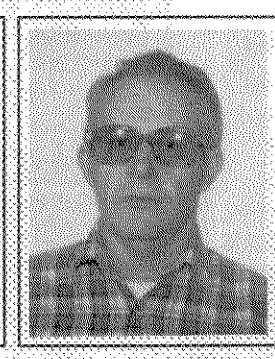
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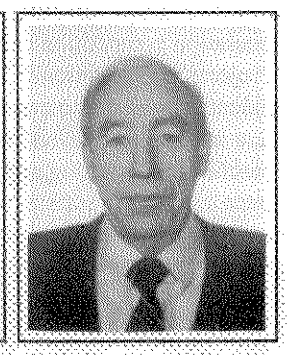
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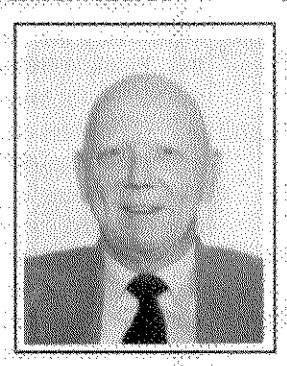
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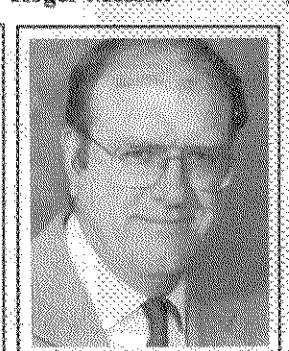
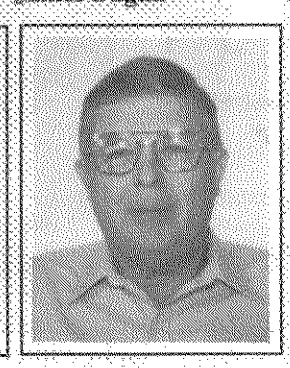

Clarence Young Jr.


George King Jr.

Lucy Leaves Legacy of Smiles

Langley Bids Farewell to Lucy

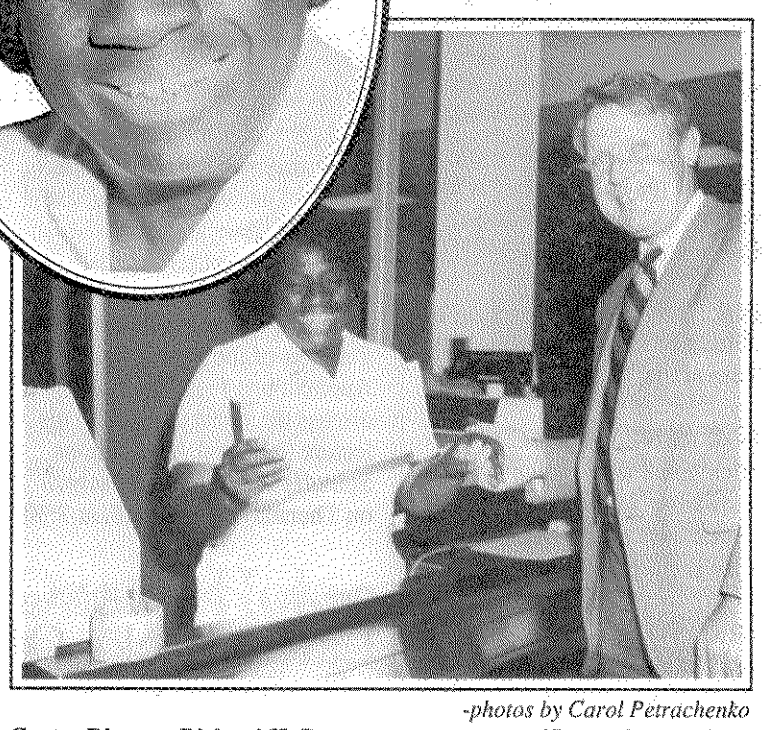
"Let's see what you got today, sugar?" She said the same thing to everyone who passed through her cafeteria line but, with those same words, greeted each and every one personally. That's Lucy W. Campbell.

Few knew her last name, many knew her as Lucy, nearly everyone knew her as a bit of sunshine--no matter what the weather. John Stokes, director for management operations, made a point of going through Lucy's cafeteria line when he was having a difficult day. "No matter what was on my mind, Lucy would make me smile." That's Lucy.

In an unprecedented action, cafeteria manager Richard Weeks stopped all activity in Langley's cafeteria for a few moments at the height of the lunch hour on Thursday, December 14. Center Director Richard H. Petersen was standing in Lucy's line but, instead of lunch items, Petersen had a certificate of appreciation noting Lucy's 41 years of service to the Center. Lucy stopped, accepted her award gracefully, posed for a couple of pictures and then picked up her assignment as usual--she had one more day to work before retirement. That's Lucy.

Petersen didn't have time for lunch that Thursday, but wouldn't miss recognizing an employee like Lucy. "I've always said that the people at Langley are our greatest asset. Lucy Campbell has touched the lives of so many of our people in the 41 years she has been at the Center. A smile is contagious--and she's generated a lot of them.."

Lucy began her career at NASA Langley on August 3, 1948. She started out in the dish room, worked in the kitchen, baked pies and cakes in the bakery, and served on the serving line. She worked on the East side, became a cashier and, at the insistance of then cafeteria manager Mr. Phelps, learned the big register. "I worked for a lot of bosses--both men and women--and did a lot of jobs. Mr. Phelps challenged me to learn the big register and I did it. I think he knew way back then how much I would enjoy meeting with all the people who came by for lunch each day," said Lucy.



-photos by Carol Petrachenko

Center Director Richard H. Petersen presents a certificate of appreciation to Lucy W. Campbell in recognition of her 41 years of service to Langley.

Jerry Hansborough, chief of the Research Information and Applications Division and chairman of the Langley Exchange Council, thinks Lucy is probably one of the most recognizable figures at Langley. "We have gotten many compliments over the years from visitors and employees alike. People are really going to miss Lucy's personal touch."

And so is her current boss, Richard Weeks, and her co-workers. "Lucy is a very unique person and has been a fantastic employee," said Weeks. "She excelled at taking care of the customer."

Lucy retired Friday, December 15. Her mission now is "to attain higher heights and deeper depths. I'm going to use my time to help the elderly, work in my church and sing in the choir. And on Monday, I'm going to clean my house." When asked what she will remember the most about her years at Langley, the reply was all too typical of Lucy. "Most of all, I'll remember the people. My job was the people and I never let my people down."

And her people will always remember Lucy. The "Breakfast Bunch," says Nancy Holt, always looked forward to Lucy's "Good morning, everybody," as the official signal to let breakfast begin. "Her jovial personality and wit made getting to the cafeteria by 6:15 a.m. a highlight of the day. We really miss her."

Holiday Spirit Lingers into the New Year

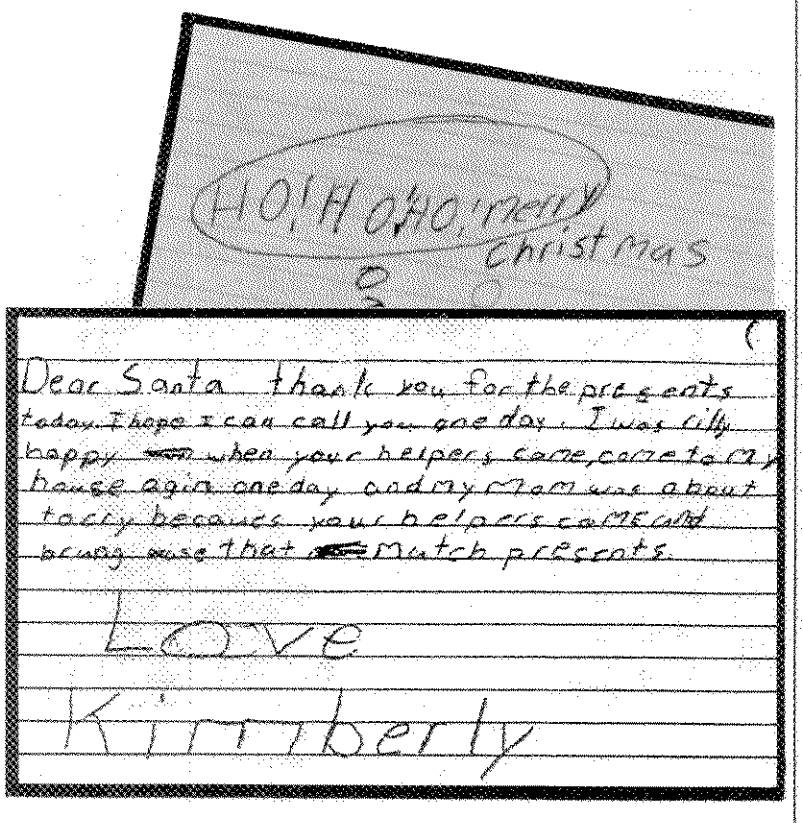
Adopted Family Says Thanks

The employees of Langley's Financial Management Division centered their holiday celebrations around a Hampton family in need.

A Christmas committee headed by Tom Frasher, FMD systems accountant, contacted Social Services who matched the division with a family of five--a mother and four children. The mother requested socks, pajamas and warm clothes for the young ones; on her own wish list was an iron and ironing board.

All these wants were fulfilled and much, much more. "The response was overwhelming," said Frasher. "We asked for money, food and gifts and we got it all. Presents included everything from underwear to ninja turtles."

All this holiday spirit was put in the proper perspective when Social Services directed the following thank you to Frasher and FMD. Christmas really is for kids--kids of all ages.



HO! HO! HO! Merry Christmas

Dear Santa thank you for the presents today. I hope I can call you one day. I was silly happy when your helpers came, came to my house agin one day and my Mom was about tacky because your helpers came and bring me that much presents.

Love

Kimberly

Scrooge Teaches Family a Valuable Lesson

The emotions of a Unisys employee and his family skyrocketed from disappointment to delight when news of a break-in elicited good will from friends--old, new and unknown.

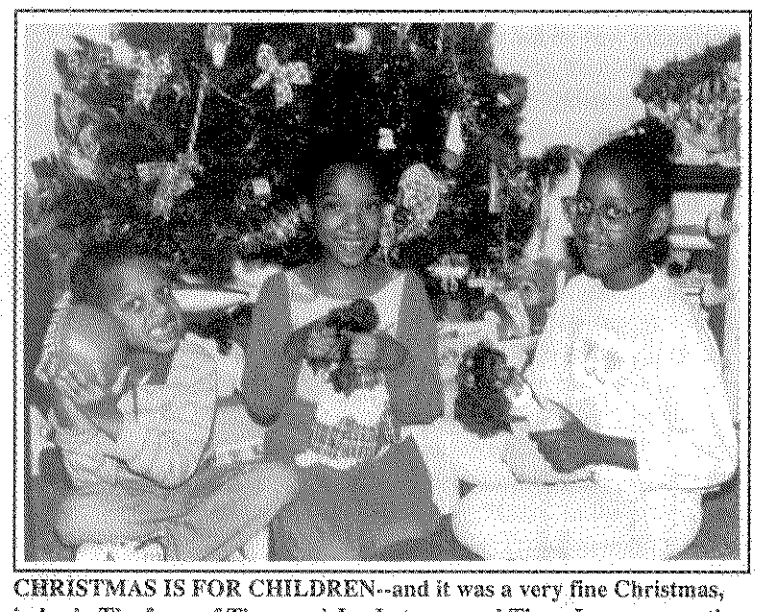
Thurgood Lane, a computer operator in the Analysis and Computation Division, was attending a Christmas program at John Marshall Elementary School with his three children on Tuesday, December 12. His wife, Mae, was attending a Christmas dinner. Upon their return to their Newport News home, they discovered a burglary.

An unknown Scrooge had stolen various items--vacuum cleaner, sewing machine, typewriter, stereo, computer--as well as all the brightly wrapped Christmas presents from under the tree! Theft is hard to explain to three small children, but that the family might not have Christmas was an alternative that Lane did not relish.

News of the family's misfortune was picked up by a local TV station which aired their plight on the late night news. That's when the Christmas spirit --or man's innate concern for his neighbor, as Lane prefers to see it--took over. Alerted by the news story, the Unisys Corporation started collecting money and items for the family. The children's school had a similar plan, as did Faith Church of God where Lane is assistant pastor.

A local radio station volunteered to bring the family's Christmas back home and countless individuals have offered whatever the family needed.

Lane describes the outpouring of love as simply incredible and deems the experience a lesson he could not have more effectively taught his children. "I've always preached that all things work together for good and that God will bless you for your goodness. There's no question in my family now that good can come out of any situation," says Lane.



CHRISTMAS IS FOR CHILDREN--and it was a very fine Christmas, indeed. The faces of Thurgood Jr., Latanya and Tiana Lane convey the family's good fortune as a result of an earlier misfortune. The lesson learned will be remembered throughout the new year.

Retirement Party

Nadine Batkins will be honored at a retirement dinner Wednesday, February 7, at the Warwick Yacht and Country Club. Cocktails will begin at 5 p.m. (cash bar) and dinner will be served at 6. Cost is $12/person; gift contributions are separate. Contributions to gift only are welcome. Checks may be made payable to Effie Nicosia, Mail Stop 185, by January 24.

Happenings

SPECIAL LAA SOCIAL will be held Friday, January 19, from 4 to 8 p.m., in the H.J.E. Reid Conference Center.

DISCOUNT TICKET SALES. Effective January 1, 1990, all discount ticket sales, except Busch Gardens season passes, will be sold at the Visitor Center Souvenir Counter. For details, call 864-1739.

NASA TOASTMASTERS will meet Wednesday, January 24, 11:30 a.m., in the H.J.E. Reid Conference Center, Building 1222. Guests are always welcome. For additional information, contact Myra Walton, membership chairman, at ext. 44108.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, January 24, from 9 to 3 p.m. in the H.J.E. Reid Conference Center. Share your good fortune. Give the gift of life.

FOR SALE: COMPUTER. EGA 40 MB-28ML Segate and Thompson Monitor. For details, call 877-2939.

WANTED: ROOMMATE to share a new house in Kiln Creek, Newport News. $300 plus 1/2 utilities. Call 864-1570 or 874-1281.

COUNTRY-WESTERN CLUB. Dance on Saturday, January 20, from 7 to 11:30 p.m. in the H.J.E. Reid Conference Center. Guests are always welcome. Club membership is $5/person/year and includes admission for all monthly dances. For more information, call Jerry Nichols at ext. 43686.

FLORIDA TRIP to Disney World/Epcott/MGM. May 17-21. Cost is $275/person and includes hotel, transportation and tickets. Call Dee at 887-8481 or Tina at 888-6743.

LOST: SCARF. Lady's red/charcoal grey checked scarf lost Dec. 4 in cafeteria or Fitness Center area. Call ext. 44425.

FOUND: KEYS in parking lot in front of 1232 Trailer 3. Call Rose at ext. 42962.

FOR RENT: HOUSE. 3BR brick home with garage in Poquoson. Large corner lot, fenced back yard. Deposit and lease required. Call 838-8111.

FREE TO GOOD HOME. Well-trained black retriever, one year old. Call 599-9419.

WANTED TO BUY: EXERCISE BICYCLE with articulating arms. Call ext. 44649 or 898-8160 after 4 p.m.

Researcher News

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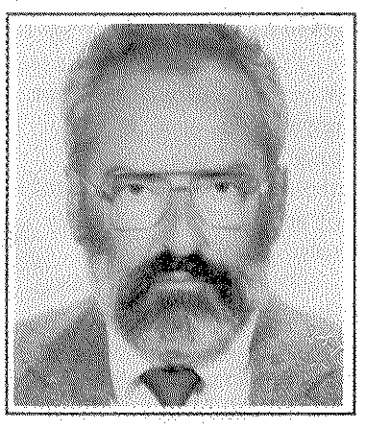
At the VC during January

Anderson Discusses Hypersonic Flight



NASA Langley is currently developing hypersonic technology for the next generation of aircraft.

Griffen Y. Anderson will discuss hypersonic propulsion at noon Wednesday, January 17, in the Visitor Center theater. This free lecture is co-sponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

Anderson will examine the outlook of hypersonic flight and NASA's high-speed propulsion research. Head of the Hypersonic Propulsion Branch, Anderson serves as principal point of contact between the National Aero-Space Plane Technology Program and NASA's high-speed propulsion research.

Medical Applications of NASA Technology Discussed

NASA's experience in protecting and monitoring the health of astronauts during space flight has generated hundreds of devices and techniques that improve lives.

Dr. Franklin Farmer, manager of the Biomedical Applications Program, will discuss the latest projects in his lecture "Medical Applications: Spinoffs from NASA Research" on Thursday, January 18, at 7:30 p.m. in the Visitor Center theater.

Farmer will examine three projects with strong applications in the geriatrics field. He will discuss the status of the projects, the technology used and their potential applications.

Farmer began his career at Langley in 1965 where he established and directed the bacteriology/microbiology program and laboratory.

One Man's Trash is Another's Treasure

LaRC Kicks Off Recycling Program

Believe it or not, most of the garbage we generate is valuable--because it is recyclable.

Recycling has become an important consideration for the 1990s as the nation's landfills continue to overflow. Businesses, environmental groups and government agencies have discovered that recycling saves valuable natural resources, conserves energy in the manufacturing process and extends the life of existing landfills. Often thought to be time consuming and inconvenient, studies have shown that general household recycling requires only about one hour per month.

A center-wide recycling project is being instigated by the newly-formed LAA Conservation Club. Initially, the program will focus on the collection of alumnium cans; employees will also be encouraged to bring in cans from home. Future plans include expansion of the program to the collection of newspaper and glass. The overall goal of the program is to provide a convenient place for employees to bring their recyclables.

Aluminum cans will be collected by volunteers via a network of collection sites conveniently located in several buildings around the Center. The cans will then be gathered in a dumpster, located by the water tower behind the Activities Center, for pickup by the Hampton Roads Recycling Company. Proceeds generated by this project will go to the further expansion of recycling efforts as well as towards additional LAA activities.

Buildings designated for collection include: 643, 1148, 1152, 1169, 1192, 1194, 1200, 1202, 1205, 1206, 1208, 1209, 1212, 1219, 1220, 1221, 1222, 1224T, 1230, 1232, 1244, 1247A, 1250, 1267, 1268A, 1293T, 1298, 1299 and 1312. More volunteers are needed to collect cans from other buildings. Individuals interested in contributing aluminum cans or assisting in the collection process, should contact a club officer for information.

The goals of the LAA Conservation Club are to initiate a recycling project at NASA Langley, to encourage the Center-wide conservation of resources and energy, and to serve as a model to the local community in the effort to conserve and recycle the Earth's resources. For more information about the project or about recycling in general, contact Karen Looney, ext. 41492, Jean Peters-Do, ext. 41537; Juan Cruz, ext. 43173; or Tim Collins, ext. 43113.

COLLECT PRECIOUS METALS. Gathered to kickoff a Center-wide recycling project are LAA Conservation Club principals (front row, L to R) Dan Burdette, site coordinator; Juan Cruz, secretary; Karen Looney, president and club co-founder; Jean Peters-Do, vice-president; (back row) Jim Townsend, site coordinator; Tim Collins, treasurer and Nathan Van Hooser, co-founder.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 2 January 26, 1990

Bi-weekly Employee and Contractor Publication

News Researcher

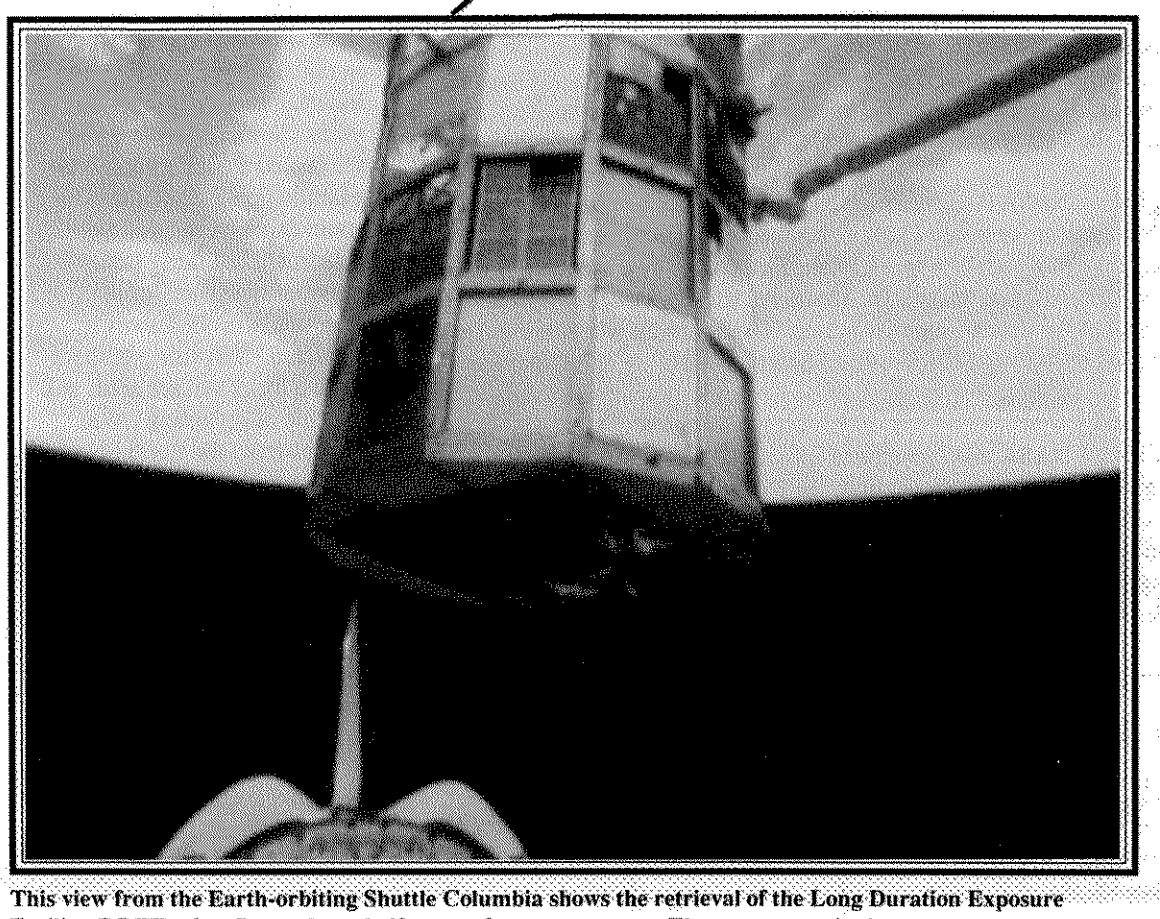
Hello, LDEF!

Hello, LDEF. Well, hello, LDEF.
It's so nice to have you back
where you belong.

You're looking swell, LDEF.
We can tell, LDEF,
You're still glowing,
You're still growing,
You're still going strong.

We feel the craft swaying,
for the crew's playing
One of your old favorite aeronautic songs.

So, stop your nap, fellows,
Open the Shuttle flap, fellows.
*LDEF will never stay away so long.**



This view from the Earth-orbiting Shuttle Columbia shows the retrieval of the Long Duration Exposure Facility (LDEF) after five and one-half years of space exposure. The remote manipulator system, operated by Bonnie Dunbar, has just contacted the grapple fixture of the LDEF. This photograph was recorded from live television transmission on January 12, 1990, at 10:23 a.m. EST.

"Good morning, Columbia!" announced Mission Control at Johnson Space Center, Houston, on Saturday, January 13. "Your music this morning is courtesy of the LDEF Project who are obviously very happy today. Our planning team would also like to extend their congratulations on an exceptionally successful day yesterday."

One of the main objectives of Space Shuttle mission STS-32 had been accomplished--the retrieval of the Langley designed, built and managed Long Duration Exposure Facility (LDEF). Columbia's crew--Bonnie Dunbar operating the robot arm, Dan Brandenstein maneuvering the Shuttle into position, Jim Weatherbee piloting the orbiter, Marsha Ivins photographing activities from the mid-deck and David Low reading data from monitors--captured the LDEF at 10:16 a.m. EST, Friday, January 12.

Drama has been building for LDEF scientists and engineers since the April 1984 deploy of the satellite, NASA's first to explore the effects of long-term space exposure. Originally scheduled to be in low-Earth orbit for just under a year, Friday's capture of the LDEF marked an unprecedented life in space of nearly six years. At retrieval, LDEF had travelled more than 741, 928, 837 nautical miles, the equivalent of the distance between Earth and Saturn. LDEF is expected to return invaluable data for the design and construction of future spacecraft, such as Space Station Freedom.

LDEF Project Manager Burt Lightner and Chief Scientist Bill Kinard watched retrieval activities from JSC mission control. "It looks just like (it did when) we left it," said Lightner as Columbia closed in on the spacecraft.

"LDEF was a beautiful sight!" said Kinard. "It looked like we expected it to look. We're delighted with the first visual observations. Now we want to get it back (on Earth) and take a closer look," said Kinard in an interview following retrieval.

LDEF Experiments Manager Jim Jones and several Langley scientists who have experiments on-board watched from the Langley News Center. Jones seemed delighted at the first looks at LDEF from space. "It looks so good!" noted Jones. Initial views of the spacecraft showed no obvious signs of major damage from meteoroids or space debris.

Langley scientist Jim Robertson noted both excitement and relief after the capture of the spacecraft. Robertson's experiment on LDEF relates directly to monitoring global air pollution and thermal mapping of the Earth. "Some deterioration of the sensors was expected after a year," said Robertson. "I'm anxious to see the result of over five years in space."

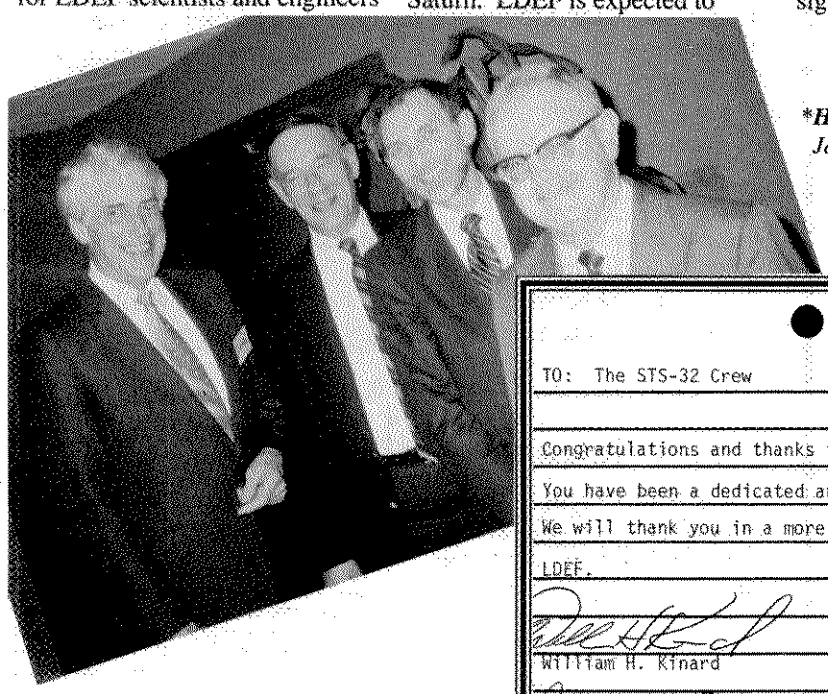
Don Humes held a replica of LDEF marked with the locations of multiple panels intended to assess meteoroid impact frequency and damage. The experiment is directly related to space station design, said Humes.

Also analyzing meteoroid impact on LDEF is Gale Harvey. Harvey hopes that residue contamination of his experiment will give information on the precursors of life.

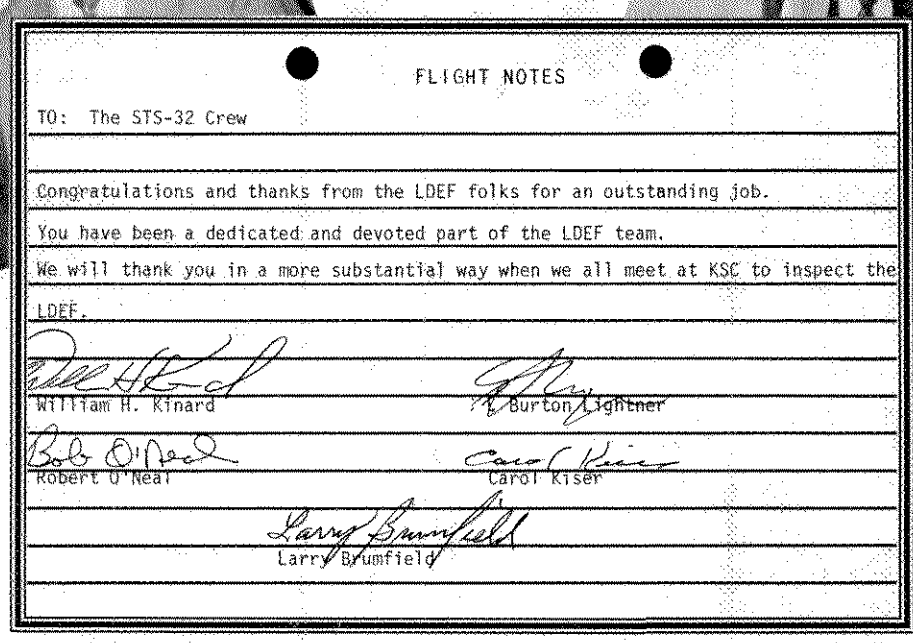
Wayne Slemp saw his projects at least twice as Columbia's crew completed a visual and photographic survey to document the condition of the experiments prior to return to Earth's atmosphere. As expected, some of the polymer film had disintegrated completely. "It just tells us that we have predicted what's happened in space pretty well from our ground-based tests," said Slemp.

"This is just the tip of the iceberg," said Kinard. "Data from LDEF will become a handbook on how to design spacecraft."

**Hello, LDEF written and sung by James C. Martin, son of LDEF secretary Glenna Martin, and his friend Terry Radomski.*



Bill Kinard (left) greets Headquarters officials (L to R) Jack Levine, director, Flight Projects Division; Robert Rosen, deputy associate administrator, Office of Aeronautics and Space Technology (OAST); Arnold Aldrich, associate administrator, OAST; at KSC for pre-launch activities



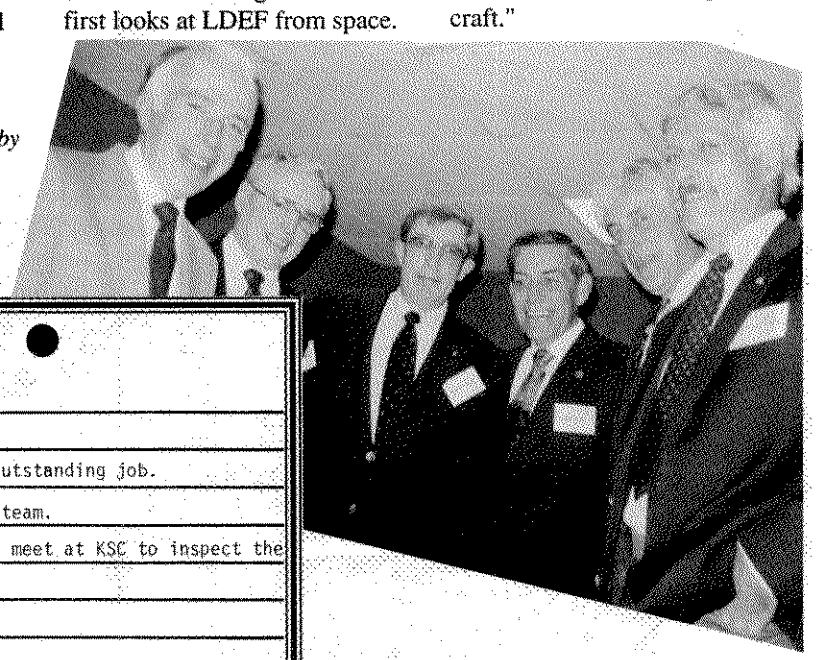
FLIGHT NOTES

TO: The STS-32 Crew

Congratulations and thanks from the LDEF folks for an outstanding job.
You have been a dedicated and devoted part of the LDEF team.
We will thank you in a more substantial way when we all meet at KSC to inspect the LDEF.

William H. Kinard — L. Burton Lightner
Robert O'Neal — Carol Kiser
Larry Brumfield

This message was faxed to the crew of STS-32 following the successful capture and berthing of the Long Duration Exposure Facility (LDEF) on January 12, 1990.



Langley LDEF supporters gather before launch of STS-32, (L to R) Ed Cortright, former Langley director; Oran Nicks, former deputy director; Bob O'Neal; Carol Kiser; Bill Kinard and Lenwood Clark.

(See additional photos on page 4.)

News Briefs

JOHNSON SPACE CENTER, Houston, Texas--- USAF Col. Ronald J. Grabe has been named to command STS-42, a nine-day mission aboard Space Shuttle Columbia in December 1990. Stephen S. Oswald will be the pilot, and William F. Readdy will fly as a mission specialist. Columbia will carry the International Microgravity Laboratory in which five NASA astronauts and two payload specialists will conduct a variety of studies and experiments in the fields of materials processing and life sciences. Mary L. Cleave, Ph.D., and Norman E. Thagard, Ph.D., were assigned to the flight as mission specialists in June 1989. Two payload specialists will be named in the near future.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md.---NASA has released a request for proposal (RFP) for the Advanced Tracking and Data Relay Satellite System (ATDRSS). The RFP requests that companies demonstrate their ability and capacity to design, manage, integrate and test large, modern communications spacecraft and associated ground facilities. The first ATDRSS spacecraft tentatively is scheduled for delivery in July 1997, when it could be used to replace one of the Tracking and Data Relay Satellites (TDRS) currently in use. ATDRSS is intended to maintain the present NASA track and data relay system through the first decade of the 21st century.

HEADQUARTERS, Washington, D.C.---NASA Administrator Richard H. Truly has named Thomas E. Utsman as the Deputy Associate Administrator for Space Flight (Management) and James A. "Gene" Thomas as the Deputy Director of the John F. Kennedy Space Center, Fla. In his new capacity, Utsman will have overall responsibility for assisting William B. Lenoir, Associate Administrator for Space Flight, in the day-to-day oversight management of the Space Flight programs. Thomas, who will serve as Deputy Director under Forrest S. McCartney, has been the KSC Director of Safety, Reliability and Quality Assurance since January 1987.

HEADQUARTERS, Washington, D.C.---NASA and Japan have completed an agreement for the launch of Japan's GEOTAIL spacecraft on a Delta II launch vehicle, from the Kennedy Space Center, Fla., in July 1992. Richard H. Truly, NASA Administrator, and Professor Jun Nishimura, Director-General of Japan's Institute of Space and Astronautical Science (ISAS), signed the agreement on behalf of the U.S. and Japanese agencies implementing this cooperative activity. The GEOTAIL spacecraft is a bilateral cooperative mission between NASA and ISAS which will investigate the stored energy in the geomagnetic tail of the Earth.

Senior Management Research Review

The Senior Management Research Review will be held Tuesday, February 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.

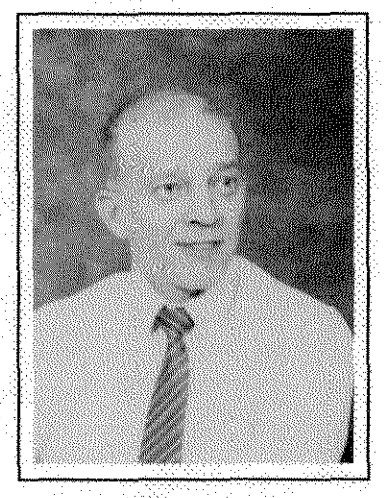
TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:30	Aircraft-ATC Information transfer Simulation Study	Marvin Waller (Flight Systems/FLMD)
9:45	Application of Computer-Aided Design Tools to the Specification and Evaluation of Telerobotic Control System Architectures	Wallace Harrison (Flight Systems/ISD)
10:00	Identification of Global Smog Using Satellite Data Through Use of Stereopsis and Color Cueing	Jack Fishman (Space/ASD))
10:15	Flutter of a Joined-Wing High-Altitude Vehicle	Michael Durham (Structures/SDYD)
10:30	Protective Light-Weight Coastings for Titanium Alloys in Hot Corrosion Environments	Ronald Clark (Structures/MD)
10:45	Water Tunnel Investigation of Concepts for Alleviation of Adverse Inlet Spillage Interactions on External Stores	Dan Neuhart (Aeronautics/PRC)

Lankley

Editorials

Langley

Headquarters Forum



The retrieval of the Long Duration Exposure Facility (LDEF), anxiously awaited by Langley scientists and engineers, was accomplished by the crew of Space Shuttle mission STS-32 earlier this month.

The flight video observations suggest a spacecraft that is in remarkable condition after loitering in space for almost six years. Some "wear and tear" was noted during the on-orbit examinations. Specimens on some experiments that were constructed of fairly thin, polymer type films were completely eroded away as expected. Surprisingly, there were a lot of surface areas still capable of reflecting cloud images from the Earth below.

Preparations are complete to receive LDEF at Kennedy Space Center and to initiate the LDEF Science Program which is expected to continue through 1994. This last phase of LDEF is geared to capture the "science return" from the 57 experiments onboard the spacecraft.

A cast of hundreds is prepared to launch the scientific investigations. More than 200 principal investigators (PIs) are involved directly in the LDEF experiments. The PIs represent a fairly broad range of institutions that include 21 universities, 33 industrial firms, each NASA center, nine countries and nine other U.S. government laboratories. In addition to the PI experiments, special investigation groups (SIGs) have been established to assess the more global aspects of the low-Earth orbit (LEO) environment experienced by LDEF. Working with the PIs, the SIGs will address micro-meteoroids/debris characteristics, induced radiation, materials performance and a variety of systems performance evaluations that include batteries, tape recorders and mechanical devices that were part of the LDEF experiments. More than 60 scientists are associated with the SIGs.

For many of the LDEF experiments, the expected findings are unknown. This sets the stage for an exciting study and, possibly, new findings that will enhance our understanding of the LEO environment. The experiments cover a broad range of topics including cosmic rays, space radiation, solar cells, structural materials and optical systems.

One of the LDEF experiments carries the same optics configuration as the Nimbus 7 spacecraft that measures the Earth's Radiation Budget Experiment (ERBE). Radiometric corrections of the ERBE data may be in order should the LDEF experimental findings show optics degradation in LEO. Another experiment contains 12.5 million tomato seeds! The seeds will be used in a nationwide science experiment providing a unique opportunity for many school students.

Our Projects Division will complete their nearly 25 year task with the welcoming home of LDEF. Implementation of the LDEF Science Program has been assigned to our Materials Division. The LDEF Science Program will include assimilating the science data with the hundreds of participants, disseminating the data to the technical community and archiving key results. We estimate that NASA's investment in the LDEF Science Program will be about $12 million. The LDEF experiments will provide invaluable data that could influence the design of future spacecraft.

C. P. Blankenship
Director for Structures

News Releases

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

90-1.....Astronaut Crew Named to International Microgravity Mission

90-2.....Advanced Tracking and Data Relay Satellite Phase B RFP Released

90-3.....Truly Makes Key Appointments

90-4.....NASA and Japan Sign Geotail Agreement

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.

Honoring a Legend

Fred Weick, Aeronautical Pioneer, to be Awarded Guggenheim Medal

Fred E. Weick, former NACA employee and aeronautical pioneer whose efforts to improve flight performance and safety have led to major design advances since the 1920s, has been selected to receive the 1989 Daniel Guggenheim Medal.

The Guggenheim Medal is given annually to the "pioneers and trailblazers in man's conquest of the heavens." The award will be presented February 14 in Los Angeles.

Weick, a Langley employee from 1925 to 1936, will return to LaRC Monday, February 19. A reception and dinner in his honor is planned for 6 p.m. in the H.J.E. Reid Conference Center. All employees are invited to attend.

Dr. James R. Hansen, Langley historian, deems Weick a pioneer--"not in the Daniel Boone or Davy Crockett mold, but in the French sense of the word, as 'one who prepares the way.'" Hansen feels that Weick meets and exceeds the criteria for an aeronautical pioneer.

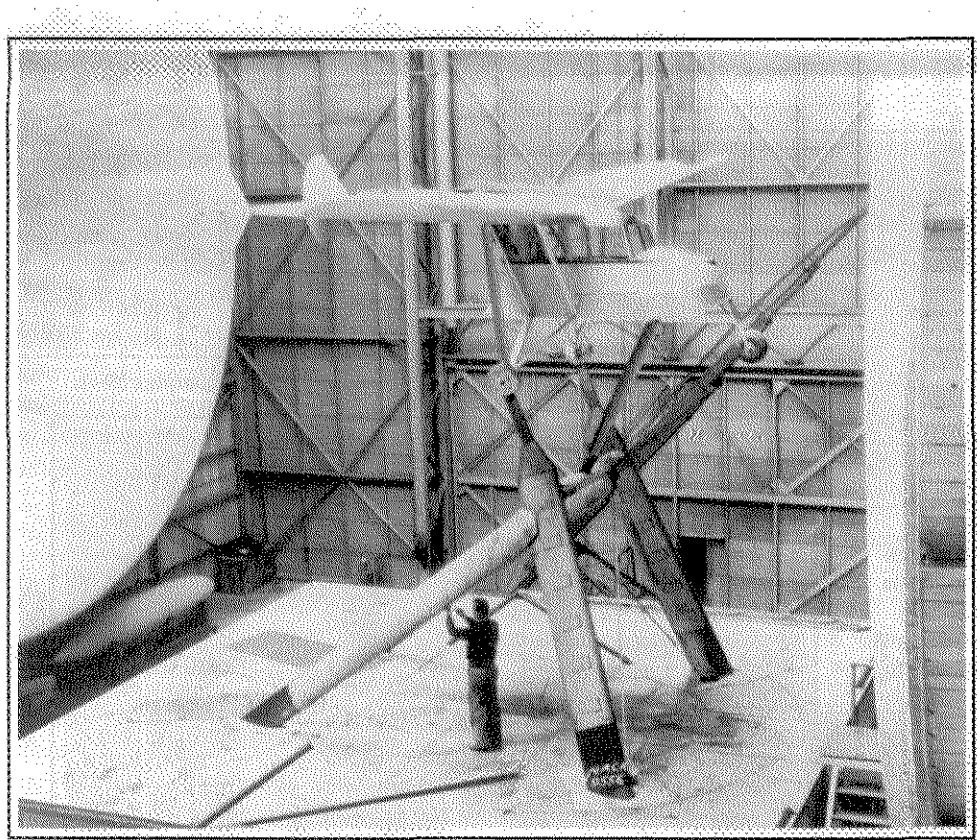
First, he is an engineer and, says Hansen, an extraordinarily talented one. He is one of the first graduates of an American engineering school, the University of Illinois, to have pursued a career in aeronautics.

Second, Weick is one of the first engineers employed by the original U.S. Air Mail Service. In the early 1920s, one of Weick's assignments was to locate and establish a series of emergency flying fields for the first night flying of mail through the central United States, from Chicago to Omaha. "This," Hansen contends, "was pioneering work in the literal sense."

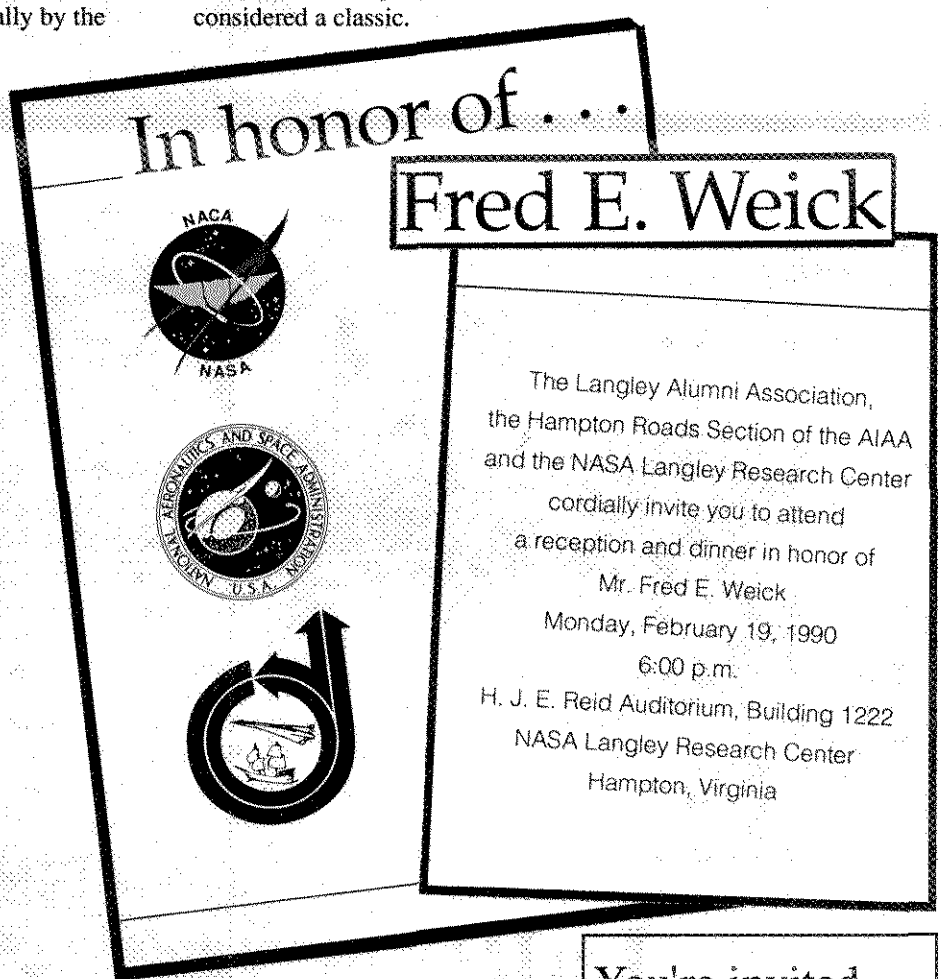
Third, over the years Fred Weick has made many significant contributions to the advancement of aeronautical technology.

In 1925-26, after becoming en employee of the National Advisory Committee for Aeronautics, he helped to design a major new wind tunnel for full-scale propeller research that would not have been built, says Hansen, if Weick had not suggested the need for such research. This wind tunnel, built at Langley, was the first facility of its kind anywhere in the world. In this pioneering tunnel, Weick and his Langley associates designed the original NACA low-drag engine cowling, for which NACA won its first Collier Trophy, a prestigious award given annually by the National Aeronautic Association for the "greatest achievement in aviation in America during the preceeding year." During the same period, he wrote one of the first textbooks on the design of aircraft propellers, a book now considered a classic.

Fred Weick, in the rear seat, and Charles Lindbergh, in the front seat of his Sirius, are pictured with Tom Hamilton after propeller tests.



The W-1 with original fins in the NACA Full-Scale Tunnel at Langley.



From the Ground Up

Fred Weick Wanted Everyone to be Able to Enjoy Aviation

Weick's lifelong dream was to build a low-cost and simple-to-fly airplane that was so inherently safe and inexpensive to operate and maintain that air travel could compete with the automobile as a mode of private and family transportation. In pursuit of his dream, he and a small group of colleagues from Langley designed the W-1. Their private venture, a home-built experimental airplane, had several unique features, including an elevator whose upward travel was limited to the point where the airplane could not be forced into a spin. Another innovative feature of theW-1 was its coordinated control system. Weick's idea was to reduce the number of controls from three to two by connecting the ailerons and rudder, thus eliminating the possibility of crossing these two controls and , thereby, simplifying the process of learning to fly.

In order to make it easier both to taxi and land the plane, Weick also equipped the W-1 with what was then an unconventional undercarriage--he moved the two main wheels a short distance behind the plane's center of gravity, took away the tail wheel and added a nose wheel that could be steered. Weick dubbed this new undercarriage a "tricycle gear," a term still used today. Soon, starting with the Douglas DC-4, all American airliners were designed with a version of the tricycle landing gear designed by Fred Weick. This was a substantial and lasting contribution to aeronautics--in fact, the tricycle arrangement is used for the landing gear of the Space Shuttle.

In the late 1930s, after leaving Langley, Weick began designing the now-famous Ercoupe, a two-seat, all-metal, low-wing cantilever monoplane that incorporated the W-1's tricycle gear arrangement as well as an improved version of the W-1's coordinated control system. The Ercoupe had no rudder pedals but instead was flown entirely by the control wheel.

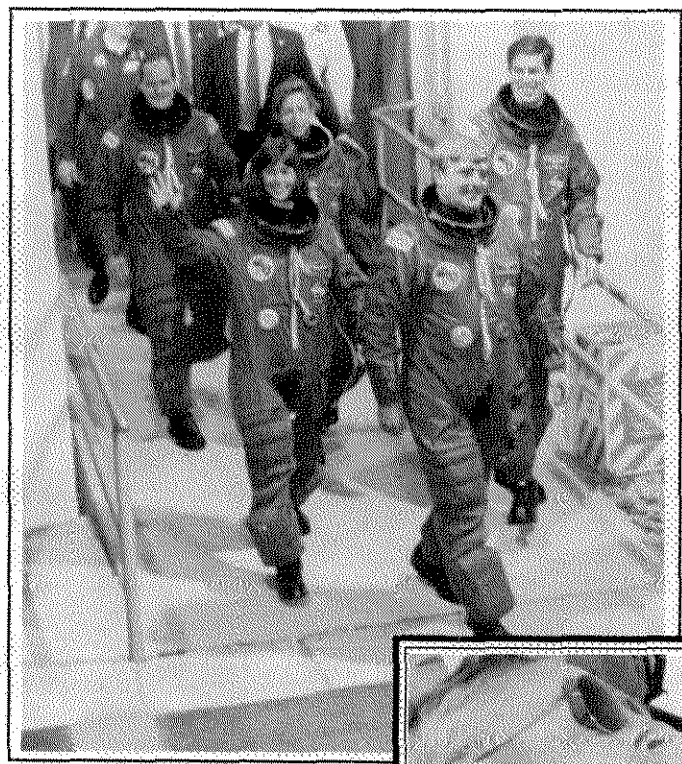
For its day, the Ercoupe was a very clean design. With its original 65-horsepower engine, the little plane cruised at 100 miles per hour (and a top speed of 118mph) on only four or five gallons of fuel an hour. But its popular appeal was its safety and simplicity. It was so easy to fly that many student pilots mastered the Ercoupe in five hours or less.

You're invited. . .

All employees are invited to attend the celebration honoring Fred E. Weick. Reservations are limited to the first 200 who respond. Cost is $10 per person.Please contact Ann Suit, Mail Stop 154, ext. 43305, by February 12 for reservations.

Copies of ***From the Ground Up**, The Autobiography of An Aeronautical Engineer*, by Fred Weick and James R. Hansen will be available for sale at the Visitor Center Souvenir Counter. A limited number of copies will be available for purchase at the H.J.E. Reid Auditorium on February 19.

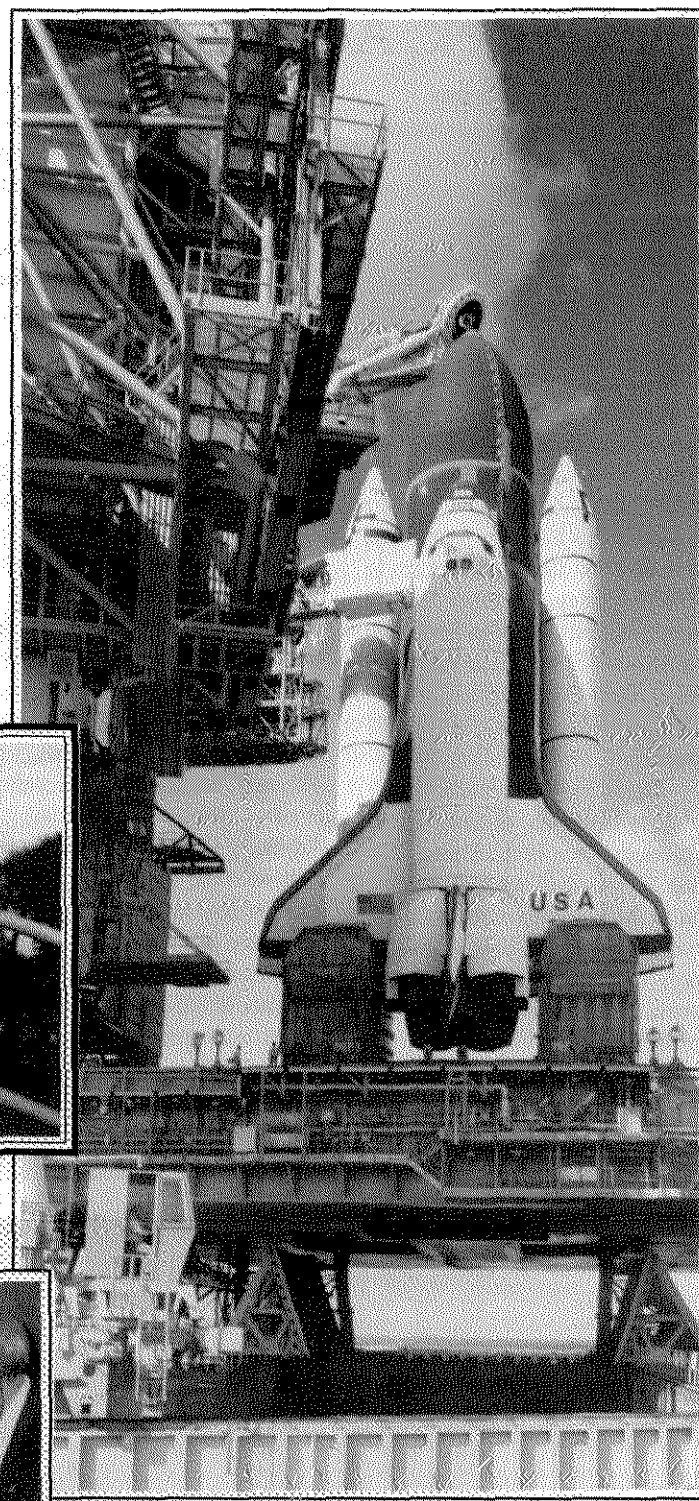
The Drama of STS-32: the Retrieval of LDEF



KSC

STS-32 crew--Dan Brandenstein, Bonnie Dunbar, Marsha Ivins, Jim Wetherbee and David Low--enter the orbiter Columbia.

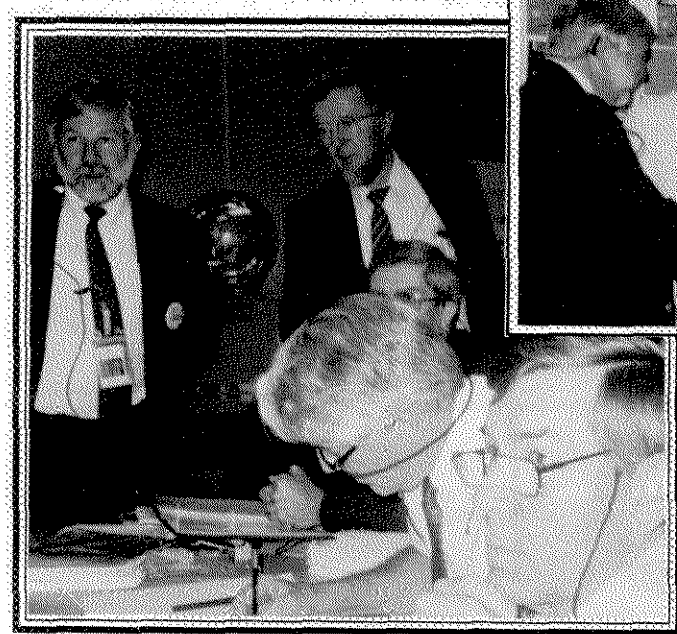
Liftoff of STS-32 is witnessed by former Langley deputy director Oran Nicks and current deputy Paul Holloway.

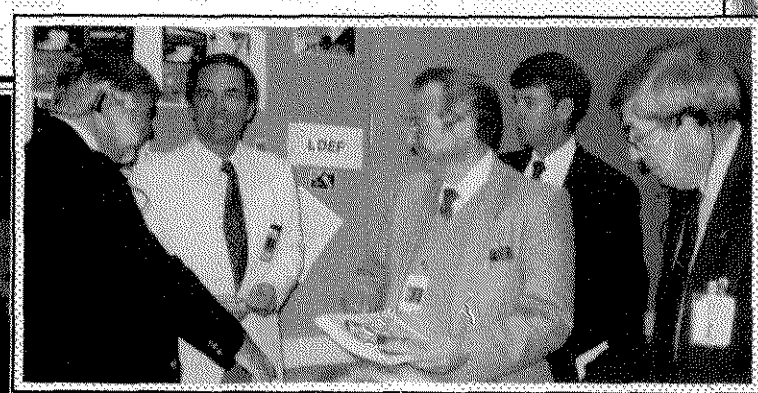


Columbia sits ready at refurbished launch complex 39-A.

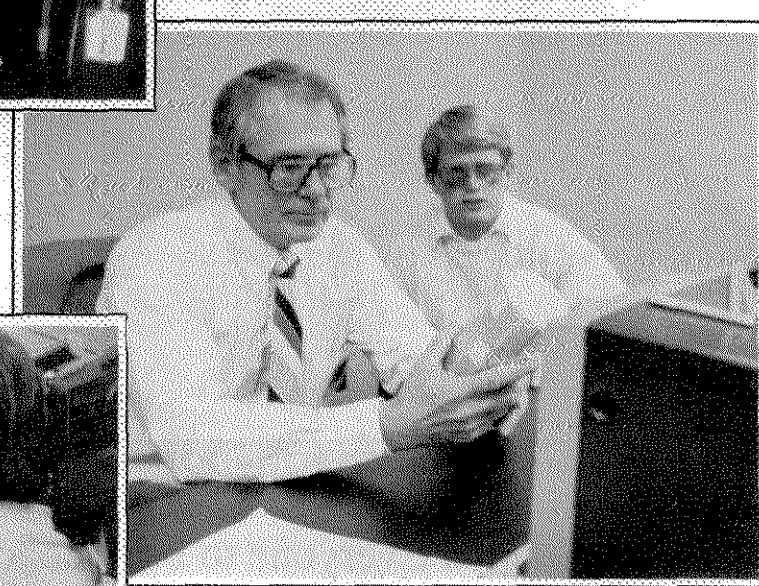
JSC

Langley *LDEF* team focuses on retrieval activities. Clockwise from top are Burt Lightner, Larry Brumfield, Bob O'Neal, Bill Kinard and Carol Kiser.





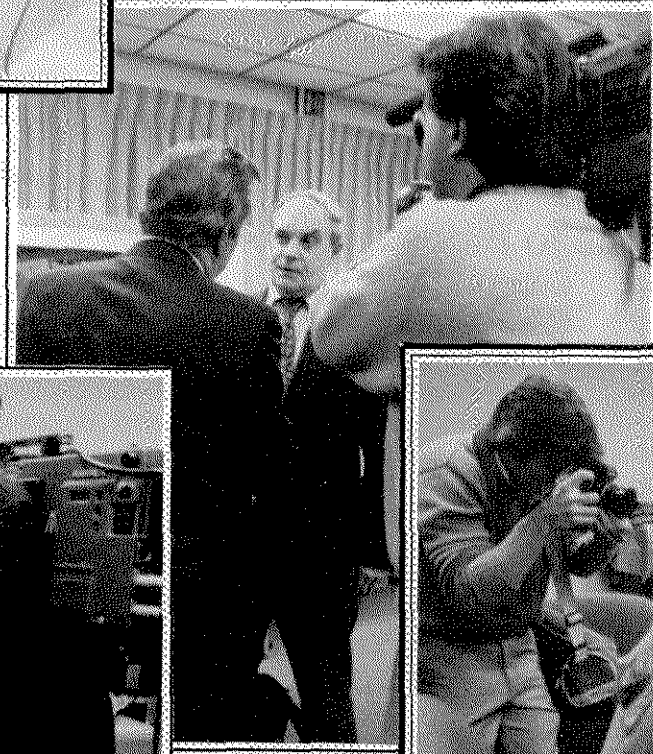
WE HAVE LDEF! These three words are mirrored in the expressions of (L to R) Lightner, Shuttle Director Robert Crippen, Frank Allario, Associate Administrator for Headquarters Office of Space Flight William Lenoir and O'Neal.

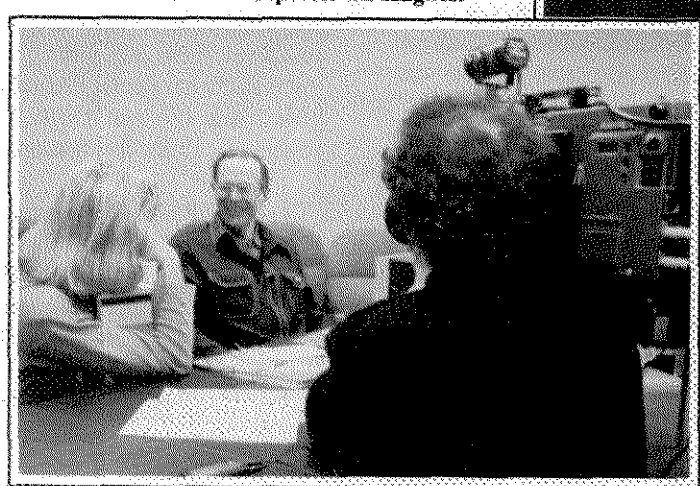


Don Humes and Bruton High student Reggie West are intent as they view the photographic survey of LDEF.

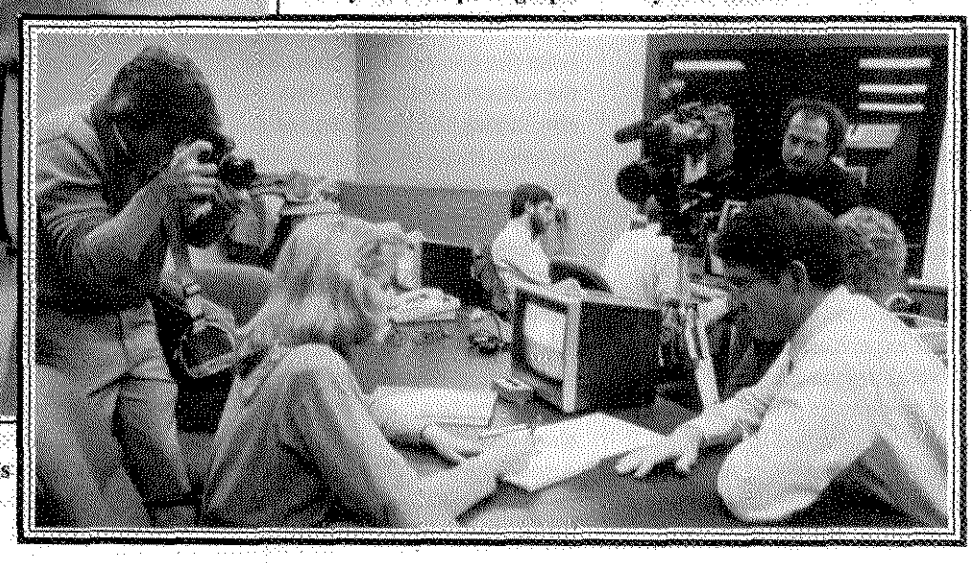
LaRC

Wayne Slemp is interviewed by WTKR-TV-3 reporter Ed Hughes.





Gale Harvey breathes a sigh of relief at LDEF's capture.



Jim Jones tells Langley's LDEF story.

People & Places

Health Corner

Heart Disease-Exercise Connection in Women Verified by Study

Women in poor physical shape are three times more likely to die at an early age of heart disease than are those who keep themselves in good condition. This conclusion is the result of a ten-and-one-half-year study of almost 3,000 women between the ages of 30 and 70.

Dr. Lars G. Ekelund, the principal author of the study, said his data provides the first strong evidence that exercise protects women from heart disease just as it does men. "Poor physical fitness is almost as important as smoking is a risk factor for cardiovascular disease in women," said Ekelund, a researcher at the University of North Carolina.

"It has been shown by many studies that you can improve fitness levels by just walking," he said. Many people could benefit from this. Later, as they feel more fit, they could progress to a more aerobic walk or jog. But the important thing is to have a regular exercise program."

Women: get spring fever early. Get outdoors and walk. Your heart will love you for it.

Employees Support Bloodmobile

Langley employees, contractors and retirees have donated 1,696 pints of blood in 1989. At the November 29 Bloodmobile, 297 pints of blood were collected. Those achieving gallon status are:

9 gallons--Jack Hewter, Daniel Dicarlo and Earl Knight;

8 gallons--Walter Wade;

7 gallons--Carl Larsen, Charles Sweet and Joseph Price;

6 gallons--Randy Fly, James Pike, Clarence Cole, John Cline, Robert Mack, James Cormsen and Kenneth Ellis;

5 gallons--James Adkins, Charles Dunton, Harry Benz and Dennis Holloway;

4 gallons--Catherine Smith and Ann Carlson;

3 gallons--Timothy Wood, Donald Ruth, Daniel Fisher and Randall Valand;

2 gallons--Jimmy Case, Steve Lee, Scott Colbert, Harry Belvin, George Palko, Nicholas Kepics, Carol Satterwhite and Chancer Hill;

1 gallon--William Wilson, Albert Trospher, Bradley Leighty, Mary Liggins, Richard White and Gerald Plassman;

First timers--Toby Comeaux, Martha Jones, Kathleen Long, Michelle Sample, Kendall Freeman, Carissa Smith and James Guy.

Notes of Thanks

Patricia Dinwiddie writes: "I wish to personally thank those individuals who contributed their leave to me. What wonderful people and friends I have at Langley."

Gloria Champine writes: I want to thank all my friends who contributed to and participated in my recent retirement dinner. It was a memorable occasion for my family and me. The wonderful memories and close relationships developed over thirty years will be cherished always."

Visitor Center Opens Doors for Professional and Technical Society Events

Langley is continuing its commitment to the public by offering a community service to share NASA Langley's rich past and promising future. The Visitor Center is now available, at no cost, to professional and technical societies interested in holding a meeting or special event at the Center.

As part of the service, the Visitor Center will provide a short overview of Langley Research Center, open the galleries and gift counter and provide a staff member to ensure the full educational benefits of holding a function at the Center. Also breakfast, lunch, dinner or hors d'oeuvres can be arranged, depending on the needs of the group.

Langley is proud to offer its Visitor Center an an alternative meeting place for groups. Whether it is a monthly business meeting during lunch or an evening social hour, the Visitor Center will accommodate the group to make it a successful function.

For more information about this new community service, call Dr. Mark Nataupsky, Visitor Center director, at 864-1580.

Langley Colloquium and the Sigma Series

Voyager Encounter of Neptune

Dr. Steven W. Squyres

Professor of Astronomy, Cornell University

2 p.m. H.J.E. Reid Auditorium

7 p.m. Holiday Inn, Hampton

Have Goggles, Will Travel

Aviatrix Wows Langley Audience

-by Carol Petrachenko

"I found myself getting goose bumps everytime I'd go to an airshow and there were antique bi-planes...blowing smoke out the back...with wing walkers...," said Martha Esch, the Ohio native who hitched rides on vintage planes from May to November 1988. "The Golden Age of Aviation seemed such a more celebrated and special time. People came out to airports. They pointed to the sky every time an airplane came flying over."

In celebration of the Golden Age of Aviation, Esch found a way to relive the glory of flight in an open cockpit---without paying for a single ride. Wearing 1930s aviatrix costumes, her motto was "Have goggles, will travel."

On January 8, Esch was NASA Langley's first Colloquium speaker for 1990. She had distilled the approximately 4,800 slides she had taken of her 29,117-mile adventure into 45 minutes of entertainment. Pictures of flying bi-planes dissolved into aerial photos of some of the most beautiful land in the world---the Grand Canyon, a smoking Mount St. Helens, Niagara Falls, the Statue of Liberty---America. The smiling faces of the many people who had helped her on her journey beamed down from the H.J.E. Reid Auditorium screen.

As Esch talked and background music played---from honky-tonk to jazz---it became clear that her odyssey was more than just 183 days of flights in airplanes over 25 years old. The approximately 350 people in the audience saw that here was a young woman who had had the courage to make her dreams come true. They also saw, through her fine photography, a glimpse of the goodness of the American people. She had received rides from 200 aviators in 215 different airplanes

Before beginning her trip, Esch had placed a classified ad in *Trade-a-Plane* magazine. She used the 250 replies she received to contact people for rides.

"Quite often I had to have people come pick me up," she said. "One woman flew 300 miles in her Cessna 195 to pick me up."

Esch's longest flight---1,878 miles in a P-51 Mustang---started in Chino, California, stopped in Arizona, Kansas and Nebraska, and ended at Oshkosh, Wisconsin. "I have planted my feet in each of the lower 48 states."

In early 1988, Esch, a fine arts graduate and pilot with commercial, multi-engine, instrument and flight instructor ratings, found herself frustrated at being on the ground for a number of months due to "being pretty much broke." She longed to fly the classics---the Stearmans, the Travel-Airs, the Tigermoths. From her experience at airshows, she knew that pilots love to share the empty seat in their airplanes. "After spending countless hours waxing and shining, they want to share their planes with other people."

It occurred to her that she might be able to "aerial hitchhike" her way across the country if she offered to exchange photographs of pilots and their vintage airplanes in return for rides. Someone suggested that the pilots would better appreciate having the photos included in a book about her adventures.

Esch is presently working on that book, *Have Goggles, Will Travel*. It is due to be published in about a year.

When Esch began her presentation at NASA Langley, she asked the audience to stand and raise their right hands. Then, to the surprise of the members of the audience, she proceeded to induct them into "The Air Adventurers Association," a club founded in 1930: "To the best of my ability I pledge myself to support the ideals and principles of AIR ADVENTURERS and *will do all in my power to further the advance of aviation*." This was certainly a most fitting way to begin at NASA Langley.

Her audience chuckled. And then, as the slide show began, interspersed among the Cessnas, Piper Cubs and Aeroncas, would be occasional photos of people in fields, in front of hangars and sitting in planes, also with their right hands raised. Martha Esch had been doing her bit for aviation all over this wide country of ours!

Happenings

SPECIAL LAA SOCIAL will be held Friday, February 16, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment will be provided by *Foxfire*. $1 cover charge.

DISCOUNT TICKET SALES. Effective January 1, 1990, all discount ticket sales, except Busch Gardens season passes, will be sold at the Visitor Center Souvenir Counter. The Souvenir Counter is open Monday through Saturday from 8:30 a.m. to 4:15 p.m.; Sunday, from 12 noon to 4:15 p.m. For additional information, call 864-1739.

VA TECH SKI TRIP to Massanutten, Thursday, February 15. Bus departs Newmarket South (near Hechinger's) at 5 a.m. and returns at 9 p.m. $43 includes transportation and lift ticket. Limited number of reservations available. Contact Joe Drewery, 722-4443, for information.

FOR RENT: WATERFRONT HOME in Seaford. 2 BR, Washer/Dryer. Lawn care, no pets. Call 898-7464.

FOR RENT: HOME in Poquoson. 3 BR brick house with FR and garage. Corner lot; fenced back yard. Deposit and lease required. Call 898-8111.

NEEDED ROOMMATE. Female to share 3BR, 2-1/2 bath townhome in Poquoson. Child welcome. $260/mo. plus 1/2 utilities. Call Anita at ext. 43324 or 868-4486 after 5 p.m.

Reminder:

LaRC Alumni Association members are invited to attend a retreat/reunion for ex-Center employees (both NACA and NASA). This **Langley only** affair is scheduled for March 23-25 in Durham, N.C. For details, call Abe Leiss, 877-2939, or Axel Mattson, 898-7462.

Retirement Parties

A retirement luncheon will be held for **Evelyn D. Wallace** Friday, February 9, 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. The cost of the luncheon is $7.50 and includes gift. Contact Suzanne Melson, ext. 43568, Mail Stop 380, for reservations.

James L. Williams will be honored at a retirement dinner Friday, February 9, at 5 p.m. in the executive dining room of the NASA cafeteria, Building 1213. Cost is $10/person; $18/couple. Donations of $2 for gift are welcome. For reservations, make check payable to Joe Walz, Mail Stop 499, ext. 44053 or 595-4593, by February 2.

Outgoing Toastmasters President Dr. Steven Yaros passes the gavel to new president, Dr. Christine Darden. Additional officers for NASA Toastmasters Club are (back row, L to R) Bob Miserentino, District 66 educational vice president; Richard Booth, educational vice president; Dan Slowikowski, secretary; Troy Landers, treasurer; Dan Whitaker, publicity vice president; and Myra Walton, membership vice president.

Runners Club Announces Race Results

The electronics contractors (UNISYS, CSC, CDC) team won the Langley Interdirectorate 5 KM race held December 7. The first finisher was Steve Robbins, UNISYS, with a time of 17:28.

Team results are as follows:

1st	19 pts	Electronics	Robbins, Slominski, Sudik, Thorsen
2nd	32 pts	Electronics	Earls, Hoppe, Ferguson, Drozdowski
3rd	48 pts	Space	Shipman, Harvey, Bachmeier, Aguirre
4th	51 pts	Aeronautics	Bauer, Dunham, Thomas, Wusk

Researcher News

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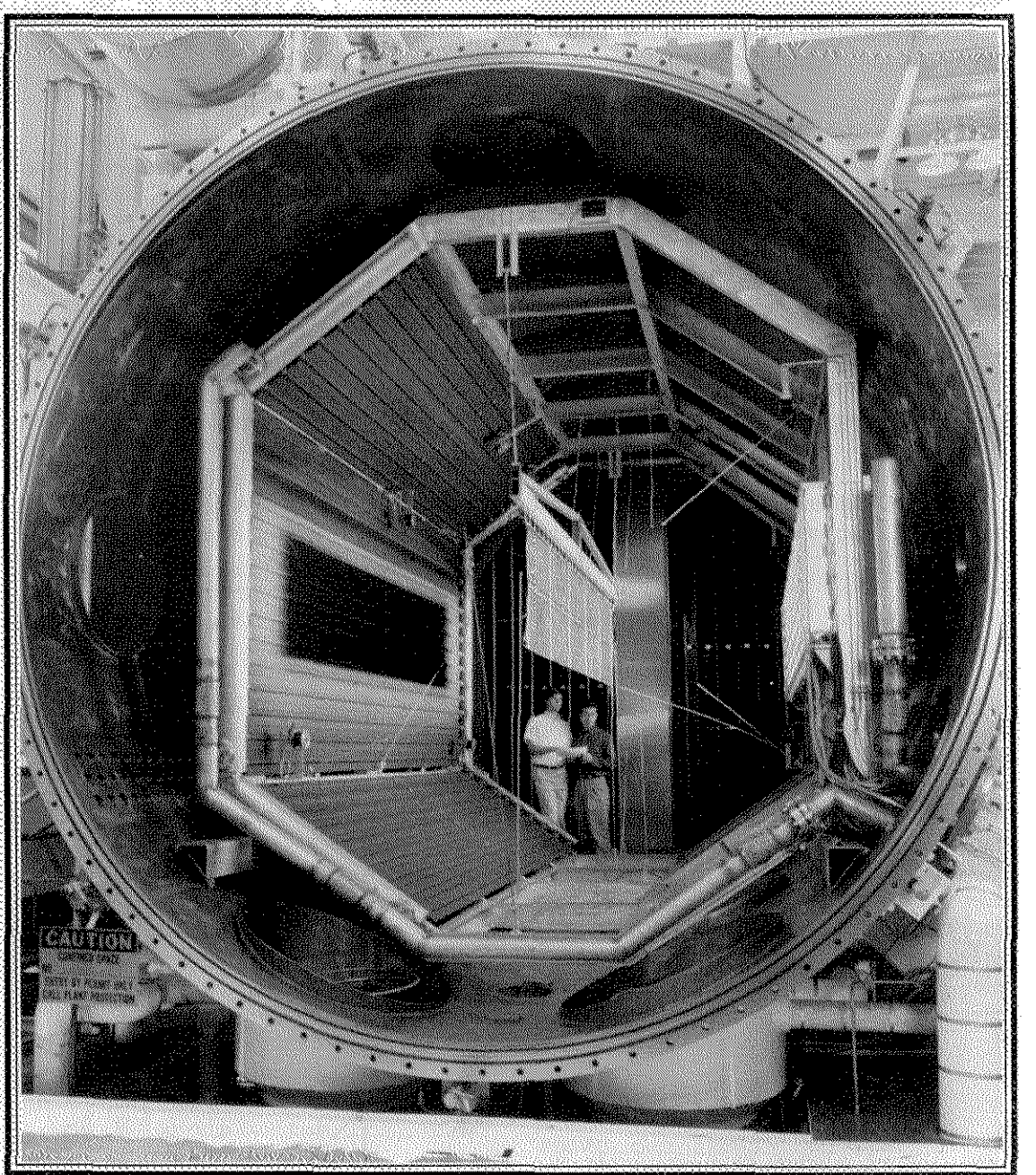


Lewis Research Center operations engineers Don Martin and Ken Mellott make final checks prior to plasma interaction tests with Space Station Freedom solar array panels. A series of tests were conducted in the "space-like" environment of Lewis' vacuum chamber to evaluate the effects of space plasma on solar panels. Test results will be used to determine optimum panel design and operating parameters and to select an appropriate mechanism for the arrays. The panels were developed for Lewis by Lockheed Corp.

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 3 February 9, 1990

Bi-weekly Employee and Contractor Publication

First Look at Long Duration Exposure Facility Shows Few Surprises

Television views, astronaut commentary and post-retrieval photos of the Long Duration Exposure Facility (LDEF) from the STS-32 Shuttle mission suggest that the condition of LDEF is about as NASA officials expected.

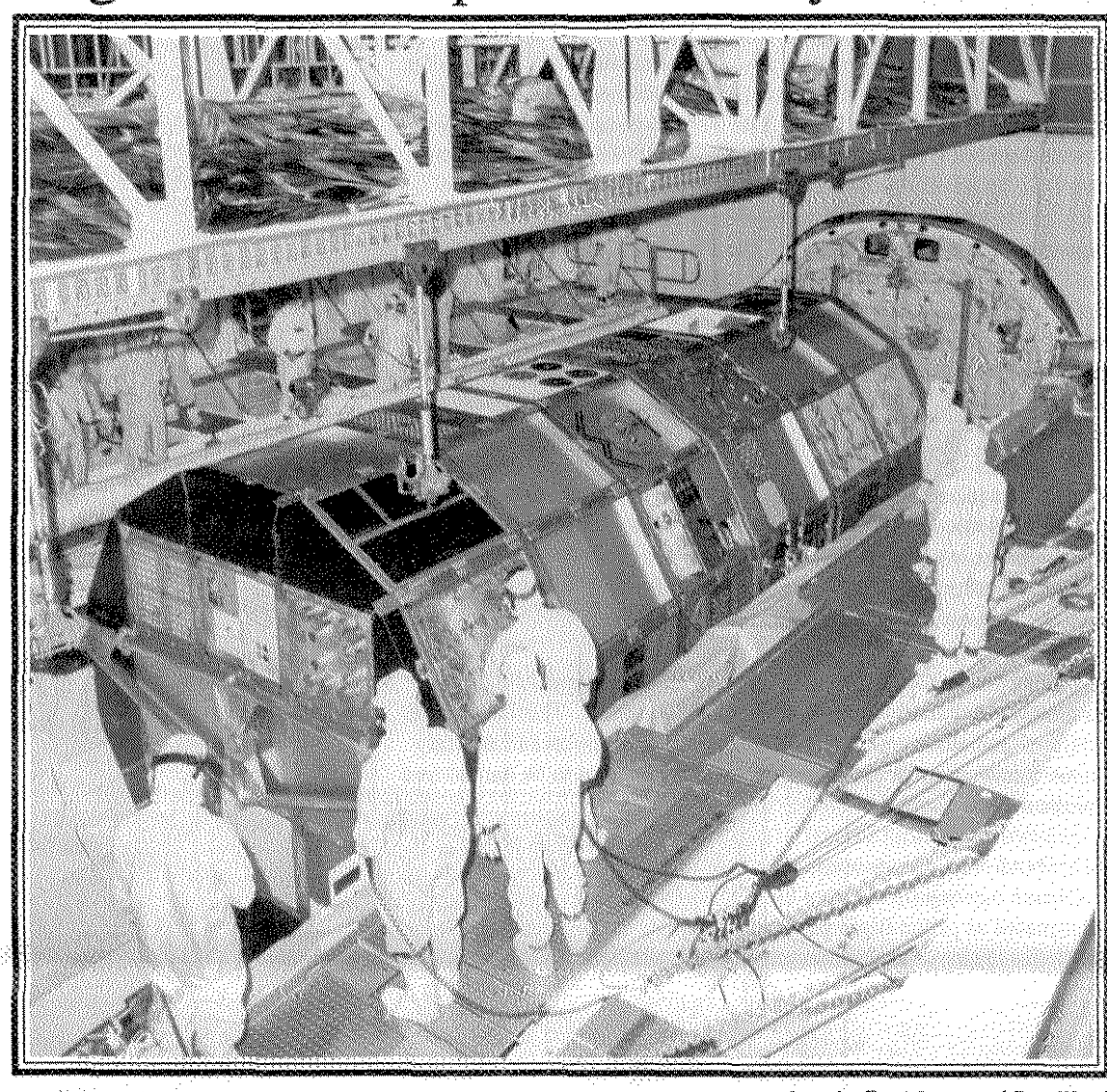
The objective of LDEF, which orbited Earth for nearly six years, was to measure the effects of atomic oxygen, space radiation, micrometeoroids, man-made debris, vacuum and other space-related phenomena on more than 10,000 test specimens. Some of those effects were immediately observable on LDEF during in-flight recovery operations.

Some thin film test specimens appeared to be degraded or completely eroded. Also thin film balloon material test specimens were broken away at one end. These are expected results that will be fully analyzed when the principal investigators have access to their LDEF experiments.

The Kapton thermal covers on two heavy ions in space experiment trays were partially peeled back, in the words of one astronaut "like a sardine can." In addition, the thermal cover strips around the detectors of a space plasma high voltage drainage experiment appear to have eroded away. Impact on these experiments will not be known until researchers can examine them.

At least one of the thermal covers of an ultra-heavy cosmic ray nuclei experiment, located adjacent to LDEF's leading edge, exhibited more apparent debris or meteoroid impacts than anticipated but there probably was no effect on the cosmic ray data obtained. Investigators will pay particular attention to this area during post-flight examination of the satellite to determine the nature of the deterioration.

LDEF program officials also noted discoloration around the high voltage leads of an interstellar gas experiment. Just what this means will be studied in the data analyses that are the next step in the LDEF program.



-photo by Fred Jones and Don Ward

LDEF is lifted from Columbia's cargo bay in the Orbiter Processing Facility at the Kennedy Space Center. Next it will be transferred to the Operations and Checkout Building and loaded onto LATS, it special transporter. From there it will move to the Spacecraft and Encapsulation Facility II for inspections and photos.

Space Shuttle orbiter Columbia and LDEF arrived at Kennedy Space Center on January 26. The orbiter was demated from the Boeing 747 Shuttle Carrier Aircraft and towed to the Orbiter Processing Facility (OPF) shortly thereafter. LDEF was removed from Columbia's payload bay late on January 30.

LDEF was transferred to the Operations & Checkout (O&C) Building the first of February and loaded onto a special transporter. The satellite was then moved to the Spacecraft Assembly and Encapsulation Facility II (SAEF II) where researchers will inspect and photograph its structure and experiment trays through mid-February. Program officials estimate that removal of the experiment trays will begin later in the month.

A meeting of the LDEF Investigator Working Group will take place at Langley this summer on a date to be announced later. A press release summarizing the preliminary results will follow the meeting.

LDEF contains 57 science and technology experiments representing more than 200 investigators, 33 private companies, 21 universities, seven NASA centers, nine Department of Defense laboratories and eight foreign countries. Experiment analysis is expected to provide invaluable data for the design of future spacecraft as well as insight into Earth's cosmic origins.

Pritchard Heads New Office

Langley Establishes Human Exploration Office

NASA is aggressively moving forward in the area of human exploration of space and Langley is preparing to be a part of that initiative. To that end, Center management has established, pending the approval of NASA Headquarters, a Human Exploration Initiative Office (HEIO), reporting directly to the Director for Space.

E. Brian Pritchard has been appointed to head the HEIO. Pritchard will spearhead the effort to vitally involve Langley in the Nation's program for human exploration of the solar system. HEIO will be responsible for recommending and advocating the Center's role in this important Agency effort. In his new position, Pritchard will lead mission and systems analyses to define technology needs and development options.

Pritchard views his role as "the development of the strategic plan as well as the business plan to involve Langley in a major way in the human exploration initiative." He believes that Langley will be involved not only in technology development but also in a more visible, developmental role. Just what Langley's role will be and what facilities and personnel will support it are the immediate concerns of the new office. "One of our first jobs will be to review the Human Exploration Initiative Assessment done by Joe Talbot and his team," said Pritchard. "We'll review the options outlined and proceed from there.

"Personally, I'm very excited about the opportunity," said Pritchard. "I've been working planetary missions, off and on, throughout my entire career." Having been involved in the Viking initiative, Pritchard is very optimistic about a return to Mars. More recently, he has been actively involved in the NASA Headquarters' Office of Exploration, looking at requirements for transportation nodes.

Pritchard was formerly deputy manager of the Space Station Freedom Office at Langley. His responsibilities included definition of space station systems and the capabilities required to meet future requirements and assessment of the needs and benefits of advanced technologies for the evolutionary space station.

He began his NASA career in 1959 as an aerospace technologist.

February is Black History Month; Program Planned February 23

Dr. Howard G. Adams, executive director of the National Consortium for Graduate Degrees for Minorities in Engineering, will speak February 23 as part of the Center's annual Black History Month Program. Adams will address "Understanding the Crisis in American Education: It is More than the Minority Communities' Problem." Dr. Adams was formerly vice president of student affairs and director of alumni affairs at Norfolk State University.

Langley employees and retirees are invited to attend a reception and dinner honoring

Fred E. Weick

Monday, February 19, at 6 p.m.
in the H.J.E. Reid Auditorium

The cash bar social begins at 6 p.m. A Chicken Kiev dinner for $10 per person begins at 7 p.m., followed by a program. For reservations, contact Ann Suit, Mail Stop 154, by February 12. Mr. Weick may consent to autograph a few copies of his recent autobiography, *From the Ground Up*. Limited copies are available at the Visitor Center Souvenir Counter.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA and Global Outpost, Inc., Alexandria, Va., have signed an agreement under which NASA will support Global Outpost's exploration of the feasibility of using Space Shuttle external tanks as research, storage or manufacturing facilities in low-Earth orbit. This activity is part of NASA's effort to seek and encourage, to the maximum extent possible, the fullest commercial use of space.

JOHNSON SPACE CENTER, Houston, Texas --- Four Space Shuttle mission specialists currently assigned to STS missions have been designated as payload commanders. Named as payload commander for STS-42, the first flight of the International Microgravity Laboratory (IML-01) set for late 1990, is Norman E. Thagard, M.D. Kathryn D. Sullivan, Ph.D., will serve as payload commander for STS-45, the first flight of the Atmospheric Laboratory for Applications and Science (ATLAS-01), slated for launch in 1991. Payload commander for STS-46 is Jeffrey A. Hoffman, Ph.D. The STS-46 mission, set for 1991, will feature the first flights of the European Retrievable Carrier (EURECA), developed by the European Space Agency, and the Tethered Satellite System, a joint project between NASA and the Italian Space agency. Air Force Lt. Col. Mark Lee will be the payload commander on mission STS-47 for Spacelab-J, a joint science venture between NASA and the Japanese National Space Development Agency.

HEADQUARTERS, Washington, D.C. --- NASA issued its January 1990 Payload Flight Assignments manifest for both the Space Shuttle and expendable launch vehicles (ELV). NASA plans 64 Space Shuttle and 30 ELVs missions through September 1995. The most significgant change to the manifest is the movement of the Gamma Ray Observatory from its June launch date into a November flight period aboard Atlantis.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- A major advance in cosmology was revealed as early results from NASA's Cosmic Background Explorer (COBE), launched last fall, were presented at the American Astronomical Society meetings held at Crystal City, Va. Limited COBE data now indicate a smooth, uniform Big Bang. However, small deviations from a blackbody spectrum--the uniform temperature--would reveal energetic processes in the early universe.

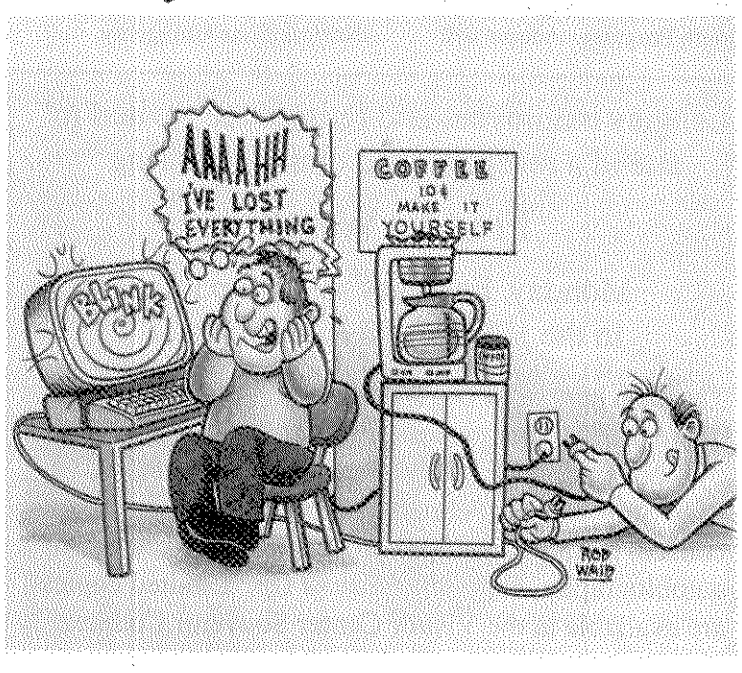
JOHNSON SPACE CENTER, Houston, Texas --- In the first of what will become standard biennial selections, 23 new astronaut candidates have been named for the Space Shuttle program. The 1990 group consists of 7 pilot candidates and 16 mission specialist candidates, including 11 civilians and 12 military officers. Among the 5 women selected are 3 military officers, including the first woman to be named as a pilot candidate, and the first Hispanic woman to be chosen.

HEADQUARTERS, Washington D.C. --NASA has announced, after consultation with the Canadian Space Agency (CSA) and the European Space Agency (ESA), that Dr. Ulf D. Merbold, ESA, and Dr. Roberta L. Bondar, CSA, have been designated as prime flight payload specialists for the first International Microgravity Laboratory mission (IML-1) aboard Columbia scheduled for December 1990.

-photo by Sandy Horsey

LANGLEY IS ON THE CUTTING EDGE OF ANOTHER TECHNOLOGY. Gathered to cut the ribbon opening the Experimental Test Range (ETR) are (L to R) J. F. Creedon, W. W. Anderson, T. G. Campbell, B. M. Kendall, R. H. Petersen and R. L. Swain. The ETR is a new laboratory for electromagnetic research and testing.

Lankley



News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

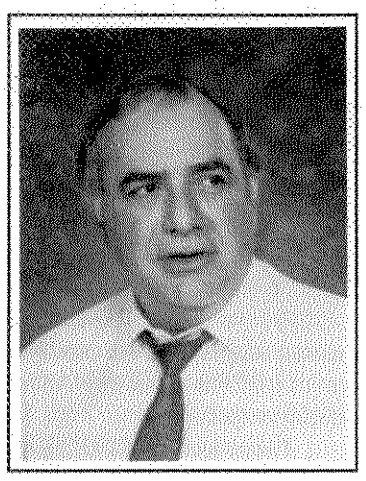
Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Editorials

Langley

Headquarters Forum



LDEF is home! What was originally intended as a quick experimental satellite program that would capitalize on all of the new capabilities provided by Shuttle has stretched to about 20 years, and it will still be productive for many years to come.

Conceived, designed and built by Langley, LDEF affords the opportunity for major advancements in the understanding of long duration exposure in space at minimum costs. Because Shuttle enabled a two-way trip for the exposure of specimens, all of the expensive testing equipment remains in the investigator's laboratory.

LDEF was strongly supported by three Center directors over its life. The first, Ed Cortright, and his deputy, Oran Nicks, joined us on January 8 at Kennedy Space Center (KSC) for the scheduled launch. The combination of rapidly variable weather, pad problems and a ship that strayed into the flight path soon removed the possibility of launch on that day. On the 9th, however, the Shuttle enjoyed what has to be the smoothest countdown in the history of the program.

That launch set the tone for the rest of the mission. Rendezvous and retrieval on January 12 were of textbook quality. Dan Brandenstein, Bonnie Dunbar, Marsha Ivins, Jim Weatherbee, and David Low performed individually and as a team with a perfection that future crews will strive hard to match. The night landing, again a day late due to weather, was flawless. And to cap off a perfect mission, LDEF in the payload bay of Columbia atop the 747 left California on Thursday, the 25th, and landed at KSC on Friday, the 26th, at approximately 3:30 p.m.-- ahead of schedule.

In the Johnson Space Center (JSC) Mission Control Center during retrieval, I overheard comments from senior JSC and NASA officials, as they viewed LDEF from the various angles during the photo survey. The importance of the data to be obtained for future missions was both obvious and overwhelming. Several expressed relief that we had achieved retrieval before it was too late. Everyone at Langley echoes that feeling.

There was some concern in NASA Headquarters, as we prepared for the mission, that the photographic survey could be too risky. A problem might develop with the Remote Manipulator System (RMS) that would prevent berthing--securing the spacecraft in the Shuttle payload bay. Bonnie Dunbar easily dispelled that concern through her personal skills and the demonstration of the RMS capability.

I first met Bonnie at JSC in the 70s when she was assigned to work on the Office of Aeronautics and Space Technology (OAST) orbiter experiments (OEX) with Langley. At that time she was anxiously awaiting a decision on her astronaut application. During STS-32, two primary Langley OEX experiments, the Shuttle Infrared Leeside Temperature System (SILTS) and the Shuttle Entry Air Data System (SEADS) were making their third flight. Preliminary indications are that they also performed as expected. Data tapes were retrieved during the week of January 29. So, Bonnie has a long history of working with Langley.

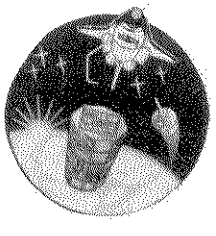
Similarly, Bob Crippen, commander of mission 41-C, deployed LDEF about six years ago. This month, as the new director of the National Space Transportation System, Bob was responsible for the retrieval.

As you would expect for a program conceived about 20 years ago, LDEF encompasses a great deal of NASA and Langley history. We should remember those scores of people who made significant contributions to LDEF and later retired. Some, like Bob O'Neal and Carol Kiser, came back to play critical roles in the retrieval (as you saw in the last issue of the **Researcher News**) and in the next step--the analysis of the data. There were countless others. I hope many can attend the program planned at KSC on February 14. I look forward to seeing you!

Congratulations to the LDEF team and, in particular, Bill Kinard. Bill was there at the beginning; he was there at the retrieval; he will be there for the analysis. He has been with LDEF full-time since its inception. Bill 's perseverance paid!

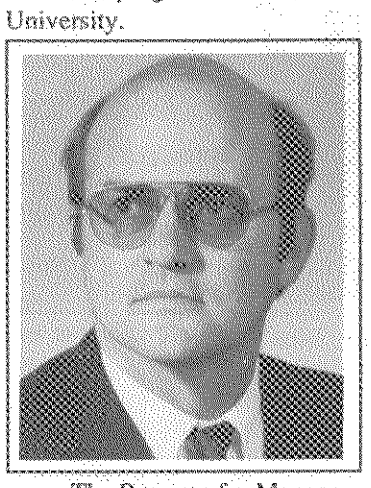
LDEF is home! What a great way to begin a new decade! Now the work begins again.

Paul F. Holloway
Deputy Director



Campbell to Attend Harvard Management Program

Thomas G. Campbell, head of the Antenna and Microwave Research Branch, has been chosen to attend the 1990 spring session of an education program at Harvard University.



The Program for Management Development is an intensive, 12-week program created by the faculty of the Harvard University Graduate School of Business Administration. The program is designed for exceptionally promising middle managers of proven ability whose future responsibilities in general management will demand skills and knowledge beyond those developed in a single specialty. The Harvard program investigates resourceful solutions to the managerial problems participants will encounter as they grow with their organizations.

Campbell explained that while at Harvard he will be studying with over one hundred other participants from major corporations in the United States and abroad to acquire a broad understanding of what it takes to successfully run a business. "Part of the program will be conducted using the case study method, popular at Harvard, which allows in-depth penetration of issues related to areas such as finance and marketing," said Campbell.

"My goal is to improve my management skills through a better understanding of new management concepts which will benefit NASA," he said. "Since my NASA career has been dedicated to the development of technology, participation with managers in the aerospace industry will sharpen my skills in critical management situations, especially problem solving and decision making. At Harvard, I will be exposed to varied international cultures as well as business and financial concepts implemented by other organizations."

Campbell is responsible for the branch research activities in Large Space Antenna (LSA) technology as well as the technology developments of airborne radar for wind shear detection, electromagnetics analysis for space station antennas, and development of the Microwave Reflectometer Ionization Sensor (MRIS), which is one of 12 experiments on the Aeroassist Flight Experiment (AFE) spacecraft.

He joined the Langley staff as an aerospace technologist in July 1961.

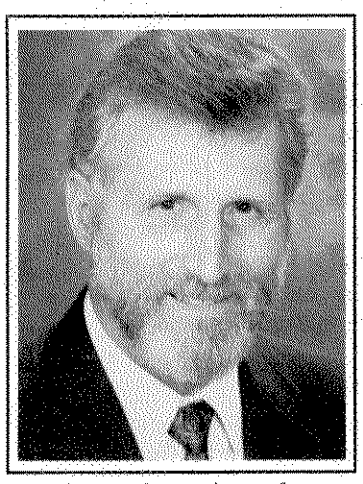
Fab Division Assistant Selected

Sullivan R. Donadio has been selected as assistant chief of the Fabrication Division. He replaces Douglas W. Whipple who was recently named the division's chief.

When he assumes the position on February 11, Donadio will participate in the planning and direction of technical services to fabricate research test models and associated systems in support of Center scientific and engineering project requirements. He will also be responsible for the continuing development of programs for improving fabrication methods and practices, including numerically controlled and computer-aided manufacturing systems and equipment.

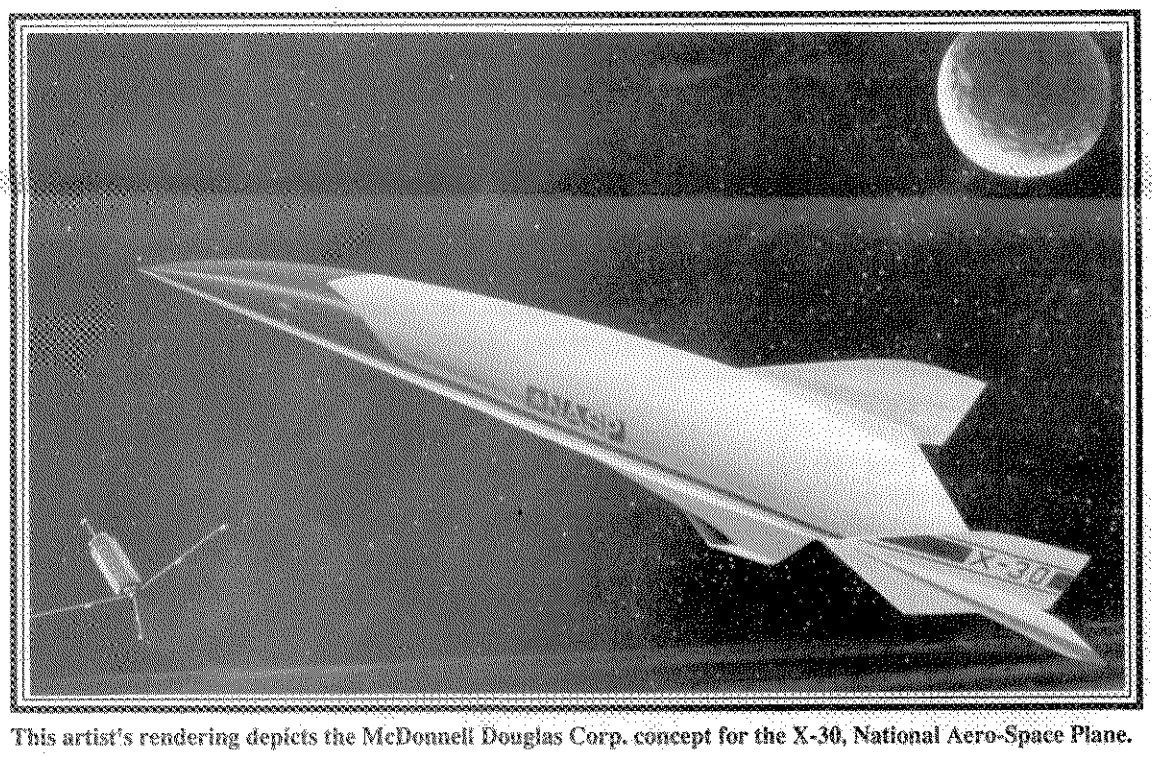
Additionally, he will develop and manage the Division Institutional Management System and serve as a consultant on manpower resource commitments, hardware make-or-buy decisions and manufacturing feasibility considerations. Further, he will participate in the overall administration of contracted fabrication services and represent the division on a variety of panels and committees.

Models developed by the Fabrication Division are used in the more than 40 wind tunnels at Langley and must be precisely built to ensure accurate test results. The division builds



complete scale versions of aircraft and spacecraft as well as their scale and full-size parts. Models for free-flying research applications are also fabricated within the division.

Donadio joined NASA Langley in 1958 as an apprentice machinist and has since specialized in metal model making, numerical control machining and research equipment development. In 1985, he was named head of the Composites and Models Development Section.



This artist's rendering depicts the McDonnell Douglas Corp. concept for the X-30, National Aero-Space Plane.

Competitors Team Up to Build Space Plane

The principal aerospace firms competing to build the National Aero-Space Plane (NASP) have agreed, in a highly unusual move, to form a single team to design and assemble the aircraft capable of taking off from a conventional runway and flying directly to orbit.

General Dynamics, McDonnell Douglas, North American Aircraft and Rocketdyne divisions of Rockwell International, and Pratt & Whitney division of United Technologies have announced their intention to form a National Contractor Team to jointly develop the NASP.

The five companies have submitted a proposed Interim Teaming Agreement to the government for approval. The proposed agreement will permit combining the best ideas and concepts for more focused configuration development; increasing technical depth which will be needed to design, build and test the NASP experimental aircraft; and providing a more effective use of national capabilities needed to ensure continued American leadership in aerospace.

Upon government approval of the agreement, the National Contractor Team will have the responsibility for designing, building and flying the NASP X-30 experimental vehicle.

Senior executives from the five companies met in St. Louis on January 22 and selected Rockwell International to provide the program director and to administer a National Program Office.

The National Program Office will be established to lead the contractor team. This office, staffed by all members of the team, will direct NASP development and serve as the principal point of contact between the government and the team.

Barry Waldman was named program director. He has 26 years of technical and management experience with Rockwell International.

"The creation of this team was built upon the strong sense of trust and cooperation between the NASP contractors," Waldman said. "I look forward to building even stronger relationships with the NASP teammates and meeting our program goals."

The contractor team will be a part of the NASP National Team headed by Dr. Robert Barthelemy of the NASP Joint Program Office at Wright-Patterson Air Force Base, Ohio. The NASP National Team consists of Department of Defense, NASA, industry, national laboratories and universities.

The five companies have been working independently on the NASP Program since 1985.

NASA Scholarships Available

Three college scholarships in the amount of $1,500 each are available for the 1990-91 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 eighth year. Michael Fripp, son of Dr. Archibald L. Fripp, senior research scientist in Langley's Information Systems Division, won a NASA scholarship last year. Michael is attending Virginia Polytechnic Institute and State University as a Presidential Scholar and is enrolled in an engineering science and applied mechanics program with an interest in medical research. He is interested in exploring the area of protein crystal growth in space.

Dr. Fripp is highly supportive of the NASA scholarship program. "It has been an inspiration to Michael, definitely an accomplishment of which he is very proud," he said. "In very realistic terms, NASA's support has allowed Michael to purchase a very fine computer that has been most helpful during his first year." Fripp is convinced that his son feels a keen obligation to succeed, not only for himself but for those who have supported him.

James O. Pendergraft, son of Odis C. Pendergraft Jr., aerospace engineer in Langley's Propulsion Aerodynamics Branch, won a NASA scholarship in 1983. He, too, attended Virginia Tech. Pendergraft studied electrical engineering and computer science and graduated in June 1987 with a bachelor's degree in computer science. He earned a master's degree from Tech in electrical engineering in 1988. He is now employed by Data General Corp.

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.

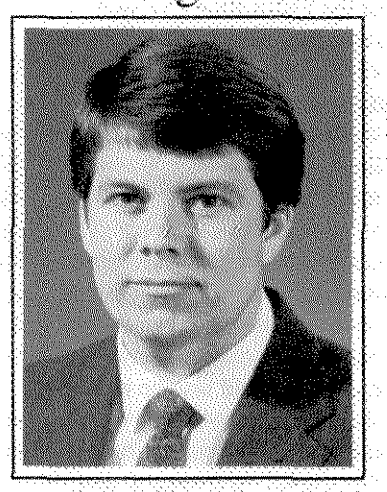
Completed application forms must be received at the Johnson Space Center no later than March 16. Late applications will be returned unopened.

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 Allan Hanrahan, Office of External Affairs, ext. 42762.

February at the Visitor Center

Aeroassist Flight Experiment (AFE) to be Examined at Brown Bag Series



An important phase of future space transportation relies on a Langley-based project called the Aeroassist Flight Experiment (AFE). Robert Calloway, AFE project manager, will discuss the experiment at noon February 14 in the Visitor Center theater. This free lecture is co-sponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

AFE will provide invaluable flight data needed to develop a spacecraft known as the aeroassisted orbital transfer vehicle.

Calloway will detail Langley's responsibility for the ground-based tests and development of the integrated flight experiments package. AFE is scheduled for deployment in May 1994 by the Space Shuttle Endeavour.

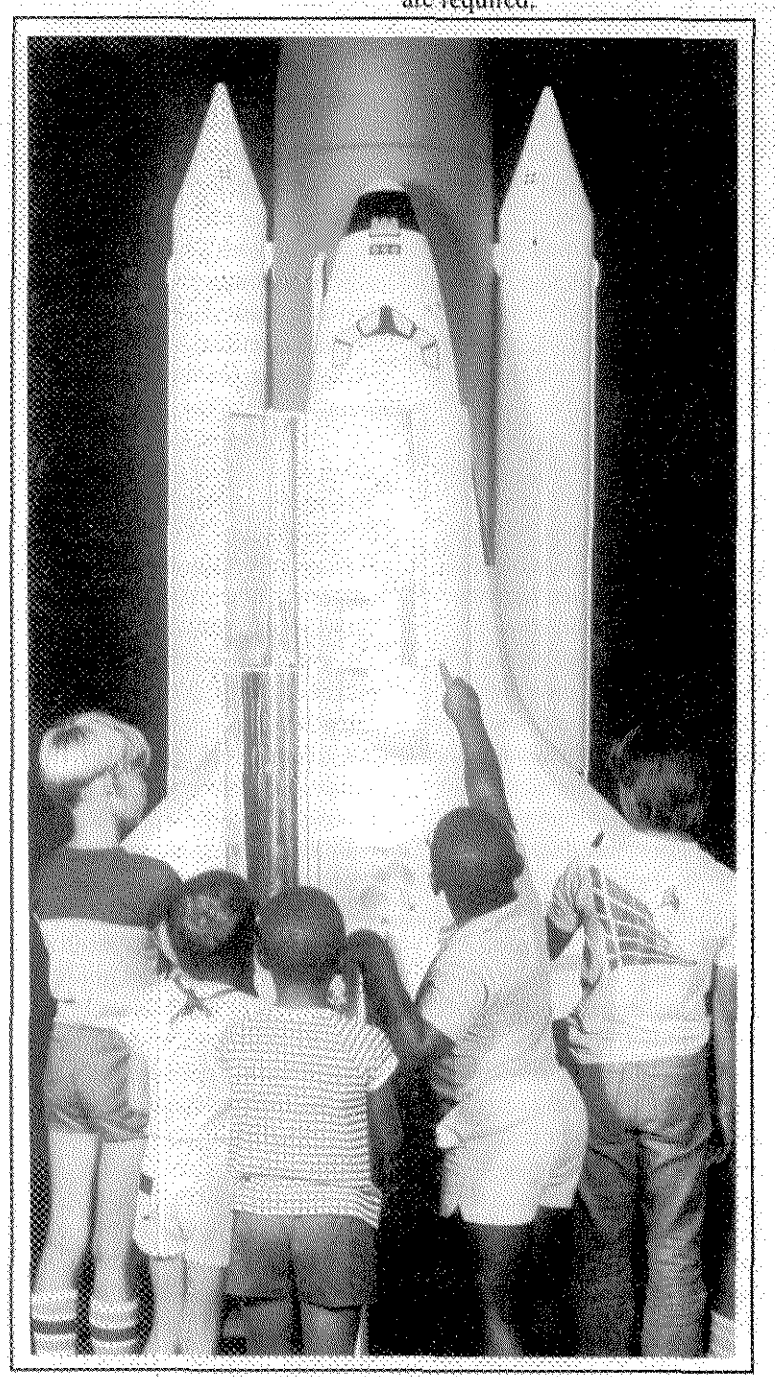
Children's Program Highlights "Life Aboard the Space Shuttle"

Do your children ever wonder what it is like to live in space? Do they want to be an astronaut when they grow up?

To experience life in space, the Visitor Center is offering a free children's program, "Life Aboard the Space Shuttle," on Saturday, February 24, at 10 a.m. in the theater.

This hands-on program, designed for children in grades 4 through 6, allows them to experience eating, sleeping and working in space. They will also be able to try on an astronaut suit.

To register for the program, call the Visitor Center at 864-6000. Due to limited seating, advanced reservations are required.



This scale model of the Shuttle, used in the children's program "Life Aboard the Space Shuttle" can be seen in the Space Gallery.

Retirement Parties

Harold Murrow will be honored at a retirement dinner Friday, February 23, in the H.J.E. Reid Conference Center, Building 1222. Cocktails (cash bar) at 5 p.m.; dinner is at 6. Cost for dinner and gift is $15/person. Contributions to gift only are welcome. Checks may be made payable to John Davis, Mail Stop 241, by February 16.

Robert L. Stallings will be honored at a retirement party on Tuesday, February 27, at the Langley Officers' Club. Festivities, featuring heavy hors d'oeuvres and cash bar, will be held from 5 to 8 p.m. in the Commander's Room. Cost is $12/person; $22/couple (gift included). Gift only contributions are also welcome. For reservations, call Janice Via, ext. 44568, and mail check to Mail Stop 170 by February 20.

Charles D. Nichols will be honored at a retirement party Friday, March 9, in the H.J.E. Reid Conference Center. A social hour (cash bar) will begin at 6:30 p.m., followed by heavy hors d'oeuvres at 7:30. Cost, including gift, is $12/person; $22/couple. Donations of $2 for gift only are welcome. For reservations, make check payable to Harry Benz, Mail Stop 473, ext. 41496 or 930-2912, by February 23.

Note of Thanks

Willie Curtis writes: "My retirement party was a grand occasion and I want to thank you for the many gifts and mementos. It was quite a send-off and a lasting remembrance of my NACA/NASA days. Thank you for attending and making this a very special occasion."

In Memoriam

Sympathy is extended to the families of:

Betty Malone, who died in September 1989 in Bradenton, Florida. Malone was a NACA and a NASA employee at the 8-Foot Tunnel.

Elsie P. Eason, who died October 19. Eason retired from NASA in 1984.

Aubrey M. Raiford, who died November 13. Raiford was a supervisor engineer technician in the Fabrication Division at NASA Langley for 33 years.

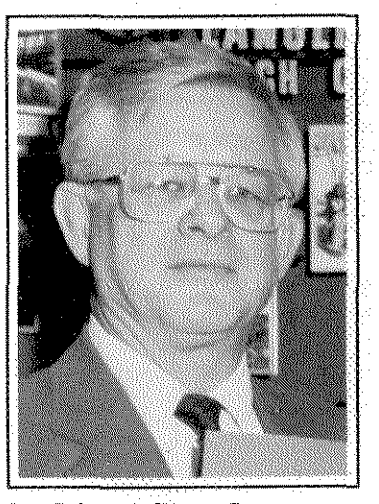
Stanley E. Gula Sr., who died November 16. Gula retired in 1976 after 15 years of civil service.

Marvin Forrest, who died November 23. Forrest retired as chief of technical services at Langley after 41 years of service

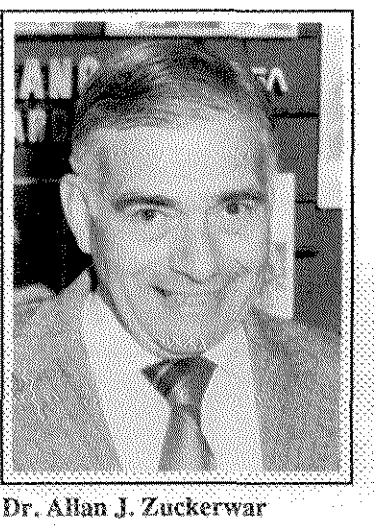
Woodrow W. Buchanan, who died January 2. Buchanan retired in 1971 as a heating plant specialist after 30 years of government service.

Three Receive Space Act Awards

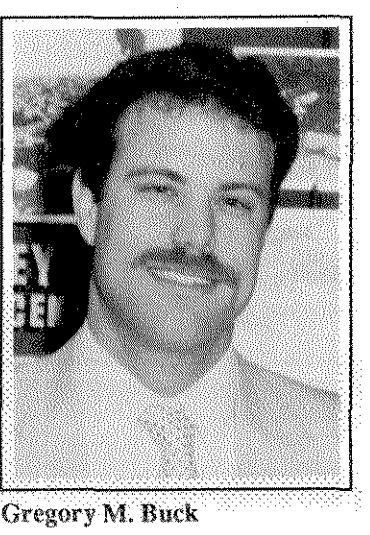
Deputy Director Paul F. Holloway presented monetary Space Act Awards to three employees. Dr. John H. Crews Jr., Mechanics of Materials Branch, was cited for the bearing bypass material testing system. Dr. Allan J. Zuckerwar, Acoustics and Vibration Instrumentation Section, was awarded for his ultrasonic depth gauge for liquids under high pressure. Gregory M. Buck, Experimental Aerodynamics Branch, was honored for his quantitative surface temperature measurement using two-color thermographic phosphorus and video equipment.



Dr. John H. Crews Jr.



Dr. Allan J. Zuckerwar



Gregory M. Buck

Employees Support Bloodmobile

Langley Employees, contractors and retirees donated 308 pints of blood at the January 24 Bloodmobile. Those achieveing gallon status are:

13 gallons---William G. Chapin and Stanley L. Pearce;
11 gallons---Nelson L. Seabolt, John B. Kovtum and Michael S. Warner;
10 gallons---Pendleton M. Jackson;
9 gallons---Richard L. Chattin;
7 gallons---Charles A. Sweet, Carl S. Larsen, Tyrone O. Ellis and Carl N. Robeson;
6 gallons---Robert F. Bryant, L. Conway Rogers Jr. and James P. Bailey;
5 gallons---Thomas R. Levin and Raymond C. Scholz;
4 gallons---Richard Bloxom, Henry E. Freeman Jr. and John H. Soule;
3 gallons---Randy D. Michaelsen, Nancy M. Sessoms, Thomas J. Yager and Felecia C. Berry;
2 gallons---Jerry R. Harris, Lee Jordan, John W. Hopkins, James K. Adams and Wayne A. Davis;
1 gallon---Richard D. White, Jack B. Hester, Greg S. Hogge and Gene S. Monroe;
First Timers---Pilar K. Kitchin, Joanne D. Hogg, Stephanie S. Conover, Henry S. Wright, Jeffrey J. Evanko and Staten R. Spruill.

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

The next scheduled Bloodmobile is Wednesday, March 28.

Change of Speaker

Visitor Center to Give LDEF Update

"We have LDEF" were the words Langley has been waiting to hear for over 5 1/2 years. With LDEF back home, an LDEF expert will give a special update on preliminary results Thursday, February 15, at 7:30 p.m. in the Visitor Center theater.

The update will include the latest pictures, results and first-hand experience from the LDEF project office, temporaily based at Kennedy Space Center. William Kinard, LDEF chief scientist was originally scheduled to speak. Due to the delay of the mission, Kinard is involved in the post-landing inspection of the facility and documentation of the experiments.

People & Places

Tidbits from Training

Education Assistance--Tax Break

On December 19, 1989, President Bush signed the Omnibus Budget Reconciliation Act. The reconciliation measure contains a 21-month extension of Section 127 of the Internal Revenue Code.

Section 127 permits employees to exclude employer-provided education assistance, typically tuition aid, from gross income. This tax break does, however, contain certain restrictions. Under Section 127, only the first $5,250 of education assistance received by an employee can be excluded from gross income. As of 1988, Section 127 does not provide a tax break for graduate level courses.

The tax status of graduate assistance is determined by Treasury Regulation 162.5 (T.R. 162.5), which states that **job-related educational assistance is excluded from gross income.** There is **no cap** on the amount of tax-free educational assistance that can be received under T.R. 162.5. Therefore, any educational assistance employees receive from the Center is covered under Section 127 or T.R. 162.5. The Training and Education Section will keep employees informed of any changes concerning tax-free educational assistance.

Alumni News and Views

LaRC Alumni Choose Leaders

Elected to the Langley Alumni Association Board of Directors on January 17 were David B. Ahearn, George W. Brooks, Frances L. Butler, Cornelius Driver, J. Norwood Evans, William N. Gardner, David G. Stone, Helen K. Willey and William L. Williams. Each was elected for a three-year term of office.

Other Board members are: Kitty B. Brand, Elizabeth A. Bieri, Hubert K. Clark, William C. Henley, John L. Patterson, George L. Meidinger, John L. Patterson, Charlotte N. Phillips and Louis P. Tosti for two-year terms.

William J. Boyer, John E. Duberg, Betty P. Joyner, Abraham Leiss, Dwight G. McSmith, Mary J. Mesic, Israel Taback, Donald H. Ward and Joyce M. Wright for one-year terms.

At its organizational meeting on January 25, the Board of Directors elected the following officers for 1990: Donald H. Ward, president; William L. Williams, vice president; Elizabeth A. Bieri, secretary; and William N. Gardner, treasurer.

The next Alumni Association luncheon meeting is scheduled for 11:30 a.m., Tuesday, February 13, in the NASA cafeteria. Buddy Poe will speak on Aging Aircraft.

Current News Releases

To obtain a copy of any of these NASA News Releases, summarized on page 2, contact Edith Watts, Mail Stop 146, ext. 43293.

90-05.....Early COBE Results in Accord with Big Bang Theory
90-06.....Firing Old Shuttle SRMs Benefits Future
90-07.....1990 Astronaut Candidates Selected
90-08.....Research Experiments to Monitor Columbia Re-entry
90-09.....NASA Announces Payload Specialists for Spacelab IML-1 Mission
90-10.....Management of Polar Platform to Change
90-11.....Long Duration Exposure Facility Shows Few Surprises
90-12.....Proposals Sought For Satellite Servicer Flight Demonstration
90-13.....Science Payload Commanders Named; Carter Replaces Cleave on IML-1
90-14.....Global Outpost, Inc., to Study Uses of Shuttle External Tanks

Klate Holt Co. Honors Employee

Klate Holt Company, Logistics Support Services, recently recognized Ingrid Dodge (pictured at left) as Employee of the Quarter.

Dodge is a reproduction and packaging machine operator in Langley's Reproduction Section. She has been with the Klate Holt Company for four years.

-photo by Carol Petrachenko

William T. Freeman, Structural Mechanics Division, (left) discusses the award-winning electromagnetic sensor technology with William and Mary Professor David E. Kranbuehl.

NASA, Universities Combine for Aerospace Manufacturing Advance

-by Craig E. Murden

Major innovations in fabrication techniques for future aircraft and space vehicles are emerging from a scientific partnership between NASA Langley Research Center, the College of William and Mary and Virginia Polytechnic Institute and State University.

This collaborative effort capitalizes on electromagnetic sensor technology developed under a NASA grant by Professor David E. Kranbuehl of William and Mary. Kranbuehl's sensor "understands" the manufacturing intricacies of advanced composite materials. These materials provide the immense strength and light weight that promise breakthroughs in aerospace vehicle performance for commercial passenger travel and future space ventures. Also involved is VPI's Professor Albert Loos whose predictive mathematical model complements sensor output.

The new sensor allows scientists, for the first time, to monitor chemical changes during the manufacturing process; to assess, in real time, how those changes will affect quality of the final product; and to make corrective decisions. This new tool, according to Kranbuehl, provides insight into processing chemistry and material behavior not previously available to either research laboratories or industry.

In addition to being "smart" during manufacture, the sensor will also give NASA and the aerospace industry the ability to continually monitor changes in the chemical properties of aerospace vehicle parts during their entire life span. For instance, the sensor can be embedded in critical aircraft engine assemblies or highly stressed aerodynamic structures. Chemical changes, translated from the sensor's electromagnetic impulses, will indicate potential problems as well as confirm the viability of stable components. In space, this capability will be focused on changes in chemical composition from exposure to such phenomena as atomic oxygen and thermal radiation. Applications involving the National Aero-Space Plane and the Space Station Freedom could be among the first to benefit from the in situ sensor.

Another aspect of the sensor's use, according to Bland A. Stein, assistant chief of the Materials Division at Langley, is to make composite products better and yet less expensive, thereby encouraging more innovation in their development. He explains that new three dimensionally woven and stitched composite materials have much greater "toughness" than the currently used layered materials. The sensor's value in exploiting this enhanced material is its ability to determine exact amounts of bonding agent, heat and other catalysts needed to achieve uniform quality. This constant monitoring of the curing process allows adjustments throughout. The result is assurred quality, without waste, for these very expensive products and their ingredients. Additionally, there is less worker exposure to the hazardous chemicals involved, Stein adds.

Kranbuehl's sensor has been recognized as one of the U. S.'s 100 most significant scientific and engineering products of 1989 by **Research and Development** magazine. He was given that publication's IR 100 Award in ceremonies this Fall at the Chicago Museum of Science. On January 26, 1990, he presented a plaque to the NASA Langley Materials Division commemorating the Center's sponsorship of his work.

NASA Langley scientists intensified their work on qualitative control of composite processing as the result of building wing panels for the Mach 3 Lockheed YF-12 Blackbird in the late-1970s. The lack of consistency during that project clearly signalled the need for a form of qualitative science that would control the materials during processing rather than relying on after-the-fact analysis, according to W. T. Freeman, Langley aerospace technologist ,who was part of the early effort. Freeman notes that it was in 1981 when NASA involved Kranbuehl in the investigatory effort to bring dielectric physics theory and electromagnetic measurement together to provide on-line feedback and process reproducibility. He adds that, as a result of the promising success of that effort, other agencies joined in the subscription of Kranbuehl's work, including industry and the Air Force Astronautics Lab.

The technology which the sensor represents is getting increasing use, says Kranbuehl. Not only is McDonnell Douglas using it in initial applications to large parts such as wing skin, but other firms like General Dynamics, DuPont, Dow, U.S. Steel and Newport News Ship Building are beginning to explore applications. Another part of the attraction for this technology is that the hardware is commercially available to potential users.

Kranbuehl also points to the invaluable educational experience his graduate and undergraduate students gained in working on an actual series of complicated problems.

Happenings

SPECIAL LAA SOCIAL. Valentine's Party will be held Friday, February 16, from 4 to 8 p.m., in the H.J.E. Reid Conference Center, Building 1222.

LaRC ALUMNI LUNCHEON will be held Tuesday, February 13, at 11:30 a.m. in the private dining room of the NASA cafeteria. Buddy Poe will speak on Aging Aircraft.

AFCEA LUNCHEON will be held Wednesday, February 28, at 11:30 a.m. in the Langley AFB NCO Club. Anyone may attend. For more information or to make reservations, call Capt. Brown, 764-6674, or Lt. Cherinka, 764-6699, by February 26.

IMPORTANT REMINDER. LaRC Alumni Association Weekend Retreat/Reunion is March 23-25 in Durham, N.C. Mail your check and registration form by February 16 to Langley Research Center Alumni Association, Mail Stop 496, Hampton, Va. 23665. Registration forms are available at the H.J.E. Reid Conference Center. For additonal information, contact Abe Leiss, 877-2939, or Axel Mattson, 898-7462.

DAYTONA 500 will be shown on the large TV at the H.J.E. Reid Conference Center, Sunday, February 18. The doors open at noon. Cash bar; sandwiches available for purchase.

BOOK SALE. The Visitor Center Souvenir Counter will hold a book sale February 22-March 2. The Souvenir Counter is open Monday through Saturday, 8:30 a.m. to 4:15 p.m.; Sunday, noon to 4:15 p.m.

FOR SALE: PORSCHE. 1968 911 Targa, red, one owner. Call Pete, ext. 44111.

WANTED: ROOMATE. Female to share 3-BR house in Fox Hill area; $250 includes utilities, kitchen privileges. Available now. Furnished if necessary. Please call 851-2255 after 4 p.m.

Note of Thanks

Ann Worth writes: "My family and I wish to thank all my friends and co-workers at Langley Research Center who contributed leave to me through the Voluntary Leave Transfer Program. Your generosity will always be remembered.

Langley Colloquium and The Sigma Series

Cornell Professor Outlines Voyager Discoveries

In over a decade of exploration, culminating with the August 24, 1989 encounter with Neptune, the twin Voyager spacecraft have provided new and often breathtaking views of the outer planets, their moons and systems of rings.

During two lectures on the Peninsula Monday, February 12, 1990, Dr. Steven W. Squyres, professor of astronomy at Cornell University, will review the important discoveries of the Voyager spacecraft with particular emphasis on the Neptune encounter.

At 2 p.m. Squyres will present his lecture, "The Voyager Encounter of Neptune," to Langley employees, contractors and retirees during a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 8 p.m., he will give the same lecture at the Hampton Holiday Inn 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 Squyres, the Voyager transmitted photographs and measurements of the atmospheres and magnetospheres of Jupiter, Saturn, Uranus and Neptune and their planetary-size moons: Ganymede, Callisto, Europa and Io circling Jupiter; Titan circling Saturn; and Triton circling Neptune. Squyres says the numerous Voyager discoveries include the existence of active volcanoes on Io which spew sulfur hundreds of kilometers into space, a possible ocean of liquid water on Europa, and atmospheres on Titan and Triton similar to the early atmosphere on Earth that led to the formation of organic molecules of increasing complexity--the precursors of the first living systems.

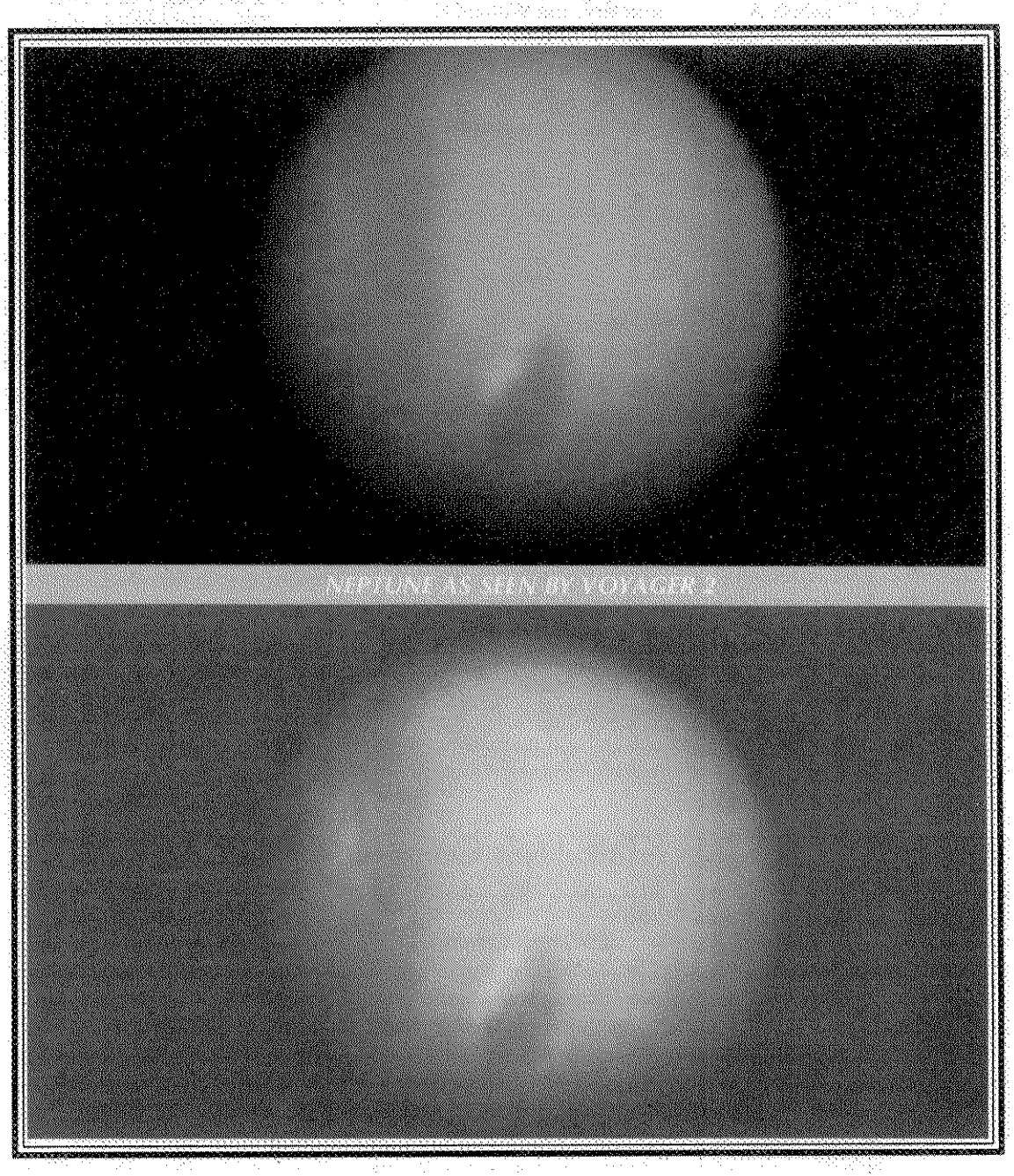
Squyres received a doctorate in planetary sciences from Cornell University. After serving several years as a research scientist at the NASA Ames Research Center in California, Squyres returned to Cornell as a professor of astronomy in 1986. His areas of research include planetary geophysics with particular emphasis on Mars and the moons of the outer planets.

Squyres was an investigator on the Voyager imaging experiment and is an investigator on the Mars Observer Mission and the Comet Rendezvous/Asteroid Flyby missions. He serves on the NASA Space Sciences and Applications Advisory Committee which advises the NASA associate administrator, Office of Space Sciences and Applications, and is planetology editor of the Journal of Geophysical Research. He was awarded the Harold C. Urey Prize in planetary science from the American Astronomical Society in 1987.

Thursday Ski Trips

February 15 ..... Massanutten
February 22 ..... Bryce
March 1 ..... Wintergreen

Bus leaves from Newmarket South at 5 a.m. Arrives at 9 a.m. for all day skiing. Bus leaves at 5 p.m. and arrives home at 9 p.m. Cost is $43. For information call Richard Bennett, 599-5585.



NEPTUNE AS SEEN BY VOYAGER 2

Researcher News

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

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Langley Research Center

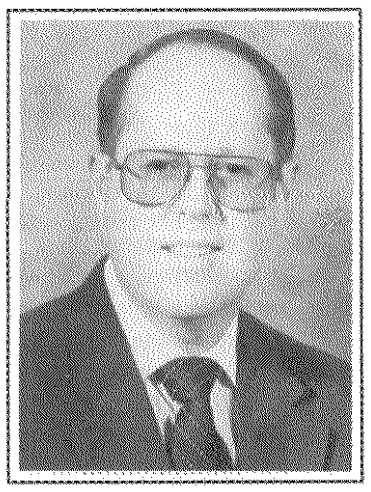
Volume 4, Issue 4 February 23, 1990

Researcher News

Bi-weekly Employee and Contractor Publication

Farrow Leads Facilities Development Office

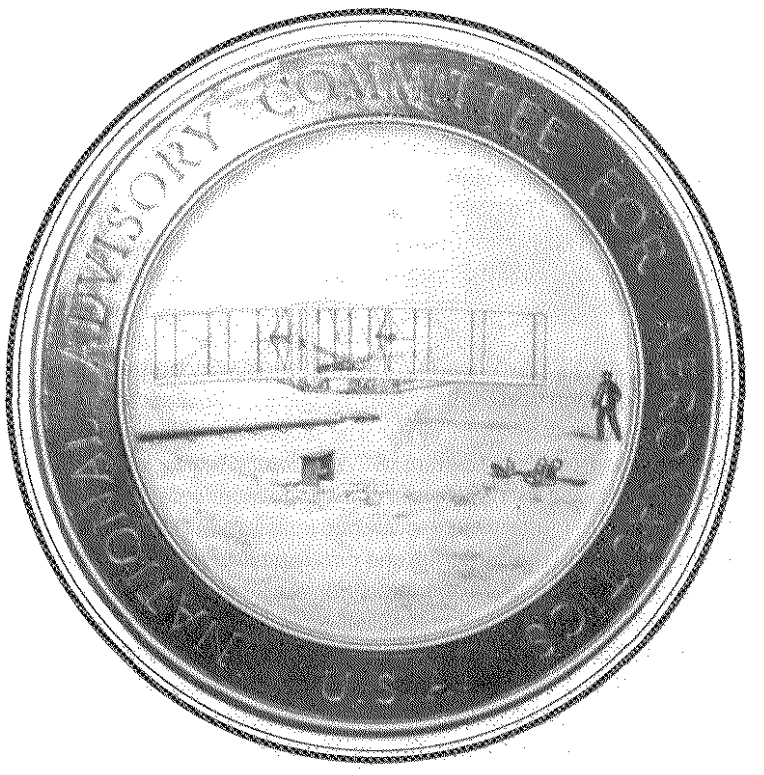
Alan L. Farrow has been chosen head of the Facilities Program Development Office. He replaces Irvin L. Hamlet, who retired December 29, 1989.



Effective January 1, 1990, Farrow became responsible for directing the Center-wide focus on overall facilities planning for both research and institutional programs. Two major elements of the position are developing the Center's Master Plan and serving as the primary point of contact for the Construction of Facilities program. Also involved is developing short- and long-range plans for major and minor construction, rehabilitation, modification and repair activities.

Farrow brings unique credentials to the job. His most recent post was Senior Facilities Program Manager for the Office of Facilities Management at NASA Headquarters, Washington, D.C. There, he provided technical and managerial facilities support for the Office of Aeronautics and Space Technology construction programs. In that role, he maintained NASA-wide oversight for facilities planning, programming, engineering, design and construction management. Before that assignment, he served as NASA's Energy Conservation Program Coordinator, also at Headquarters.

Farrow began his NASA career in 1963 as a cooperative education student in the Facilities Engineering Division at the Johnson Space Center, Houston, Texas. After graduation in 1968, he served as a technical project engineer and senior program manager on a variety of facilities design tasks including the facility at Brooks AFB, San Antonio, Texas, which houses some of the most important samples collected on Lunar landing missions; upgrade of NASA's industrial plant in Downey, California, for the Shuttle Orbiter program and construction of the route between Palmdale AFB and the Dryden Flight Research Facility for overload transport of the Shuttle Orbiter from its final assembly location to the mate/de-mate structure for 747 ferry to the launch site at the Kennedy Space Center. In 1980, he transferred to NASA Headquarters and in 1988 came to Langley where he was deputy head of the Facilities Program Development Office until his promotion in January.



March Marks NACA 75th Anniversary

Langley Research Center will commemorate the 75th anniversary of the formation of the National Advisory Committee for Aeronautics (NACA) with special programs next month. Details in the March 9 issue of the **Researcher News**.

Close-Up Inspection of Long Duration Exposure Facility Begins

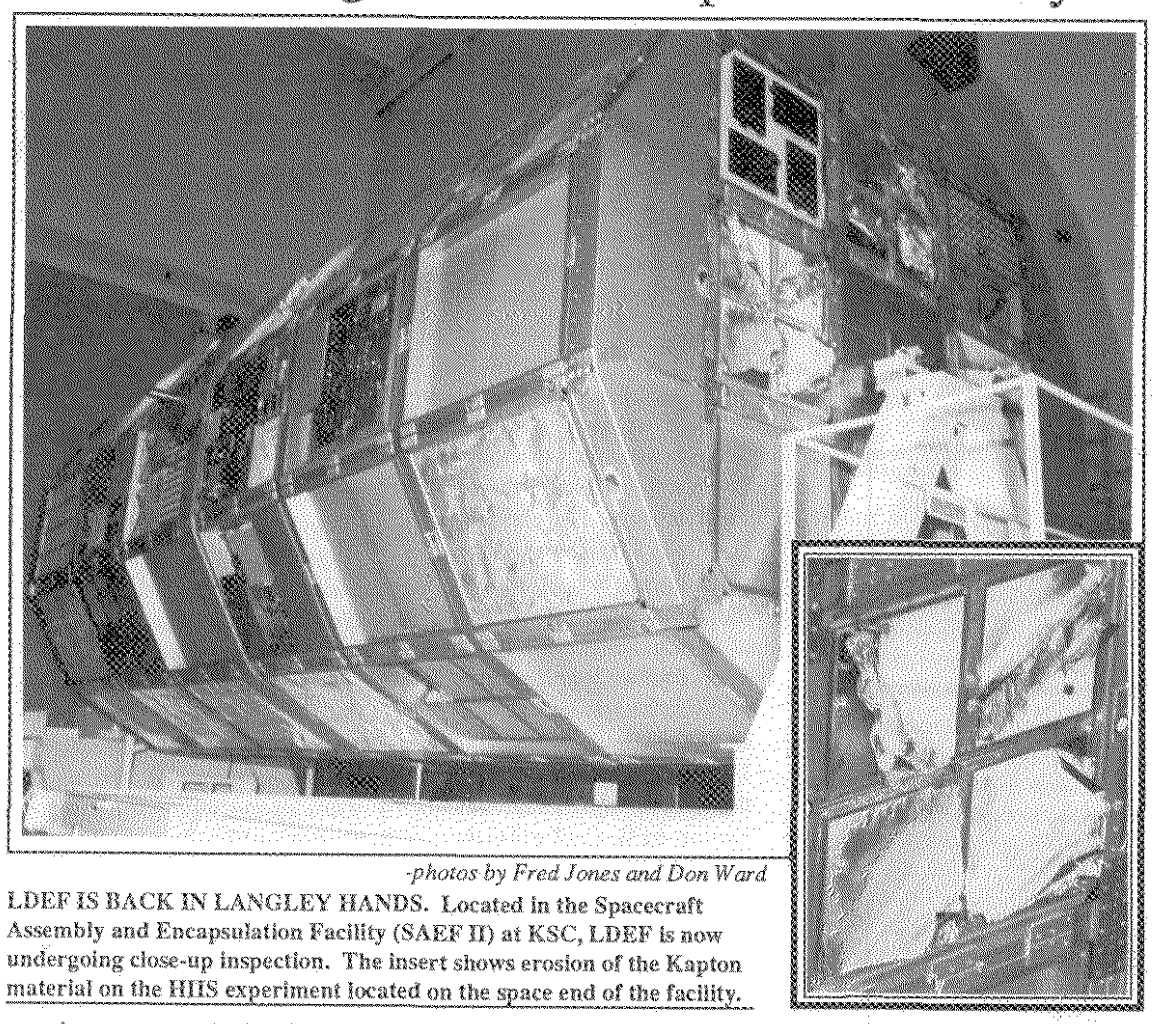
-by Jean Clough

NASA officials and principal scientific investigators, making their first close inspection of the Long Duration Exposure Facility (LDEF) at Kennedy Space Center, Fla., report that the spacecraft looks much like they expected and hoped for after its extended stay in space.

LDEF's 57 experiments provide a unique opportunity to study significant long-term effects of spaceflight on a broad range of materials and components, as well as on living organisms. The spacecraft was retrieved by the crew of Space Shuttle Columbia on January 12.

LDEF's exterior shows obvious effects from nearly six-years' exposure to bombardment by micrometeoroids and orbital debris, atomic oxygen impingement and the Sun's ultraviolet rays. LDEF will provide unprecedented data on the changes caused by the combination of these environmental parameters, because accurate simulations of the complex space environment are difficult to perform on Earth. These and other effects will be evaluated in detail once LDEF's experiments are removed for subsequent testing and analysis.

Discolorations or physical changes appear on many of LDEF's thermal control and optical surface experiments. There seems to be a significant contrast between the surfaces on the leading edge (facing the direction of flight) and those on the trailing edge. One major difference between these two sides of LDEF is the high exposure to atomic oxygen on the leading edge and very low exposure on the trailing edge. Many of the materials appear as expected for this extended exposure, while others look either more or less degraded compared to preflight estimates.



-photos by Fred Jones and Don Ward

LDEF IS BACK IN LANGLEY HANDS. Located in the Spacecraft Assembly and Encapsulation Facility (SAEF II) at KSC, LDEF is now undergoing close-up inspection. The insert shows erosion of the Kapton material on the HIIS experiment located on the space end of the facility.

Observation of solar array and structural materials on LDEF's leading edge and surrounding rows reveals that all unprotected Kapton thin-film insulation appears to have eroded away. This Kapton erosion is responsible for the disappearance of three solar cell modules and a number of one-mil polymer film materials on the Solar Array Materials Passive LDEF Experiment (SAMPLE). Kapton films protected with silicone coatings seem to have survived prolonged exposure to atomic oxygen, however, along with some silverized reflectors protected with ionic bonded solids. Observations show Tedlar is intact, and that Kevlar 29 and 49 appear eroded.

Two effects seen on SAMPLE and several other experiments are not understood at this time. Unbonded silvered teflon thermal blankets appear white, while the silvered teflon bonded to metallic substrates appears tarnished. Elastomer materials, typically used as seals, have greatly discolored. Some surface erosion occurred on the carbon fiber-epoxy matrix composite materials. Even though space debris impacts on the experiment's solar cells appear to be numerous, few of the cells look broken.

The Thermal Control Surfaces Experiment (TCSE) is a once-active experiment that performed periodic in-space optical properties measurements of exposed thermal control and optical surfaces during LDEF's initial 15-18 months in space. This experiment will provide a record of the condition of the test materials during that period, and postflight laboratory analysis of the samples will determine any subsequent damage. In addition, the TCSE will be evaluated as a means to obtain important knowledge on the effects of long-term space exposure on complex optical, electronic and mechanical instrumentation.

The Chemical and Isotopic Measurements of Micrometeoroids by Secondary Ion Mass Spectrometry measured isotopic composition of interplanetary dust. A special capture cell on the front of LDEF and two capture cells on the back collected vapor and debris fragments from impacts. When particles penetrated the foils, they should have "exploded" on hitting the plates beneath, producing a plume of vapor and debris that would redeposit on the underside of the plastic.

Unfortunately, many capture cells suffered catastrophic rupture of the thin entrance plastic films during LDEF's longer-than-planned sojourn in space. But if the plastic was in place when impacts

(Continued on page 4.)

News Briefs

HEADQUARTERS, Washington, D.C. --- The Centre National d'Etudes Spatiales (CNES), the French space agency, hosted an International Space Year (ISY) Education and Applications conference in Deauville, France, February 12-15. The conference was organized in cooperation with NASA. More than 120 education and training experts from around the world attended the conference. The Deauville conference delegates developed proposals for projects for the ISY in 1992 in the areas of education and applications.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- A scientist at NASA Goddard has co-authored a report on a study that provided new evidence that pollution can modify clouds so that they help cool the Earth's climate. In a study published in the journal **Science**, Michael D. King and his colleagues observed the effects of pollution from ships burning fossil fuels on shallow layer clouds. The study used simultaneous measurements from the NOAA-10 satellite and the University of Washington's C-131A research aircraft. The observations of these "ship track" clouds were conducted off the coast of California in July 1987. The study's findings exemplify the complexity of the global climate and the fact that scientists do not understand the processes well enough to make unequivocal predictions about long-range climate trends.

HEADQUARTERS, Washington, D.C. --- NASA has selected eight research proposals to help maintain U.S. preeminence in satellite communications. Still under contract negotiations, the proposals will result in contract awards by April 1990. The proposals were submitted under the Satellite Communications Applications Research Program (SCAR), which has an annual budget of $2 million. SCAR, established to support promising satellite-based communications technology systems, will aid applied research, innovative services and, ultimately, accelerate transferral of the results of this research to the user community. The program's goal is to define and develop space communications technology that can be used by the industry to open up new communications services.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- The Gamma-Ray Observatory (GRO), one of NASA's Four Great Observatories, was shipped February 6 by builder TRW from its Redondo Beach, Calif., facility to Cape Canaveral Air Force Station, Fla., in preparation for Space Shuttle launch from Kennedy Space Center, Fla., in November 1990. Following the Shuttle launch, GRO will be deployed into a near-circular orbit 279 miles from Earth, where it will gather gamma-ray data generated at the beginning of time--perhaps 15 billion years ago--in a comprehensive scientific effort to learn more about the origin and fate of the universe.

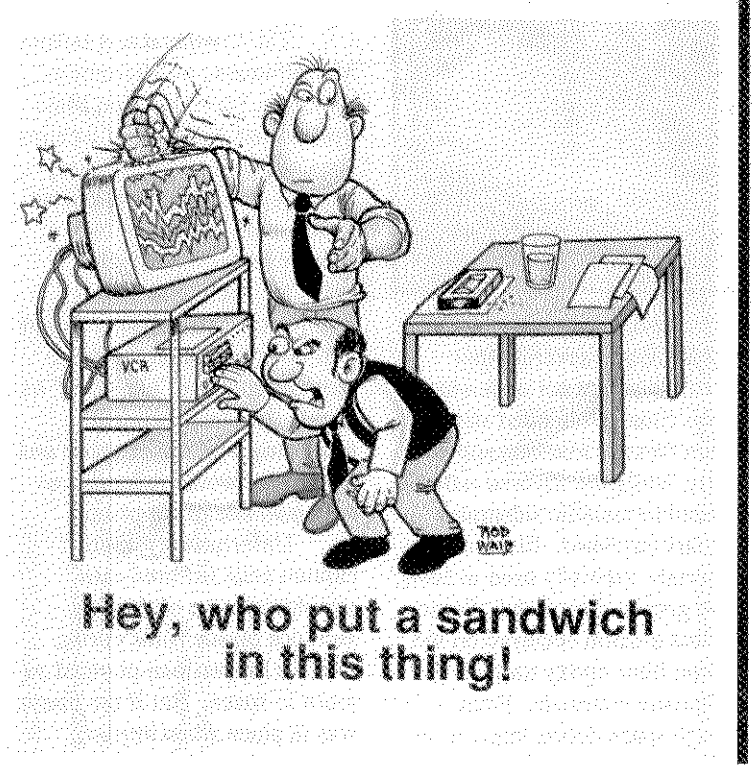
HEADQUARTERS, Washington, D.C. --- NASA has announced the appointments of Peter G. Smith to the position of director, International Relations Division, and David L. Stottlemyer to the position of director, Industry Relations Division. Smith's appointment was effective February 5. He replaced Richard J. H. Barnes who retired after 29 years of NASA service. Stottlemyer was appointed to his position January 10 and replaces Carl F. Emde who is serving as special assistant to the Associate Administrator for External Relations.

Current News Releases

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

90-16.....International Space Year Education Conference to be held in France
90-17.....Scientist Reports Pollution in Clouds Can Cool Earth's Climate
90-18.....NASA Selects Eight Research Satellite Communications Proposals
90-19.....Gamma-Ray Observatory Set for Shipment to Florida Launch Site
90-20.....New Directors Named for International and Industry Relations
90-21.....NASA Selects SBIR Projects

Lankley



Apollo Program Head Dies

Air Force General Samuel Phillips, who served as NASA's Apollo Program Director from 1964-1969, died January 31 of heart failure. He was 68.

Phillips, who retired as a four-star Air Force general in 1975, headed the Apollo Lunar Landing Program for the agency for five years. He returned to NASA in 1986 to conduct a management review and recommend changes in the wake of the Challenger accident.

Phillips was director of the Minuteman Intercontinental Ballistic Missile Program from 1959-1963, vice commander of the Ballistic System Division at Norton AFB, California, for another year and commander of Air Force Systems Command, Andrews AFB, Maryland. After retiring from the Air Force, he joined TRW in California as general manager of its Energy Systems Management Divsion. In 1984, Phillips became vice president of TRW's Defense Systems Group. He retired in 1986.

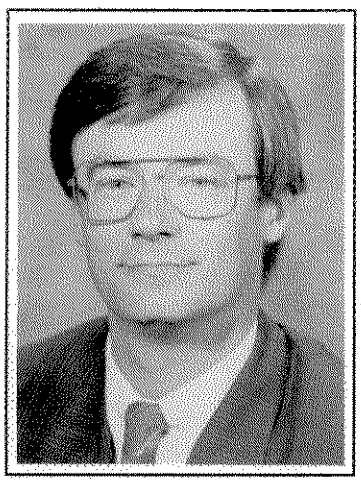
Take Note:

The Human Exploration Initiative Office (HEIO)is located in Building 1219, Mail Stop 107. To reach Brian Pritchard, head, HEIO, or Barbara Fryer, secretary, call ext. 48200.

Editorials

Guest Editorial

Fred E. Weick, Model Engineer



In eight years as the historian-in-residence at Langley, I have discovered many outstanding cases of wonderfully sound research performed by NACA/NASA employees. But never have I found a more talented individual or better engineer than this year's winner of the Guggenheim Medal, 90-year-old Fred E. Weick.

Weick's contributions to aviation are already a matter of historical record; a recent article in the **Researcher News** recalled the highlights. But the history books alone do not contain the full significance of the Weick story. Imbedded in every airfoil section Fred ever drew and every wind-tunnel test he ever conducted are all of the elements essential to success in the engineering profession.

One of the most important of these elements is represented by Weick's strictly rational approach to the analysis and solution of technical problems. Here one sees the same sort of marvelously clear thinking that allowed Fred's heroes, the Wright brothers, to achieve controlled flight in the first place. In his autobiography, **From the Ground Up**, we see Weick's rational approach in the way that he, as a 15 year old, constructed a four-wheel "cycle car;" he built it with a single-wheel drive in order to avoid the complexity of a differential. We see it again in the parameter variation method he followed in defining the shape of the NACA's famous low-drag cowling; again in his validation of the superiority of the tricycle landing gear and steerable nose wheel relative to the conventional tail-dragging configuration; again in the design of a two-control system for the Ercoupe; again in his work on a single-buckle shoulder harness and other safety devices; and over and over again.

In all of these cases and many more, Weick found practical, safe and economic solutions. The boldest of his ideas succeeded because he tempered them always with a sufficient dose of conservatism. All his novel designs had to be put through extensive systematic testing.

One would be hard-pressed to find an engineer more resourceful or versatile than Weick. Back in 1926, lacking a tachometer to measure the revolution speed of a certain new type of propeller that he had thought up, Fred had his musically talented wife, Dorothy, listen to the tone emitted by the propeller and compare it with the piano sound of a middle C. In this way he determined that his propeller whirled at a frequency of 256 cycles per second. This corresponded, he figured, to 7,680 revolutions per minute. On another occasion, many years later, he conducted full-scale wind tunnel-type tests of a tail surface by mounting it on one side of his Volkswagon camper.

As a manager, Weick was equally skilled. He was no proponent of the modern business method of designing a rigid organization and then fitting the people into the holes, whether they were square or round. Rather, Fred was inclined "to let the people build up their strong points and then form the organization around the people."

Even if I were not the co-author of Fred Weick's published life story, I would agree with the gentleman who wrote in a published review of **From the Ground Up** that our book should be "required reading" for every aeronautical engineering student now enrolled at an American university. As a guide to how sound engineering should be done, an authentic biography of someone as talented and as productive as Fred Weick is a dozen times more valuable than any academic treatise that theorizes about what it takes to be technologically innovative.

Most books come and go and are forgotten. Of all the books I write (and I hope to write many more), I imagine that this one with Fred Weick will be read the deepest into the future. I hope so. It will mean that we will have many more generations of Americans who understand what good engineering is all about.

James R. Hansen
Historian-in-Residence

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

National Engineers Week, February 18-24

The Engineer's Mission: Turn Ideas into Reality

The Peninsula Engineers Council (PEC), comprised of representatives from nineteen engineering and technical societies, was organized in 1970 to strengthen and promote the engineering profession in the Peninsula area.

Dr. Vicki S. Johnson, aerospace engineer in Langley's Vehicle Integration Branch, is chairman of the PEC. Johnson cites the following specifics as goals of the council: to promote the observance of National Engineers Week; to select and recognize a Peninsula Engineer of the Year; to further engineering education in the schools and colleges in this area as well as increase the interest of youth in the engineering profession; and to provide a forum for the discussion of professional concerns and activities of common interest brought before the council by member societies, community groups, institutions or individuals. "PEC membership," says Johnson, "consists of representatives of recognized engineering and technical societies as well as liaisons to academic and government organizations.

"About two years ago, the council began to take a more active role in promoting the engineering profession on the Peninsula and surrounding areas. A constituion and bylaws were developed to pave the way for the council to function year-round," Johnson continues. The Bylaws Committee continues to fine-tune the operation of the PEC.

The Education Committee is involved in various activities to further an interest in engineering and advance opportunities for engineering education. Each year NASA hosts a Career Day for area high school students. In addition, member societies are able to set up a display booth and interact with the students. Another annual event is School Activities Day, sponsored by the Tactical Air Command. Langley Air Force Base engineers visit area high schools and explain what it is like to be an engineer.

Other annual activities include the Egg Drop Contest, sponsored by the American Society of Mechanical Engineers, and MATHCOUNTS, sponsored by the Virginia Society of Professional Engineers. New areas currently being explored include interacting with Boy and Girl Scouts on engineering merit badges and the establishment of a speakers bureau.

Students Visit Langley for Career Day

Approximately 350 high school students attended a career day program Thursday, February 21, at the H.J.E. Reid Conference Center. The program was sponsored by the Peninsula Engineers Council as part of Engineers Week activities.

The day's program focused on career information and opportunities for students who are considering further study in a high technology field.

Dr. John C. Houbolt, the 1989 Peninsula Engineer of the Year, was the keynote speaker. Following the presentations, students had the opportunity to interact with engineers, scientists and technicians from Langley, Newport News Shipbuilding and other local companies.

Roger Hathaway, Langley education specialist, coordinated Career Day.

MATHCOUNTS Competition Tomorrow

Langley will again host students from 17 local middle schools for the annual MATHCOUNTS competition.

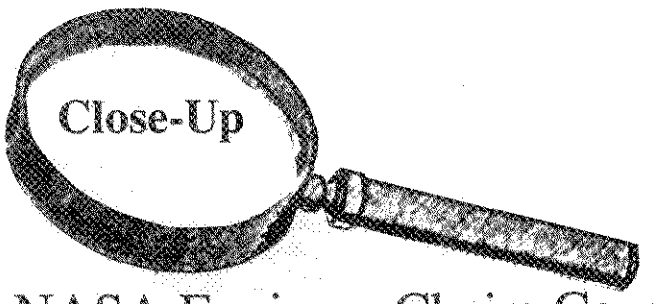
The contest will be held tomorrow, February 24, in the H.J.E. Reid Conference Center at 8:30 a.m. Awards will be conferred at 12:15 p.m.

MATHCOUNTS is a nationwide program designed to answer the problem of declining math skills among students at the precollege level. The seventh and eighth grade students are tested on probability, statistics, linear algebra and polynomials. The competition consists of written tests and fast-paced oral matches.

The competition is sponsored by the Virginia Society of Engineers. Arlene Levine, Langley education specialist, is coordinating the event.

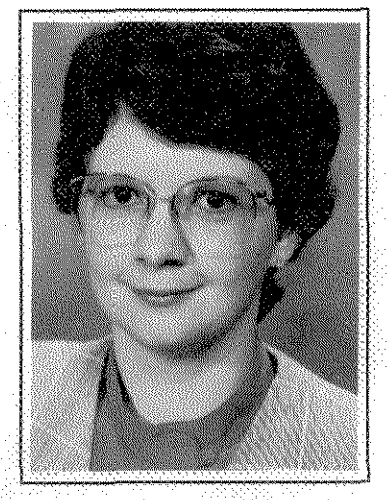
Peninsula Engineers Council Member Societies

American Helicopter Society
American Institute of Aeronautics and Astronautics
American Society of Civil Engineers
American Society of Mechanical Engineers
American Society for Metals
American Society for Nondestructive Testing
American Society for Quality Control
American Welding Society
Engineers Club of the Virginia Peninsula
Institute of Electrical and Electronics Engineers
Institute of Industrial Engineers
National Association of Corrosion Engineers
National Technical Association
Society for the Advancement of Material and Process Engineering
Society of Allied Weight Engineers
Society of American Military Engineers
Society of Manufacturing Engineers
Society of Women Engineers
Virginia Society of Professional Engineers



NASA Engineer Chairs Council

-by Mary Jane Dunlap, University of Kansas



Peninsula Engineers Council Chairman Dr. Vicki S. Johnson was the first woman to receive a doctorate in aerospace engineering at the University of Kansas. Johnson thinks of herself as an engineer, not a woman engineer.

At Langley she concentrates on developing subsonic and supersonic aircraft concepts to meet design specifications. Only occasionally does she think about being one of 147 women among Langley's 1,300 scientists and engineers. Among the women, she is one of 10 with a doctorate.

For the past 12 years, since she began studying aerospace engineering, she has usually been the only woman in her class.

Since her 1977 graduation from Liberty, Mo., high school, she has been among the top three students in her class. She was the outstanding graduating senior in the 1982 engineering class at the University of Missouri-Rolla.

Although she was surprised at being named one of 28 Women of Promise in July 1986 **Good Housekeeping** magazine, her University of Kansas (KU) dissertation adviser was not.

"She's in the top five percent, if not the top two percent, in what she does," says her adviser, Jan Roskam, an Ackers distinguished professor of aerospace engineering at KU.

In her dissertation, Johnson investigated the optimum design of commercial airplanes through life-cycle costs--including design, construction, operation and, finally, disposal.

Previous studies examined optimum design from a mission viewpoint, Roskam says. "No one had looked at the optimum design from the life-cycle costs viewpoint."

Johnson's first love is airplane design. New acquaintances often ask if she is interested in space flight. Johnson smiles and replies she'll travel in space as a passenger when space flight becomes commonplace.

She earned her pilot's license at age 17 through the Liberty, Mo., Civil Air Patrol unit and counted Jimmy Doolittle and Amelia Earhart among her heroes. Yet, as a high school student, Johnson considered a more traditional woman's career, teaching high school mathematics.

A 1977 teachers' strike in the Kansas City area called her attention to the low salaries and poor working conditions of teachers. She then considered engineering. Teaching remains an interest, however.

As part of her job, Johnson visits community schools to encourage young women to consider engineering careers. She feels that school counselors should hear from women in non-traditional professions.

She remembers that her younger sister, Valerie, now a chemical engineer in Houston, Texas, was discouraged by school counselors from going into engineering.

"No one told me I couldn't be an engineer. First of all, I wouldn't have believed them," Johnson says of her own experiences.

Yet subtle discouragement occurred. In high school, she was offered two scholarships, one of which would fund four years of engineering study. A counselor suggested she relinquish the engineering scholarship to a male student with a lower class ranking.

She chose the engineering scholarship because it met her needs better.

That scholarship took Johnson to Rolla, where she entered a cooperative program that NASA offered to promising students. Through NASA, she gained education benefits. With those benefits and with Amelia Earhart Fellowships from Zonta International of Chicago, she financed her master's and doctoral degrees.

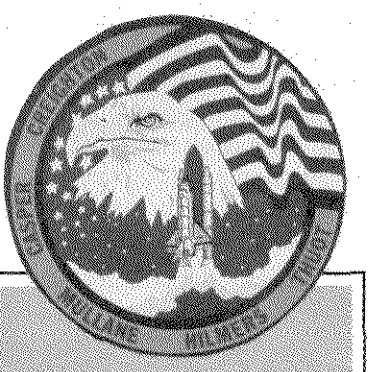
Johnson received a master's in flight sciences from George Washington University. The University of Kansas was her first choice for a doctorate. "KU's conceptual aircraft design program is the best in the country, if not the world. A side benefit was that KU was close to home," Johnson said.

STS-36 Set for February Launch

Launch of Space Shuttle mission STS-36, a Department of Defense-dedicated mission, has been set for no earlier than February 22. The orbiter Atlantis was rolled out to launch pad 39-A at the Kennedy Space Center in late January.

STS-36 crew members shown below include John O. Creighton, mission commander (center); John H. Casper, pilot (second left); Pierre J. Thuot, Richard M. Mullane and David C. Hilmers, mission specialists (left to right).

A full dress rehearsal for the mission was held in early February. The terminal countdown demonstration test (TCDT), involving the flight crew, KSC launch team and the Mission Control Center (MCC) team, Houston, culminated with a simulated "t-zero." Objectives of the test include establishing timelines and validating sequences involved in the flight crew suit-up and entry into the orbiter's cockpit. The test also offers an occasion for the flight crew, the KSC launch team and the MCC to work together in a launch day configuration.



Training Tidbits

Center Makes Learning Easy and Convenient; '90 Catalog Available

The NASA Learning Center has produced its 1990 Learning Center Catalog containing over 702 self-paced, tutorial courses available to both NASA and on/off-Center contractor employees. The catalog has been distributed to training coordinators on Center, and extra copies are available to interested persons.

This year's catalog is divided into 13 subject areas including clerical, communications, computer sciences, electronic/mechanical, engineering/scientific, fastrack series (business books on audio tape), languages, management/supervisory, mathematics, personal computers, personal development, procurement and safety. Of special note, the personal computer section offers over 16 tutorials on DOS, DBase III/IV, Lotus, and WordPerfect that may be checked out or used in the Learning Center depending upon the media.

The Learning Center continues to offer up to 15 new titles monthly from the "Success Library" lease program. A flyer is sent to each training coordinator the first week of each month listing the titles offered for the month. Current titles include "Psychology of High Self-Esteem," Psychology of Winning" and "Leadership Secrets of Attila the Hun." A reservation list is maintained in the center for each of these and other titles.

The Learning Center is located in Building 1194, Room 115. For more information, contact Jane Derby, ext. 42325, or Elaine McMahon, ext. 42326.

Have You Seen These Items?

The following items have been reported missing. If you can help locate any of them, please contact the Equipment Management Section, extensions 42055 or 42056.

- o Control, Inverter, Pads, ECN 531696
- o Generator, Signal, RF, ECN 473598
- o Gauge, Capacitance, Datametrics, ECN 428271
- o Multimeter, Digital, Data Precision, Corp., ECN 532309
- o Analyzer, Signature, Hewlett-Packard Co., ECN 463211
- o Multimeter, Digital, John Fluke Mfg. Co., ECN 532236
- o Sony Television Monitor, ECN 056101
- o Sharp VHS Video Cassette Recorder/Player, no ECN

Galileo Milestone

NASA's Galileo spacecraft completed the first major milestone in its gravity-assisted flight to Jupiter late Friday and early Saturday morning, February 9-10, when it flew a carefully designed course close to the planet Venus.

Closest approach, about 10,000 miles above the surface, 41 degrees south of Venus' equator, came as planned one minute before 1 a.m. EST on Saturday. This moment was the midpoint of a four-hour period in which the planet's gravity increased Galileo's speed by almost 5,000 miles per hour.

"This is why the spacecraft came to Venus," said Project Manager Richard Spehalski. "It went really well."

Two more gravity assists, both from planet Earth, lie ahead for Galileo before it has enough velocity to reach Jupiter, its ultimate scientific destination.

While it is near Venus, Galileo turned its scientific instruments designed to observe Jupiter, its satellites and environment, toward the hot, cloudy world which is closest to Earth. Scientists watched as telemetry showed sensors being switched on and off and pointed in the programmed direction, and the data being recorded on tape.

Close-Up Inspection of LDEF Underway at Kennedy Space Center

(Continued from page 1.)

occurred, there should be a spray of vapor and debris on the germanium plates that can be analyzed. The initial look from about six feet away shows at least half of the front-facing cells have visible impacts; at the microscopic level there probably will be many more. The knowledge gained from LDEF will be used to design a more complex interplanetary dust experiment, one that will differentiate between dust from comets and asteroids, for Space Station Freedom.

The Heavy Ions in Space (HIIS) experiment used plastic track detectors to measure the abundance of chemical elements in cosmic radiation. The experiment should offer new insights into the origin of chemical elements and may show how the elemental composition of the Solar System differs from that of the rest of the galaxy. The data also will improve our knowledge of radiation hazards faced by astronauts and by modern micro-electronic components in space.

On seven of the eight HIIS modules, multilayer insulation thermal blankets partially detached and rolled up while LDEF was in orbit. The loss of temperature control and exposure of some of the detector material to direct sunlight probably resulted in some data loss. The thermal blanket on the eighth HIIS module is largely intact and may have preserved the data in that module.

Still another experiment, Space Exposed Experiment Developed for Students (SEEDS), looks good and all hardware is intact on the tray, suggesting that the seeds have been protected as planned. After preliminary growth tests, the 12.5 million tomato seeds that flew aboard LDEF will be distributed to U.S. students in grades 5 through university for use in classroom research.

Experiment trays will be removed from LDEF around February 22 and delivered to the principal investigators. By the end of April, all experiments should be in the hands of the investigators and analyses of the experiments underway.

Results from the LDEF mission will furnish invaluable data for design of future space structures, such as Space Station Freedom, as well as insight into Earth's cosmic origins.

NASA Bowling League Update

Team High Game	942 Spare Change	962 Strike Force
Team High Series	2686 Strike Force	2679 Spare Change
Male High Game	242 Don Hinson	257 Lynn Curtis
Male High Series	644 Steve Horvath	645 Lynn Curtis
Female High Game	200 Linda Kovtun	201 Shari Moran
Female High Series	519 Linda Kovtun	501 Shari Moran
Most pins over average	+70 Don Hinson	+73 Lynn Curtis

Runners Club Announces Race

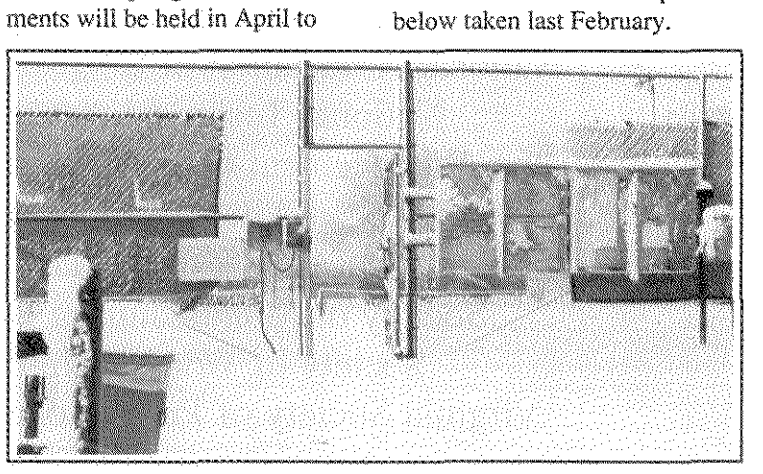
The Langley Runners Club will hold a pick-your-distance event on Wednesday, February 28. Runners may run 5 KM, 10 KM or 15 KM. Races start at 5 p.m. on Doolittle Road, next to the Activities Center. For more information, call Richard Shearer, ext. 47036.

Tennis Club Gears Up for Season

The NASA Langley Tennis Club 1990 membership drive is currently underway. Annual dues are $5. Application forms are available at the LAA Office, on the sign-up board by tennis court #2 or by contacting Tom Yager, ext. 41304.

The spring ladder tournaments will be held in April to establish player positions for challenge matches throughout the summer. There are ten additional tournaments scheduled between May and October which are open to club members.

Hopefully, weather conditions will be more favorable than reflected in the photo below taken last February.



Health Corner

Clinic Offers Varied Services

The LaRC Health Clinic is operated under the auspices of the Office of Occupational Health Services via a contract with Kelsey-Seybold Clinic. Hours of operation are from 7 a.m. to 4:30 p.m., Monday through Friday, excluding government-observed holidays.

The Health Clinic staff and facilities provide a complete program of occupational medical services to Langley civil service employees. These services include annual physicals as well as emergency, preventive and therapeutic medicine.

The following non-occupational services in the injury and illness arena are provided:

- o Initial diagnosis and treatment of illness or injury
- o Flu shots
- o Allergy injections*
- o Wound care*
- o Heat treatments*
- o Dressing changes*
- o Soaks*
- o Vitamin injections*
- o Hypertension checks
- o Stitches removed*
- o Federal Aviation Association (FAA) exams

(*with direction from a private medical doctor)

Langley employees are reminded that the Health Clinic **does not replace nor assume the role of private physician.** For example, treatment for non-occupational illnesses or injuries should not be delayed until the Health Clinic is open. If you experience an illness or injury while off duty, you should seek the services of your private physician. Your private physician has your historical medical data file which serves as an informative guide for tracking and treating your medical-related incidents.

The following telephone numbers may be used to inquire about health-related services offered through the Health Clinic:

Health Clinic	ext. 43193
Appointments	ext. 43195
Fitness Center	ext. 46386
Office of Occupational Health Services	ext. 43191
Employee Assistance Program	873-0228

Optical Dispensing Services are available through the Systems Safety, Quality and Reliability Division. The Optical Office is located in Room 225, Building 1149. The phone number for Optical Services is ext. 43211.

Your assistance in assuring that medical appointments are kept or cancelled early (24 hours or more before the appointment) would be appreciated. This will help increase the efficiency and productivity of the Health Clinic.

Positions Open at Langley

90-22: Production Controller, GS-1152-10 or 11; Office of the Director for Systems Engineering and Operations, Fabrication Division, Resources and Contracts Branch, Contractual Resources Section. Open to LaRC; closes February 26.

90-23: AST, Science Mission, GS-1301-14 or 15; Office of the Director for Space. Atmospheric Sciences Division, Atmospheric Studies Branch. Open to LaRC; closes February 26.

90-24: Accounting Assistant, GS-503-6 or 7; Office of the Director for Management Operations, Financial Management Division, Financial Services Branch, Payroll Section. Open to LaRC; closes February 28.

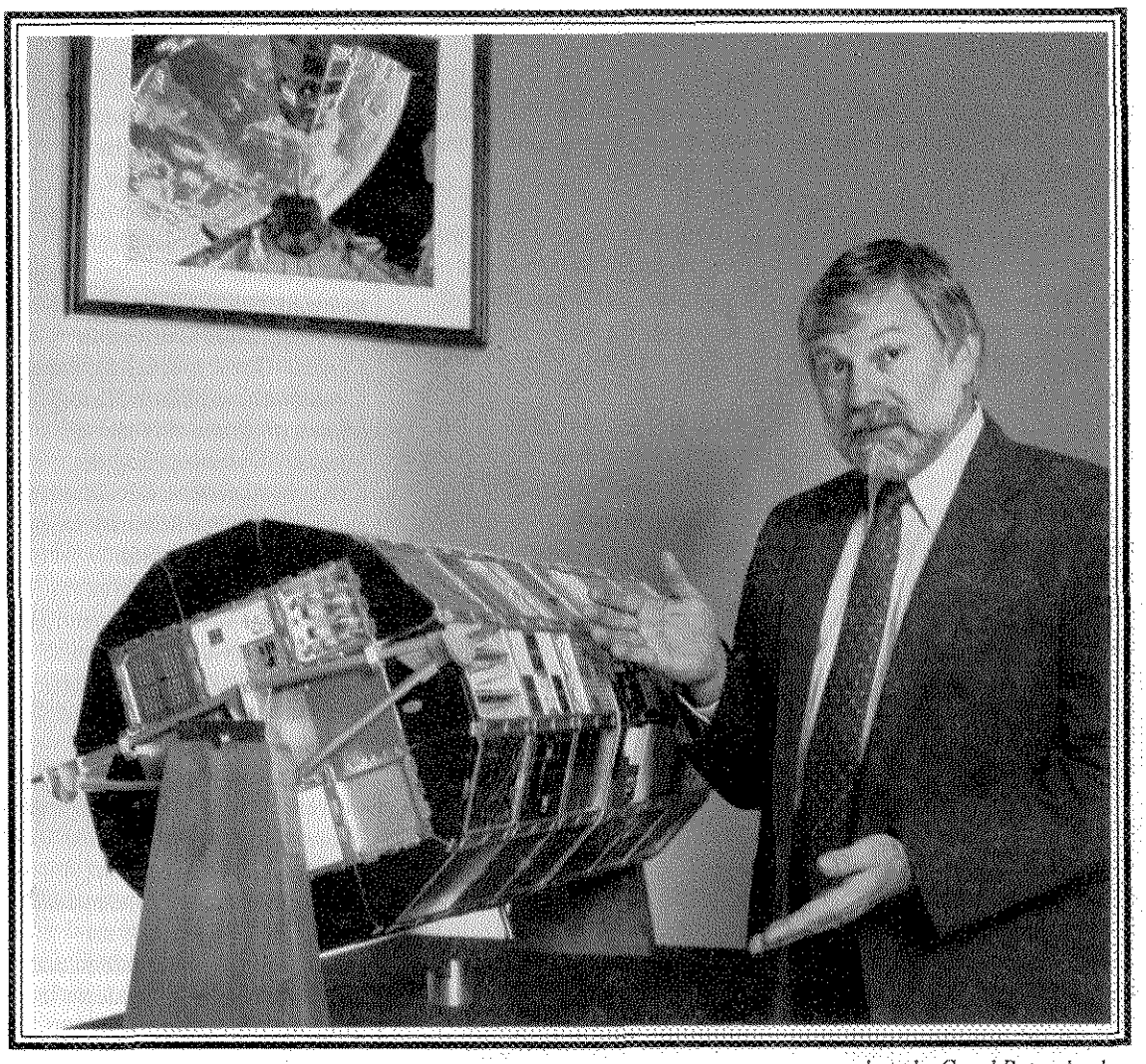
Notes of Thanks

Ivan Beckwith writes: "I wish to thank all who came to my retirement luncheon at the Gas Lab on January 19 for a very enjoyable time together and for the great gifts and food. Irene and I hope that you can stop by and visit us when you are in Gloucester County. Please give us a call at 642-2060."

James L. Williams writes: "My family and I wish to express our appreciation for the distinctive retirement party February 9. Our thanks to all of you for your interest, participation and the memorabilia. Your friendship and generosity will be cherished and remembered always."

Former Employee Needs Blood

D. Eugene "Gene" Hicks underwent major surgery February 8 to correct an abdominal aneurysm. Please consider donating blood in Hicks' name at the next Bloodmobile, Wednesday, March 28.



-photo by Carol Petrachenko

Personality Profile

The LDEF Adventure Continues

-by Allan C. Hanrahan

E. Burton Lightner was born in the year of the Hindenburg airship disaster, the same year that birthed the continuing mystery of aviatrix Amelia Earhart's disappearance in the Pacific. But this year as we feature the project manager for the Long Duration Exposure Facililty (LDEF), the fiery disaster that could have befallen LDEF was averted, and its mysteries are yielding to the scrutiny of the more than 200 investigators representing the 57 science and technology experiments on board.

For Burt Lightner, the nuts-and-bolts man for LDEF, these are busy but euphoric and exhiliarating days. Asked his most exciting moment during the STS-32 mission he answered, "That's a hard one. You share different emotions each time" (something significant happens). "First you have to grapple it," which is what mission specialist Bonnie Dunbar--using the remote manipulator system robot arm--accomplished at 10:16 a.m. EST Friday, January 12, at 178.8 nautical miles altitude over the east coast of Brazil. "Next you have to get it in the cargo bay and then get it latched down," which occurred just before 4 p.m. EST, slightly more than three days and eight hours into the 10-day mission.

Still to come were the reentry and night landing, and then the piggyback return to the Kennedy Space Center.

"But the retrieval from orbit," he continued, "has to be one of the best moments for me."

Lightner is certainly no novice where projects like LDEF are concerned. After graduating from Randolph-Macon College in 1959 with a bachelor of science degree in physics, he came to Langley and was assigned to the old Pilotless Aircraft Research Division (PARD) on the Trailblazer project. He then became project engineer for the last six to eight flights.

"There were gaps," he stated, times when he wasn't working on projects, but he agreed that the high points of his career have to be the projects.

"Projects involve assembly and operations," he reflected. "Or disassembly, as now with LDEF," he added.

"Projects involve a number of operations between Centers, part of a joint effort," he said. "There is the fun of trying to pull it all together--an integration and operations aspect."

After Trailblazer, Lightner saw duty in the operations group on the Lunar Orbiter project, followed by work on the Viking program and then the position of project manager of ACCESS (Assembly Concept for Construction of Erectable Space Structures).

Aside from the experience, the contribution he was making--and the paycheck--there was an added bonus of his ACCESS days: he met his present wife, Carol. She was a secretary at the time and her office was just around the corner from his. She has since left NASA, graduated from college last May, and is now a conference manager with Bionetics.

Lightner's family also includes three sons: Herb, Andrew and Evan, ages 29, 27, and 23, respectively.

Lightner was born in Hardy County, West Virginia, but grew up living in various places in Virginia before his parents settled in Suffolk, where he graduated from high school.

Now he lives on the Peninsula, and is a member of Asbury United Methodist Church, where he is "fairly active," he admitted.

He likes to read--"For enjoyment," he emphasized, "and relaxation." He also likes to sing.

"Musical theatre is of interest to me," he stated. "I have sung in the Virginia Choral Society, and also the church choir," he added.

As for other interests and activities? "Nothing worth mentioning," he answered because, obviously, LDEF has been the focus these last months. Lightner opined that, until about mid-April, LDEF will occupy almost all of his attention--as it has and will for so many dedicated LaRC employees. As Burt observed: "Having worked on projects with Langley personnel before--away from Langley--and I'm doing it again--I'm always impressed and really proud of what Langley people do. Other centers see it; I receive that message from them. It really makes you proud, of both the hardware produced and the way the people operate. It really can give a good impression."

Happenings

LAA SOCIAL will be held Friday, March 2, from 4 to 6 p.m. in the H.J.E. Reid Conference Center, Building 1222. Join your friends for an end-of-the-week celebration.

SKI WEST VIRGINIA. Second annual Canaan Valley Ski Weekend, March 9-11. $170/person (double occupancy) includes transportation, two nights' lodging, food, lift tickets and more. Contact Richard Bennett, 599-5585.

VA TECH TENNIS PARTY, Friday, March 16, at Centre Court and Racquet Club. Courts reserved from 8 p.m. till midnight. Fun and prizes for all levels of play. $11/person, reservations limited. Call Frank Cowling, 722-7636 or 873-3339 for information.

CONSERVATION CLUB will meet Tuesday, March 20, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call ext. 41537 for more information.

FOR SALE: CONDO. 1 BR condominium, Harpersville Road area, $40,900. Call Norma Davis, 865-6414, after 6 p.m.

TELA-TAX SERVICE. Federal, state, individual, business. Member National Association of Tax Preparers. By appointment. We come to you. Call 874-3121.

FOR RENT: CONDO. 1 BR condominium, Harpersville Road area, $375/month. Call Norma Davis, 865-6414, after 6 p.m.

FOR RENT: HOUSE. 3 BR brick home with attached garage in Poquoson. Large family room and screened porch; corner lot with fenced back yard. Deposit and lease required. Call 838-8111.

BOOK SALE. The Visitor Center Souvenir Counter is holding a book sale February 22-March 2.

Retirement Party

Mary M. Jenkins will be honored at a retirement luncheon Friday, March 9, at 11:30 a.m. in the H.J.E. Reid Conference Center. Cost is $7.50/person which includes gift. Send check made payable to Nellie E. Freeman to Mail Stop 377. Separate gift contributions are welcome.

Celebrating Black History Month

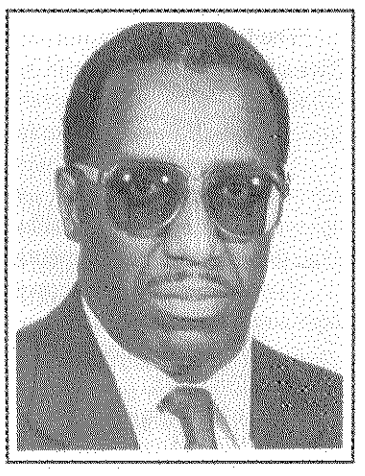
Educator Promotes Education for Minorities

Dr. Howard G. Adams, Executive Director of the National Consortium for Graduate Degrees for Minorities in Engineering, Inc., (GEM), will speak to Langley employees at 1 p.m. Friday, February 23, in the H.J.E. Reid Conference Center. Guest speaker for the Center's annual Black History Month program, Adams will address "Understanding the Crisis in American Education: It is More than the Minority Communities' Problem."

The goal of GEM is to increase the number of minority students who annually receive advanced degrees in engineering. A frequent lecturer and keynote speaker, Adams has spoken at over 100 colleges and universities. He is the author of *Successfully Negotiating the Graduate School Process: A Guide for Minority Students* and has written extensively on improving the participation and success of minority students in graduate education.

Adams came to GEM from Norfolk State University where he had served as vice president of student affairs and director of alumni affairs. He began his career in education as a teacher of science and biology in the Norfolk School System.

During his 11 years with GEM, Adams has become a national advocate for improving access and choice of graduate education for minority students. He has received numerous awards and citations, including the 1986 National Society of Black Engineers Torch Bearer's Award; the U.S. Black Engineering Magazine 1987 Promotion of Higher Education Award; and the 1987 Reginald H. Jones Distinguished Service Award from the National Action Council for Minorities in Engineering.



Refreshments will be served following the presentation.

Blacks at Higher Risk for Glaucoma

Anyone can develop glaucoma, but Blacks are eight to 15 times more likely to develop this serious eye condition than Whites. Glaucoma is the leading cause of blindness in Blacks.

Glaucoma is a serious eye disease caused by too much pressure within the eye. Because there are usually no symptoms in the early stages, half the more than two million Americans who have glaucoma don't even know it. In fact, the disease often remains undetected until some sight is lost. Unfortunately, vision lost to glaucoma can never be restored, but treatment can halt the progress of the disease. Regular professional eye exams are the best defense against the loss of sight from glaucoma and other serious eye disorders.

During February, Black History Month, the National Society to Prevent Blindness is urging all Blacks to make an appointment for a complete eye exam with a qualified eye care professional.

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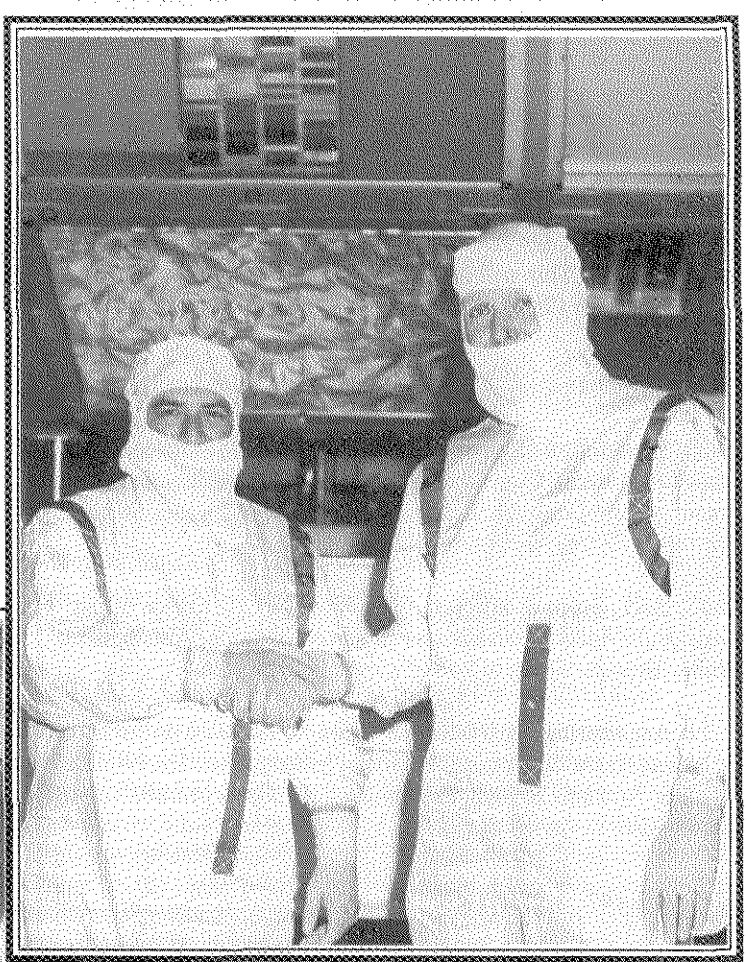
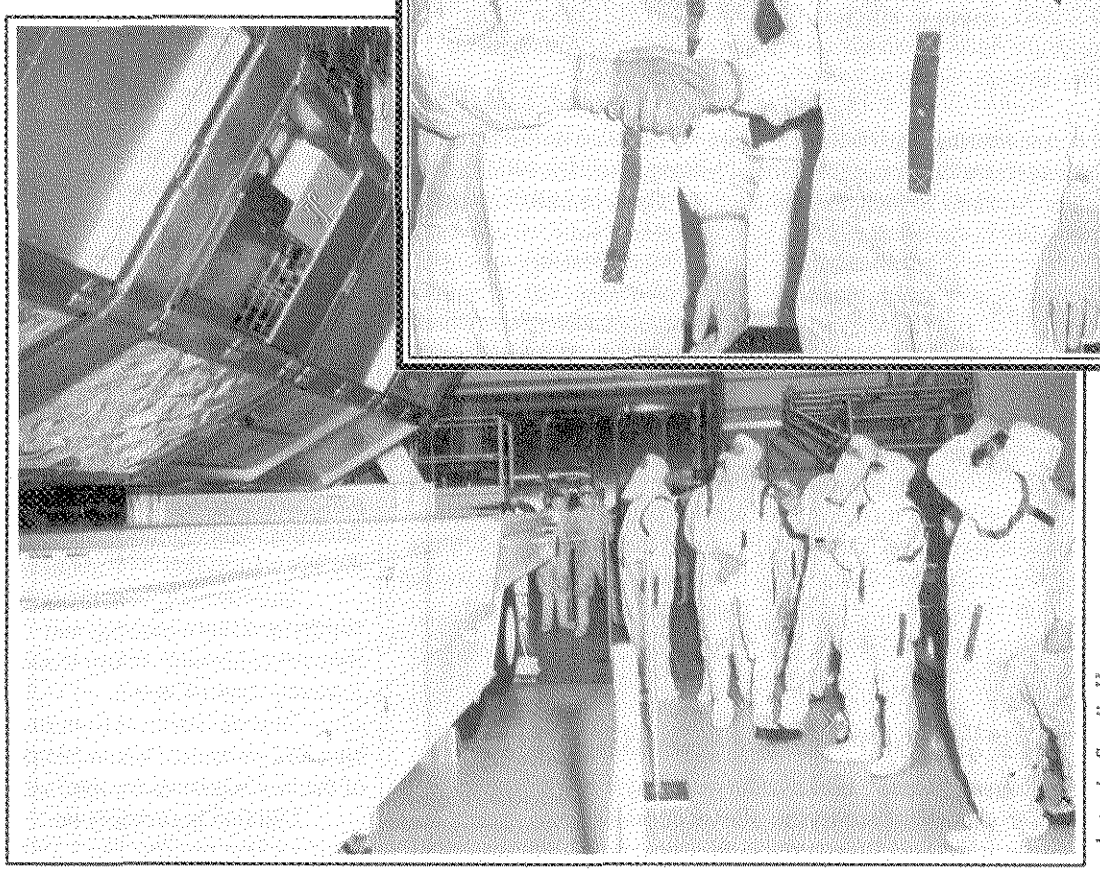
News Researcher

The 'Eyes' Have It

Center Director Richard H. Petersen (right) and Deputy Director Paul F. Holloway express approval after seeing LDEF, returned from its sojourn in space and now undergoing analysis in the Spacecraft Assembly and Encapsulation Facility (SAEF II) at Kennedy Space Center, Florida.



Langley Senior Staff and Headquarters officials view LDEF for the first time since its retrieval and return from low-Earth orbit.



-photos by Sandie Horsey

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 5 March 9, 1990

Researcher News

Bi-weekly Employee and Contractor Publication

Technicians Remove LDEF Experiments

- by Jean Clough

NASA technicians from Langley have begun removing experiments from the Long Duration Exposure Facility (LDEF), the satellite retrieved from space by the STS-32 crew in January.

The first experiment, the Space Exposed Experiment Developed for Students (SEEDS), was removed from the spacecraft at 12:22 p.m. EST, Friday, February 23. SEEDS is sponsored by the GeorgeW. Park Seed Company in Greenwood, S.C. SEEDS tomato seed kits will eventually go to classroom students around the country for use in school science projects.

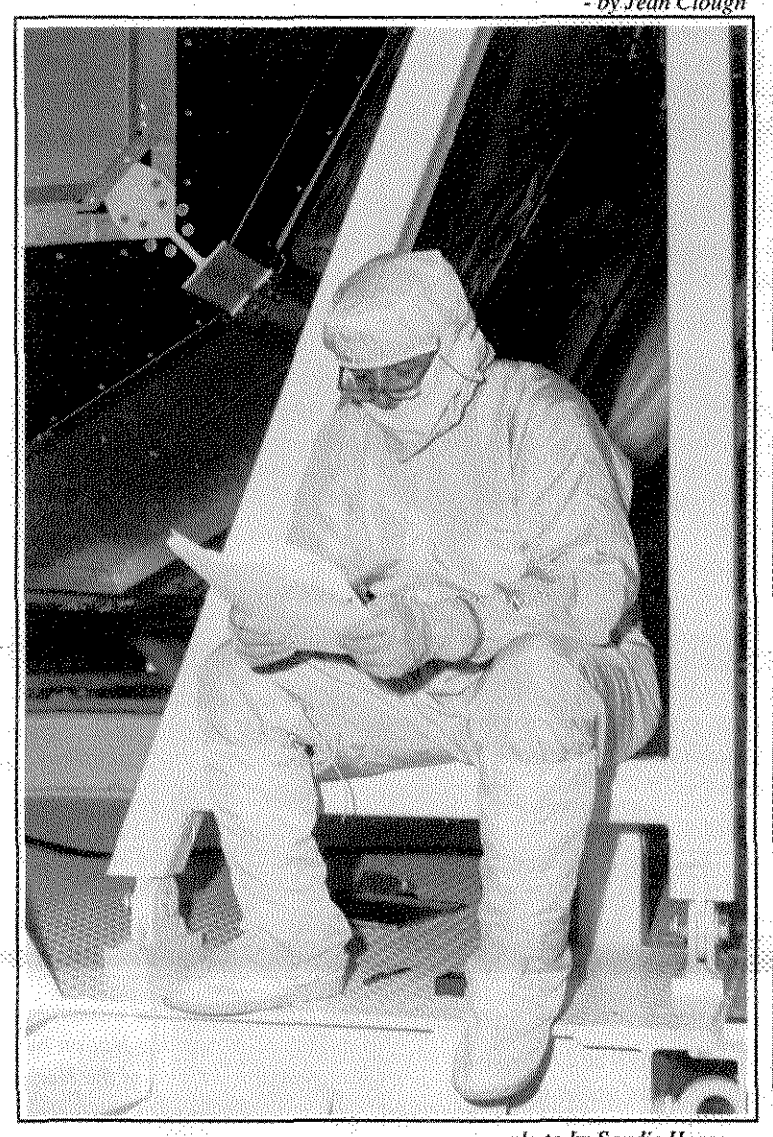
Two additional trays were removed on the first day. Illustrating the international flavor of the experiments, these trays contain cosmic ray experiments from the Dublin Institute for Advanced Studies in Dublin, Ireland.

The protocol for tray removal is painstaking in its protection of scientific data. As each tray is removed from LDEF, it is placed on a workbench where the principal investigators perform closer inspections and take basic measurements. These measurements include detailing the sizes of micrometeoroid and orbital debris impacts.

The combined data from individual trays and the LDEF frame will provide valuable information in planning future space structures, including Space Station Freedom. Removal of the 57 experiments, contained in 86 trays mounted on the LDEF framework, is expected to continue through March.

After the measurements and first analyses are completed, the experiment hardware will be appropriately configured for transport, then packaged and shipped to the investigator's laboratory. There, additional investigation and analysis will be performed. More than 200 investigators have participated in the experiments flown on LDEF, which spent almost six years in space.

Preliminary results of these individual investigations will be announced late this summer during an Investigator Working Group meeting to be held at Langley. Langley developed and managed the LDEF project, which is unique in its opportunities for analysis of the effects of space on various materials.

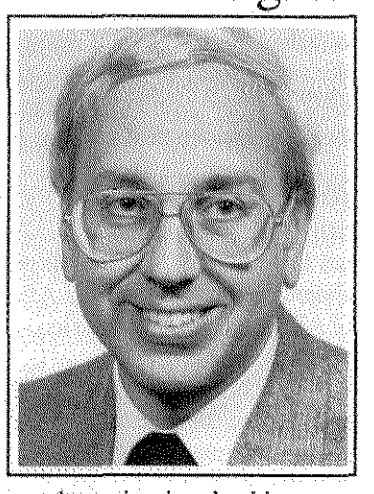


-photo by Sandie Horsey

Roger Messier, recently retired from Langley, was brought back to work on the LDEF project. Pictured here in SAEF-2 at KSC, Messier studies the plan for removal of the experiment trays. See story on page 5.

Langley Colloquium

Was There a Race for First Flight?



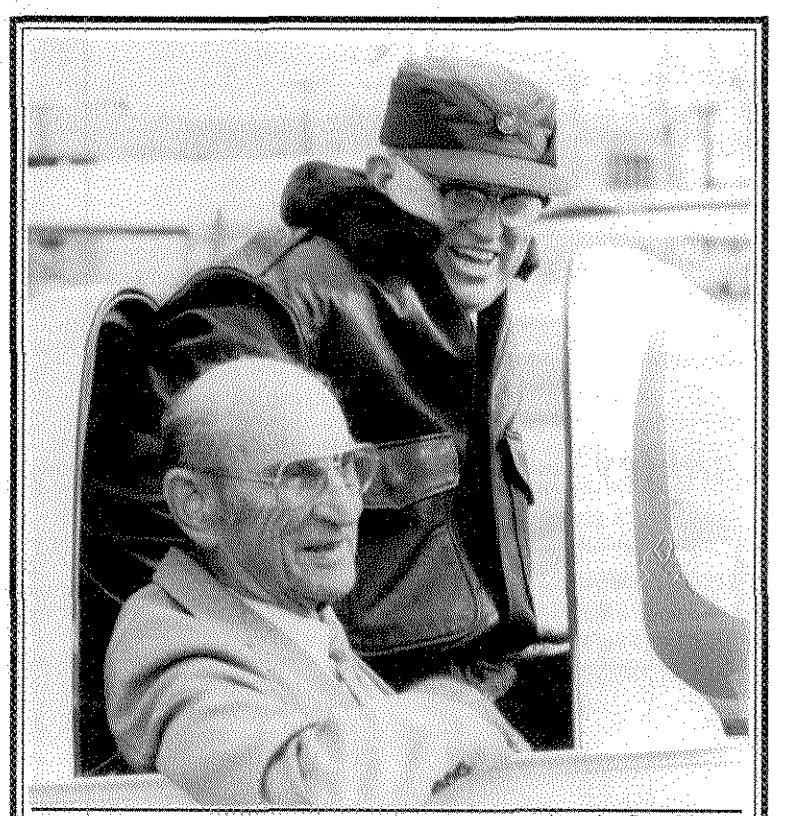
December 17, 1903 is emblazoned in the history of the 20th century as the day the Wright brothers made their pioneering first flight. What is not so well known are the technical and personal events that preceded the first powered flight.

What state-of-the-art technology did the Wrights inherit from their predecessors in previous centuries? What competition did they have in the race to be the first to fly? What role did Samuel Pierpont Langley, the secretary of the Smithsonian Institution, play in the quest for powered flight? How did his development of the "aerodromes" impact the Wrights' work?

Was there really a race between Langley and the Wright brothers for the first flight? Dr. John D. Anderson Jr., professor of aerospace engineering at the University of Maryland, will address all of these concerns at a colloquium Monday, March 12, at 2 p.m. in the H.J.E. Reid Conference Center.

Anderson, an internationally known aerospace authority, occupied the Charles Lindbergh chair at the Smithsonian Institution's National Air and Space Museum from 1986-87. He is now their special assistant for aerodynamics, involved in research and in the writing of a history of aerodynamics. Anderson has given over 40 short courses to major aerospace companies, the Air Force Academy and government institutions. He has lectured at Rolls-Royce in England and the von Karman Institute in Belgium.

Anderson has published five books and authored over 90 papers in radiative gas dynamics, reentry aerothermodynamics, gas dynamic and chemical lasers, computational fluid dynamics, applied aerodynamics, and hypersonic flow. In 1987, he was chosen as the senior consulting editor for the McGraw-Hill series in aeronautical and astronautical engineering.



-photo by Cam Martin

LANGLEY SALUTES FRED WEICK. Weick, the developer of the NACA cowling for which Langley won its first Collier Trophy, returned to the Center to be honored as the 1989 Guggenheim Medal winner. Weick is shown with Langley retiree Charles Drummond in the cockpit of his 1946 Ercoupe, an airplane designed by Weick.

Langley to Support New State Focus on Space Business

-by Craig Murden

Developing economic opportunities in space is the focus of a major Commonwealth of Virginia initiative in which the NASA Langley Research Center will support a prominent cross-section of scientific, business, education and public agencies.

The newly formed Virginia Space Business Roundtable is seen as the catalyst for a partnership dedicated to the growth of a vigorous space industry and world-wide market for Virginia space technology, according to Frederick O. Allamby, Langley's manager of Commercial Programs and a charter member of the roundtable's board of trustees. Serving as the group's president is Dr. Dennis W. Barnes, the Governor's Space Business Advocate and associate vice president of Governmental Affairs at the University of Virginia.

The Virginia Roundtable was chartered by the Space Foundation, a Houston organization that promotes commercial space development. There are seven other roundtables in the country. The Virginia group will sponsor speeches by state and federal space policy specialists, offer training in applying existing space technology to commercial products and invite government decision-makers and business leaders to workshops where they will develop strategies to boost the state's space industry. Additionally, meetings will be arranged for aerospace executives, university officials and NASA personnel to help identify new business opportunities for the state within the space program.

Early efforts include scheduling a series of day-long technology transfer seminars led by the editor of *NASA TechBriefs* magazine. A roundtable workshop in Richmond on the use of satellite remote sensing data by Virginia state agencies is planned for later this year. The group is hoping for membership from all sectors of the state, with growth to 100 members by the end of 1990. The parent Space Foundation has been exploring the potential of expanding internationally with roundtables in Moscow, Japan and Australia.

The first formal board meeting was held March 8 at Norfolk's Omni Hotel when Courtney Stadd, newly appointed senior director for commercial space with the President's National Space Council, made the keynote speech. According to Joel Levy, chairman of the board of trustees, the Norfolk location emphasizes the roundtable's intent to draw on the southern Norfolk/Richmond/Hampton region of Virginia to complement the heavy northern Virginia participation in the Washington-based roundtable. Overall, says Levy, the Virginia Roundtable is designed to promote an understanding of how viable the commercialization of space can be for non-aerospace companies.

News Briefs

HEADQUARTERS, Washington, D.C. --- Vice President Dan Quayle met with NASA's senior management and gave the agency a resounding vote of confidence. Speaking at an informal luncheon at NASA Headquarters, the Vice President emphasized that the White House "is committed to making space a priority." The Vice President is the chairman of the National Space Council, which is charged with overseeing the President's national space policy and coordinating interagency space issues.

KENNEDY SPACE CENTER, Fla. --- The ROSAT spacecraft, a German scientific satellite to be launched by NASA in early summer, has arrived at Cape Canaveral Air Force Station, Fla., after a flight from the Federal Republic of Germany (FRG) aboard a German 747 cargo plane. ROSAT will be launched using a Delta II rocket. Built by Dornier Systems of the FRG, ROSAT will perform the first all-sky survey with an imaging x-ray telescope. ROSAT is a cooperative project between NASA and the FRG's Federal Ministry for Research and Technology. The United Kingdom is cooperating on ROSAT through an agreement with the FRG.

JOHNSON SPACE CENTER, Houston, Texas --- Effective July 1, Colonel Richard M. Mullane will retire from NASA and the Air Force. Mullane was selected as a mission specialist astronaut in 1978 and has flown three Space Shuttle missions. His third flight was STS-36, NASA's most recent mission, aboard the orbiter Atlantis. After leaving NASA and the Air Force, Mullane will return to his hometown of Albuquerque, New Mexico.

AMES RESEARCH CENTER, Moffett Field, Calif. --- Pioneer 11 has crossed the orbit of Neptune and become the fourth spacecraft to leave the solar system, providing a coda to humanity's first major planetary explorations. Pioneer 11 will join Pioneer 10 and Voyagers 1 and 2 in searching for the heliopause, the point at which the Sun's electromagnetic influence gives way to the galaxy's influence. As it crossed Neptune's orbit, Pioneer 11 was 2.8 billion miles from the Earth. Launched in 1973, Pioneer 11 provided scientists with their closest view of Jupiter, passing within 26,600 miles of the cloud tops in December 1974.

HEADQUARTERS, Washington, D.C. --- NASA and the University Corporation for Atmospheric Research (UCAR), Boulder, Colo., have signed an agreement under which NASA will support UCAR's exploration of the feasibility of using Shuttle external tanks (ETs) as research, storage or manufacturing facilities in low-Earth orbit. Under the agreement, UCAR has the main responsibility to address the issues associated with their planned orbital use of external tanks. NASA's support of UCAR's efforts is on a direct cost, reimbursable basis.

Editorials

March is Women's History Month

History, as it has been traditionally taught, has focused on political, military and economic leaders and events. This approach has virtually excluded women, people of color and the mass of America's ordinary citizens. To the children of those ignored groups, history may seem remote and lifeless, a tale having little bearing on their own lives.

By expanding the focus of "history" to include the stories of women's lives, whether they reflect everyday life experiences or the roles women have played in the major events of our nation's past, our students can gain a deeper understanding and appreciation of American history.

This year's theme, "Courageous Voices Echoing in our Lives," recalls the words and deeds of previous generations of women, and the way their beliefs and ideals are reflected in our lives today. It also recalls the lives of women in our own families who have sustained and passed on the cultural heritage that makes us the unique individuals we are. It is in the words and deeds of such women that inspiration for our own lives can be found.

Public Law 101-6 designates the month of March as Women's History Month. The President has issued a proclamation alerting the people of the United States to recognize the contributions of American women. The Office of Equal Opportunity Programs is planning appropriate activities to observe Women's History Month. Watch the TV monitors on Center for specifics.

Whereas American women of every race, class and ethnic background have made historic contributions to the growth and strength of our Nation in countless recorded and unrecorded ways;

Whereas American women have played and continue to play a critical economic, cultural and social role in every sphere of the life of the Nation by constituting a significant portion of the labor force working inside and outside of the home;

Whereas American women have played a unique role throughout the history of the Nation by providing the majority of the volunteer labor force of the Nation;

Whereas American women were particularly important in the establishment of early charitable, philanthropic and cultural institutions in our Nation;

Whereas American women of every race, class, and ethnic background served as early leaders in the forefront of every major progressive social change movement;

Whereas American women have been leaders, not only in securing their own rights of suffrage and equal opportunity, but also in the abolitionist movement, the emancipation movement, the industrial labor movement, the civil rights movement and other movements, especially the peace movement, which create a more fair and just society for all; and

Whereas despite these contributions, the role of American women in history has been consistently overlooked and undervalued, in the literature, teaching and study of American history:

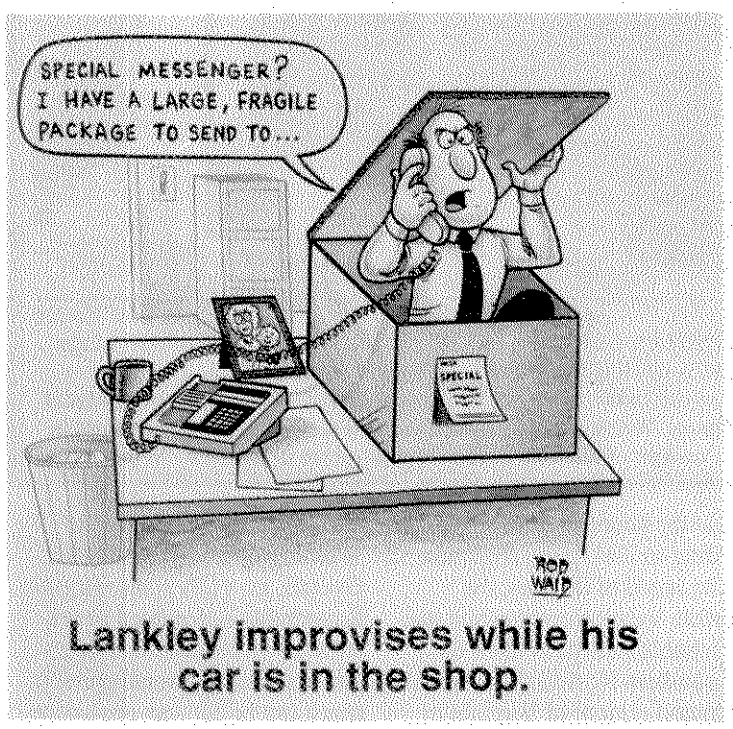
Now, therefore, be it resolved by the Senate and House of Representatives of the United States of America in Congress assembled, that March 1989 and March 1990 are both designated as "Women's History Month."

Senior Management Research Review

The Senior Management Research Review will be held Monday, March 19, 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	Three-Dimensional DSMC Calculations for the Shuttle Orbiter	James Moss (Space/SSD)
9:45	Determination of Processes that Affect Ozone in the Middle Atmosphere	Martin Mlynczak (Space/ASD)
10:00	Development of an Unstructured Grid Algorithm for Inviscid Flows	Kyle Anderson (Aeronautics/FLDMD)
10:15	Carbon-Carbon Panel Sonic Fatigue	Jack Leatherwood (Structures/ACOD)
10:30	Active Flutter Suppression on an Advanced Flexible Wing	Martin Waszak (Flight Systems/GCD)
10:45	Automatic Generation of ADA Code	Carrie Walker (Flight Systems/ISD)

Lankley



Lankley improvises while his car is in the shop.

In Memoriam

Sympathy is extended to the family of **William R. "Bill" DeShazor**, who died February 6. De Shazor retired in September 1989 from the Projects Development Branch after 41 years of service.

Current News Releases

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

90-22.....Vice President Emphasizes White House Space Commitment
90-23.....Technicians Begin Removing LDEF Experiments
90-24.....NASA Acquires Supersonic SR-171s on Loan from USAF
90-25.....Truly Promotes Science and Math During National Engineers Week
90-26.....UCAR To Study Possible Uses of External Tanks
90-27.....ROSAT Spacecraft Arrives at Florida Launch Site
90-28.....Astronaut Mullane to Retire from NASA, Air Force
90-29.....Pioneer 11 Passes Neptune's Orbit, Leaves Solar System

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

In the beginning . . .

NACA Established 75 Years Ago "To Supervise and Direct the Problems of Flight"

1915 was a banner year for accomplishments: Albert Einstein put forth his theory of relativity; Henry Ford produced his one millionth automobile; Alexander Graham Bell placed the first transcontinental telephone call. Motion pictures began to reshape American entertainment; New Orleans jazz began to make an imprint on American music; a new speed record for automobiles was set--102.6 mph. And on March 3, 1915, Congress established the National Advisory Committee for Aeronautics--NACA--"to supervise and direct the scientific study of the problems of flight, with a view to their practical solution."

American flying lagged behind European aviation, even behind automotive progress in this country. This shortcoming was particularly disturbing to many aviation enthusiasts in the United States, the home of the Wright brothers and the location of the first successful powered, controlled flight. The American attitude toward the airplane was divided between those who viewed it as a mechanical triumph with a significant future and those who saw it as a fad, a dangerous one at that.

European progress in aeronautics and America's inertia in the field was obvious. The outbreak of war in Europe in 1914 served as a catalyst for the creation of an American aeronautics agency. The use of German dirigibles for long-range bombing and the rapid evolution of airplanes for reconnaissance and for pursuit underscored the shortcomings of American aviation. The enabling legislation for the NACA slipped through almost unnoticed as a rider attached to a Naval appropriation bill.

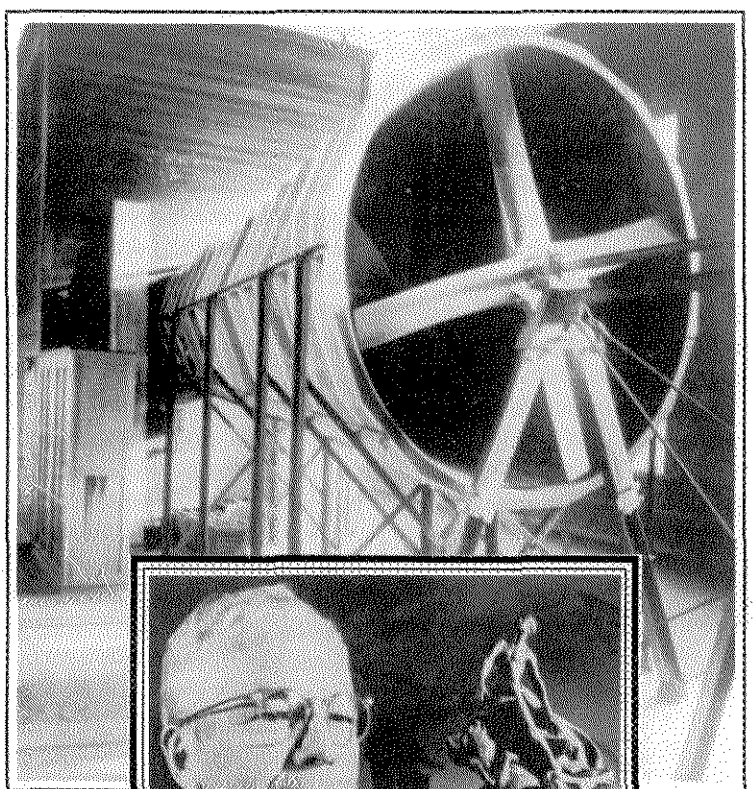
The authors of NACA's charter left open the possibility of establishing an independent laboratory. Even before the war's end, plans were progressing to acquire a laboratory, with the best option a collaboration in the development of a U.S. Army airfield across the river from Norfolk, Virginia. The military facility was named after Samuel Pierpont Langley, former secretary of the Smithsonian. NACA's corner, the Langley Memorial Aeronautical Laboratory, was modest: an atmospheric wind tunnel, a dynamometer lab, an administration building, a small warehouse and a staff of 11 people.

The management of the NACA and Langley, with a small staff for many years, remained personal, straightforward and informal. Langley attracted the brightest young aeronautical engineers in the country, because they knew that their training would continue to expand by close contact with the senior NACA engineers on the cutting edge of research.

Although the Langley organization became more formalized over time, there was maximum opportunity for individual initiative. The agency followed a regular procedure for instituting "research authorizations," but promising ideas could be pursued without formal approval.

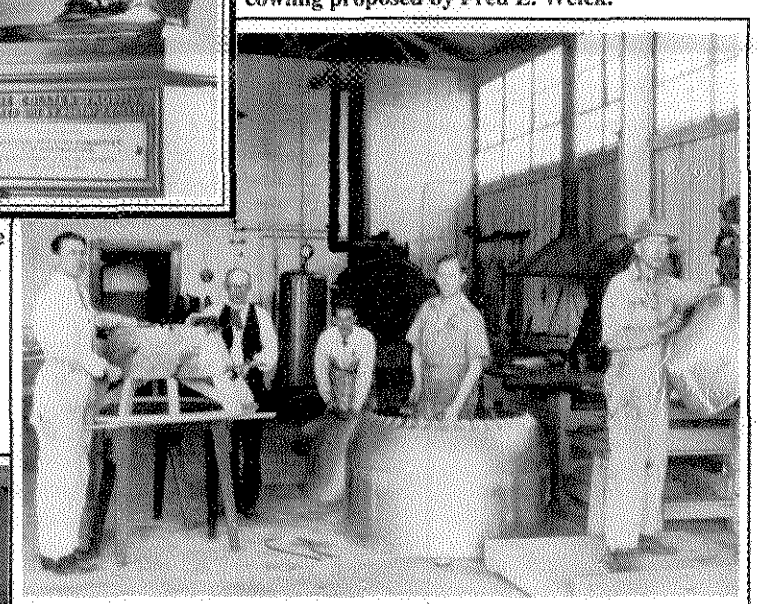
In addition to creative ideas, NACA's research also depended on facilities. At Langley, technicians turned their attention to a new wind tunnel. It was not large, designed to have a test section of about five feet in diameter, but it could be configured to produce speeds of 120 miles per hour (mph) in the test section, making it one of the best facilities in the world.

Still, there were inherent drawbacks. The NACA engineers at Langley knew how to scale up data from the small models tested in their sea level, open circuit tunnels, but soon they realized that their estimates were often wide of the mark. In the spring of 1921, construction of a pressurized, or variable density tunnel (VDT), began at Langley. The goal was to keep using models in the tunnel, but conduct the tests in a sealed, airtight chamber where the air would be compressed to the same extent as the model being tested. In other words, if a one-twentieth scale model was being tested in the VDT, then researchers would increase the density of air to a level of 20 atmospheres. Results could be expressed in a numerical scale known as the Reynolds number.

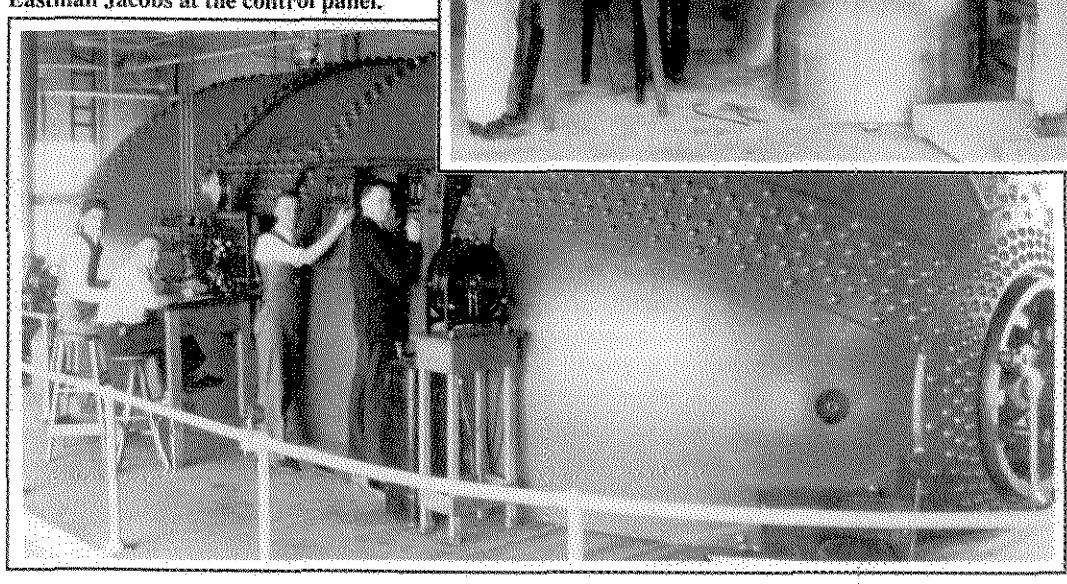


Langley Laboratory's first wind tunnel, completed in 1920, was essentially a replica of a British tunnel.

Henry J. E. Reid, Engineer-in-Charge from 1926 to 1960, admires Langley's first Collier Trophy presented to NACA for the development of the low-drag engine cowling.



Langley engineers work to develop the NACA cowling proposed by Fred E. Weick.



NACA's VDT research team with Eastman Jacobs at the control panel.

The VDT began operations in 1922 and proved highly successful in the theory of airfoils. In fact, Langley's VDT established itself as the primary source for aerodynamic data at high Reynolds numbers in the United States, if not the world.

In parallel, the NACA ran a program of full-scale flight tests that helped establish a body of required guidelines and procedures for flight testing. One problem involved instrumentation--proper equipment for acquiring accurate data on full-scale aircraft during actual flight that could correlate with data obtained in wind tunnels. In an early project, wind tunnel data for a model of the Curtiss JN-4 "Jenny" was compared to information derived from an instrumented Jenny put through a series of flight tests to investigate lift and drag. By comparing data, the reliability of wind tunnel information could be judged more rigorously. These tests represented the start of carefully planned and instrumented experimental flights that became a hallmark of the NACA and NASA from subsonic through supersonic flight. These early flights also uncovered the need for specially trained test pilots; in fact, Langley pioneered the concept of training fliers as test pilot-engineers.

The VDT paid additional dividends in the form of airfoil research. During the late 1920s and into the 1930s, the NACA developed a series of thoroughly tested airfoils and devised a numerical designation for each--a four-digit number that represented the airfoil section's critical geometric properties. By 1929, Langley had developed this system to the point where the numbering system was complemented by an airfoil cross section. The complete catalog of 78 airfoils appeared in the NACA's annual report for 1933. Engineers could quickly see the peculiarities of each airfoil shape because the four-digit classification specified camber lines, maximum thickness and special nose features. These figures and shapes transmitted the sort of information to engineers that allowed them to select specific airfoils for desired performance characteristics of specific aircraft.

During the late 1920s, the NACA also announced a major innovation that resulted in the agency's first Robert J. Collier Trophy, presented annually by the National Aeronautic Association for the year's most outstanding contribution to American aviation. The 1929 Collier trophy went to NACA for the design of a low-drag cowling. Investigations of full scale aircraft in a new propeller research tunnel at Langley uncovered a possibility of reducing the drag of exposed cylinders without creating a cooling problem. The virtues of the NACA cowling received public acclaim when installed on a Lockheed Air Express monoplane which broke the Los Angeles-to-New York nonstop record. The cowling raised the plane's speed from 157 to 177 mph. After the flight, Lockheed sent a telegram to the NACA committee: "Record impossible without new cowling. All credit due NACA for painstaking and accurate research." The NACA cowling was estimated to save the industry over $5 million--more than all the money appropriated for NACA from its inception through 1928.

NACA's first fifteen years recorded remarkable growth in aeronautics. The progress of military and civilian aviation and aeronautics research set the stage for the aeronautical revolution that began in the 1930s. The design characteristics of the 1920s--fabric covered biplanes with radial engines gave way to truly sophisticated airplanes of the 1930s with streamlined shapes, metal construction, retractable landing gear and high performance. The national economy may have sagged during the Great Depression of the 1930s, but the aviation industry reached new levels of excellence.

Alumni News and Views

March Luncheon Features Tanner

The monthly Alumni Association luncheon will be held Tuesday, March 13, in the private dining room of the NASA cafeteria. Attendees should go through the cafeteria line at 11:30 a.m.

John Tanner will speak about landing loads tests for the Space Shuttle. Members and guests are welcome.

For planning purposes, these luncheons are held on the second Tuesday of each month. Mark your calendars.

Everything is set for the alumni retreat/reunion in Durham, N.C. the weekend of March 23-25, 1990. A few more people can be accommodated if they act promptly. Mail check and reservation forms (available in the LAA office) to Mail Stop 496 by March 19. Call Abe Leiss, 877-2939, or Axel Mattson, 898-7462, for details.

Club News

Club Names Runner of the Year

Bob Ferguson, Electronics Branch, and Gale Harvey, Chemistry and Dynamics Branch, tied for Langley 1989 Runner of the Year. Each earned 51.46 points in the NASA Intercenter competition.

Rounding out the top ten were Joe Kubalak, Chuck Engle, Pete Earls, John Hoppe, Al Graham, Steve Bauer, Steve Sudik and Liz Filer.

For additional information about the Langley Runners Club, contact Richard Shearer, ext. 47036.

Alumni Support Air & Space Center

Former Alumni Association president Bill Boyer is "amazed at the response" by alumni to the Virginia Air and Space Center's pavers project. The project offers museum supporters the opportunity to purchase a personalized paving stone that will be used in the museum's main courtyard.

Boyer enclosed a paver order form in a recent newsletter to association members. "NASA/NACA alumni have responded enthusiastically," he reports. The LaRC alumni pavers will be grouped together emphasizing Langley's support of the new museum initiative.

To "pave your way to immortality" and "own a piece of history," order a paver. Call (804) 727-0800 for an order form.

NASA Tenpin League Announces Bowling Stats

Team High Game	963	Short Circuits	917	Strike Force	984	Ballers
Team High Series	2694	Short Circuits	2715	Strike Force	2620	Ballers
Male High Game	236	Vernon Boyd	229	O. J. Cole	248	Gene Wagner
Male High Series	587	Dick Jones	695	Ng O. Ging	598	Dennis Martin
Female High Game	209	Ruth Frizzell	195	Ruth Frizzell	205	Barbara Massey
Female High Series	534	Ruth Frizzell	535	Marilyn Aldrich	547	Ruth Koren
Most pins over average	+86	Vernon Boyd	+69	John Miller	+88	Richard Shearer

Volleyball Wrap Up; New Season Plans Announced

The 1989 fall volleyball season concluded with league tournaments in mid-November. The regular season champions of the B-League, Leftovers, and C-League, Misfits, won their tournaments. The D-League regular season champion was the Juvenile Court, and the BBs won the tournament.

To help participants become better volleyball players, three clinics are planned shortly before the spring season begins. Advanced level skills will be covered on Tuesday, March 13. Intermediate level skills will be discussed on Wednesday, March 14. Basic or beginner skills will be demonstrated on Thursday, March 15.

The 1990 spring volleyball season is scheduled to begin on March 20 for a period of 10 weeks. Team registration forms can be obtained from one of the officers. Registration forms and fee of $80 (by check only to the Langley Activities Association) are due between March 5-9. For additional information contact Tricia Romanowski, president, ext. 47020, or Frank Quinto, vice president, ext. 45068.

Help is on the Way! Stress Club Forms on Center

The phone won't stop ringing. Deadlines are coming up fast. Everyone wants his project done first. You've worked late for the last three nights. Stress begins to take its toll as you find yourself unreasonably irritable with co-workers, family and friends. There seems to be no time to just relax.

In a society and workplace that emphasizes deadlines, production, efficiency and accomplishment, many of us regard stress as just "a part of life." It becomes difficult to imagine even a short stress-free period. We seem to have lost the natural capacity to relax, even when we have some time!

Doctors tell us again and again that we need to reduce stress levels if we ever hope to improve or maintain our health. Due to physical circumstances (or just by personal preference), intense physical activity may not be an open avenue for some to release their tension. Besides, exercise--even for athletes--may not be enough.

Enter Stressbusters--a weekly informal gathering of Langley employees and contractors who are interested in reducing stress in both body and mind. A weekly session of 45 minutes will be offered by Steve Dahmen, a computer systems analyst who has taught yoga and a variety of stress-reducing techniques for the past eight years.

The sessions will consist of progressive relaxation, a guided process of tensing and releasing each muscle in the body, using relaxing, soothing music to aid the "letting-go" of tension. This technique has been shown to assist in achieving states of relaxation deeper than some levels of sleep, allowing the body to enhance its stress-combating mechanisms.

"By first relaxing the body in this way," Dahmen says, "it becomes far easier to relax the mind." Stressbuster sessions are intended to be an opportunity for participants to take a regular refreshing, recharging break from the often fast-paced, stressful work environment. Dahmen is encouraging participation by personnel from all corners of LaRC, including office staff, executives, co-ops, security personnel, engineers, etc. "The only qualification you need to have stress (and relieve stress)," says Dahmen, "is to be a human being."

In addition, there will be opportunity to informally discuss a variety of methods that can be used daily to reduce stress in our lives: attitude reorientation, good nutrition, desk stretches, breathing and exercise.

The first meeting of Stressbusters will be Wednesday, March 14, from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. Subsequent meetings will be held each Wednesday at the same time in Building 1212, Room 200. For further information or to register, call Steve Dahmen, ext. 44519. Fliers detailing the program are available at the Dispensary.

Health Corner

Clinic Offers Services To Contractors

The LaRC Health Clinic provides emergency initial treatment and first aid for illnesses and injuries sustained on the job by Non-Personal Services (NPS) on-site contractors. Those who sustain acute injuries or illnesses are immediately referred to a physician or appropriate specialist of their choice.

In addition to emergency services and initial treatment of illness, the clinic provides the following non-occupational services to NPS contractors:

- o Flu shots
- o Allergy injections (per direction of a private medical doctor)
- o First aid-type treatments (aspirin for headache; bandages for cuts, etc.)

Physical examinations are provided certain NPS contractors engaged in potentially hazardous occupations, when it is required by the government and deemed cost effective to provide the service.

Further information on health services available to NPS on-site contractors may be obtained by calling the Health Clinic, ext. 43195.

Positions Open at Langley

90-27: Accounting Officer, GS-510-14 or 15; Office of the Director for Management Operations, Financial Management Division. Open NASA-wide. Closes March 15.

90-30: Supervisory Electronics Engineer, AST, Electronic Instrumentation Systems, GM-855-14; Office of the Director for Electronics, Flight Electronics Division, Electronics Branch. Open to LaRC. Closes March 16.

90-31: Supervisory Electronics Engineer, AST, Electronic Instrumentation Systems, GM-855-14 or 15; Office of the Director for Electronics, Flight Electronics Division, Electronics Branch. Open to LaRC. Closes March 16.

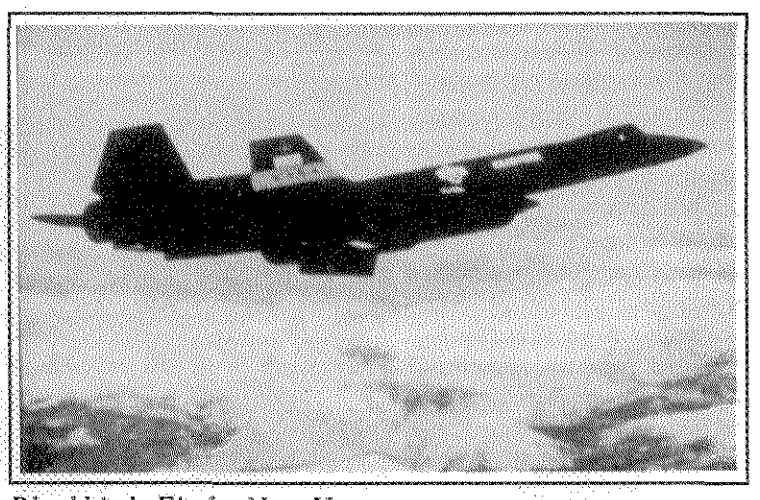
Retirement Party

John P. McPherson will be honored at a retirement dinner Tuesday, March 13, from 4:30 to 7 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $10/person including gift. Separate gift donations are welcome. For reservations, please call John Quinn, ext. 41678, by March 9.

Av Week Videos

The Aviation Week video, *SR-71 Blackbird, the Secret Vigil*, is now available for loan from the Teacher Resource Center on a first come-first served basis.

Due to copyright specifications, the video may not be reproduced. To borrow, call Edith Watts, ext. 43293.



Blackbirds Find a New Home

NASA Acquires SR-71s from USAF

Three of the supersonic SR-71 "Blackbird" aircraft being retired from the U.S. Air Force are slated for loan to NASA's Ames-Dryden Flight Research Facility, Edwards, Calif.

The aircraft will be in flyable storage at the NASA facility until the Air Force determines it no longer has a need to preserve them. NASA will use the aircraft to fly scientific experiments requiring high-speed research testbeds.

The Dryden facility operated YF-12s, similar to SR-71s, from 1969 to 1979, gaining much useful research data on structures and stability and control at high speeds and altitudes. Airbreathing propulsion information highlighted the program.

The SR-71s are capable of flying at greater than three times the speed of sound. The approximately 101-foot-long titanium structure is powered by two J58 engines. The airplanes are coated with a special black paint that helps dissipate heat caused by high speeds. The manufacturer is Lockheed Corp.

The first of the three planes arrived in mid-February from Beale Air Force Base near Marysville, Calif., where it served in a classified program

Personnel Profiles

Backstage at the LDEF

-by Allan C. Hanrahan

"All the world's a stage," wrote William Shakespeare, but that was before this agency trod the boards; now the stage includes our solar system and the heavens beyond.

The Long Duration Exposure Facility (LDEF) is the latest "star" in the spotlight with its supporting players "Papa LDEF," Bill Kinard, and "big brother," Burt Lightner (both featured in earlier issues). But what about the stage crew, that intrepid troupe of technicians, also known, colloquially, as troops-in-the-trenches?

We set out to ascertain the names of all those Langley Research Center technicians directly involved in the support of LDEF's return and subsequent processing. **Leon A. Williams**, summoned out of retirement to serve as deputy to Spacecraft and Ground Operations Manager **Tom Williams**, talked to us about the technicians.

"I call them the 'A' team, and I've told them I call them that. We pulled them out of different divisions. We looked for as much talent as we could find and it (the talent) really came in handy," related Williams.

When it became evident that LDEF retrieval was a distinct possibility, **William Fernald** and about a dozen technicians were sent to Kennedy Space Center last February to refurbish the LDEF Assembly and Transportation System (LATS). Beginning in October technicians shuttled back and forth between Langley and KSC, as necessary, getting ready for the retrieval. Other pre-retrieval work was done on the robot arm, formally known as the Remote Manipulator System (RMS) used by Mission Specialist Bonnie Dunbar to grapple the LDEF and maneuver it into Columbia's payload bay.

Post-retrieval efforts, of course, are focused on preserving the LDEF just as it emerged from space, preventing any damage or earth-borne contamination. That has necessitated 12-hour-shifts, seven days a week, at least since Langley people took possession after the LDEF was transferred from the canister, or special transporter, to the LATS.

"Most of the technicians are in two groups, the Facility Operations Group and the Experiment Operations Group," Leon Williams continued. "**Linwood Burcher** is the leader of the former and helping him are **Norman Willey**, **James Linker** and **Elmo Sterling**.

"The facility group will take off of LDEF the experiment trays and pass them to the Experiment Operations Group. **Thomas Leffel** leads that group and helping him are **Charles Bailey**, **Richard Martin** and **Vance Overbay**.

"Then there are the persons we call rotators, **Frank Boyer** and **Richard Rawls**. They can be put into either group to relieve anyone who has to be away."

Talking to Linwood Burcher later revealed that family obligations go on, high-profile project notwithstanding. One gentleman had to return to Virginia for a week or so because of his daughter's wedding. Another returned home for a time to help his daughter with a college situation.

"**William Terrill** handles the schedules for us," continued Williams, "and **Gordon Owsley** developed the paperwork and handled the logistics--such things as shipping and cooperating with Customs. He'll have to bring Customs to the facility to see the experiments (that are going to one of the eight foreign countries that have experiments on LDEF) as they are sealed in air-tight, moisture-free containers.

"The Electronics and Data Retrieval Group is headed by **Sam Sokol**, and helping him are **Eugene Sutton**, **William Munden** (responsible for data retrieval), **James Bene** and **Will Scott**.

"The latter two gentlemen are responsible for the on-board batteries," added Williams. "They'll do the checkout and see that the batteries are packed and shipped.

"**George King** led the Reliability and Quality Assurance people, and he interacted with three additional Air Force people provided by Patrick Air Force Base.

"The Non-Destructive Evaluation Group is not here (at KSC) right now," reported Williams, "but they'll come down after all the experiments are taken off, and check out the LDEF structure and the LATS. Then they'll button it up and store it at KSC and head home. That group includes **Philip Glaude**, **Robert Berry** and **Philip McElveen**."

Meantime the work goes on and Burcher gives us a glimpse of the technicians' life at KSC during these days of the LDEF.

"You know," Burcher began, "We had to take 60 hours of classes at Langley just to get in to work here (at KSC). We had to transfer our training records, security records and 'dispensary' records, and then we had to get passports to seven different countries -- in case Columbia had to land outside this country.

"Down here we've had to take classes for so many things," Burcher continued. "We've had to go to door-opening school. (Don't laugh; some of the doors are intricate mechanisms, costing small fortunes, and opening them improperly could damage them or allow air-borne contamination of the Spacecraft Assembly and Encapsulation Facility [SAEF-2] where the LDEF and its experiments are being processed.). We've also attended crane operating school, rigging school and 'ELSA' school ('ELSA' is the nickname for a breathing apparatus). Plus, we've had to keep up our usual training and go through reviews," added Burcher.

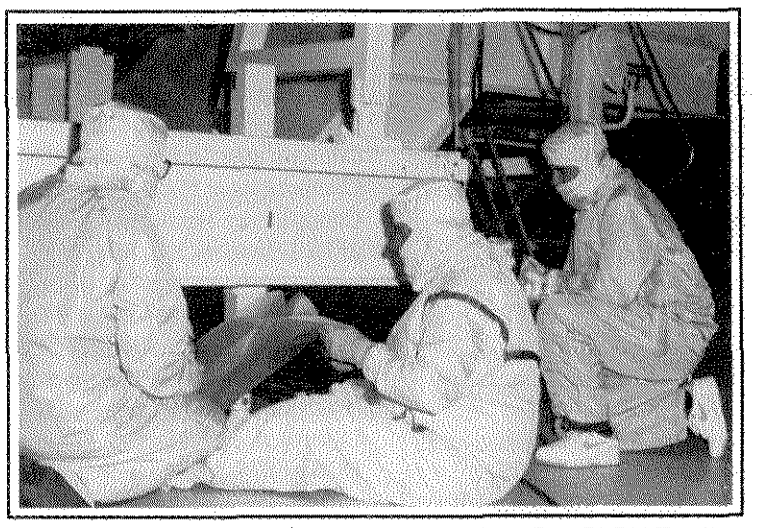
Make no mistake; LDEF work is demanding.

"It takes us about 15 minutes just to get into the facility," Burcher revealed. "First we have to clear with the guard and leave our badge with him. Then we have to 'dress out' and then take a two-minute air shower, after which we go in to work.

"We have to be very particular. For example, we have to record the torque value of the screws before removing them, and every screw is catalogued and saved. We're even cataloguing the dust and paint chips. We vacuumed the shuttle payload bay, we vacuumed the transfer container, and we vacuumed the LATS. Each dust bag was catalogued and saved. And the investigators want them. You know, they--the investigators and others--are really learning a lot from LDEF already," Burcher concluded.

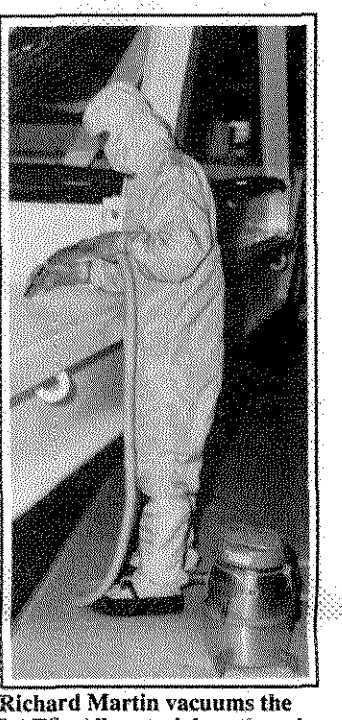
The knowledge that has been gained has made worthwhile the personal sacrifices that some of the technicians have made to serve on the LDEF project. But as Leon Williams noted, "Langley's been noted for good people. I really admire the people in the shops; I had an appreciation for them early on in my career."

-LDEF photos by Sandie Horsey, Fred Jones and Don Ward

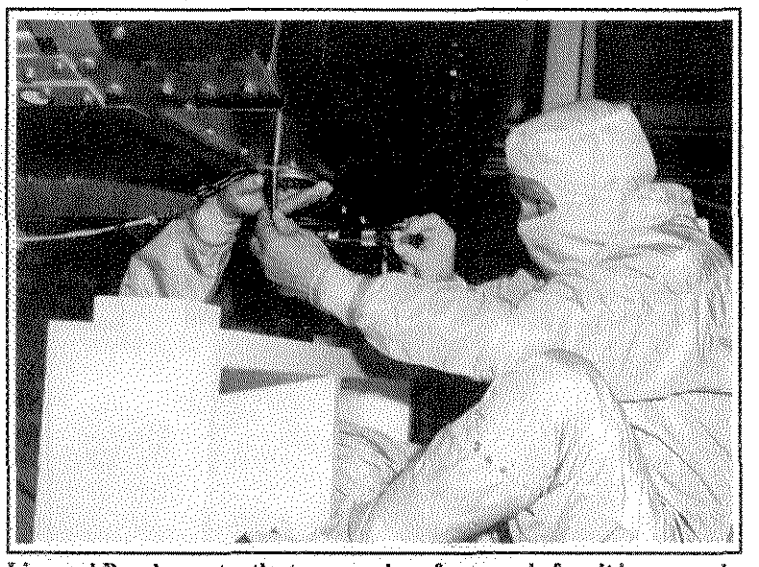


Preparing the area around LDEF, Vance Overbay, (L to R) Bill Terrill and Gordon Owsley prepare to wrap the jacks supporting the transportation structure to avoid any contamination of the spacecraft.

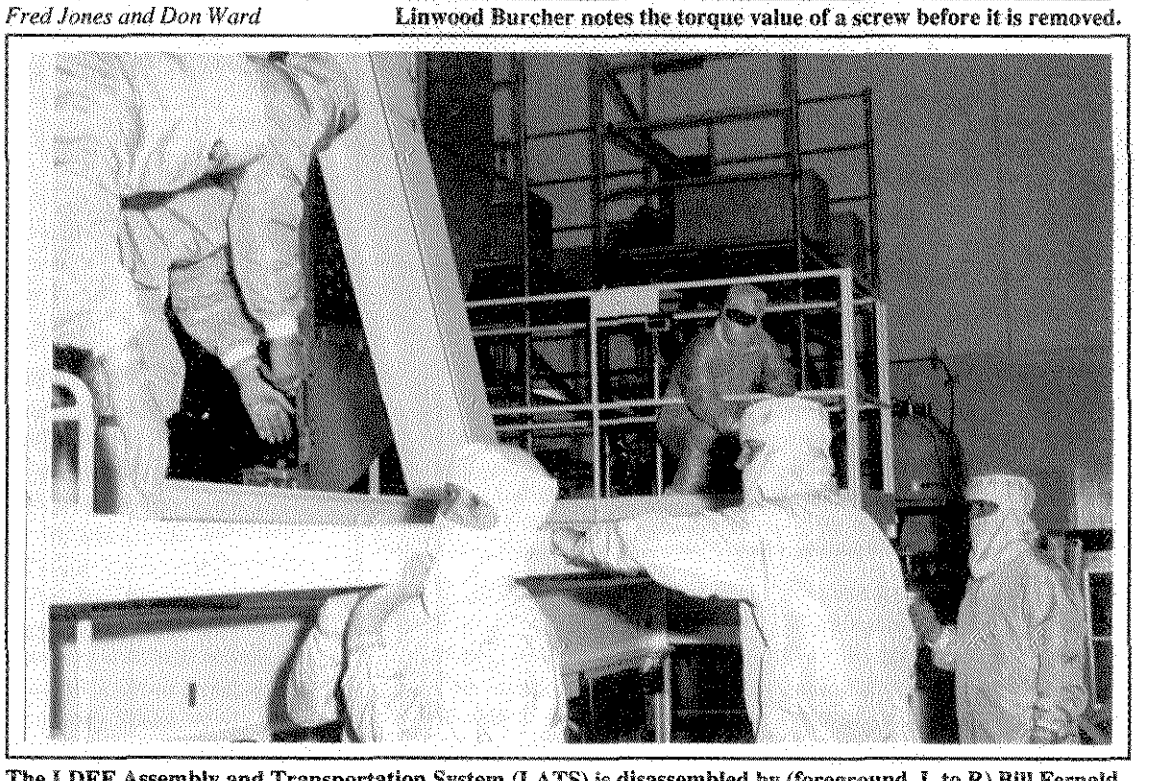
Norm Willey (above) and Jim Linker carefully remove a thermal panel from the Earth end of the LDEF.



Richard Martin vacuums the LATS. All materials gathered are catalogued and saved.



Linwood Burcher notes the torque value of a screw before it is removed.



The LDEF Assembly and Transportation System (LATS) is disassembled by (foreground, L to R) Bill Fernald, Charles Bailey, Richard Martin and (above) Jim Linker, Norm Willey and Elmo Sterling.

Happenings

SPECIAL LAA SOCIAL will be held Friday, March 16, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Join your co-workers at the LAA St. Patrick's Day party featuring the Permanent Vacation Band. $1 cover charge.

CONSERVATION CLUB will meet Tuesday, March 20, in the H.J.E. Reid Conference Center. Topics include recycling, conservation of resources and community education. Call ext. 41537 for more information.

LAA EXERCISE CLUB. Low-impact aerobics and calisthenics. Mondays, Wednesdays and Fridays from 5 to 6 p.m. in the cafeteria, Building 1213. Cost is $20/month. NASA and contractor employees and families are welcome.

TELA-TAX SERVICE. Federal, state, individual, business tax service. Also bookkeeping services. Member National Assoc. of Tax Practitioners. By appointment; we come to you. Call 874-3121.

FOR SALE: TOWNHOME. 2 BR, 1-1/2 BA near NASA and LAFB. $59,900. Call 838-2748 after 4 p.m. or 838-2565.

LOST: BIKE. Large yellow chrome bike, number LA 133, belonging to Aeroacoustics Division, disappeared from cafeteria area, in front of Computational Fluids Lab. Contact Erby Harris, ext. 43642, or Isa Daudpota, ext. 43628.

WANTED: ROOM OR APT. Visiting (male, married) researcher needs furnished room or shared apartment from April 16 through July 31. Call 864-1525 or 874-3894 (evenings).

WANTED: HOUSE TO RENT. Professor, wife and 24-month-old child need furnished place to live June 15-Aug.15. Must be convenient to NASA. Call 864-3467 or 877-4557 after 6 p.m.

WANTED: FURNISHED LODGING. Man and wife desire furnished apt., condo or home from June 1 to mid-Aug. while TDY at Langley. No children, no pets. Call 864-4363 or 898-7361 (evenings).

FOR SALE: GOLF CLUBS. Hogan radial irons, regular flex, #3-9 plus p.w. $100. Custom golf metal woods, midnight blue. #1, 3, 5; regular flex.; adj. wgts. $60. Call Walter Illg, 898-5003.

At the Visitor Center during March

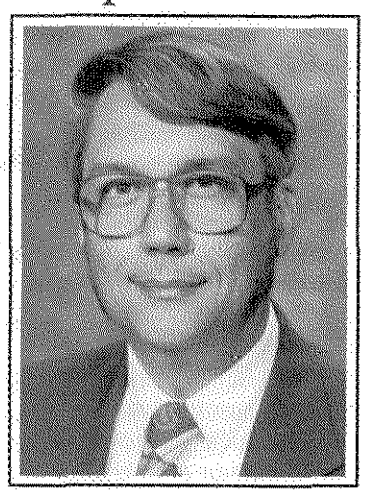
Barkstrom to Discuss Earth Radiation Experiment

In celebration of the 20th anniversary of Earth Day, the Visitor Center, with the help of the Atmospheric Sciences Division, is dedicating its spring quarter to the study of Earth, the environment and the challenges that lie ahead.

To kick off the quarter, Dr. Bruce Barkstrom, a senior research scientist, will examine the Langley-based Earth Radiation Budget Experiment (ERBE) on March 15 at 7:30 p..m. in the Visitor Center theater.

ERBE was designed to measure the amount of sunlight absorbed by the different regions of Earth and the amount reflected back to space. The budget of incoming and outgoing energy is one of the fundamental ways to learn about the Earth's climate.

Principal investigator and team leader of ERBE, Barkstrom will describe both the ERBE experiment and what the data shows about current understanding of the Earth's climate.



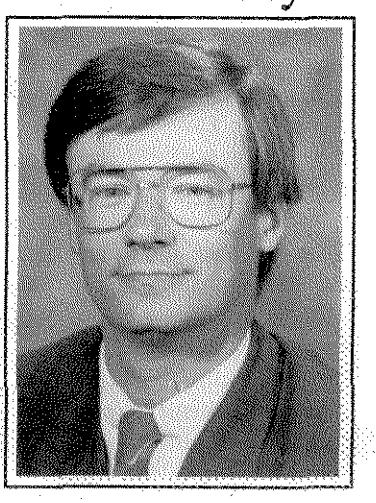
Hansen Commemorates NACA's 75th Anniversary

NASA Langley historian Dr. James R. Hansen will give a special presentation on the history of the National Advisory Committee for Aeronautics (NACA) to commemorate NACA's 75th anniversary. The free program will be offered at noon on Wednesday, March 21, and again at 7:30 p.m. on Thursday, March 22, in the Visitor Center theater.

As part of the NACA celebration, the Visitor Center will have a special exhibit on display. The exhibit, a pictorial review of the NACA years, will highlight accomplishments such as NACA Wind Tunnel No. 1 and the high altitude research. Through the exhibit visitors may experience the early years of aeronautical research and NACA's remarkable progress.

In addition, from March 16 through March 30, a 20-minute overview of NACA will be given daily in the theater for visitors.

NACA was established on March 3, 1915, to supervise and direct the scientific study of the problems of flight, with a view towards practical solutions.



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Researcher News

NACA

LAW ESTABLISHING THE NACA

Public Law 271, 63rd. Congress approved March 3, 1915

An Advisory Committee for Aeronautics is hereby established, and the President is authorized to appoint not to exceed twelve members, to consist of two members from the War Department, from the office in charge of military aeronautics; two members from the Navy Department, from the office in charge of naval aeronautics; a representative each of the Smithsonian Institution, of the United States Weather Bureau, and of the United States Bureau of Standards; together with not more than five additional persons who shall be acquainted with the needs of aeronautical science, either civil or military, or skilled in aeronautical engineering or its allied sciences: Provided, that the members of the Advisory Committee for Aeronautics, as such, shall serve without compensation: Provided further, That it shall be the duty of the Advisory Committee for Aeronautics to supervise and direct the scientific study of the problems of flight, with a view to their practical solution, and to determine the problems which should be experimentally attacked, and to discuss their solution and their application to practical questions. In the event of a laboratory or laboratories, either in whole or in part, being placed under the direction of the committee, the committee may direct and conduct research and provided further, That rules and regulations for the conduct of the work of the committee shall be formulated by the committee and approved by the President.

That the sum of $5,000 a year, or so much thereof as may be necessary, for five years is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available, for experimental work and investigations undertaken by the committee, clerical expenses and supplies, and necessary expenses of members of the committee in going to, returning from, and while attending, meetings of the committee: Provided, That an annual report to the Congress shall be submitted through the President, including an itemized statement of expenditures.

Parchment presentations of the NACA Charter, prepared by former Langley employee and calligrapher Wesley Berryman, are available at the Visitor Center Souvenir Counter. See NACA story on page 3.

NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 4, Issue 6 March 23, 1990

Bi-weekly Employee and Contractor Publication

Aeronautics-Exploration-Technology Merger Completed

NASA Administrator Richard H. Truly has announced the creation of the Office of Aeronautics, Exploration and Technology (OAET). This formalizes the merger of two previous NASA offices, the Office of Aeronautics and Space Technology and the Office of Exploration.

On December 21, 1989, Truly stated his intention to merge the two offices in order to continue the analysis of exploration mission alternatives and to begin the actual pursuit of innovative technologies. At that time, he said the two efforts were closely related and that they should proceed under a strong central management. Also, he emphasized that in no way would the consolidation of the two offices diminish the agency's dedication to aeronautical research.

The OAET will be headed by NASA Associate Administrator Arnold D. Aldrich.

In approving the consolidation, Truly said, "This office will provide the plannning, direction and technology, as well as manage the assessment of concepts and technology, for human exploration beyond Earth orbit into the solar system. I view this as a major step in streamlining the management arrangement that will combine cutting-edge technologies with studies of future space and aeronautics missions."

Dr. Valarie Costello, Old Dominion University, will present a seminar entitled "Courageous Voices Echoing in our Lives," as part of Langley's celebration of Women's History Month. The program will be held Tuesday, March 27, from 9 to 11 a.m. in the H.J.E. Reid Conference Center.

NASA's First 'A' Marks 75 Years of Achievement

With just a $5,000 initial outlay 75 years ago on March 3, 1915, Congress established the National Advisory Committee for Aeronautics (NACA), which would, in 1958, form the foundation for the National Aeronautics and Space Administration (NASA). Even today, that first small investment--made only a dozen years after Orville Wright's famous flight--is still paying enormous returns.

Although the United States could claim the first heavier-than-air flight by the Wright brothers in 1903, American aviation had been surpassed by European technology at the outbreak of World War I, and no American-designed aircraft flew in combat. The NACA was created to help regain the nation's position of aeronautical preeminence.

From its beginnings as a simple government entity, NACA grew into the world's premier aeronautical research organization,, pushing back the frontiers of flight for more than four decades. Aviation pioneers such as the Wrights, Jimmy Doolittle, Charles Lindbergh and Eddie Rickenbacker were among the early NACA members.

The 1915 law directed the new NACA to "supervise and direct the study of the problems of flight, with a view to their practical solution." The committee was also to facilitate the exchange of information within the aeronautical community.

At that time, the United States had virtually no aeronautical engineers. NACA focused American scientific, technological and industrial talent on the potential of aircraft and, in effect, created the academic disciplines of aeronautical engineering and its related fields.

Though NACA was begun later than similar European efforts, it eventually put the United States in the lead in aviation. Today, three-quarters of a century later, NASA scientists and engineers continue to solve the problems of flight, both in and beyond Earth's atmosphere. It was the NACA that first built key facilities and devised organizational methods for advancing what is now called aerospace technology.

The practical-minded engineers and scientists of the NACA incubated the ideas and hatched the technology that first allowed American aviation to take off and fly. The returns on the nation's investment in NACA remain clearly visible today in numerous ways.

By recognizing the needs of manufacturers and the military, NACA contributed extensively to every generation of commercial, civilian and military aircraft and developed the foundations for the modern aviation and space industries. The economic benefits of this long-term American competitiveness are a particularly clear part of the NACA legacy. In 1989, for instance, the U.S. aerospace industry saw a trade surplus of some $18 billion.

(See story on page 3.)

NASA Scientist Maps Global Pollution with New Satellite Techniques

-by Craig Murden

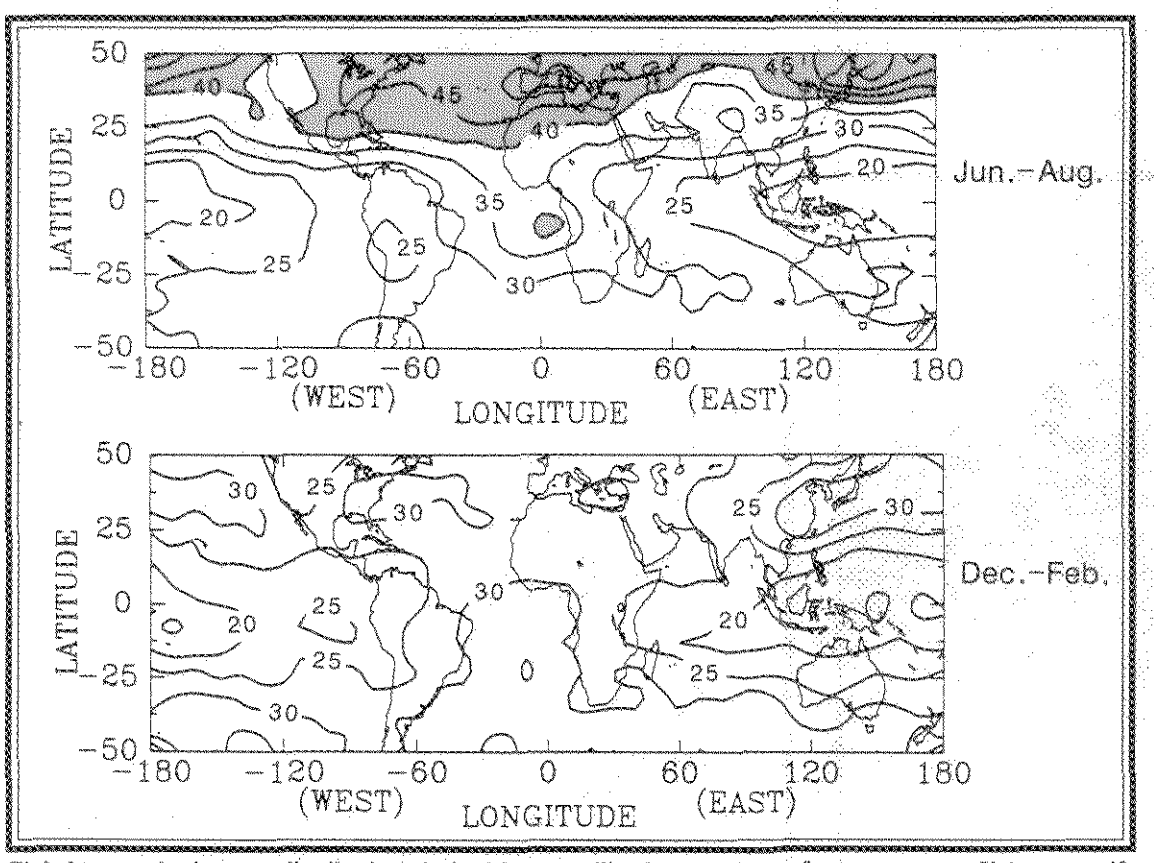
The spread of low altitude pollution throughout the world will get new visibility as the result of a Langley scientist's application of satellite mapping techniques.

Using, for the first time, the combined surveillance power of two different satellite systems, Dr. Jack Fishman of Langley's Atmospheric Sciences Division, has mapped the global distribution of potentially poisonous ozone in the troposphere--the lowest part of the Earth's atmosphere. In the process, his research has revealed important new facts about the causes of an alarming increase in pollution of the air breathed by the world's population.

Fishman's mapping of tropospheric ozone concentrations reveals major pollution plumes coming from the populated continents. Of particular significance, says Fishman, was identifying the "African Hotspot," a previously uncharted source of pollution from biomass burning of savanna and forestland in western and central Africa.

Most of the African activity is the result of farmers and tribesmen setting fires to clear shrubs and to stimulate the growth of crops and grass. This effort involves thousands of acres and fires often rage for months at a time. Unfortunately, the cumulative effect is to create ever larger expanses of grassland which are, in-turn, burned regularly. The problem is further intensified by steady population growth in these tropic areas with corresponding increases in cultivation. The overall process has made Africa the world's leading source of pollution from the burning of vegetation, according to Dr. Paul Crutzen of the Max Planck Institute for Chemistry in Mainz, West Germany, where Fishman once served as a visiting research professor. In a New York Times News Service article, Crutzen reported that the African fires dump three times more gases and particles into the low atmosphere than from all the fires in South America.

To study this pollution, Fishman has developed a satellite measurement technique which shows the points of origin and subsequent migration patterns of such "smog." Scientists can now see how locations far away from primary pollution sources can suffer the effects of the contamination. His research confirms the ability to definitively measure the presence of low-level ozone using two instruments that were originally designed to measure ozone in a different region of the atmosphere: TOMS (Total Ozone Mapping Spectrometer) aboard the Nimbus 7 satellite and SAGE (Stratospheric Aerosol and Gas Experiment) which was on the Applications Explorer Mission-2 satellite in 1979 and was again deployed by the Space Shuttle in 1984. TOMS was developed at NASA's Goddard Space Flight Center in Maryland and SAGE at Langley by a team led by Dr. M. Patrick McCormick, also of Langley's Atmospheric Sciences Division.



Global tropospheric ozone distributions derived from satellite data are shown for two seasons. Values over 40 Dobson Units (equivalent to an average concentration of about 60 parts per billion of ozone) are shaded. Of particular interest is the widespread nature of summertime ozone pollution in the Northern Hemisphere (top) relative to the amount of ozone present in the Southern Hemisphere during austral summer (bottom).

Tropospheric ozone is the product of chemical reactions between nonmethane hydrocarbons, nitrogen oxide and sunlight. Auto exhaust, biomass burning and industrial emissions are the world's greatest sources of these pollutants. This ozone is distinguished from the ozone in the upper reaches of the Earth's atmosphere, or stratosphere, which serves as a shield against solar radiation and is generated through a different chemical process.

Low level ozone concentrations have been increasing at an average rate of one to two percent per year in the Northern Hemisphere since the 1970s. Fishman says this increase is three to five times the rate of carbon dioxide build-up, which has long been viewed as one of the major areas of concern by scientists investigating the theoretical phenomena of "Global Change." He points out that ozone has reached levels that can be detrimental to humans even in rural areas, which is a significant change from earlier years when only a few urban centers, like Los Angeles, would occasionally

(Continued on page 2.)

News Briefs

AMES RESEARCH CENTER, Mountain View, Calif. --- Dr. Dale L. Compton, director of NASA Ames, has named Victor L. Peterson, deputy director of the Center. Peterson, 55, has served as Ames' director of Aerophysics from 1984 and as the Center's acting deputy director since 1988. He has held various positions at Ames, including research scientist, chief of the Aerodynamics Branch and chief of the Thermo and Gas Dynamics Division. He was one of the originators of the NASA initiative to develop the Numerical Aerodynamic Simulation System, the leading computational resource for the nation's aerospace program.

KENNEDY SPACE CENTER, Florida --- KSC dedicated its new Launch Complex 39 Operations Support Building (OSB) on March 8. Construction on the new six-story office building began in September 1988. Scheduled to be ready for occupation in mid-March, the building will provide office space for over 1,700 KSC employees currently working out of prefabricated modules, portable trailers and modified railroad boxcars.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has announced the establishment , effective March 18, of the Office of Legislative Affairs and the appointment of Martin P. Kress as the acting assistant administrator. The newly named office will report directly to the Administrator and be responsible for legislative matters and the coordination of budgetary and policy matters with Congress. "The elevation of this organization reflects the significance of its work and the importance of maintaining excellent communication with Capitol Hill, " Truly said.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- The astronomical telescopes for NASA's Extreme Ultraviolet Explorer spacecraft have been delivered to Goddard for integration into the Goddard-designed payload module and for subsequent environmental testing. The scientific payload consists of four specially designed telescopes that will make astronomical observations in the previously unexplored portion of the electromagnetic spectrum called the extreme ultraviolet, which is between the X-ray and ultraviolet wavelengths. Integration and testing of the spacecraft is expected to take 18 months. The payload will be launched into low-Earth orbit aboard a Delta II expendable launch vehicle from Cape Canaveral Air Force Station in August 1991.

JOHNSON SPACE CENTER, Houston, Texas --- Navy Captain Donald E. Williams, veteran of two Shuttle flights, retired from NASA and the Navy, effective March 1, to pursue a career in private industry. Williams was selected by NASA as an astronaut in 1978 and made his first space flight in April 1985 as pilot of Discovery on mission STS-51D, which included the first unscheduled rendezvous and spacewalk. He flew again as crew commander of Atlantis in October 1989 on mission STS-34, which was highlighted by the deployment of the Jupiter probe, Galileo.

Satellite Techniques Map Global Pollution *(Continued from page 1.)*

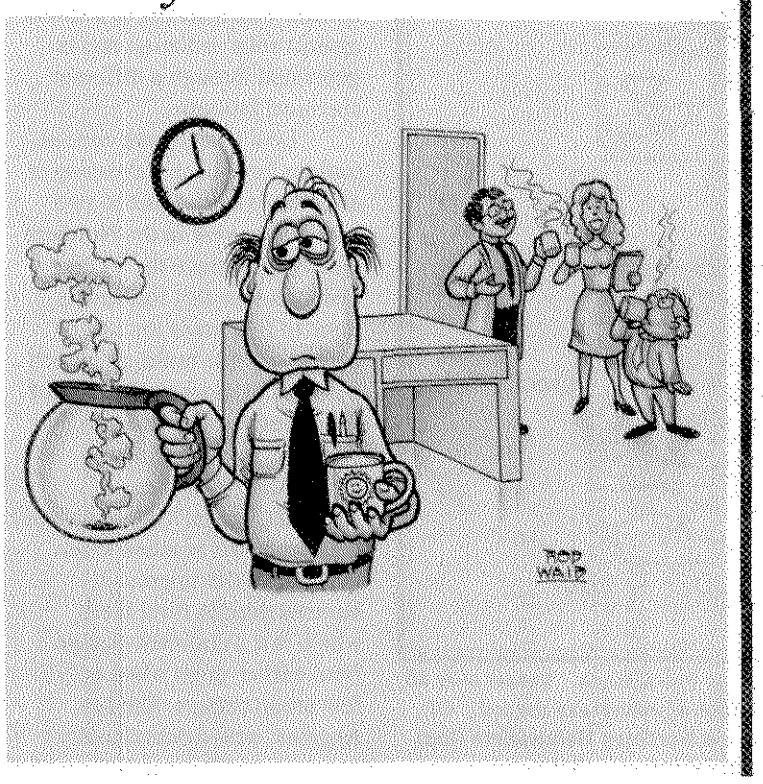
reach harmful levels. The toxic effects of ozone are further seen in the recent heavy crop losses of U.S. farmers, the dying forests in Germany and the damage to U.S. forests at higher elevations, Fishman adds.

However, he notes that examples like his satellite identification of ozone concentrations are beginning to focus overdue attention on the problem as one of global proportions. For instance, the International Global Atmospheric Chemistry Programme has recently been established to investigate the global pollution problem, including specific field programs that will concentrate on tropospheric ozone generation resulting from biomass burning.

This latest satellite research is a major extension of the work NASA has been doing in tropospheric ozone distribution analysis using the Agency's Electra aircraft as well as rocket and balloon technology. Now, through the efforts of scientists such as Fishman, NASA is playing an increasingly influential role in this international thrust to focus new techniques on this problem.

The scientific verification of Fishman's satellite mapping process is the subject of his paper which will appear in the March 20th issue of the **Journal of Geophysical Research,** one of the leading technical journals which concentrates on studies of the Earth's atmosphere. Entitled "Distribution of Tropospheric Ozone Determined From Satellite Data," it details the methods used and demonstrates that the results achieved can be verified by previously established measurement techniques at various locations throughout the world. The paper, which highlights the findings of research funded by NASA's Global Tropospheric Chemistry Program since 1984, was co-authored by Catherine E. Watson, Lockheed Engineering and Science Corporation; Jack C. Larsen, STX Corporation; and Jennifer A. Logan, Harvard University.

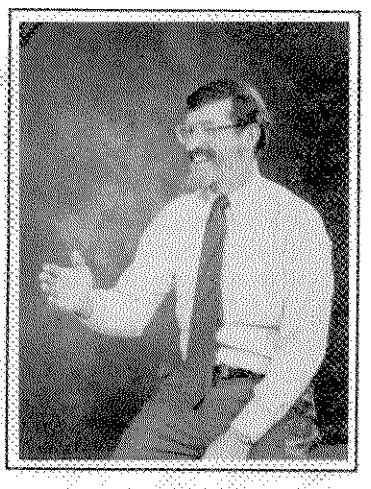
Lankley



Editorials

Langley

Headquarters Forum



Langley has always been justifiably proud of its capability to draw on its expertise in a wide range of disciplines to support national initiatives. The Center's emerging contributions to eliminating the effects of wind shear are on track to become part of this tradition of accomplishment.

In 1985, Langley was selected by the Federal Aviation Administration (FAA) to lead the airborne part of its national wind shear program. Since that time, many organizations at LaRC have been performing research in a wide spectrum of coordinated activities. Specific efforts run the gamut from sophisticated analyses through wind tunnel and piloted simulation studies to flight evaluation.

The results obtained to date have been outstanding! The capability to model wind shear has been developed and validated by comparison to meteorological measurements taken during actual microburst events. Heavy rain conditions which often accompany microbursts have been shown in wind tunnel and Aircraft Landing Dynamics Facility (ALDF) tests to induce aerodynamic performance penalties. (To see a truly awesome display of power, watch a heavy rain test at ALDF.) Thus, we can characterize and mathematically model the phenomena.

We are developing three concepts for "forward looking" sensors which will alert the pilot to the presence of threatening conditions in time for that pilot to take corrective action. A forward-looking Doppler radar is being developed at Langley, a LIDAR sensor is being developed principally under contract, and an infrared (temperature) sensor was developed as part of the Small Business Innovative Research (SBIR) program. All of these are progressing well. In particular, very detailed simulation models of radar performance (including even the radar backscatter noise caused by reflections from automobiles near the airport) have demonstrated the feasibility of this sensor to the point that NASA and the FAA have augmented the originally proposed program to permit simultaneous flight tests of all the forward-looking sensors.

Can the pilot use this information? Real time simulation studies involving a simulated forward-looking sensor and improved piloting procedures (also developed at Langley) have shown that, with as little as 15 seconds warning, the pilot's ability to survive a wind shear encounter can be significantly enhanced. Planned research into crew procedures and innovative display concepts should enable pilots to avoid hazardous wind shear encounters altogether.

The FAA has been so impressed with the overall progress, that the program has twice been augmented at their request--most recently to evaluate the benefits of airborne use of ground-derived wind shear information.

On July 11, 1988, four aircraft on final approach to Stapleton airport in Denver were forced to execute missed approaches as a result of a microburst encounter. One of them (fortunately the best performing aircraft in a wind shear) came within 100 feet of the ground. With continued success by the many organizations at Langley involved in this effort, future disasterous effects of wind shear should be prevented.

J. F. Creedon
Director for Flight Systems

Current News Releases

To obtain a copy of any of these NASA News Releases, call ext. 43293. Request information by release number and headline.

90-30.....Computerized Medical Reference has Space and Earth Applications
90-31.....Veteran Shuttle Astronaut Williams to Retire from NASA, Navy
90-32.....Aeronautics/Exploration/Technology Offices Merger Completed
90-33.....Marty Kress to Head Newly Organized Legislative Affairs Office
90-34.....Astronomical Telescopes for NASA Aircraft Arrive at Goddard
90-35.....NASA's First "A" Marks 75 Years of Achievement
90-36.....Peterson Named Ames Deputy Director
90-37.....NASA Revises Space Shuttle Manifest
90-38.....Environmental Fact Sheet
90-39.....International Conference Addresses Global Burning

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

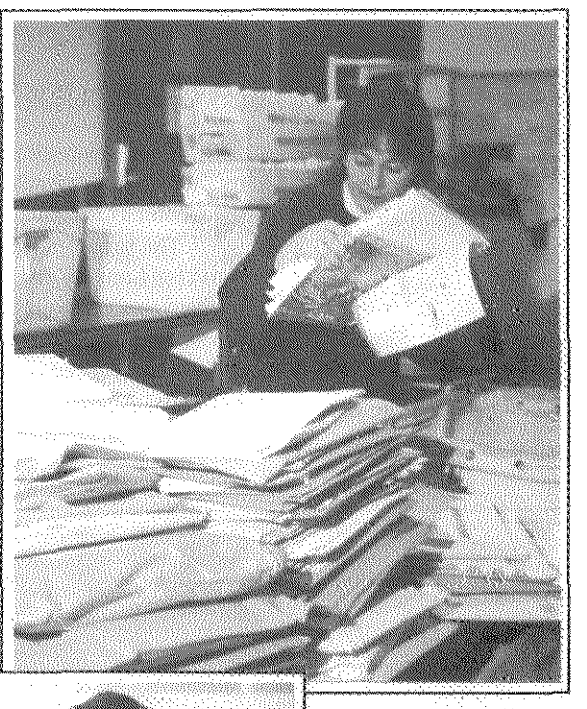
Editor ..... Marny S. Skora

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

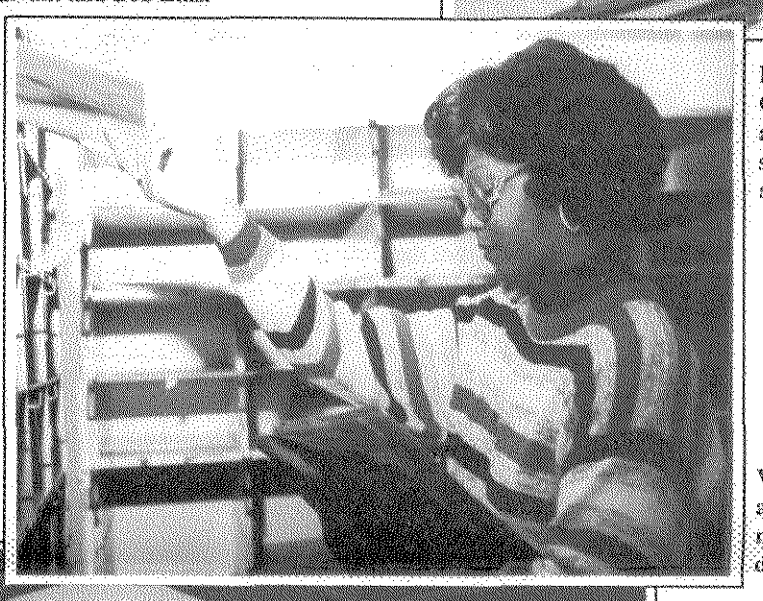
Bob Ellis rolls the first of the mail carts into the Langley Mail Room. The hectic process begins.



-photos by Carol Petrachenko

The mail undergoes its first sorting by Joyce Sturdivant and Bob Ellis.

From Uncle Sam. . . through the Mail Room . . . to YOU!



Not far away, Sharon Grauer is nearly buried at her desk by more stacks of mail that need sorting.

Virginia Higgs-Sumpter again sorts mail into numbered bins for delivery to mail stops.

Letters, Lots and Lots of Letters

We see them in our respective work areas but two times a day, and for just minutes each time. But without them, the flow of communication--external and internal--would be severely curtailed. They are our mail carriers.

March 26-30 has been designated Mail Awareness Week. Barbara Newton, head of the Correspondence and Records Management Section, can't praise her staff of 12 loudly enough. "This group processes nearly 60,000 pieces of mail each week. They pride themselves on giving an eight-hour turnaround on mail delivered to the Center."

Langley has two mail trucks, each of which services two mail routes; a shuttle truck handles high volume service, packages and special deliveries.

Mail is delivered to the Center each morning and a secondary delivery is made around noon. The mail that is received in the mail room, Building 1206, is acted on immediately. A detail dispersal process is instantly effected--mail is sorted for opening and mail stop delivery, carried to awaiting mail truck, transferred into corresponding bins on the truck, delivered to the appropriate buildings and carried to mail stop distribution points. At each mail stop, a reverse process begins as mail carriers not only deliver but pick up outgoing mail which must be sorted . . . .

"It's an ongoing, and vitally important, process that contributes to the mission of the Langley Research Center," notes Newton.

The sheer volume of the task necessitates strict adherence to a very ambitious time schedule. Each of the regular mail trucks carries a crew of three. Each crew delivers to nearly 25 buildings, servicing from 44 to 67 mail stops in a period of 60 to 80 minutes per route. That averages out to approximately three minutes per building, about one minute per mail stop. And, they do it twice a day. Perhaps that's why we refer to it as a standard mail **run**!

The shuttle truck carries a crew of two and delivers to high volume areas. They also make special deliveries (packages etc.) continuously throughout the day.

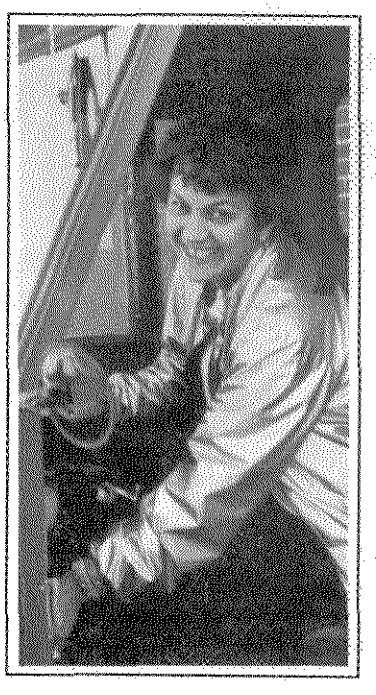
There is one out-going delivery from the mail room each day. This occurs at 3 p.m. Before the mail leaves the Center, it is again sorted and "faced." This means it is packaged according to size--standard white envelopes vs. manilla, etc.--and placed in trays with the addresses facing front so it can be processed by automated equipment at the Post Office.

"We are constantly upgrading our services, both the mail room and the vehicles," concludes Newton. The most recent plan is to acquire mail trucks that are four feet longer so the sorting bins in the mail room will be able to be rolled onto the vehicle, eliminating one of the sorting processes. "That will give the crews an additional 10 minutes per route each day. Forty minutes per day doesn't sound like much, but on a schedule as tight as theirs, this is a real step forward."

Very few people on Center affect the work and well-being of almost all Langley employees, civil servant and contractor. These 12 individuals touch our lives nearly every day. Be especially kind to them during Mail Awareness Week.

Joe Hopson and Virginia Higgs-Sumpter roll the sorted mail out to the delivery truck. Current plans call for longer trucks so that the bins can be rolled directly onto the trucks and secured.

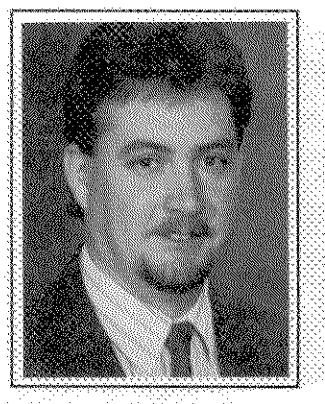
Becky Johnson (left) and Peggy Perrine transfer the sorted mail into corresponding bins on the mail truck.



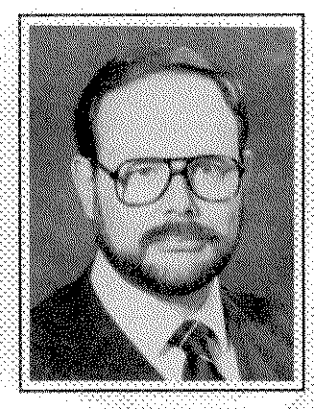
Barbara Newton salutes the mail crew. She reminds us that March 26-30 is Mail Awareness Week.

Mail carriers (L to R) Frank Furley, Sharon Grauer and Vickie Page bring the mail to your mail stop. There they pick up outgoing mail and the process starts all over again!

Employees Earn Advanced Degrees



David E. Bowles



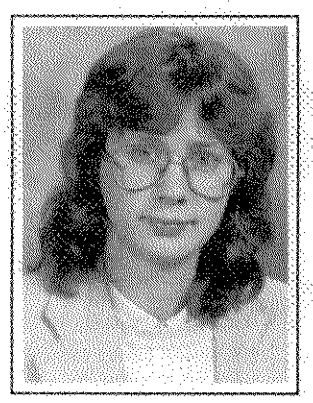
Ivan O. Clark

Twelve Langley Research Center staff members received advanced degrees through the Center's Graduate Study Program.

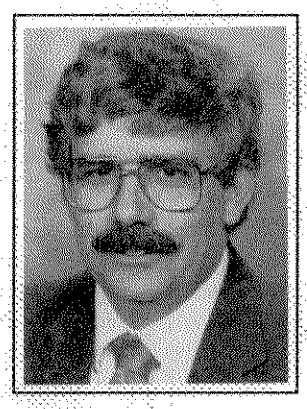
The program, established in the 1940s, provides Langley engineers, scientists and administrators an opportunity to improve their proficiency in aeronautical and space research and earn advanced degrees while working at Langley. Approximately 1,370 employees have been awarded master of science or doctoral degrees under this program.

Doctoral degrees have been awarded to the following two employees: **Ivan O. Clark**, Information Systems Division, received a Doctor of Philosophy in Materials Science from the University of Virginia; and **David E. Bowles**, Materials Division, received a Doctor of Philosophy in Engineering and Mechanics from the Virginia Polytechnic Institute and State University.

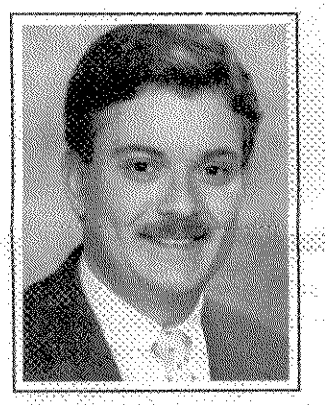
Masters of Science degrees were awarded to the following employees: **Catherine L. Herstrom**, Structural Mechanics Division, received a Master of Science in Computer Science from the College of William and Mary; **Michael T. Palmer**, Flight Management Division, received a Master of Science in Computer Science from the College of William and Mary; **Cindy W. Albertson**, Structural Mechanics Division, received a Master of Science in Mechanical Engineering from Old Dominion University; **Susan N. McMillin**, Applied Aerodynamics Division, received a Master of Science in Fluid Mechanics and Thermal Science from George Washington University; **Harold W. Beazley**, System Safety, Quality and Reliability Division, received a Master of Science in Engineering Administration from George Washington University; **Barry L. Price**, Systems Engineering Division, received a Master of Science in Engineering Administration from George Washington University; **Craig S. Cleckner**, Systems Engineering Division, received a Master of Science in Mechanical Engineering from George Washington University; **Michael D. Mastaler**, Facilities Engineering Division, received a Master of Science in Mechanical Engineering from Old Dominion University; **Osvaldo F. Lopez**, Structural Mechanics Division, received a Master of Science in Engineering Mechanics from Old Dominion University; and **Lisa S. Simonsen**, Space Systems Division, received a Master of Science in Chemical Engineering from the University of Virginia.*



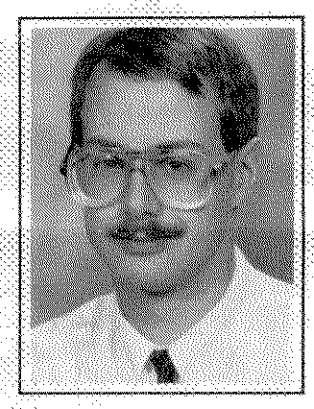
Cindy W. Albertson



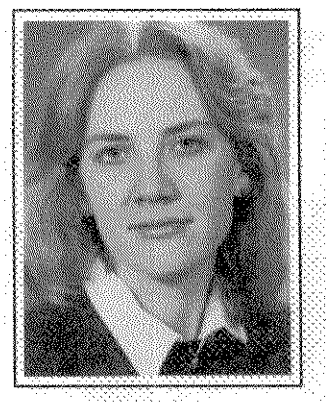
Harold W. Beazley



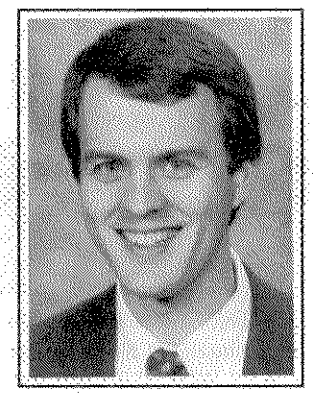
Osvaldo F. Lopez



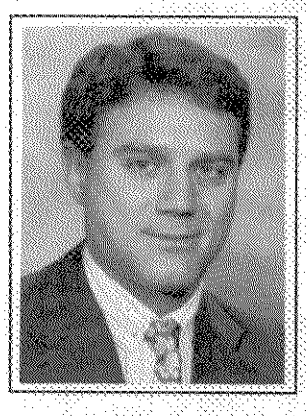
Craig S. Cleckner



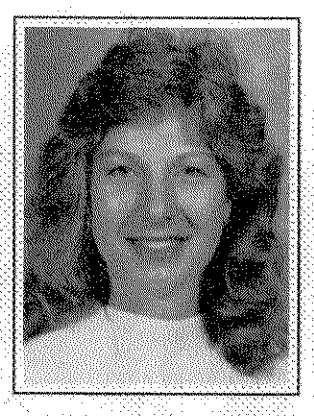
Susan N. McMillin



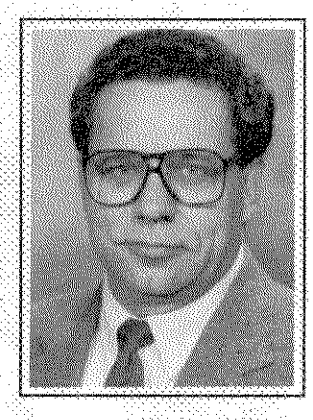
Michael T. Palmer



Michael D. Mastaler



Catherine L. Herstrom



Barry L. Price

*The Training and Education Section congratulates these individuals for the long hours and hard work necessary for this 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, please call the Training and Education Section, ext. 42594.

Note: Car passes for the launch of Space Shuttle mission STS-31, currently scheduled for April 12, are available on a first come-first served basis from Ann Suit, Mail Stop 154, ext. 43305.

ODU Holds Engineering Open House

A canoe made of concrete that floats, a wind tunnel and a wave-making machine will be among the demonstrations featured during Old Dominion University's 18th Annual Engineering Open House.

The open house, which is free and open to the public, is being held from 10 a.m. to 5:30 p.m. today and 9 a.m. to 3:30 p.m. Saturday, March 24, in Kaufman Duckworth Hall.

The theme of the open house is "Engineering: A World of Infinity." Exhibits include a Federal Aviation Administration flight simulator, Army helicopters, a mini F-16 Air Force jet, IBM's new RISC System/6000 computer, a mini baja vehicle and a 10-foot model of an aircraft carrier from Newport News Shipbuilding.

As part of the program all engineering and technology laboratories, including state-of-the-art robotics and computer-aided design facilities, will be open to the public. There will also be a variety of contests for students, including an egg drop contest, a mouse trap car design contest and a paper airplane design contest.

In addition, the open house will feature industrial, government and research displays as part of a career fair for college students.

Other participants in the program include NASA, NAVSEA, Systems Management American Corp. and Johnson Controls.

Positions Open

90-35: AST, Technical Management, GS-801-13 (TERM)/ **Program Analyst**, GS-345-13 (TERM); Office of the Director for Electronics, Projects Division, Space Experiments Office. Open to LaRC. Closes March 26.

90-36: AST, Technical Management, GS-801-14; Office of the Director for Electronics, Projects Division, Space Experiments Office. Open to LaRC. Closes March 26.

90-37: Supervisory Engineering Technician, GS-802-11 or 12; Office of the Director for Systems Engineering and Operations, Operations Support Division, Tunnels Operations Branch, Technical Support Section "D." Open to LaRC. Closes March 28.

90-38: AST, Experimental Facilities Techniques (Electronics Systems), GS-801-9, 11, 12 or 13; Office of the Director for Structures, Structural Mechanics Division, Aerothermal Loads Branch, Experimental Facilities Techniques Section. Open to LaRC. Closes March 29.

Retirement Parties

A retirement party for **William D. Grantham** will be held in the executive dining room of the NASA cafeteria Friday, April 6, from 5 to 8 p.m. Heavy hors d'ouevres will be served and a cash bar will be available. Cost is $11/person or $20/couple, which includes a $2 gift donation. To make reservations, please send check to Dave Raney, Mail Stop 489, ext. 44033, by March 30. Separate gift donations are welcome.

Dr. Clarence P. "Buddy" Young will be honored at a retirement dinner on Saturday, April 7 at the Central Restaurant, 11712 Jefferson Avenue, Newport News. Cost is $12.50/person or $22/couple, including gift. Separate gift donations of $3 are welcome. For reservations, please call Maria Mitchum, ext. 47034, or Harriett Coombs, ext. 47010, by April 2.

After 42 years of government service, **Walter E. Bressette** will be honored at a retirement dinner on Saturday, April 7, from 6 to 8:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $12/person or $22/couple, including gift. Separate gift donations are welcome. For reservations, please call Sheila D. Johnson, ext. 45691, or Gerald M. Keating, ext. 45804, by April 2.

James H. Parker will be honored at a retirement party Friday, April 20, from 6:30 to 9:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost, including gift, is $10/person or $19/couple. Separate contributions for gift are most welcome. For reservations, respond to Al Shearin, Mail Stop 222B, ext. 42776, by April 13.

Guess who's hopping down the bunny trail?

Personalized chocolate-covered Easter eggs are available from St. Luke's Church. $2.50 each. All proceeds to benefit a terminally ill child. To order, call 898-3017.

Benefits Continue from Original U. S. Flight Agency

The inception and subsequent major periods of growth for the NACA were spurred by some of the century's major historical events. World War I demonstrated the military value of aircraft. Charles A. Lindbergh's 1927 solo Atlantic crossing caught the world's imagination. World War II precipitated massive research and development in aviation, as did the events of the decades that followed.

The growth spurred by these events was evident in another visible aspect of the NACA legacy: research facilities.

By the early 1920s, aeronautical research had begun in earnest at the NACA's Langley Memorial Aeronautical Laboratory in Hampton, whose personnel formed the nucleus for two newer laboratories. On the eve of World War II, Ames Aeronautical Laboratory opened in Mountain View, Calif., and the Aircraft Engine Research Laboratory began operations in Cleveland, Ohio.

The challenge for NACA researchers in the 1920s was to improve virtually every characteristic of aircraft. The struts and wire braces of biplanes caused severe, speed-reducing drag. The planes had poor lift-to-drag ratios, bad propellers, and underpowered, unreliable engines. Basic understanding of the principles of flight was limited.

The primary research tool for overcoming these and other problems was the wind tunnel. The NACA's first wind tunnel was dedicated in 1920 at Langley. Since that time, aerospace researchers have used wind tunnels to test their ideas. By moving an airstream across an aircraft component or model, they can gather test data reliably, inexpensively, and safely.

The NACA's first Full-Scale Tunnel was built after NACA had risen to international aviation research preeminence during the 1920s. By the end of the decade, the NACA's work had pointed the way for aircraft to evolve toward the basic aerodynamic shapes still seen today.

The first Full-Scale Tunnel began as one of a trio of innovative tunnels. Later, it was the center of the World War II effort to speed up military planes by finding ways to reduce their aerodynamic drag--an effort that contributed substantially to Allied air power.

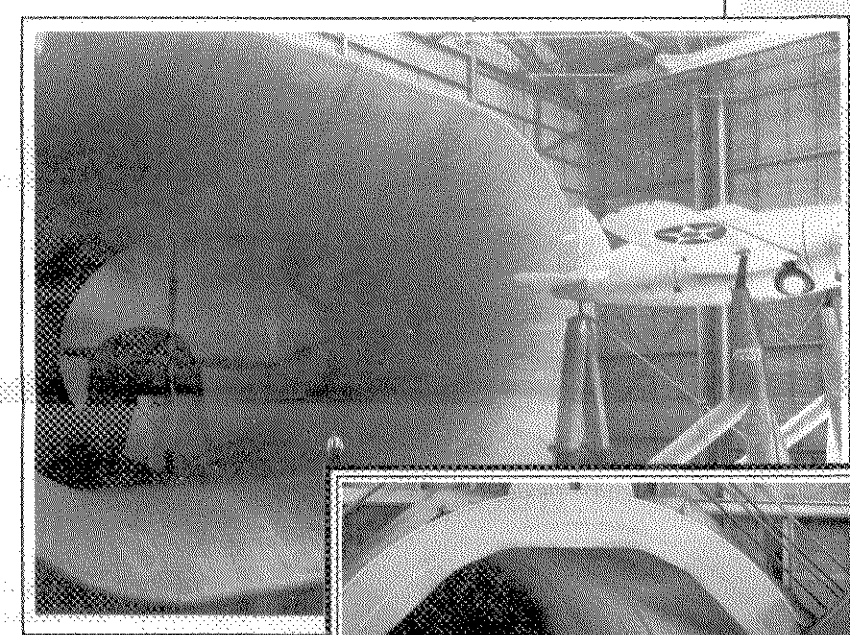
In 1990, this same tunnel is about to enter its seventh decade of churning out valuable aerodynamic data. As one of scores of American tunnels supporting research into every kind of flight, including flight through and out of Earth's atmosphere, it is used in studies of military, general aviation, and commuter aircraft. In fact, this circa-1930 facility has a backlog of demand and is staffed for double shifts.

Another example of the NACA legacy in research tools--and therefore also of continuing returns on original investments in the organization--is the world's largest wind tunnel located at Ames Research Center. The tunnel's largest test section measured 40 feet by 80 feet.

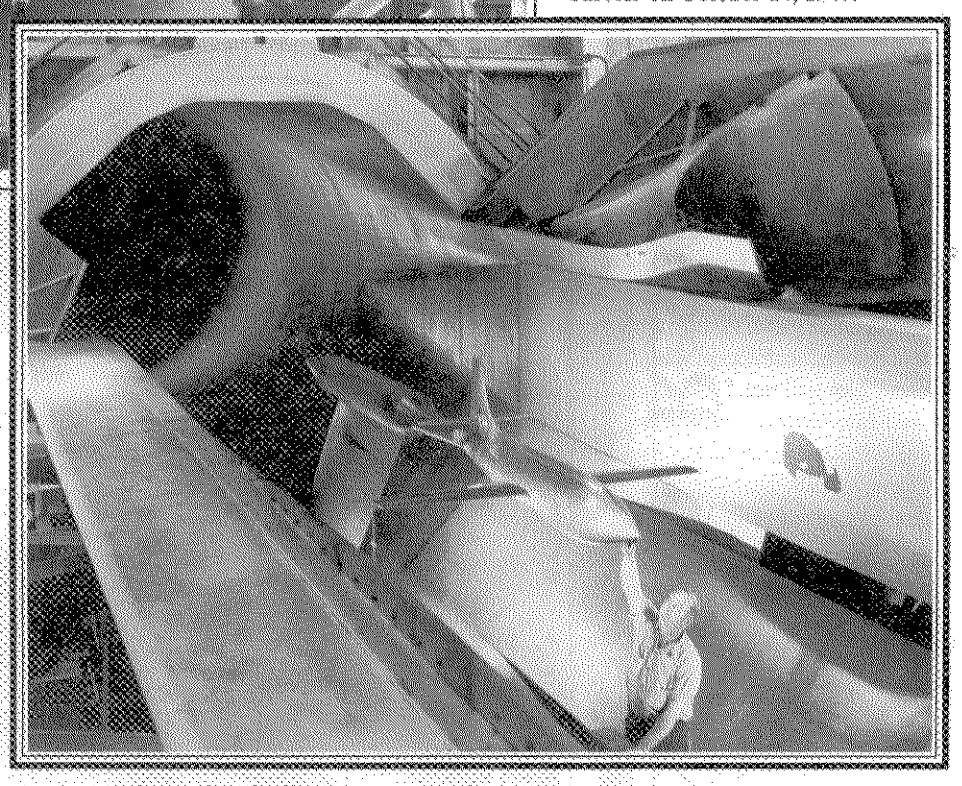
This facility was built during World War II and could test a complete fighter plane with its engine running. The tunnel was still the world's largest in 1987 when its size was increased to 80 by 120 feet and the power of its huge fans was nearly quadrupled. It now can accommodate even larger aircraft.

A supersonic tunnel at Lewis, built in the early 1950s tackled the special problems of testing full-scale jet and rocket engines. The tunnel, which is still in use, has been used for a wide range of aircraft, air-breathing missiles and manned spacecraft tests.

Wind tunnels today still constitute a large part of the American investment in aeronautical research tools. In 1988, a special committee of the National Research Council valued the combined replacement cost of American tunnels in the billions, and wrote that the health of these facilities is integrally linked with the health of the entire national aeronautical development effort. The research heritage of wind tunnels -- and many of the tunnels themselves -- come from the NACA era.



In 1938, Langley mounted the Navy's Brewster XF2A-1 Buffalo in the Full-Scale Tunnel for drag reduction studies. These studies influenced many later military fighters.



In March 1951, a Langley engineer inspects his installation of a model of the Bell X-1 supersonic airplane in the new slotted test section of the 16-Foot High-Speed Tunnel.

NACA Marks Achievements

NACA/NASA innovations won six Collier trophies, America's most prestigious aviation award, for outstanding contributions to aviation technology. In innumerable other instances, NACA contributions paved the way for other immediate or longer-term improvements in aircraft. By the post-World War II era, the work of the NACA even began paving the way toward the Space Age.

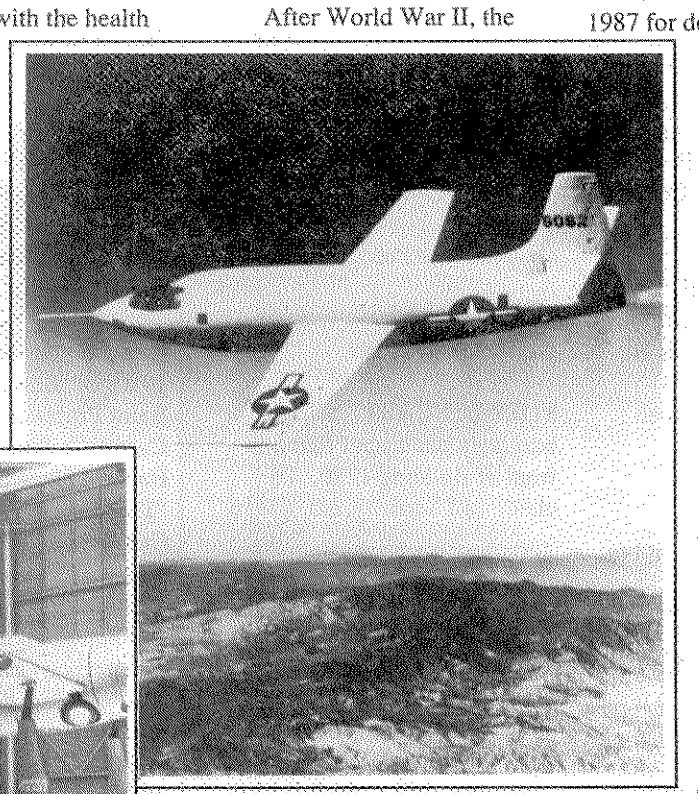
The first Collier Trophy came in 1929 for an innovation known as the NACA cowling, which was placed around the radial air-cooled engine of the day to reduce drag while allowing the needed cooling. In 1946, the NACA won the Collier Trophy for developing a thermal ice-prevention system for aircraft.

After World War II, the NACA began extensive work in jet engine research, and led advances in high-speed aerodynamics with programs like the X-1, in which Chuck Yeager surpassed the speed of sound in 1947, and the X-15, the first winged vehicle to fly into space. The 1947 X-1 flight led to the NACA's third Collier Trophy in 1948.

NACA's fourth and fifth Collier trophies came in 1951 and 1955. One was for a wind-tunnel technology innovation called the slotted throat, which enabled tunnels to simulate the conditions of transonic flight, or flight near and exceeding the speed of sound. The other was for the transonic "area rule," a principle of aerodynamic shaping that greatly enhanced the designs of supersonic aircraft.

Building on NACA's proud heritage, NASA was awarded a sixth Collier trophy in 1987 for developing the technology for and testing of advanced turboprop propulsion systems that offer dramatic reduction in fuel usage for future subsonic transport aircraft.

The NACA research tradition lent itself well to work on concepts for aerospace craft that would need to return to Earth from orbit or from space flight. Many NACA researchers worked years ahead of existing technology in the post-World War II era, much as NASA researchers often do today. They established the fundamentals of atmospheric re-entry during these pre-NASA years.



The Bell XS-1 in flight. X-1 pilot Chuck Yeager broke the sound barrier on October 14, 1947.

Return on the Investment

As the world's premier organization for aeronautical research, NACA provided the foundation--the people, the institutions, the research tools--on which NASA and the American aerospace industry have been built. The extent of the NACA-era legacy to NASA and to the nation shines through in a recent celebration of engineering achievements by the National Academy of Engineering.

The academy cited NASA's Apollo moon landing as one of the greatest engineering achievements of all time, and listed nine other achievements as the greatest of the past quarter-century. In addition to Apollo, three of these nine involve some large degree of NASA contribution: unmanned satellites, advanced composite materials, and the jumbo jet. Four other cited achievements fall within the sphere of daily activity throughout NASA: micro-processors, computer-aided design, lasers, and fiber-optic communication.

Even after 75 years, that first $5,000 apportioned by Congress in 1915 is still paying off throughout the American economy and in NASA--a scientific and technological organization that spurs American competitiveness, spans the continent and reaches for the heavens.

Happenings

LAA SOCIAL will be held Friday, March 30, 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, March 28, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center, Building 1222. Give the gift of life--give blood.

TOASTMASTERS. The NASA Langley Toastmasters Club will meet at 11:30 a.m., Wednesday, March 28, in the H.J.E. Reid Conference Center. Guests are welcome.

AEROBICS CLASSES. Low impact aerobics classes will be held Tuesdays and Thursdays, 5 to 6 p.m. in the NASA Cafeteria. Cost is $12/month and the first class is free. Classes begin April 3.

LaRC RETIRED WOMEN are invited to a Dutch-treat luncheon at 1 p.m. Thursday, April 5, at the Western Sizzlin' restaurant, Cunningham Drive, Hampton. For reservations or more information, call Eloise McGehee, 838-4146; Edna Davidson, 898-3868; or Irene Collins, 898-8188, by Tuesday, April 3.

NASA SOFTBALL ASSN. Organizational meeting and rules clinic for 1990 season will be held Tuesday, March 27, at 4:45 p.m. in the H. J. Reid Conference Center. Current team managers and representatives of new teams should attend.

VIRGINIA TECH NIGHT will be held Tuesday, April 3, from 7:30 to 9 p.m. at the Sheraton Inn, Coliseum. High school students and parents are invited. For information, contact Joe Drewery, 722-4443, after 5 p.m.

TELA-TAX SERVICE. Federal, state, individual business taxes. Also bookkeeping services. Member National Association of Tax Practitioners. By appointment; we come to you. Call 874-3121.

FOUND: SCARF. Wine/burgandy plaid scarf found in front of Building 1230. To claim, call Security, ext. 43416.

FOR RENT: HOME. 4BR, 2-1/2 BA, FR with FP. All appliances, CA, gas heat, much more. $825/month. Call 564-8947.

FOR RENT: TOWNHOME. 2 BR townhouse in Magruder Commons, near Coliseum Mall. $475/month. Like new. Available now. Call 827-5253.

Langley Colloquium and The Sigma Series

Harvard Professor to Discuss Mass Extinction of Species at Two Hampton Lectures

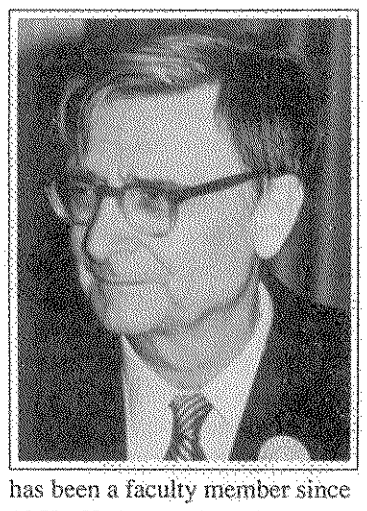
The current mass extinction of species due to habitat destruction is the greatest since the Mesozoic Era (the "age of dinosaurs") 65 million years ago. It is especially acute in the tropical rain forests, which contain over half the species of organisms in the world and which are being reduced at the rate of about one percent annually. If continued at this rate, destruction of the tropical forests and other species-rich habitats is likely to result in the extinction of one fourth of all species on Earth within 50 years.

During two lectures in Hampton, Monday, April 9, 1990, Dr. Edward O. Wilson, Baird Professor of Science and Curator in Entomology at Harvard University, will discuss "The World's Biodiversity: Crisis and Opportunity." Wilson will address Langley employees, contractors and retirees at a colloquium in the H.J.E. Reid Conference Center at 2 p.m. That evening, he will give the same lecture at 8 p.m. at the Holiday Inn--Coliseum Hotel and Conference Center, as part of The Sigma Series. The Sigma Series is a series of free public lectures sponsored by the Virginia Air and Space Center, the Daily Press and NASA.

According to Wilson, people--not comets or volcanoes--are "the angels of destruction" and that plant species are also disappearing. Moreover, the Earth is suffering the decline of entire ecosystems--the nurseries of new life-forms. For that reason, Wilson calls this crisis the "death of truth."

Wilson says the effort to preserve this great heritage does not necessarily oppose the economic development of the mostly Third World countries that so desperately need both. Wild species are a proven source of new crops, pharmaceuticals, fibers and petroleum substitutes. In some cases, maintaining land reserves for removing these products without major environmental damage is more profitable than clear-cutting for timber and agriculture.

A native of Alabama, Wilson earned a doctorate from Harvard University, where he



has been a faculty member since 1953. He has made major contributions to many fields, including the behavior and evolution of social insects, chemical communication and the evolution of social behavior. His 15 books include *The Insect Societies*, *Sociobiology: The New Synthesis*, *Human Nature*, *Biophilia* and most recently, (with Bert Holldobler), *The Ants*. His awards include the Pulitzer Prize in Nonfiction, the National Medal of Science and the Tyler Prize for Environmental Achievement.

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

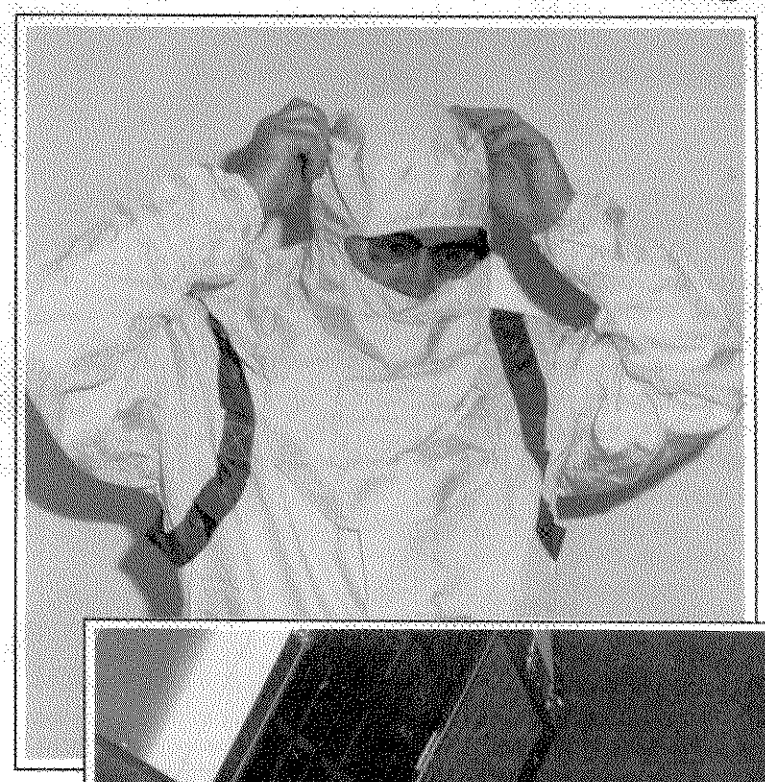
Official Business
Penalty for Private Use $300

No fooling . . .

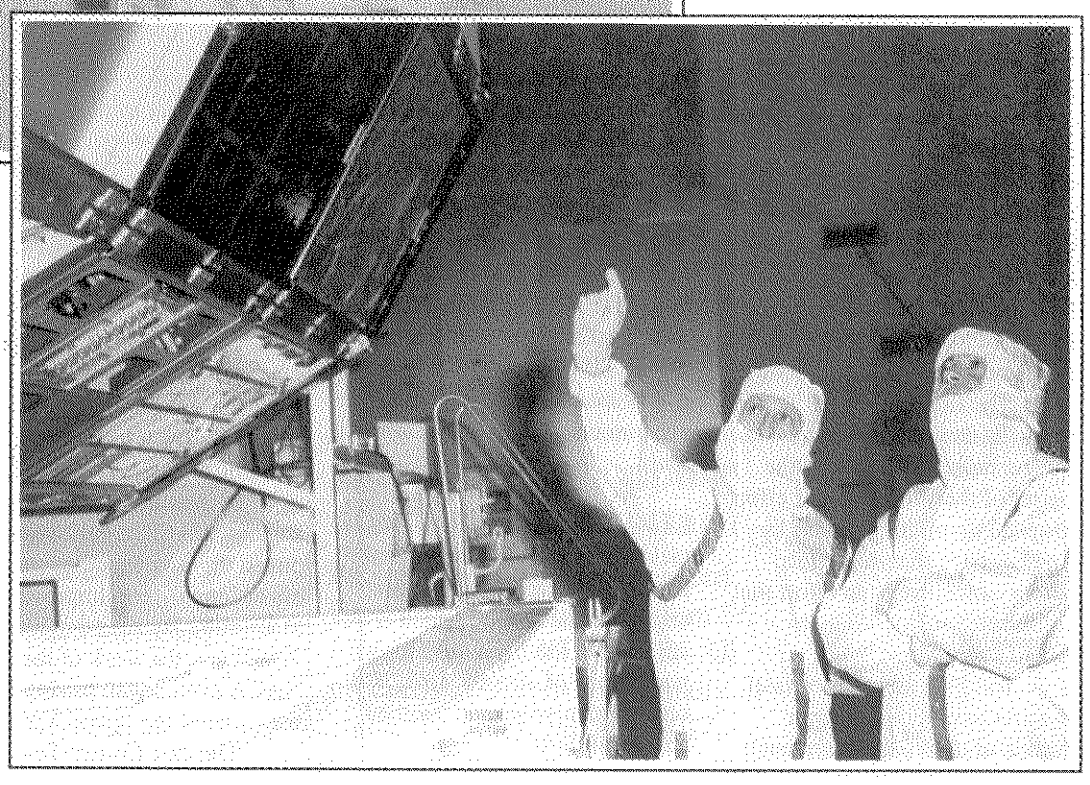
Don't forget to turn your clocks **forward** one hour Sunday night, April 1.

News Researcher

LDEF Continues to Draw Spectators



Arnold Aldrich suits up prior to entering the Spacecraft Assembly and Encapsulation Facility, SAEF-2, at the Kennedy Space Center where the recently retrieved Long Duration Exposure Facility (LDEF) is under examination. Aldrich is head of the newly merged Office of Aeronautics, Exploration and Technology (OAET). See story on page 1.



Examining LDEF in SAEF-2 is Senator Herbert Bateman (right), R-Virginia. Bateman is hosted by Lenwood Clark, a former LDEF experiments manager now associated with Langley's Space Station Freedom Office.

-photos by Sandie Horsey

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

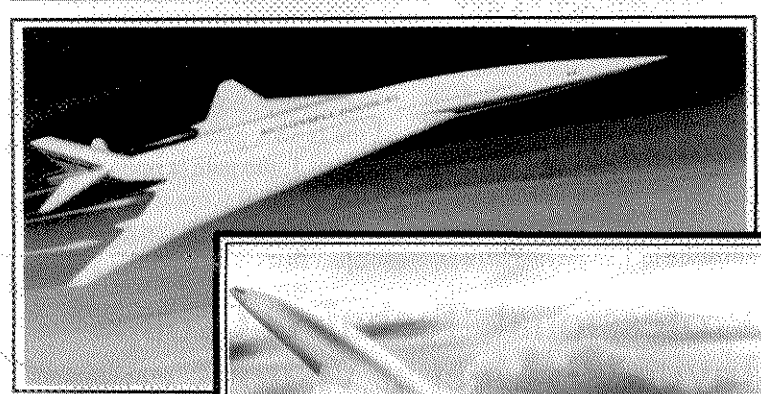
Volume 4, Issue 7 April 6, 1990
Bi-weekly Employee and Contractor Publication

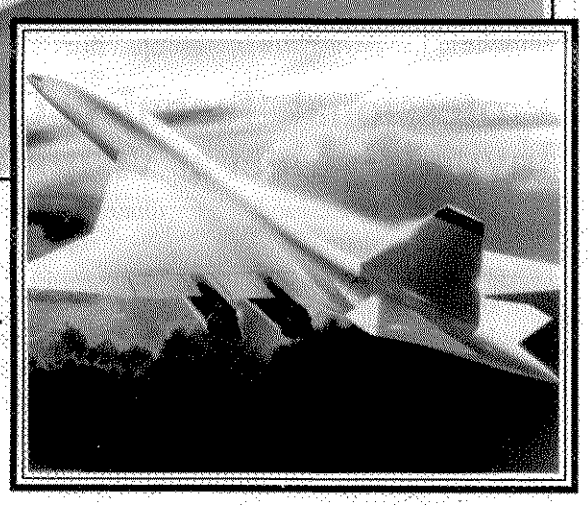
State-of-the-Center Address

Langley Director Richard H. Petersen will address Center employees, retirees and support contractors Wednesday and Thursday, April 25 and April 26, in the H.J.E. Reid Conference Center.

April 25	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 26	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.





Douglas (above) and Boeing (right) have released photos of their respective conceptual designs for a supersonic transport.

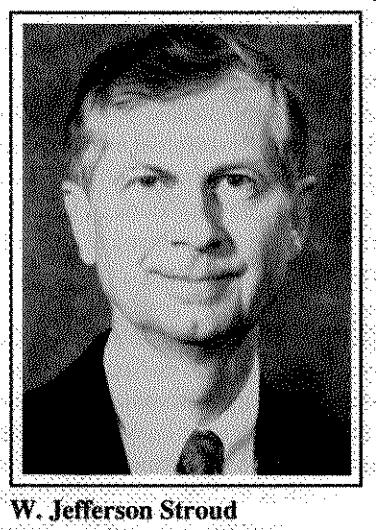
Stroud, Zorumski Named Thompson Fellows

Dr. William E. Zorumski, Acoustics Division, and Dr. W. Jefferson Stroud, Structural Mechanics Division, have been awarded 1990-91 Floyd L. Thompson Fellowships. Zorumski will attend the University of Colorado at Boulder; Stroud will study at Florida Atlantic University, Boca Raton, and Virginia Tech, Blacksburg.

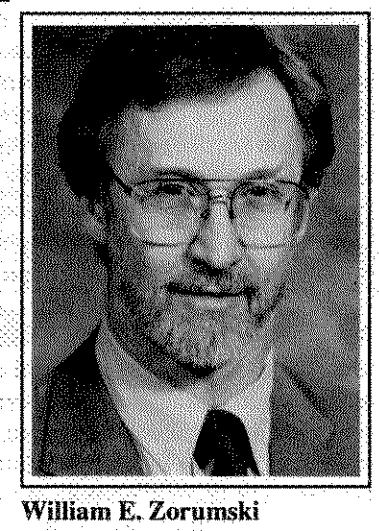
The Thompson Fellowship program was established in 1977 to encourage the development of research potential among the Langley staff. The fellowship allows researchers who have demonstrated continued growth in research to spend up to 12 months at an educational or research institution. It is named in memory 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.

Stroud will focus his research attention on accounting for design uncertainties in aerospace structures. These uncertainties include variations in loads, material properties, shape, thickness, temperature, etc. He will study ways to express these uncertainties as likely statistical distributions. Then, using probability theory and other mathematical techniques, a structure can be designed to maximize its reliability.

Stroud will spend the first nine months at the Center for Applied Stochastics Research at Florida Atlantic University. He will work with Isaac Elishakoff and Y. K. Lin, internationally known experts in probabilistic methods and structural reliability.



W. Jefferson Stroud



William E. Zorumski

The last three months, Stroud will study under Raphael Haftka and Efstratios Nikolaidis at Virginia Tech. Haftka is an international authority in structural optimization; Nikolaidis is an expert in probabilistic methods for structural design. Stroud hopes to combine probabilistic/reliability methods with structural optimization methods to produce new methods for designing superior structures.

Fluctuating pressure loads under high-speed boundary layers may control the design of certain structures on supersonic and hypersonic aircraft. Zorumski is highly regarded for his theoretical and experimental research in acoustics, noise prediction and wave propagation in boundary layers. His current research deals with the transmission of fluctuating pressure loads.

As a Thompson Fellow, Zorumski will conduct a theoretical and computational study of aeroacoustic and instability waves in viscous compressible boundary layer flows. At the University of Colorado, he will work closely with Dr. Sedat Biringen, an expert in computational fluid dynamics research on flow transition and turbulence. This joint research will determine the feasibility of an experimental study to be undertaken in Langley laboratories. The integrated theoretical-computational-experimental approach has the potential to provide valuable scientific findings concerning wave interactions in high-speed shear flows.

High-Speed Transport Acceptance Linked to Technology Advancements

-by H. Keith Henry

Results from the first two years of high-speed civil transport studies suggest that technological advances will determine the environmental compatibility, marketability and public acceptance of a next-generation supersonic commercial airliner.

Boeing Commercial Airplanes, Seattle, and Douglas Aircraft Co., Long Beach, Calif., recently published reports covering the first phase of studies commissioned by NASA. Based on projections for significant increases in trans-oceanic air travel, both companies concluded that there will be a market for commercial transports flying at two to three times the speed of sound (1,350-2,000 mph) between the years 2000 and 2015. According to the studies, transpacific air travel should increase four-fold by the year 2000, while transatlantic passenger trips are expected to double.

Trip times aboard a high-speed civil transport would shrink dramatically compared to flights on today's wide-bodied subsonic airliners. A trip from Los Angeles to Toyko, for example, would be reduced from just over 10 hours to a little over four hours. A next-generation supersonic airliner could carry up to three times the passenger load of the current Anglo-French Concorde at less than one-seventh the cost per passenger mile and with about twice the Concorde's range.

The Boeing and Douglas studies determined that substantial demand for an advanced supersonic transport will materialize only if the aircraft meets allowable standards of airport noise, has no harmful effects on the atmosphere and is economically competitive with future long-haul subsonic airliners. The plane's economic practicality would be enhanced if it meets acceptable overland sonic boom noise levels.

The reports pointed out that technology to build a high-speed civil transport satisfying these requirements is not yet available. However, they identified significant advances that should be possible by the early 21st century, such as variable-cycle engines, newer composite and metallic materials combined with new structural designs, supersonic laminar air flow and fully integrated flight and engine control. These technology developments would permit supersonic airliners to be more efficient, in turn allowing supersonic fares to compete with subsonic fares.

Each company focused on a different class of aircraft. Douglas studied a Mach 3.2 (approximately 2,150 mph) design sized to carry approximately 300 passengers a distance of 7,500 statute miles. Boeing's Mach 2.4 (approximately 1,600 mph) concept, which could be developed more quickly, was sized to carry 250 passengers a distance of 5,800 statute miles.

Boeing considered an aircraft certification date of 2000, and assumed a 65 percent passenger load factor and a 50 percent flight-time savings. Using these standards, the company concluded that a Mach 2.4 transport could capture more than 50 percent of the long-haul international aircraft market, as many as 750 supersonic airliners.

The same analysis indicates that a high-speed civil transport using current technology would snare only about one-third that amount of business, making capital investment far riskier. Furthermore, if two manufacturers competed for a share of today's supersonic market, economic viability would be even more reduced.

The study results have encouraged NASA, Boeing and Douglas to conduct additional research on a second-generation supersonic airliner. In late 1989, NASA initiated the government-industry High-Speed Research Program to tackle the technical and economic challenges of making a high-speed civil transport an "environmental good neighbor." The effort will continue through the mid-1990s.

NASA officials caution that the High-Speed Research Program does not imply commitment to a supersonic civil transport aircraft. If the program shows sufficient promise and further studies confirm that such an aircraft is environmentally sound as well as important to the transportation system and the national economy, a cooperative NASA-industry focused vehicle technology development effort could be considered as a next step. Ultimately, the decision to develop and produce a high-speed civil transport will rest with the nation's aerospace industry.

Question of the Day

Q. What event of particular significance to LaRC took place six years ago today?

(Stumped? Answer on page 2.)

Happenings

HEADQUARTERS, Washington, D.C. --- NASA and the Space Telescope Science Institute, Baltimore, Md., in cooperation with astronomical institutions throughout the United States, have taken a major step toward creating the astronomy leaders of tomorrow with the inauguration of the Hubble Postdoctoral Fellowship Program. The largest such program of its kind, the Hubble Fellowship Program will help ensure that some of the best young scientific talent in astronomy and physics will be afforded an opportunity to conduct important research on challenging discoveries using NASA's Hubble Space Telescope.

LANGLEY RESEARCH CENTER/GODDDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- Chemical processes that lead to ozone depletion in the Antarctic are present in the far Northern Hemisphere, and some regions of the Arctic stratosphere may have suffered ozone losses up to 17 percent during the winter of 1988-89. These results are indicated by the 1989 Airborne Arctic Stratospheric Expedition (AASE). Several investigators, using different analytical methods, reported the Arctic ozone losses. For example, a team led by Langley's Dr. Edward Browell, used a laser-based technique similar to radar to measure ozone distribution and observed depletions of up to 17 percent at some altitudes. Goddard's Dr. Mark Schoeberl inferred average photochemical ozone losses of 0.44 percent per day over the mission at altitudes above approximately 12 miles.

AMES-DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- NASA research pilots have successfully tested a flight control system that detects in-flight failures and automatically reconfigures an aircraft's ailerons, rudders and elevators, allowing pilots to continue their missions or land safely. The self-repairing flight control system, the first system of its type in the aerospace industry, has been demonstrated on NASA's F-15 Highly Integrated Digital Electronic Control research aircraft based at Ames-Dryden. The primary purpose of the system is to detect damaged flight control components and adjust undamaged flight surfaces so the pilot can maintain good aircraft response.

HEADQUARTERS, Washington, D.C. --- Vice President Dan Quayle, in a special White House ceremony on March 19, presented Dr. Lew Allen, director of the Jet Propulsion Laboratory, Pasadena, Calif., with the Robert H. Goddard Memorial Trophy. Allen received the 1990 award "for distinguished and significant contributions to the Nation's advancement in space, earlier by service with the Air Force and the strategic defense of the country, and currently by leadership with NASA in the assurance of U.S. preeminence in planetary exploration." The Goddard Trophy is the premier award of the National Space Club and the aerospace industry.

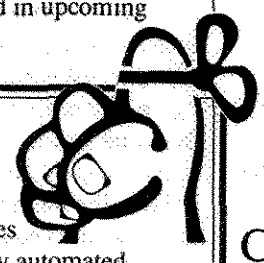
Senior Management Research Review

The Senior Management Research Review will be held Monday, April 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	A Control System Design and Evaluation Procedure for a Potential Flight Experiment--CASES	Michael Scott (Flight Systems/GCD)
9:45	Conical Euler Method Developed to Study Unsteady Vortical Flows About Rolling Delta Wings	Elizabeth Lee (Structures/SDYD)
10:00	Fatigue Delamination Onset Prediction in Tapered Composite Laminates	Gretchen Murri (Structures/MD)
10:15	Advanced SSTO Abort Study	Douglas Stanley (Space SSD)
10:30	Development of an Euler-Based Method for Turboprop Integration	Bobby Berrier (Aeronautics/AAD)
10:45	Upwind Scheme for Solving the Euler Equations on Unstructured Tetrahedral Meshes	Neal Frink (Aeronautics/AAD)

Announcing 'Mail Tips'

The March 23 issue of the **Researcher News** announced Mail Awareness Week, March 26-30, and paid tribute to the outstanding contribution of 12 Klate Holt employees who keep communications at LaRC flowing through the mail service. To help you help our employees and all postal workers accomplish their monumental task of distributing the mail, Mail Tips will be published in upcoming issues.



FOR SPEEDY POSTAL DELIVERY:

- Use typewritten or machine printed addresses (Hand written envelopes cannot be "read" by automated postal equipment and are delayed for personal attention.)
- Address in ALL CAPITAL LETTERS, no punctuation except hyphen in zip code, use state abbreviations. (This new regulation supercedes the rules your grammar school English teacher taught you!)
- Last line MUST BE city, state, and zip code. (Do not use the last line for Attention: _____)
- When in doubt, type address on a plain white label and send to the mail room for proper handling.

Q: What event of particular significance to LaRC took place six years ago today?

A: The Space Shuttle Challenger was launched April 6, 1984, and carried the Long Duration Exposure Facility (LDEF) as its primary payload. LDEF, deployed by STS-41C, was retrieved during the STS-32 mission January 12, 1989.

-photos by Tom Prothro

Be prepared for either option when entering Langley Air Froce Base via the NASA gate, located near the golf course. See announcement below.

Air Force Implements Cut-Backs

Langley Air Force Base security police are responsible for operations at the NASA gate to the air base, located near the golf course. Recent manpower reductions now limit the posting of a guard at this station on a regular basis.

Langley AFB security police will man the NASA gate when sufficient manpower is available and during periods when enhanced security is required. This means that, since March 27, an Air Force guard is only occasionally posted at this entrance to Langley. There is, therefore, special need to be conscious of the posted speed limit and the need to stop should a guard be posted. If there is no guard, Langley employees and contractors with the proper identification and car decal may proceed to their East Area destination.

For your additional information, Langley AFB security police open and close the NASA gate daily. As of April 1, the gate is open from 6 a.m. until 9 p.m.; from October 1 until March 31, the gate is open from 6 a.m. until 7 p.m.

Professional, Technical Groups Invited to Meet at Visitor Center

The Langley Research Center wants to share NASA's rich past and promising future with area professional and technical societies. These groups are invited to hold meetings in the Visitor Center.

Visitor Center staff will present an overview of Langley Research Center. In addition, the Center's galleries and gift counter will be open for the program/social portion of a group's regular business meeting.

Dr. Mark Nataupsky, Visitor Center director, reports that area groups are beginning to take advantage of this educational opportunity to learn more about NASA's early history on the Peninsula as well as the future of America's aerospace program. "In addition to a quality program, the Center will be glad to help make arrangements for breakfast, lunch or dinner meetings, hor d'oeuvres or other refreshments, depending on the needs of the group," noted Nataupsky. "The program has been so successful in its first month, that both initial organizations have indicated a desire to meet at NASA again next year."

Langley is proud to offer its Visitor Center as an alternative meeting place for community groups. However, meeting opportunities are limited and groups are encouraged to plan ahead. Whether it is a business meeting during lunch or an evening social hour, the Visitor Center will accommodate the group to help make each event a most successful function.

For more information about this community service, contact Dr. Nataupsky at 864-1580.

Current News Releases

To obtain a copy of any of these NASA News Releases, contact Jolyn Rivenbark, ext. 43293, Mail Stop 146. Please request information by headline and release number.

90-38.....Hubble Postdoctoral Fellowship Program Established
90-39.....International Conference Addresses Global Burning
90-40.....High-Speed Transport Linked to Technology Advancements
90-41.....Study Detects Possible Ozone Loss over Arctic
90-42.....Goddard Trophy Presented at Special White House Ceremony
90-43.....NASA F-15 Demonstrates Self-Repairing Flight Control System

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

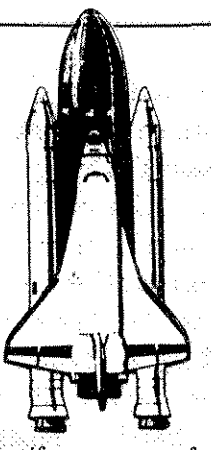
Editor ..... Marny S. Skora

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Space Shuttle Manifest



Manifest courtesy of ***Space News Round-Up,*** *Johnson Space Center.*

1989

Mission	31	35	38	40	41	37	42
Date	4-12-90	5-9-90	7-9-90	8-29-90	10-5-90	11-1-90	12-12-90
Orbiter	*Discovery*	*Columbia*	*Atlantis*	*Columbia*	*Discovery*	*Atlantis*	*Columbia*
Payload	HST, IMAX-04	ASTRO-01, BBXRT-01	DOD	SLS-01	ULYSSES	GRO	IML-01, IMAX-05
Inclination	28.5°	28.5°	—	39°	28.5°	28.5°	28.5°
Altitude	310 × 330	190	—	150	160	243	165
Duration	5	9	—	9	4	5	9
Crew CDR	Loren J. Shriver	Vance D. Brand	Richard O. Covey	Bryan D. O'Connor	Richard N. Richards	Steven R. Nagel	Ronald J. Grabe
PLT	Charles F. Bolden	Guy S. Gardner	Frank L. Culbertson	Sidney M. Gutierrez	Robert D. Cabana	Kenneth D. Cameron	Stephen S. Oswald
MS	Steven A. Hawley	John M. Lounge	Robert C. Springer	Tamara E. Jernigan	William M. Shepherd	Jerry L. Ross	Manley L. Carter
	Bruce McCandless II	Jeffrey A. Hoffman	Carl J. Meade	M. Rhea Seddon	Bruce E. Melnick	Jay Apt	Norman E. Thagard
	Kathryn D. Sullivan	Robert A. R. Parker	Charles D. Gemar	James P. Bagian	Thomas D. Akers	Linda M. Godwin	William F. Readdy
PS		Ronald A. Parise		F. Drew Gaffney			Ulf Merbold
		Samuel T. Durrance		Millie Hughes-Fulford			Roberta L. Bondar

1990

Mission	43	44	45	46	47	48	49	50
Date	1-31-91	3-4-91	4-4-91	5-16-91	6-17-91	8-22-91	9-30-91	12-5-91
Orbiter	*Discovery*	*Atlantis*	*Columbia*	*Discovery*	*Atlantis*	*Discovery*	*Atlantis*	*Discovery*
Payload	TDRS-E	DOD	ATLAS-01	TSS-01, EURECA-1L, IMAX-06	SL-J	UARS	STARLAB	LAGEOS II
Inclination	28.5°		57°	28.5°	57°	57°	33.4°	28.5°
Altitude	160	—	160	230	160	291	175	160
Duration	5	—	9*	7	7	5	7	7
Crew CDR	5	5	TBD	Robert L. Gibson	TBD	5	7	5
PLT			TBD	TBD	TBD			
MS			Kathryn D. Sullivan	Jeffrey A. Hoffman	Mark C. Lee			
			C. Michael Foale	Franklin R. Chang-Diaz	N. Jan Davis			
			TBD	Claude Nicollier	Mae C. Jemison			
					TBD			
PS			Byron K. Lichtenberg	TBD	TBD			
			Michael L. Lampton	TBD				

*Possible extension to 10 days

**Dependent on prior long-duration flight experience

1991

Mission	51	52	53	54	55	56	57	58	59	60	61	62
Date	1-23-92	2-13-92	3-5-92	4-23-92	5-28-92	6-18-92	7-16-92	8-6-92	9-3-92	9-30-92	10-29-92	12-10-92
Orbiter	*Atlantis*	*Endeavour*	*Columbia*	*Atlantis*	*Endeavour*	*Columbia*	*Discovery*	*Atlantis*	*Endeavour*	*Columbia*	*Discovery*	*Endeavour*
Payload	AFP-675, IBSS	GEOSTAR-01, EURECA-1R, USMP-01	USML-01	ACTS	SL-D2	ATLAS-02	SRL-01	Flight opportunity	SPACEHAB-01, SPAS-ORFEDS, GEOSTAR-02	SLS-02	INMARSAT-01	TDRS-F
Inclination	57°	28.5°	28.5°	28.5°	28.5°	57°	57°	TBD	28.5°	28.5°	28.5°	28.5°
Altitude	140	160	140	160	160	160	130	TBD	160	140	160	160
Duration	8	9	13**	7	9	9	9	TBD	7	13**	8	5
Crew	7	5	7	6	7	7	5	TBD	5	7	7	5

1993

Mission	63	64	65	66	67	68	69	70	71	72	73	74	75
Date	1-28-93	2-25-93	3-18-93	4-15-93	5-6-93	6-10-93	7-1-93	7-22-93	9-2-93	10-1-93	10-22-93	11-12-93	12-9-93
Orbiter	*Columbia*	*Discovery*	*Atlantis*	*Endeavour*	*Columbia*	*Discovery*	*Atlantis*	*Endeavour*	*Columbia*	*Discovery*	*Atlantis*	*Endeavour*	*Columbia*
Payload	IML-02	SPACEHAB-02, GEOSTAR-03	USMP-02, INMARSAT-02	ATLAS-03, SPAS-CRISTA	EURECA-2L	HST REV-01	Flight opportunity	SPACEHAB-03	Flight opportunity	Flight opportunity	SPACEHAB-04, Payload opportunity	EURECA-2R, USMP-03, SATCOM	SRL-02
Inclination	28.5°	28.5°	28.5°	57°	28.5°	28.5°	TBD	28.5°	TBD	TBD	28.5°	28.5°	57°
Altitude	140	160	160	160	160	TBD	TBD	160	TBD	TBD	160	160	130
Duration	13**	7	7	9	7	5	TBD	7	TBD	TBD	7	9	9
Crew	7	5	5	7	5	5	TBD	5	TBD	TBD	5	5	5

1994

Mission	76	77	78	79	80	81	82	83	84	85	86
Date	2-3-94	2-24-94	3-17-94	4-7-94	5-12-94	6-2-94	8-4-94	8-25-94	10-6-94	10-27-94	12-8-94
Orbiter	*Discovery*	*Atlantis*	*Endeavour*	*Columbia*	*Discovery*	*Atlantis*	*Columbia*	*Discovery*	*Atlantis*	*Endeavour*	*Discovery*
Payload	ISF-01	XTE/EUVE RETR, Payload opportunity	ATLAS-04	USML-02	SPACEHAB-05, Payload opportunity	SFU-RETR, USMP-04	SL-D3	AAFE, Payload opportunity	SPACEHAB-06, Payload opportunity	ISF-02	Flight opportunity
Inclination	28.5°	28.5°	57°	28.5°	28.5°	28.5°	28.5°	28.5°	28.5°	28.5°	TBD
Altitude	160	160	160	140	160	160	160	160	160	160	TBD
Duration	7	7	7	16**	7	7	9	7	7	9	TBD
Crew	7	5	9	7	5	5	7	5	5	7	TBD

1995

Mission	87	88	89	90	91	92	93	94	95	96	97
Date	1-19-95	2-15-95	3-9-95	4-27-95	6-1-95	6-22-95	8-10-95	9-7-95	9-28-95	11-16-95	12-7-95
Orbiter	*Atlantis*	*Columbia*	*Endeavour*	*Atlantis*	*Columbia*	*Endeavour*	*Discovery*	*Columbia*	*Endeavour*	*Discovery*	*Atlantis*
Payload	OMV, WISP, SPTN-T	SLS-03	SSF/MB-01	TDRS-G	IML-03	SSF/MB-02	SSF/MB-03	ATLAS-05	TDRS-H	SSF/MB-04	SRL-03
Inclination	57°	28.5°	28.5°	28.5°	28.5°	28.5°	28.5°	57°	28.5°	28.5°	57°
Altitude	160	140	220	160	140	220	220	160	160	220	130
Duration	7	16**	7	5	16**	7	7	9	5	7	7
Crew	5	7	7	5	7	7	7	7	5	7	5

Glossary

AAFE Aeroassist Flight Experiment
ACTS Advanced Communications Technology Satellite
AFP Air Force Polar Bear
ASTRO Ultraviolet Astronomy
ATLAS Atmospheric Laboratory for Applications and Science
BBXRT Broad Band X-Ray Telescope
CRISTA Cryogenic Infrared Spectrometer Telescope for Atmosphere
DOD Department of Defense
EURECA European Retrievable Carrier
EUVE Extreme Ultraviolet Explorer
GEOSTAR Interactive Radiodetermination Satellite
GRO Gamma Ray Observatory
HST Hubble Space Telescope
IBSS Infrared Background Signature Survey
ICBC IMAX Cargo Bay Camera
IMAX Large format motion picture camera
IML International Microgravity Laboratory
INMARST International Maritime Satellite
ISF Industrial Space Facility
LAGEOS Laser Geodynamics Satellite
OMV Orbital Maneuvering Vehicle
ORFEUS Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer
SATCOM GE communications satellite
SFU Space Flyer Unit
SL Spacelab
SLS Space Life Sciences
SPACEHAB Commercially owned pressurized experiment module
SPAS Shuttle Pallet Satellite
SPTN Shuttle Pointed Autonomous Research Tool for Astronomy
SRL Space Radar Laboratory
SSF/MB Space Station *Freedom* Manned Base
STARLAB DOD Spacelab
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
WISP Waves in Space Plasma
XTE X-Ray Timing Explorer

Awards

Special Act or Service Awards G

A Special Act or Service Award is a lump-sum c
one-time special act, service or achievement con
1989 fiscal year, over 500 Langley civil service e
ment awards. The following individuals can take
contributed to the accomplishment of Langley Re

Acquisition Division
Panice H. Clark
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Betty J. Crowley
Joann Harris
Lisa M. Harvey
Gael M. Hawkins
Mary T. Hylton
Elizabeth C. Page
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William H. Sleigher

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Robert A. Golub
Jay C. Hardin
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Jack D. Leatherwood
Cheryl C. Smith

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Cary R. Spitzer

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Club News

Softball Names '89 Season Champs

League	Regular Season Champs	Playoff Champs
A	CBI NA-CON	CBI NA-CON
B	Dynamic Engineering Inc.	Dynamic Engineering
C	Ueckers	Suds
D	The Other Team	The Other Team
E	Wombats	Langley Student Branch
F	Brewers	Micro Craft Inc.

CBI NA-CON team members are (first row, L to R) Fred Riccio, Perry Rende, Charlie Gaus, Wayne Lundgren, Manny Lopez; (second row) Jack Futrell, Scott Hardie, Don Foster, Matt Stobart, Manny Lopez Jr., Tom Borden, Ken Dail and Dan Spell.

Members of The Other Team are (front row, L to R) Neil Cheatwood, Peter Gnoffo, Doug Thayer, Mark Persons, J. Al-Saadi; (back row) Frank Greene, Rick Thompson, Pam Brown, Garry Qualls and Bobby Braun. Team members not show are Rich Wahls, Scott Striepe, Suzy Fulton, Basil Hassan, Dean Eklund, Steve Frankel, Marc Knisken, Dave Olnyck and Jeff Taylor.

Langley Student Branch team members are (front row, L to R) Brooks Childers, Robert Kudlinski, Frank Quinto, Cliff Obara (coach); (second row) George Beeler, Greg Gatlin, Roger Lepsch, Greg Brauckman, Mike Wusk. Not pictured are Randy Voland, Marc McMillin, Yvonne Armstrong, Mary Beth Friga, Ram Narayanswami, Greg Schuster, John Shaw, Connie Smith and Jeff Viken.

Runners Club to Hold Intercenter Running Competition

NASA Intercenter races will be held as follows: 10-km races are scheduled for April 9, 19, 23 and May 3; 2-mile races are April 12, 16, 26 and 30. These races start at 5 p.m. on Doolittle Road next to Building 1200. In addition, a 2-mile race will be held April 24 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 also earn points and are welcome in all races.

For more information on the races or the Runners Club, call Richard Shearer at ext. 47036.

Alumni News

The monthly LaRC Alumni Association luncheon will be held Tuesday, April 10, in the private dining room of the NASA cafeteria. Attendees should go through the cafeteria line at 11:30 a.m.

Percy R. "Bud" Bobbitt will speak on "Laminar Flow Technology for the 1990s."

Retirement Party

James H. Parker will be honored at a retirement party Friday, April 20, from 6:30 to 9:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost, including gift, is $10/person or $19/couple. Separate contributions for the gift are most welcome. For reservations, please respond to Al Shearin, Mail Stop 222B, ext. 42776, by April 13.

Notes of Thanks

Evelyn D. Wallace writes: "I wish to thank all my friends who came to my retirement luncheon. Thanks also for the enjoyable time together and the great gifts and food. Your generosity and friendship will be remembered and cherished always. I'll never forget my NACA/NASA friends."

Hal Murrow writes: "I want to thank those who attended and participated in my retirement party/dinner. It was enjoyed very much by my family and me. The memories recalled and the gifts presented are both very special. I'm still on my way through the 'Milestones of Aviation.'"

Robert T. Magee writes: "My family and I wish to thank all who participated and contributed to making my retirement party a most memorable and outstanding event. Your interest, participation, friendship and generosity were overwhelming and will be foremost in our memories of LaRC."

Have You Seen . . .

The following items have been reported missing. If you have seen any of them, please contact the Equipment Management Section, ext. 42055 or 42056.

- VHS/Super VHS Video Cassette Recorder, ECN 0847805
- Laser Printer, ECN 0847368
- Microcomputer, ECN 0060691
- Moniter, ECN 0060694
- Optical Disk Drive, ECN 0846422

Discount Tickets

Discount tickets for area attractions--AMC movie theaters, Busch Gardens, Kings Dominion, Tidewater Dinner Theater, etc.--are available at the Visitor Center Souvenir Counter. Call ext. 41585.

Tidbits from Training

Co-op Program Trains Secretaries

The Office Systems Technology Program, formerly the Secretarial Co-op Program, is a parallel Cooperative Education Program between NASA Langley and Thomas Nelson Community College (TNCC). Its purpose is to recruit, select and train quality students who, after graduation, may be selected for permanent clerical positions at the Center.

Dr. Lavern Jones, Office Systems Technology Coordinator at TNCC, is currently recruiting through the local high schools for applicants to begin work July 30, 1990.

Anyone interested in enrolling in the NASA-TNCC Office Systems Technology Cooperative Education Program and working 20 hours per week may contact Dr. Jones at 825-2752 or Evelyn D. Harris, NASA Langley program coordinator, at 864-2591.

Currently there are several students who will graduate in May 1990 with an Associate Degree in Office Systems Technology. If any organizations have clerical openings, consider interviewing these students for your vacancy. They have had one-and-a-half years of clerical work experience at the Center. Call Evelyn Harris to review academic and work records and to set up interviews.

NACA 75th Anniversary Kickoff

The Langley Alumni Association and the Langley Research Center will hold a NACA 75th Anniversary reception and program on Monday, April 23, in the 30- by 60-Foot Full-Scale Tunnel, Building 643, in the East Area.

The wine/cheese social featuring music and photos from the 20s and 30s will be held from 5 to 7 p.m. All employees, retirees and guests are invited to attend.

Cost will be $4 per person or $7 per couple. Send check made payable to the Langley Alumni Association to Mail Stop 154 by April 17. For information about this and future NACA 75th Anniversary events, call Abe Leiss at 877-2939.

Calling artists and would-be artists

Earth Day Student Art Contest

The Space Shuttle is the most advanced spaceship to ever leave our planet. Like all spaceships, it requires a complicated life-support system to keep its crew of astronauts alive. It has a limited supply of food, water, air and power. The system must be carefully monitored and maintained to ensure that it continues to work properly.

In many ways, Earth is just like a spaceship, travelling through the universe at great speed. Its life support system, known as the environment, is also a very complicated system, with limited resources. Instead of supporting several people like the Shuttle, it must sustain over five billion people in addition to the forests, oceans and animals. Today, we know that everyone's actions can and do affect the environment, from the Alaskan oil spill to forgetting to turn out the lights when leaving a room.

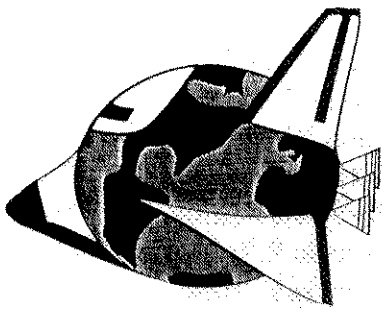
In the 1990s, NASA will begin its Mission to Planet Earth to determine what long-term effects man is having on the Earth's environment. It is still up to all of us, however, to care for the Earth and protect it from damage.

The LAA Conservation Club Earth Day committee invites you to make a poster or drawing that shows how we can become better caretakers of our home, the "Spaceship Earth."

Entries must be no smaller than 8.5 in. by 11 in., but no larger that 24 in. by 36 in. Art work will be divided into three categories: Grades K-3, grades 4-6 and grades 7-12. Each entry must be labelled on the back with the artist's name, address, age and grade. In addition, a 50-word description of the drawing should be attached to the entry. Drawings must be received by Friday, April 13.

Judging will be based on the creativity and imagination shown, on the design and description of the poster and on the demonstrated understanding of environmental issues. First prize is a $50 savings bond and NASA tee-shirt. Second and third prizes will be awarded in each category. Finalists will have their entries displayed at the NASA Langley Visitor Center.

Send entries to Earth Day Art Contest, Mail Stop 364, or contact Rogard Ross, ext. 44429, Building 1232, Room 254.



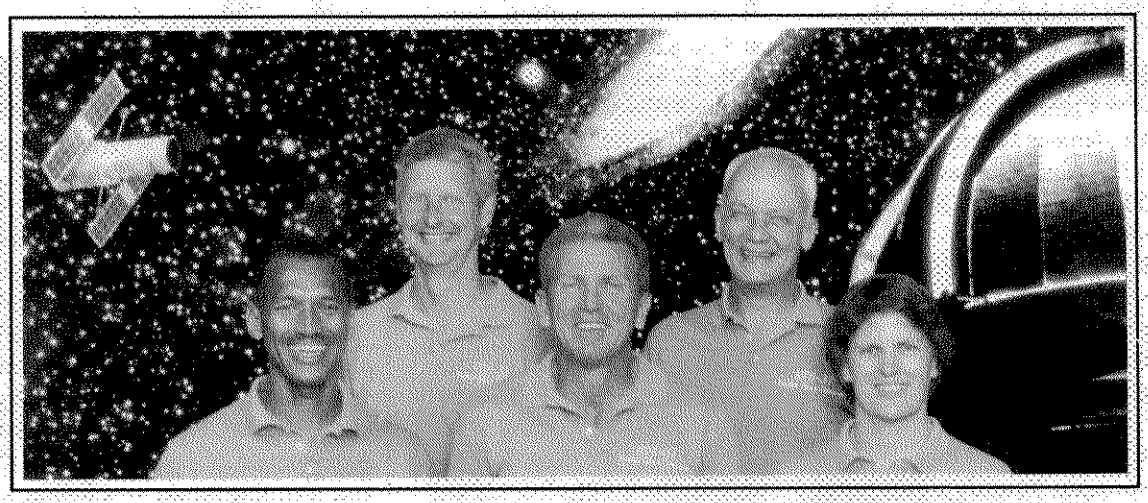
People & Places

STS-31, the 35th Shuttle Mission

Liftoff of the tenth flight of Discovery, STS-31, is scheduled for no earlier than 9:21 a.m. EDT, April 12, from Kennedy Space Center, Fla., launch pad 39-B. Nominal mission duration is expected to be five days, one hour, 15 minutes. Deorbit is planned on orbit 75, with landing scheduled for 10:36 a.m. EDT, April 17, at Edwards Air Force Base, Calif.

Commander of the mission is Loren J. Shriver, Air Force Colonel. Charles F. Bolden Jr., Marine Corps Colonel, will serve as pilot. Shriver was pilot of Discovery's third flight, STS-51C, in January 1985, the first dedicated Department of Defense Shuttle mission. Bolden previously was pilot of Columbia's seventh flight in January 1986.

Mission specialists are Steven A. Hawley, Bruce McCandless II and Dr. Kathryn D. Sullivan. Hawley's previous spaceflight experience includes Discovery's maiden voyage, STS-41D, and Columbia's seventh flight, STS-61C. McCandless previously flew on STS-41B, Challenger's fourth flight. Sullivan flew on Challenger's sixth mission, STS-41G.



STS-31 Crew. The five astronaut crewmembers for the STS-31 mission have chosen a busy night sky scene as a background for their portrait. Astronaut Loren J. Shriver (center front) is mission commander. Other crew members are (L to R) astronauts Charles F. Bolden Jr., pilot; Steven A. Hawley, Bruce McCandless II and Kathryn D. Sullivan, all mission specialists. The Hubble Space Telescope (HST), depicted in the upper left of the background scene, is scheduled to be deployed by Discovery's crew.

NASA's 'Eye in the Sky', the Hubble Space Telescope, is the Primary Payload

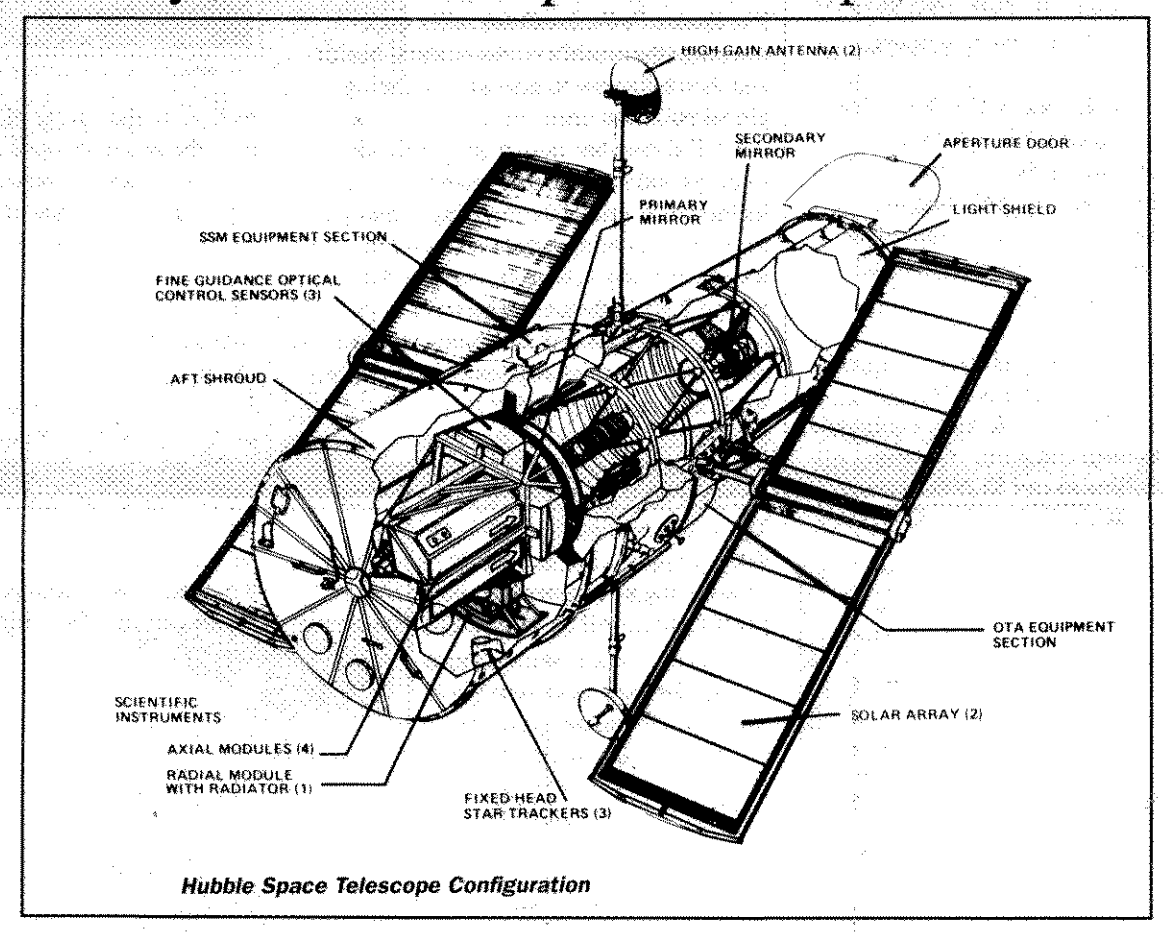
Highlighting mission STS-31, the 35th flight of the Space Shuttle, will be deployment in Earth orbit of the Hubble Space Telescope (HST).

HST, the largest on-orbit observatory ever built, is capable of imaging objects up to 14 billion light years away. Unhampered by Earth's atmospheric distortion, resolution of HST images is expected to be seven to 10 times greater than images from Earth-based telescopes.

Orbiting at an altitude of 330 nautical miles, the telescope will observe celestial sources such as quasars, galaxies and gaseous nebulae. HST also will monitor atmospheric and surface phenomena of the planets in Earth's solar system.

After launch, and once the payload bay doors are opened, the HST main power busses will be activated allowing initial communications to be established. This will begin a 90-day orbital verification period in which the telescope will be checked to ensure that all systems are operational and functioning. In addition, the crew cabin will be depressurized in preparation for contingency activities that may arise related to the telescope's deployment.

HST, which measures 43.5 feet long and 14 feet in diameter, is scheduled to be deployed on the second day of the five-day flight. Umbilical disconnect is planned on orbit 16 followed by solar array extension and slew tests on orbits 17 and 18. The high gain antenna boom deployment also is scheduled for orbit 18. Mission specialist Steven Hawley will operate and release HST from the remote manipulator system (RMS) arm. During HST checkout operations prior to release from the RMS, Mission Specialists Bruce McCandless and Kathryn Sullivan will be prepared for an extravehicular activity (EVA) if necessary. The RMS will maneuver the telescope to the release position on orbit 19 with release scheduled for 1:47 p.m. EDT April 13 based on a nominal launch time. The IMAX Cargo Bay Camera will film various points of the checkout and release of HST. Once the telescope is released, Discovery's crew will maneuver the orbiter away from HST to a distance of about 40 nautical miles. For the next 45 hours, the crew will trail HST in the event a rendezvous and spacewalk are required in response to a failure during the opening of the telescope's aperture door which protects the 94-1/2 inch mirror--the smoothest ever made. Activation of HST's six onboard scientific instruments will follow aperture door opening on flight day three, orbit 39. The remainder of the flight is reserved for middeck operations.



Hubble Space Telescope Configuration

The mission insignia for NASA's STS-31 mission features HST in its observing configuration against a background of the universe it will study. The cosmos includes a stylistic depiction of galaxies in recognition of the contribution made by Sir Edwin Hubble to our understanding of the nature of galaxies and the expansion of the universe. The STS-31 crew points out that it is in honor of Hubble's work "that this great observatory in space bears his name." The depicted Space Shuttle trails a spectrum symbolic of both the red shift observations that were so important to Hubble's work and new information which will be obtained with the HST.

The crew of the Space Shuttle discovery feel the launch of the Hubble Space Telescope will mark the beginning of an astronomical renaissance that will revolutionize humanity's knowledge of the universe.

Hubble Space Telescope Specifications

Main Mirror diameter	94.5 inches (2.4 meters)
Main Mirror weight	1,825 pounds (821 kilograms)
Main Mirror coating	aluminum with 0.025 magnesium fluoride over 70 percent at hydrogen Lyman-Alpha
Main Mirror reflectivity	70 percent at hydrogen Lyman-Alpha wavelengths and greater than 85 percent at visible wavelengths
Optical focal ratio	f/24
Spacecraft length	43.5 feet (13.3 meters)
Spacecraft diameter	
(solar arrays stowed)	14.0 feet (4.3 meters)
(solar arrays deployed)	40.0 feet (12.0 meters)
Solar array size and power	7.9 by 39.9 feet (2.4 by 12.1 m) each average 2,400 watts electricity production
Spacecraft weight	24,000 pounds (11,000 kg.)
Orbital brightness	-3 magnitude (Venus is -4.5, Jupiter is -2.3, the Moon is -12.8)
Fine guidance	Measurement of position of a star to System Capabilities within 0.002 arc-seconds

Secondary Payloads

Joining HST in the payload bay will be the Ascent Particle Monitor to measure particle contamination or particle detachment during the immediate prelaunch period and during Shuttle ascent. Also in the payload bay is an IMAX camera containing about six minutes of film. Discovery's middeck will carry a variety of experiments to study protein crystal growth, polymer membrane processing, and the effects of weightlessness and magnetic fields on an ion arc.

Happenings

SPECIAL LAA SOCIAL. *"Good Luck" Friday the 13th* party will be held April 13 from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment by *Foxfire*. $1 cover charge. Don't miss it.

NASA TOASTMASTERS will meet at 11:30 a.m. Wednesday, April 11, in the H.J.E. Reid Conference Center. Guests are always welcome.

CONSERVATION CLUB will meet Tuesday, April 17, at 4:45 p.m. in the H.J.E. Reid Conference Center. Topics include recycling, conservation of resources and community education. Call ext. 41537 for more information.

AEROBIC CLASSES. Low-impact aerobics classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA cafeteria. Cost is $12/month. First class is free. Call ext. 42295 for more information.

TELA-TAX SERVICE. Federal, state, individual, business. Bookkeeping services. Member of National Assoc. of Tax Preparers. By appointment at your location. Call 874-3121.

AIAA MEETING will be held Wednesday, April 11, in the H.J.E. Reid Auditorium. Social at 4:30 p.m.; meeting at 5. Dr. Billy R. Ashworth will speak on "Piloted Aircraft Simulation." A tour of Simulation Lab will follow. For reservations, call Ferd Grosveld, 850-3896, or Jim Youngblood, 1-588-5617.

NORFOLK SAVOYARDS in conjunction with the Virginia Beach Community Orchestra will present Gilbert and Sullivan's *The Gondoliers* April 18, 20, and 21 at 8 p.m. and April 22 at 3 p.m. in the Norfolk Center Theater. Seats are $10. For reservations, call 496-2230

WANTED TO RENT: HOME or apartment, furnished or unfurnished. Needed by professor, wife and 2 children. June 10-Sept. 10. Call (205) 821-1833 during evening hours.

FOR RENT: CONDO. 1 BR Hampton Club, 1st floor, end unit with private entrance. Many extras. $410/month. Deposit and lease required, or rent with option to buy. Call 868-9130 after 5.

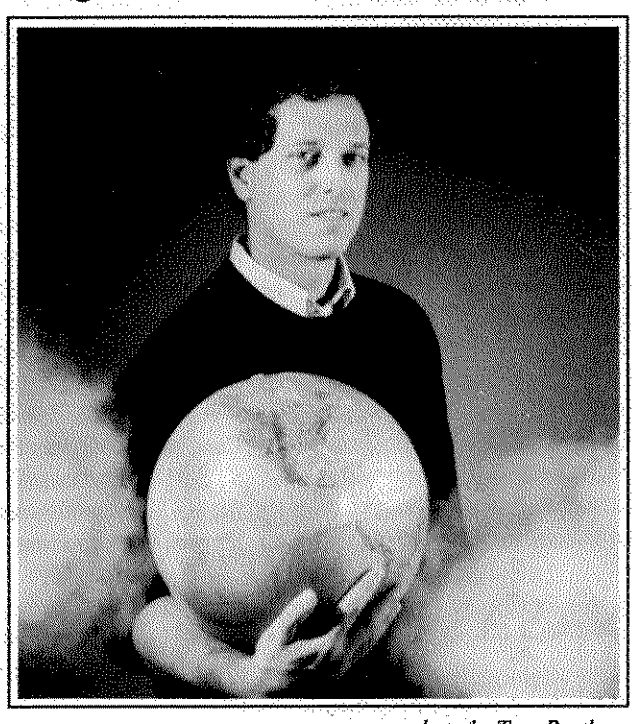
FOR SALE: HOME. Large 2 BR, 2 BA near NASA and LAFB. LR, DR, fully equipped kitchen and more. Owners willing to pay $1,000 closing costs. $57,500. Call 877-2735.

At the VC during April

Scientist Investigates Alarming Trends in Global Pollution

Man is participating in a continuing, inadvert experiment with Earth that is altering its properties on a global basis. Because the outcome cannot be predicted, NASA is committed to the study of Earth to learn more about global change. Dr. Jack Fishman will give a special Earth Day presentation, "Symptoms of an Endangered Earth," at 7:30 p.m., April 19, in the Visitor Center theater.

To mark the 20th anniversary of Earth Day, Fishman, senior research scientist in the Atmospheric Sciences Division, will investigate alarming trends in pollution, Langley's ongoing research done on global change and what mankind can do to improve the environment.



-photo by Tom Prothro

Book Sounds Global Alert

Coinciding with the 20th anniversary of Earth Day, Fishman's book, *Global Alert: The Ozone Pollution Crisis*, cites major threats to the world's environmental health and then tells how to arrest the alarming global pollution problem.

Fishman has drawn on worldwide findings and his own extensive research, including new satellite mapping techniques, to signal escalating trends in pollution levels. Written with co-author journalist Robert Kalish, the book describes how pollution has reached hazardous proportions not only in occasionally toxic areas of the world but in an expanding range of locations.

Kalish first contacted Fishman to get background for a novel set in the year 2040. The writer wanted Fishman's realistic description of what the weather and composition of the atmosphere would be like 50 years from now if global warming became a reality. In the course of working through that information, the two developed the idea for a non-fiction book.

Low-level ozone concentrations have been increasing at an average rate of one to two percent per year in the Northern Hemisphere since the 1970s. This increase is three to five times the rate of carbon dioxide build-up which has long been viewed as one of the major areas of concern by scientists investigating the theoretical phenomena of "Global Change."

Fishman's book tries to reduce the complicated atmospheric chemistry to a layman's understanding of the forces which produce the toxic conditions which increasingly threaten man's well-being. Having established the characteristics of degraded air quality, Fishman states that he and Kalish present a realistic course of action to repair the damage with both personal and national commitments on the part of every citizen.

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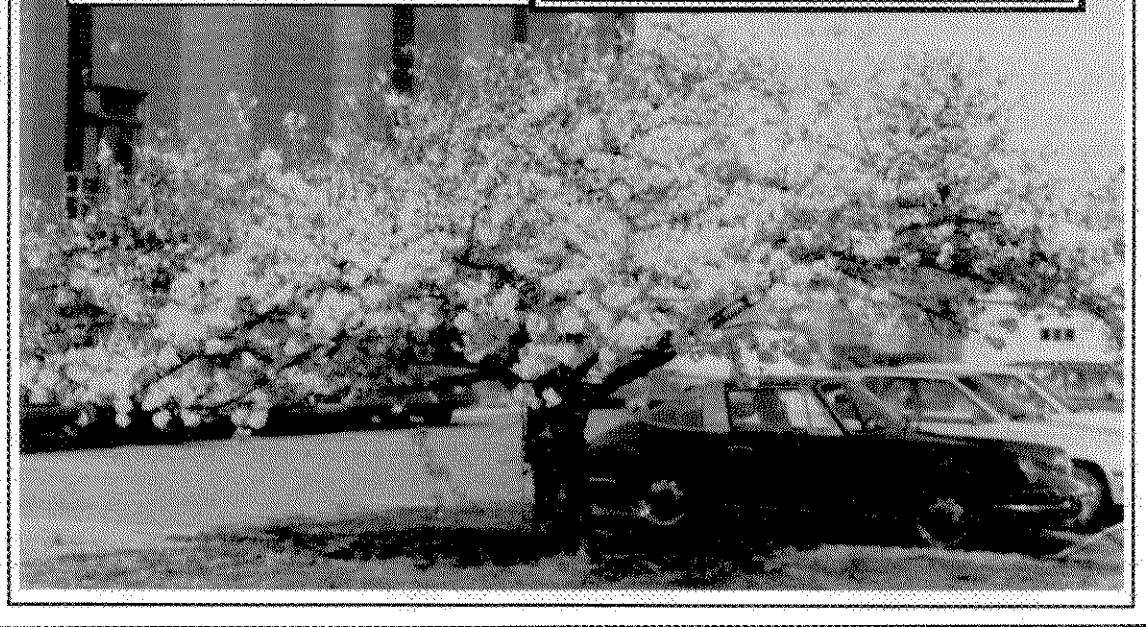
Researcher News

Spring Has Sprung!



NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 8 April 20, 1990

Langley News Researcher

Bi-weekly Employee and Contractor Publication

Tom Yager (foreground) and Walt Horne inspect the grooved concrete runway test surface used during NASA Convair 990 wet braking performance tests at NASA's Wallops Flight Facility in June 1968.

Safety Grooving Named to Technology Hall of Fame

A Langley Research Center project that eliminates hydroplaning and permits aircraft to decelerate in a shorter runway distance has been selected for inauguration into the Space Technology Hall of Fame.

Safety grooving drains surface water from runways, enhances aircraft braking and improves directional control. Thomas J. Yager, Landing and Impact Dynamics Branch, and Langley retiree Walter B. Horne accepted the award for their work on safety grooving at the U. S. Space Foundation's Sixth National Space Symposium held April 9-11 in Colorado Springs, Colorado.

Aircraft land at speeds ranging from 60 mph for small craft to 190 mph for a Boeing 747. After touchdown, a speeding aircraft must reduce lift, settle full weight to the pavement and decelerate rapidly to a safe turnoff speed before reaching the end of the runway. This deceleration requires good traction between aircraft tires and runway pavement.

Tests conducted under controlled conditions at Langley's Landing Loads Facility in the late fifties provided an understanding of the many factors which influence degraded aircraft braking and directional control performance on wet runway surfaces. The phenomenon of tire hydroplaning was

(Continued on page 2.)

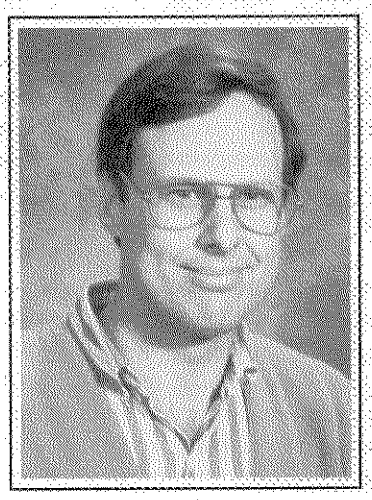
Outlaw, DeYoung Presented Space Club Awards

The National Space Club has recognized two outstanding NASA Langley Research Center scientists. Ronald A. Outlaw has been awarded the 1990 Dryden Memorial Science Fellowship. Russell J. DeYoung has been named the 1990 Low Memorial Engineering Fellow.

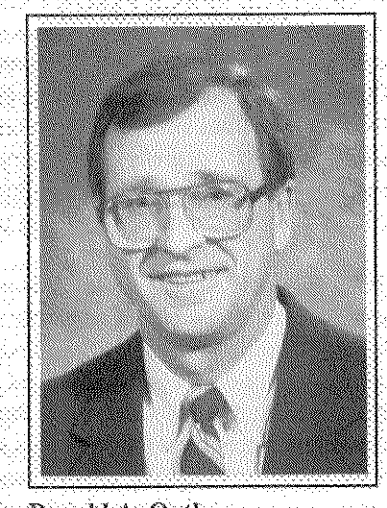
Outlaw and DeYoung were recognized at the Space Club's thirty-third annual Goddard Memorial Dinner, held March 16 in Washington, D.C.

A senior research scientist in the High Energy Science Branch, Outlaw will spend an academic year at the Massachusetts Institute of Technology. At MIT, he will work with Professor Ronald Latanision, a world renowned authority on the complex effects of hydrogen in metals.

The effects of hydrogen in titanium and aluminum alloys are one of the primary limitations to the future of hypersonic aircraft and advanced space transportation. Aircraft, such as the National Aerospace Plane and future launch vehicles, require high-strength, lightweight materials. Since hydrogen will be used to fuel and to cool the structure of these vehicles, alloys are required which are resistant to hydrogen degradation over a wide range of temperatures and concentrations. Outlaw is the third Langley researcher to receive this prestigious award.



Russell J. DeYoung



Ronald A. Outlaw

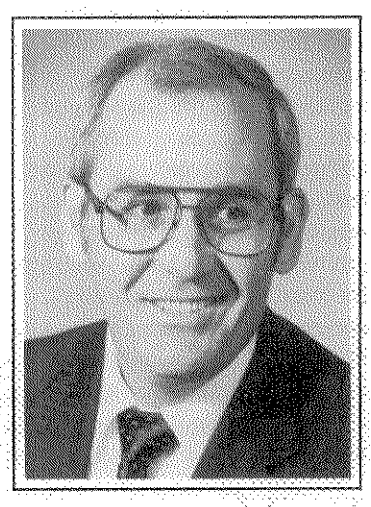
DeYoung is the first recipient of the Low award. A senior research scientist in the High Energy Science Branch, he will spend an academic year at the University of Illinois, Urbana, where he will work with the electrical and nuclear engineering departments on laser concepts for space power transmission applications.

For more than nine years, DeYoung has worked almost exclusively on experimental characterization of nuclear and solar-pumped lasers. These lasers are being pursued as a potential solution to NASA's requirements for high capacity space power for future solar system exploratory missions. He is also involved in research on the use of pulsed lasers for determining the surface composition of planetary bodies.

Jones, Langley's NASP Advocate, Retires

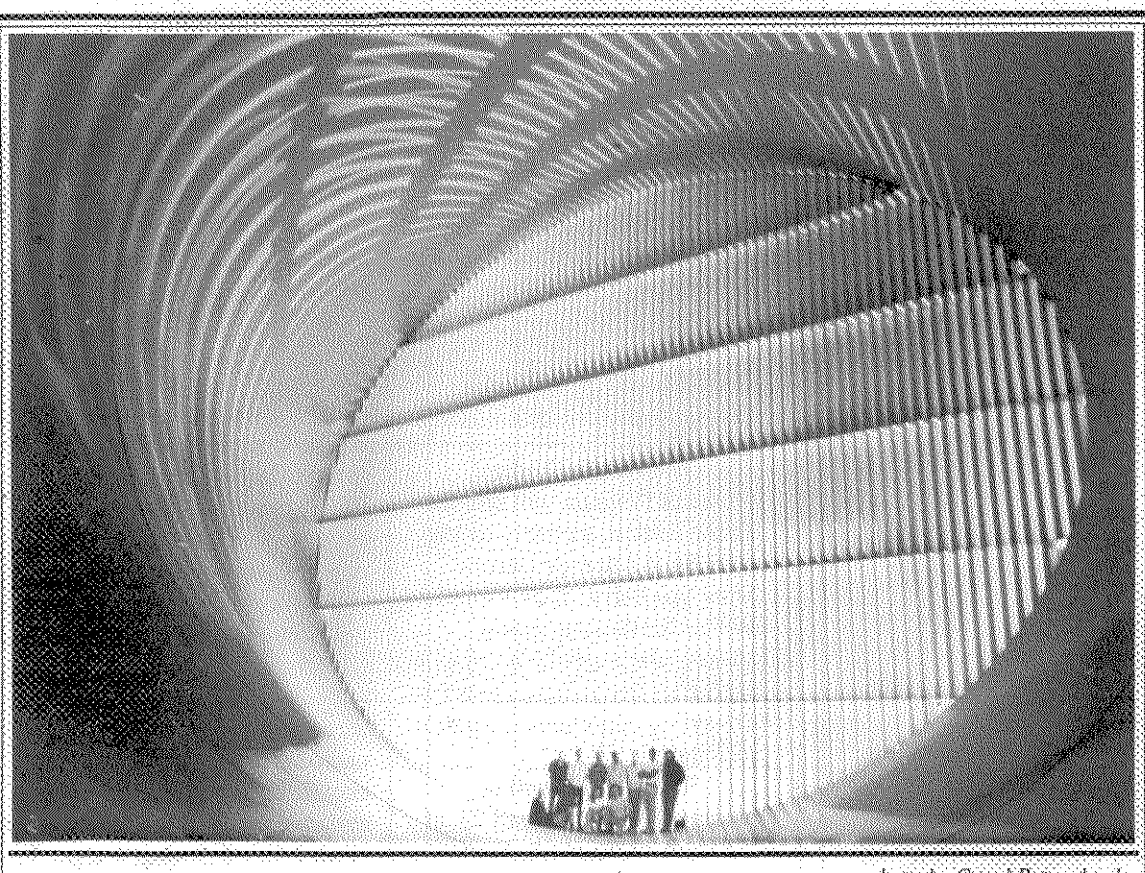
Robert A. Jones, manager of the Hypersonic Technology Office, retired March 30 after more than 35 years of federal service. Responsible for defining, advocating and guiding hypersonic research at the Center, he had been the coordinator of all Langley activities and involvement in support of the National Aero-Space Plane (NASP) Program.

Jones is now working part-time as an engineering consultant for Fluidyne, Inc., Hampton, Va., as well as for R. A. Jones, Inc., Newport News, in partnership with his son Robert.



Jones began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics, as an aeronautical research engineer in May 1955. He was assigned to the Defense Advanced Research Projects Agency (DARPA) in Arlington, Va., from September 1984 to September 1985. At DARPA, he was the deputy program manager of a major new research program to develop technology for a horizontal take-off, single-stage-to-orbit vehicle which later became known as the NASP.

In 1986, he received the NASA Medal for "outstanding leadership of NASA hypersonic programs and personal contributions which contributed significantly to the nation's continuing preeminence in hypersonics leading to the joint NASA/DOD NASP Program."



-photo by Carol Petrachenko

Facility technicians are dwarfed by turning vanes in the newly-refurbished and upgraded 16-Foot Transonic Tunnel. Tunnel safety, capability and productivity are expected to increase as a result of a $5 million construction of facilities effort and other facility upgrades accomplished within the last nine months. For a closer look at the crew who supported the upgrade, see page 5.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has launched a new education program called "Star 21 Project." Under the project, two students--NASA "Stars"--and one educator from a Washington-Baltimore metropolitan area school district will participate in an educational program culminating in a trip to the Kennedy Space Center to attend a Space Shuttle launch. The purpose of the "Star 21 Project" is to help promote scientific literacy among students and educators for the 21st century by providing a space education experience for local students age 16 or older.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. ---An improved technique for potentially measuring global atmospheric temperature changes and possible global warming has been developed by scientists at Marshall and the University of Alabama. Marshall's Dr. Roy Spencer and Alabama's Dr. John Christy evaluated temperature data gathered by the National Oceanic and Atmospheric Administration (NOAA) satellites since 1979 to monitor monthly temperature variations over the globe to a mean accuracy of 0.01 degrees Centigrade, setting a standard against which future temperature trends will be measured. While future global temperature variations were not specifically addressed, the decade from 1979-1988 showed no net warming or cooling trend.

JOHNSON SPACE CENTER, Houston, Texas --- NASA has released a call for proposals to lease space and related services on a pressurized manned module to expand the Space Shuttle orbiter's middeck locker experiment capability. Called the Commercial Middeck Augmentation Module (CMAM), the commercially-developed and owned module will ride in the orbiter payload bay when carried, be accessible through the air lock and add the volume equivalent of about 50 middeck lockers to the orbiter's capacity. The request for proposals seeks responses from companies which can provide the module for lease by the government; physical and operational integration of the module and the experiment requirements; operator training; and data collection, processing and distribution.

HEADQUARTERS, Washington, D.C. --- NASA and Rockwell International Corp., Space Transportation System Division, Downey, Calif., have signed a memorandum of agreement under which Rockwell will produce a cryogenic pallet, a major element of NASA's extended duration orbiter (EDO) program to extend Space Shuttle missions up to 16 days. The EDO cryogenic pallet holds spherical tanks of liquid hydrogen and liquid oxygen, valve panels and avionics boxes. When installed in the back of the orbiter's payload bay, the pallet will feed additional cryogenic fluids to the orbiter's electricity-generating fuel cells, thereby extending the vehicle's normal mission time from eight to 16 days.

Langley Project Makes Technology Hall of Fame

(Continued from page 1.)

identified and the associated losses in tire traction were defined for a variety of test parameters. These investigations indicated that the key to minimizing tire hydroplaning was to alleviate the fluid pressure build-up between the tire and the pavement.

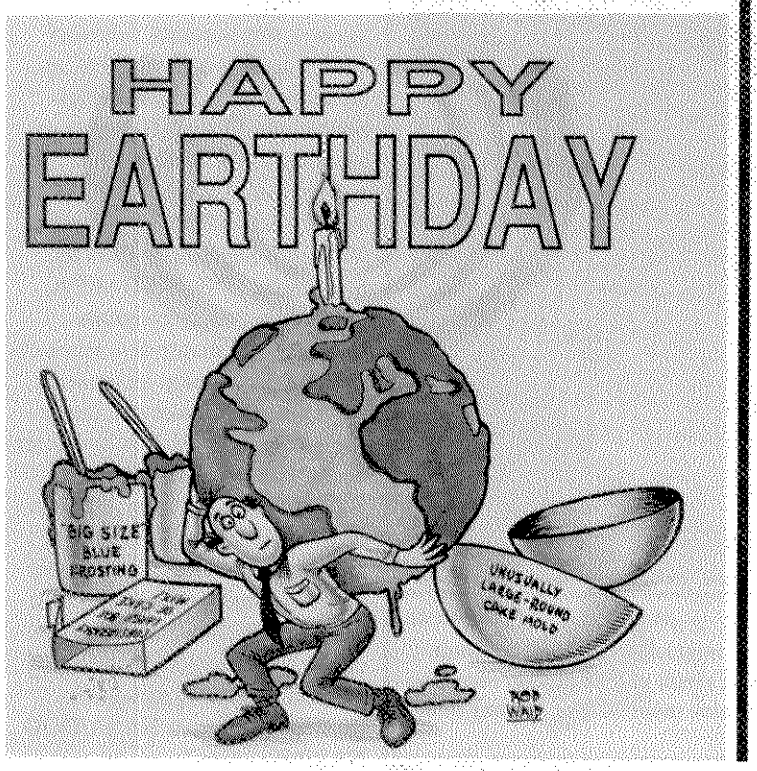
In 1962, pavement grooving studies were begun at the track facility to evaluate environmental effects, grooving techniques and tire friction and wear performance on many different test pavements. On the basis of the Langley test track results, an optimum transverse groove arrangement was selected for installation on a specially constructed runway at Wallops Flight Facility. Grooves were cut into the runway surface 1/4-inch wide, 1/4-inch deep on one-inch centers.

In 1968, with the assistance and support of the U. S. Air Force and the Federal Aviation Administration (FAA), full-scale, instrumented aircraft tests to evaluate the effect of pavement grooving on aircraft braking performance were initiated at Wallops. Promising results from these tests encouraged installation of grooved pavement on a few airport runways as well as on selected highway curves.

In a joint program with the USAF and the FAA from 1969 to 1972, a C-141, a B-727 and a DC-9 aircraft were instrumented at Langley to conduct braking performance tests on over 50 different grooved and ungrooved runway surfaces. Results from these tests clearly indicated the benefits of grooving to improve wet tire traction. A relatively small NASA investment to develop and evaluate pavement grooving has initiated action on our nation's runways and highways that has significantly minimized wet pavement skidding accidents and improved the safety of aircraft and ground vehicle operations during wet weather. This Space Technology Hall of Fame spinoff has also been used to modify the Space Shuttle landing strip at the Kennedy Space Center.

The Space Technology Hall of Fame was established by the U. S. Space Foundation in conjunction with NASA's Technology Utilization Division, Office of Commercial Programs, to create broader awareness of the many spinoffs from technology originally developed by NASA for the space program. The Hall of Fame, located in Colorado Springs, inducted the first group of spinoff technologies in April 1988.

Lankley



Secretary's Day Program

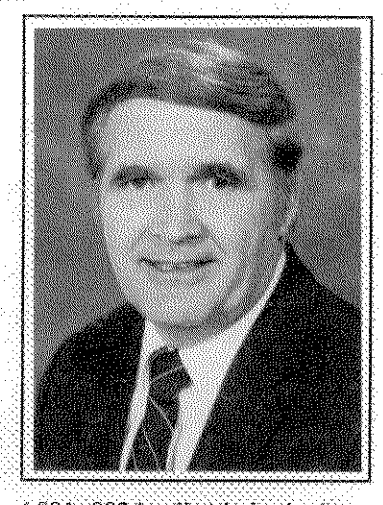
The Langley Federal Women's Program will present Keane Britton, secretary to Virginia State Attorney General Mary Sue Terry. Keane's topic will be "Embracing a New Vision," through which she will encourage her audience to act on expanding opportunities open to secretaries.

The program will be presented Monday, April 23, at 1:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Refreshments will follow the program.

Editorials

Langley

Headquarters Forum



Beginning about the time this article is published, some Langley employees should be witnessing another milestone in a long list of major Langley contributions to the progress of aviation. The Boeing company, in a jointly funded program with NASA and the Air Force, will begin flight tests of a hybrid laminar flow control system (HLFC) on their company B-757.

Laminar flow has long been the aerodynamicist's dream for reducing drag and improving flight efficiency. Past efforts to exploit the technology can be divided into two categories: natural laminar flow (NLF) and laminar flow control (LFC). NLF is a passive technique that attempts to maintain the boundary layer in a streamlined state through airfoil shaping. LFC is active in that additional evergy is used to remove some of the boundary layer air by suction and thereby stabilize the flow.

Until recently, NLF was considered a neat laboratory experiment with little value in aircraft design. During World War II, North American Aviation incorporated a Langley-designed six-series laminar flow airfoil into the wing design of the P-51 Mustang. Although the P-51 went on to become the world's premier fighter, it did so without benefit of laminar flow. Manufacturing practices of the wartime period were not good enought to maintain the shape and smoothness needed.

Research then shifted to the use of suction through the wing surface, LFC, as a means to reduce the thickness of the boundary layer, thereby maintaining its low drag laminar characteristics. In 1962, under Air Force sponsorship, Northrup flew the X-21 with suction laminar flow control over nearly the entire upper and lower surface of the wing. Thousands of narrow, spanwire slots were cut into the aluminum wing surface, and suction pumps laboriously but successfully kept the airflow laminar almost to the wing's trailing edge. High system costs and uncertainty over long term operations in an airline-type environment resulted in very little interest being shown by either the commercial or military community in further development.

Today's HLFC system on the Boeing airplane combines features of NLF and LFC. It extends along only a 17-foot section of the left wing just outboard of the number one engine, but it contains all of the system complexity and features needed for a full wing design. In the leading edge of the wing, ahead of the front spar, suction ducts are installed to actively remove boundary layer air. There are millions of tiny (.001-.002 in. dia.) holes in the skin, burned through with an efficient laser drilling process.

Between the front and rear spars, the laminar flow is maintained by controlling the pressure gradient through the airfoil shape. Advances in manufacturing processes since WWII make this possible. Aft of the rear spar, the boundary layer will soon transition to a turbulent state. However, by this time, about half of the wing will have slipped through the air mass with almost zero skin friction drag.

Studies have shown that an HLFC system achieving 50 percent laminar flow on the upper surface of the B-757 would net an improvement in efficiency of three to five percent. Furthermore, if the designer were to start from scratch and resize the aircraft to benefit from the drag reduction, a new airplane would carry the same payload over the same range with 12 to 15 percent less fuel burn. An Air Force study concluded that hybrid laminar flow is an enabling technology for a global range transport. This carrot is big enough to significantly impact the market share of future transport sales.

Richard D. Wagner and his team in the Laminar Flow Control Project Office deserve much credit for leading the program, for developing the Air Force and industry interest into cost sharing, and for laying the groundwork that has given all of us confidence to proceed to flight.

J. W. Stickle
Chief Engineer

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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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Photographic Support ..... Photo Lab

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SCAN Teams Work to Make Langley A Better Place to Work

Langley Director Richard H. Petersen has empowered three employee teams to scan the work environment at Langley in an effort to identify and improve the overall work climate. These Strategic Culture Assessment for the 90s (SCAN) teams have been tasked to identify problems, collect and analyze data, report findings, make recommendations for change and, finally, evaluate the improvements as well as the assessment process.

Culture is embedded in history, deep-rooted beliefs, shared assumptions, norms and values. An organization's culture reflects its population. A randomly selected cross section of Langley employees was surveyed in May 1989 to assess "the way we do things around here." Of the 920 surveys distributed, 459 were returned in time to be analyzed.

Petersen recently reported, with pleasure, that LaRC scored high in the areas of safety, pride in NASA and in Langley, innovation, quality of work and accomplishment of the Langley mission. On the other hand, the culture survey revealed some areas where improvement is needed.

"While our technical work is solid," said Petersen, "we must do a better job of managing our most important asset, our people." Analysis of employee responses indicates improvement is needed in three areas: communications, career development and rewards and recognition. SCAN team leaders have been selected to tackle each of the target areas: **Rich Antcliff**, Instrument Research Division, is leading the study on communications; **Cindy Lee**, Flight Applications Division, is studying career development;

and **Del Croom**, Fabrication Division, is looking into rewards and recognition.

These team leaders have selected their committees from across Center organizations and functional responsibilities. This broad cross section of Langley employees has been working since early March collecting data through on-Center interviews, observations and input from focus groups called Think Tanks. Since surveys are, in effect, only half a conversation, these think tank groups are designed to provide employees an opportunity to generate ideas, give feedback and be heard in an informal setting. In addition, external experts in each of the three target areas are being consulted.

Louise Hamilton, Personnel Division, is the consultant to all teams. "An important part of strategic planning is to scan the environment to determine gaps in the way things are versus the way things should be--thus the name of our peer group teams." She adds, "In true NASA style, words go away, acronyms are remembered."

Hamilton encourages all employees to approach any SCAN team member to discuss concerns as well as to offer recommendations that will make Langley a better place to work.

Center management at all levels is committed to improving Langley's culture. The supervisors of SCAN team members have agreed to allot the necessary time to follow through on this vital assessment. SCAN teams make monthly progress reports to the senior staff and are scheduled to present the results of their studies in July.

Associate Director Sid Pauls is spearheading this effort. "Our SCAN teams are chartered to look carefully at the data contained in the culture survey and give us some recommendations for changes which will result in significant improvements in our management practices," he said. "We owe our employees a response to the survey. We expect to take some specific actions in the near term as well as develop a plan for future improvements."

Watch for updates on the progress of the SCAN teams in subsequent issues of the **Researcher News.**

Communications

Richard R. Antcliff	Electronics	ext. 44606
Earl H. Arrowood	Management Ops	ext. 42538
George B. Finelli	Flight Systems	ext. 46188
Donna L. Forbes	Electronics	ext. 46635
Richard J. Silcox	Structures	ext. 43590
Clarence Stanfield	Sys. Eng. & Ops	ext. 44108
Diane S. Wieting	Space	ext. 46052
Stephen Wilkinson	Aeronautics	ext. 45733

Career Development

Cynthia C. Lee	Aeronautics	ext. 43865
James G. Batterson	Flight Systems	ext. 44059
Sharon Fairheart	Electronics	ext. 46068
Thomas E. Frasher	Management Ops	ext. 42139
Guy T. Kemmerly	Aeronautics	ext. 45070
Timothy J. Marshall	Sys. Eng. & Ops	ext. 46951
Diane M. Stoakley	Structures	ext. 44246
Willard R. Weaver	Space	ext. 46053

Rewards and Recognition

Delwin R. Croom	Sys. Eng. & Ops	ext. 44544
Paul R. Bagby	Management Ops	ext. 43530
Kim S. Bey	Structures	ext. 41351
Robert W. Buchan	Space	ext. 41964
Virginia B. Marks	Flight Systems	ext. 41714
Marilyn E. Ogburn	Aeronautics	ext. 41175
Julie Williams-Byrd	Electronics	ext. 41629

Langley Engineers Aid Land Sailor in Quest for World Championship

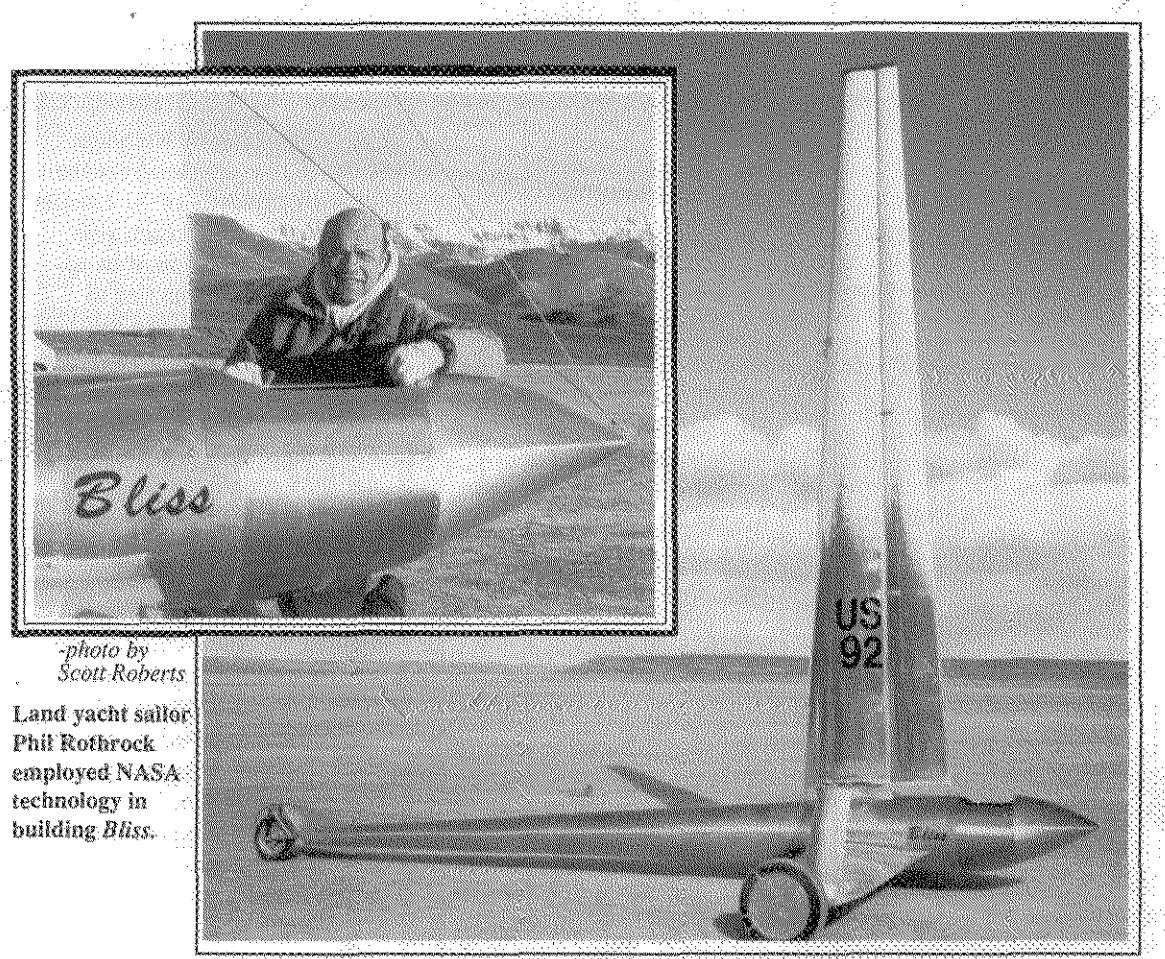
-by Craig Murden

NASA's long-standing reputation for aerodynamic design innovation is being demonstrated in a new and unusual way as Langley Research Center engineers work with an Oregon inventor to perfect land yacht sail technology for international racing competition.

Land yachts are wheeled sailcraft capable of speeds over 90 mph on the open expanses of desert or dry lake areas of the world where they compete. This year's premier event was the World Cup Regatta which featured a full complement of international competitors to challenge American racers at Ivanpaugh Dry Lake, 40 miles west of Las Vegas, April 8-13.

Most of the yachts use modified sailboat technology with cloth sail materials. However, a few builders here and abroad are experimenting with rigid airfoil-type structures shaped like an airplane wing mounted vertically. This is the same general approach used by the American sailing catamaran *Stars and Stripes* to defeat the New Zealand monohull boat in last year's challenge race off San Diego, California.

In adapting this emerging technology to such an unusual application, Philip M. Rothrock, former math teacher from Portland, Oregon, together with his engineer father Art began by using previously published NASA data for aircraft wing configurations. Their focus was on high lift, low velocity designs from early NACA work done at Langley. Using this approach, coupled with wing flap experimental data also produced by Langley, the Rothrocks won major land yacht races in 1987 and 1989, and have been seeking design refinements ever since.



-photo by Scott Roberts

Land yacht sailor Phil Rothrock employed NASA technology in building *Bliss*.

-photo by Phil Rothrock

In the course of that pursuit, they have sought the help of Langley engineers. This racer-consultant relationship has produced continuing design evolution of aircraft wing and flap adaptation to the land yacht as the Rothrocks prepared for major challenges from land sailors around the world. This work involved Langley's Harry L. Morgan Jr., an aerospace engineer in the Subsonic Aerodynamics Branch. Morgan offered suggestions for airfoils which would produce higher lift-drag ratios and maximum lift coefficients than some of the NACA designs. He also proposed changing the Rothrock approach to flap applications--used by the land yacht to gain starting momentum and also to adjust for wind speed variations. Morgan's idea was to incorporate recent Langley research on new aircraft flap systems which employ trailing-edge deflection for small adjustments in the lift coefficient in climb and cruise conditions. This departure from what the Rothrocks were using is thought to better match what the flaps do for an airplane to the specific demands of the land yacht in its acceleration and sustained speed racing modes.

The effectiveness of these refinements will be determined when the Rothrocks and their fellow Americans confront land yachts from England, Germany, Australia, New Zealand, France and other countries at the World Cup Regatta.

Race results unavailable at press time.

Who Says You Can't Change the World?

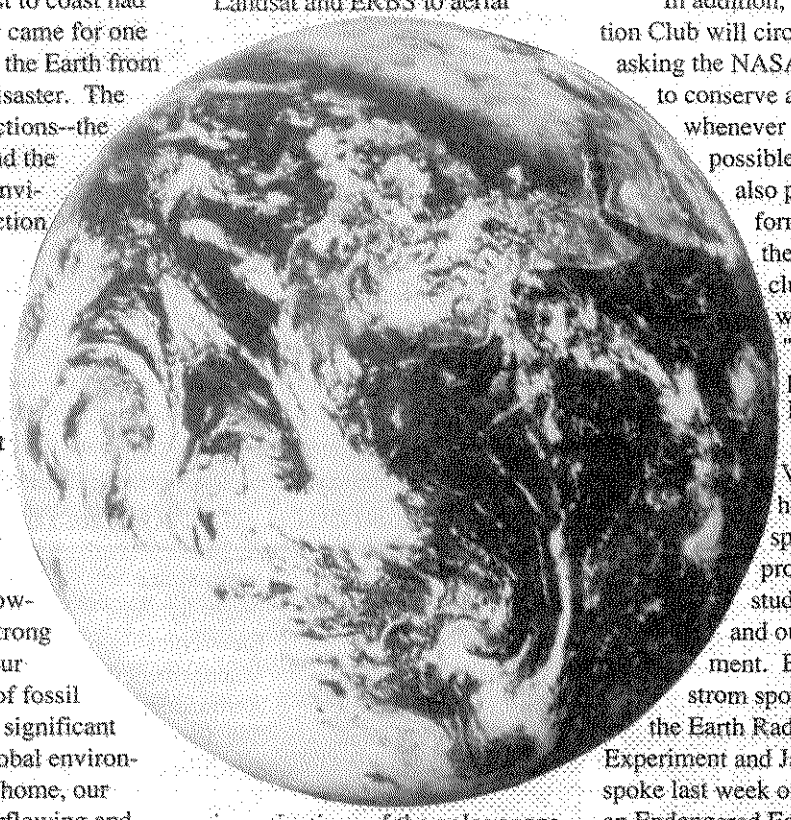
-by Rogard Ross

The date was April 22, 1970. They started arriving at our nation's capitol before dawn. Before day's end, 20 million people from coast to coast had taken part. They came for one purpose--to save the Earth from environmental disaster. The results of their actions--the Clean Air Act and the creation of the Environmental Protection Agency.

April 22, 1990 marks the twentieth anniversary of that first Earth Day. Our environment is still in danger. Tropical rainforests are dwindling and the ozone hole is growing. There are strong arguments that our unrelenting use of fossil fuels is having a significant impact on the global environment. Closer to home, our landfills are overflowing and hypodermic needles are washing up on our beaches.

On Sunday, Earth Day 1990, people will again mobilize to protect our planet. This time the effort will be worldwide--from bicycle processions in India to school children planting trees in Mauritius. A team of climbers from the United States, the Soviet Union and China hope to reach the top of Mt. Everest to remove the debris left from previous expeditions. All in all, 100 million people from over 100 countries are expected to participate.

During the past 20 years, NASA has been a key agency in monitoring the health of our planet, from orbital observation with spacecraft such as Nimbus, Landsat and ERBS to aerial



investigations of the polar ozone holes with the NASA ER-2. In the 1990s, NASA's role will expand even further with the Mission to Planet Earth.

Langley is also involved, on a more personal level, in protecting the Earth. The LAA Conservation Club was formed in January to initiate and encourage recycling and conservation in the LaRC community. In the first phase of this effort, 'cantainers' to collect aluminum cans have been placed in most buildings. The club is also sponsoring a student art contest to illustrate how we can become better caretakers of "Spaceship Earth." Finalist entries will be displayed in the Visitor Center. Winners will receive $50 savings bonds.

In addition, the Conservation Club will circulate a pledge asking the NASA community to conserve and recycle whenever and wherever possible. There are also plans for an information table in the cafeteria and club members will hold a "trashless" picnic on Earth Day.

The Visitor Center has dedicated its spring quarter programs to the study of the Earth and our environment. Bruce Barkstrom spoke in March on the Earth Radiation Budget Experiment and Jack Fishman spoke last week on Symptoms of an Endangered Earth. On Wednesday, April 25, at noon Ed Browell will speak on the Observation of Ozone Depletion. On Thursday, May 17, at 7:30 p.m., Pat McCormick will discuss the Arctic Ozone Hole and Ozone Depletion.

Earth Day 1990 is a chance for all of us to change the world. It is as simple as changing our attitude about how we treat the Earth. We have to conserve resources, recycle what we use and restore areas in which damage has already been done. We may be heading for the Moon, Mars and beyond, but Earth will always be our "home planet."

Tidbits from Training

Co-op to Apprentice to Technician

On May 14, approximately 46 technical co-ops will report to the Center to begin their first work period. Most will work a parallel schedule, which means they work in the morning and attend school full time in the afternoon at Thomas Nelson or Tidewater Community Colleges. In addition to salaries, the students will also have their tuition paid by NASA.

At the same time these students report for work, approximately 30 current technical co-ops will graduate from the program. Most have worked here for approximately one year part time. These students are scheduled for conversion on May 20 and will switch from part time to full time employment on May 21. Upon conversion, they will enter the Engineering Technician Apprentice Program as beginning third-year apprentices.

Langley seeks recruits for technical co-op positions in September and selection occurs in December. For an individual to be considered for the program, he or she must be enrolled in college in August and take the first semester of the required curriculum in either electronics or mechanical technology. Langley generally has the greater need for mechanical technology students.

Contact Fred Thompson in the Training and Education Section, 864-2585, for additional program information.

Appropriately dressed in their apprentice jackets, Debra Mabe and Tim Wood (center) are the first top graduates recognized by the Langley Exchange Council. The jackets were presented by R. L. Swain (second from right), chairman of the Apprentice Advisory Committee. Also present (from left) were Douglas Whipple, chief, Fabrication Division; Ralph Muraca, chief, Systems Engineering Division; and (far right) Fred Thompson, coordinator of the apprentice program.

Top Apprentice Graduates Recognized

The Langley Exchange Council plans to recognize the top two graduates of the Langley Apprentice School each year with the presentation of an apprentice jacket. The first to receive this recognition are Debra Mabe, Systems Engineering Division, and Timothy Wood, Fabrication Division. Mabe and Wood are graduates of the 1989 apprentice class; both earned 4.0 grade point averages.

"The Langley Exchange Council welcomes the opportunity to recognize the accomplishments of apprentice graduates in a visible way," said Jerry Hansborough, Exchange chairman. "We are proud to provide the apprentice jacket to these and future top graduates."

Mabe entered the apprentice program through the co-op program at Thomas Nelson Community College (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 an academic scholarship. She was selected to enter Langley's designer program in her third apprentice year. She is now pursuing a bachelor of science degree at Christopher Newport College.

Wood also came to the apprentice program through the TNCC co-op program. He graduated from Thomas Nelson with honors and is currently assigned to Langley's Advanced Machining Development Section, where he fabricates components for the large space station structures project. He has received awards for his support of the LITE Project and the Space Station Rotary Joint.

The apprentice jacket, designed by Fred Thompson of the Training and Education Section, was approved by the Apprentice Advisory Committee headed by R. L. Swain, director for Systems Engineering and Operations, and by NASA Headquarters, Washington, D.C.

Langley is one of three NASA centers that support a functioning apprentice program. There are currently 140 individuals in the Langley program. The six-year training program graduates approximately 30 apprentices each year.

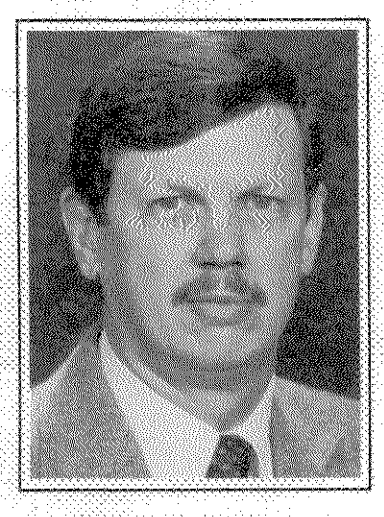
At the VC during April

Langley Scientist Investigates Possible Ozone Loss Over Arctic

During the winter of 1989, NASA conducted an air expedition to investigate the ozone over the Arctic. After a year of analysis, Dr. Edward Browell, Langley scientist, found that the Arctic suffered ozone losses of up to 17 percent.

On Wednesay, April 25, at noon in the Visitor Center theater, Browell will discuss this research in his lecture "Observations of Ozone Depletion in the Polar Stratosphere." This free lecture is co-sponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

NASA's air expeditions over the polar regions consist of an aircraft remotely obtaining large-scale cross sections of the ozone. After careful investigation, ozone destruction was found to result from chlorine chemistry and not from natural processes.



Browell will describe the laser-based technique used to measure ozone and the current understanding of the causes of the ozone destruction in polar regions.

Browell is currently head of the Lidar Applications Group in the Atmospheric Sciences Division.

Acquisition Party

The Acquisition Division is planning a pig pickin' with all the trimmings for Friday, May 4, beginning at 5 p.m. at the H.J.E. Reid Conference Center picnic shelter. Former Division members, their families and friends are invited. Cost is $5.75 per person and children under 12 eat free. Please contact Jim Taylor at 864-2406 ***no later than*** 4:30 p.m. April 27 to assure your reservation.

Intercenter Races

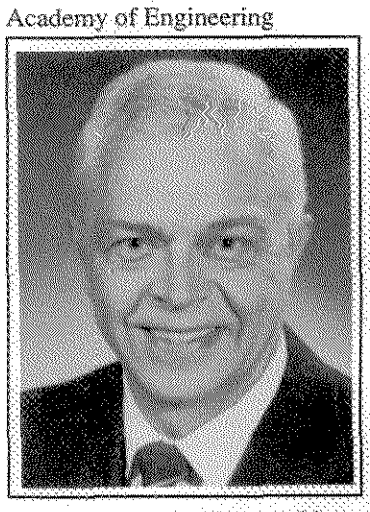
NASA intercenter running competition continues with 2-Mile races on April 26 and 30 and 10-KM races on April 23 and May 3. These races start at 5 p.m. on Doolittle Road. Also, a 2-Mile race will be held at Bethel High School track at noon April 24. Walkers are welcome. For more information about these races or about the Langley Runners Club, contact Richard Shearer, ext. 47036.

People & Places

Focus on Langley Newsmakers

Houbolt Named to Engineering Academy

Dr. John C. Houbolt has been elected to the National Academy of Engineering



"for the concept of lunar-orbit rendezvous in lunar exploration and sustained contributions to structural dynamics, aeroelasticity, aircraft loads and orbital mechanics."

Election to the Academy signifies recognition of distinguished contributions to the broad fields of engineering, engineering science and technology and to the world. Formal induction into the Academy will take place at the 1990 annual meeting, October 2-3, in Washington, D. C.

Houbolt, former chief of the Theoretical Mechanics Division, is an associate of Eagle Engineering, Inc. He is a well-known authority on space rendezvous, structural dynamics and aeroelasticity of all types of flight vehicles.

Watkins Chosen Reservist of the Year

Vernon E. "Butch" Watkins Jr., Systems Engineering Division, has been selected U. S.

Coast Guard Enlisted Reservist of the Year. Watkins was nominated by the York River Coast Guard Unit.

Watkins joined the Coast Guard Reserve upon completion of his Navy enlistment and was assigned to Reserve Unit Yorktown. When that unit was disestablished, he was assigned to Reserve Detachment Yorktown.

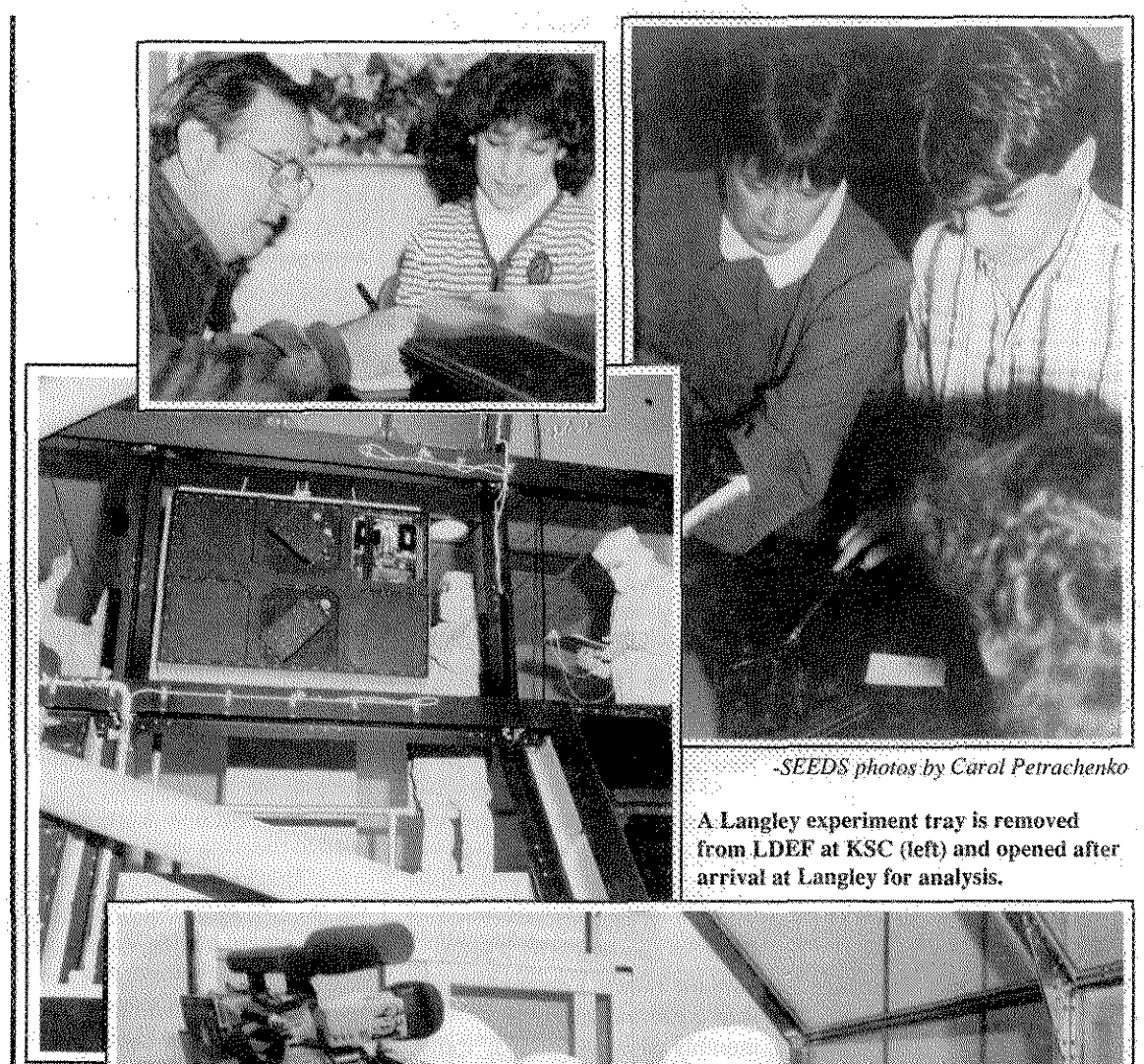
Watkins was the lead person responsible for construction of a 1/8-inch per foot scale model of the 125-foot Coast Guard Cutter Cuyahoga which was lost at sea in 1978 after colliding with the 521-foot ollier Santa Cruze II. This solid block model required more than 200 hours of off-duty time to construct and upon completion, was presented to Reserve Training Center Yorktown.

Voluntary Leave Transfer Program

The following employees are approved leave recipients:

- Robert M. Connell Jr.
- Joy W. Italiano
- Kenneth M. Jones
- Catherine B. Worth

If you wish to donate annual leave or wish more information, contact Linda Park of the Employee Relations Section, ext. 42610.



-SEEDS photos by Carol Petrachenko

A Langley experiment tray is removed from LDEF at KSC (left) and opened after arrival at Langley for analysis.

-LDEF experiment photos by Don Ward and Fred Jones

From SEEDS to Science, LDEF is News

School students all over the country are planting tomato seeds--space exposed and Earth varieties. Dozier Middle School in Newport News was the first area school to receive the requested packets from NASA. CBS local network affiliate WTKR-TV-3 was on hand to document the planting process in Patricia Schroen's sixth grade class (top right). Ed Hughes (top left) interviews Dozier student, Crystal Lewis. The next day, Hughes and news photographer Brian Igelman tackled LDEF science as they witnessed the opening of one of the first experiment trays to arrive at Langley from Kennedy Space Center. Langley's Wayne Slemp (right) compares unexposed samples with those that have endured six years of exposure to space.

mail tips

The mail service at Langley can only be as efficient and effective as the people who use it. Here's another in our series of mail awareness tips to help improve and speed up Center communications.

A Case of the DON'Ts:

- **DO NOT** use the internal delivery system for personal mail.
- **DO NOT** use indicia* envelopes for internal mail.
- **DO NOT** use window envelopes for foreign mail. Above all,
- **DO NOT** be creative! It is illegal to cut and paste the indicia* to make your own mailing envelope complete with postage!

***Today's vocabulary word:**

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA 451

U.S. MAIL

indicia (in-dish'i-a): signs, indications; specifically, *U. S. Post Office*, the markings printed in place of stamp, cancellation, postmark, etc., on envelopes in bulk mail.

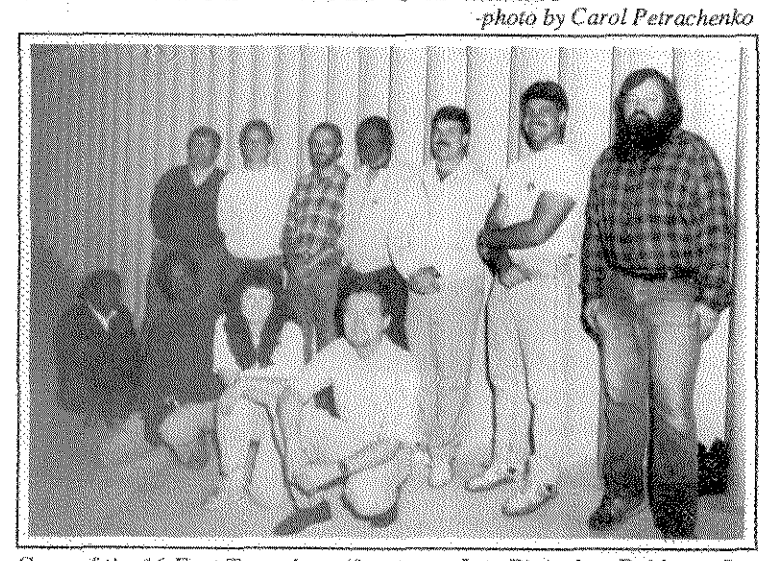
16-Foot Transonic Tunnel Back on Line

-photo by Carol Petrachenko

A $5 million construction of facilities effort and other facility upgrades are expected to increase safety, capability and productivity of the 16-Foot Transonic Tunnel.

Facility technicians supported the work of several outside contractor firms on various projects that began in July 1989. The inner surface of the tunnel circuit was shot blasted and repainted, new composition fan blades were installed, an enhanced model support system was installed and the control room was updated with microprocessor computers with touch screens and other advanced features.

The picture at the right is an enlarged detail of the cover photo.



Crew of the 16-Foot Tunnel are (front row, L to R) Arthur Robinson Jr., Charles E. Spruill Jr., Janice L. McCollum, Michael P. Moore; (back row) Facility Coordinator Michael J. Taylor, Michael E. Ramsey, James K. Geiger, Alton Barnes, Charles A. Poupard, H. Grady McCoy and Randy R. Fly. Not shown are Edward C. Durham, James A. Gayton, Robert T. Harris and Peter M. Kjeldsen.

Happenings

LAA SOCIAL--A Salute to Secretaries--will be held Friday, April 27, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Music by Brian McDonald "Synchronisity." Surprise your secretary.

TOASTMASTERS will meet Wednesday, April 25, at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are always welcome. For details, contact Christine Darden, ext. 45258.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 to 12:30 in Building 1212, Room 200. Location is subject to change, so call ext. 44519 for confirmation.

AEROBICS CLASSES. Low impact aerobics classes are held Tuesdays and Thursdays, 5 to 6 p.m., in the NASA Cafeteria, Building 1213. Cost is $12 per month. First class is free.

ALUMNI DANCE- SOCIAL, co-sponsored by the Alumni Assoc. and the LaRC Exchange Council will be held at 8 p.m. Saturday, April 28, at the H.J.E. Reid Conference Center, Building 1222. Music by the Charlie Johnson Band. No admission charge, free refreshments, cash bar. NASA/NACA retirees and guests are invited.

ALUMNI LUNCHEON will be held Tuesday, May 8, in the private dining room of the NASA cafeteria. Attendees should go through the cafeteria line at 11:30 a.m. Domenic Maglieri, Eagle Engineering, will speak on Sonic Booms.

TELA-TAX SERVICE. Federal, state, individual, business. Member National Association of Tax Practitioners. By appointment--we come to you! Call 874-3121.

SCALE MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society is holding the Region II model contest September 21-22. No need to be IPMS member. For information, contact IPMS Tidewater, P.O. Box 1651, Newport News, Va. 23601.

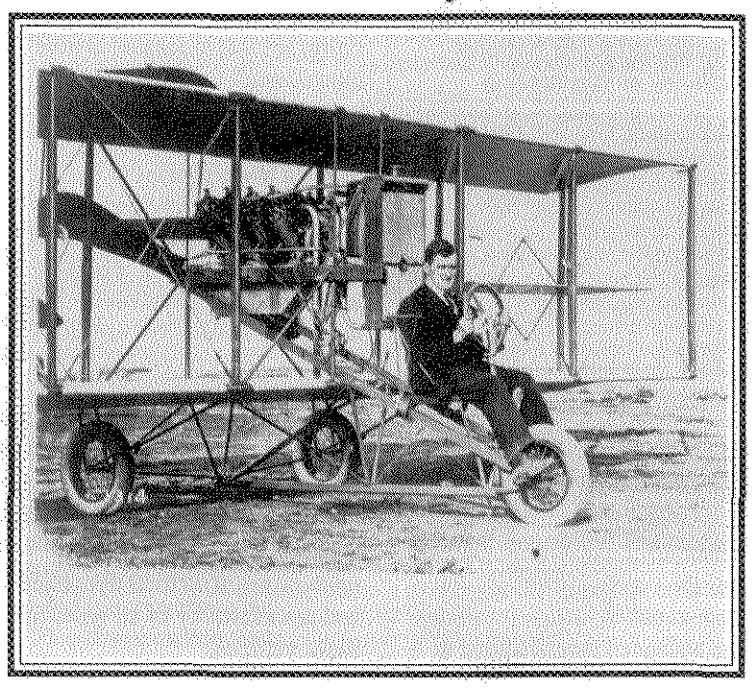
FOR RENT: HOUSE on Nantucket. 3 BR, 2 BA. Call 723-0861.

FOR SALE: MEMBERSHIP. *LifeLine* Fitness Center Membership, $100 and take over monthly payments of $35. Call 827-6447 after 5 p.m.

FREE TO GOOD HOME: Four-year-old Sheltie, male, tri-color. Good with children. Call 838-1797.

Alumni News and Views

Come Celebrate 'The Good Old Days'



Seventy-five years ago our Congress passed an act which has had a major impact on everyone who has ever flown in an airplane.

I'm sure that those voting on the bill did not realize at the time what an impact the organization they were authorizing would have on the future of aviation and space exploration. In fact, I have heard that the bill could not stand on its own, but got through Congress as a rider on an appropriations bill. That 1915 Congressional action established the National Advisory Committee for Aeronautics (NACA).

None of us worked for the original committee; however, many of us--either through our families or our own work--go back to the early days of NACA.

This year, we are celebrating the 75th anniversary of the establishment of NACA. To kickoff the celebration, the Langley Research Center Alumni Association (LaRC AA) and the Langley Research Center are co-sponsoring a wine and cheese reception on Monday, April 23. The reception will be held in the 30- by 60-Foot (Full-Scale) Wind Tunnel from 5 to 7 p.m. Drinks and finger sandwiches will be served.

Reservations are required; many have already made them. The cost is $4 per person or $7 per couple. Please make your checks payable to the Langley Alumni Association and send them to Mail Stop 154, Langley Research Center, Hampton, Va., 23665.

I invite all retirees, employees and their spouses or guests to help us celebrate the 75th anniversary of the first NACA committee meeting.

Don Ward
President, LaRC AA

Old photographs . . . old music . . . old friends!

BULK RATE
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NASA Washington, DC
Permit No. G-27

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

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Penalty for Private Use $300

27-01 LANGLEY EMPLOYEE (LRC ADDRESS)
HOLLOWAY, KATHERINE A.
MAIL STOP 115 BLDG 1219

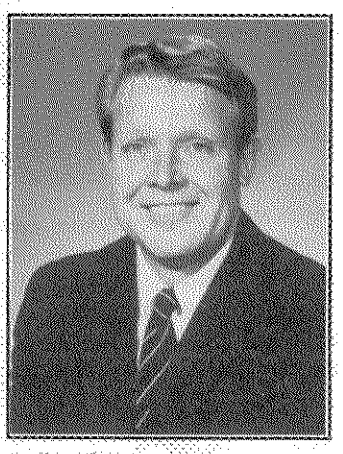
News Researcher

Launch of STS-31 has been rescheduled for no earlier than Wednesday, April 25.

HUBBLE SPACE TELESCOPE

STATE OF THE CENTER

Langley in the Nineties



90

Richard H. Petersen
H.J.E. Reid Conference Center, Building 1222

Four sessions have been scheduled to permit as many employees as possible to attend.

APRIL 25

1:30 - 2:15 p.m. — Office of Director
Aeronautics Directorate
Fabrication Division

3:00 - 3:45 p.m. — Electronics Directorate
Management Operations Directorate

APRIL 26

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 Fabrication Division and Operations Support Division)
Structures Directorate

This invitation is also extended to all retirees and support services contract personnel. These individuals are encouraged to attend the session scheduled for the directorate they support (ed).

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 9 May 4, 1990

Bi-weekly Employee and Contractor Publication

Scout Rocket to Launch Communications Satellites

Two Multiple Access Communications Satellites (MACSATs) are scheduled to be launched aboard a NASA Scout rocket May 9 from Vandenberg Air Force Base, Calif. The one-and-a-half hour launch window for the mission opens at 1:49 p.m., Eastern Daylight Time.

The MACSATs will provide a global store-and-forward message relay capability at UHF frequencies for a variety of users during test demonstrations to be conducted this year.

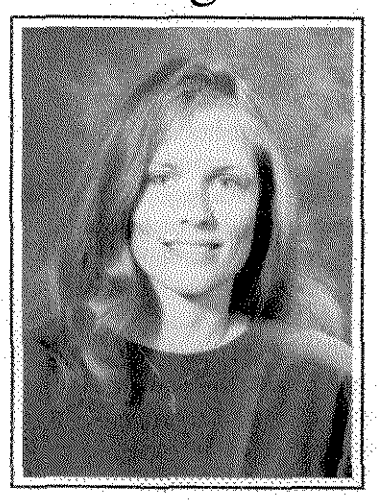
The MACSATs, which weigh 150 pounds each, will ride in a stacked configuration aboard a Scout launch vehicle and be placed into a circular polar orbit at an altitude of 400 nautical miles. This orbit will provide worldwide coverage, a maximum of 14 to 15 passes daily with 14 minutes visibility each at the earth's poles, and a maximum of five to six passes with an average visibility of five to 10 minutes each at equatorial locations.

These experimental satellites are part of the Defense Advanced Research Projects Agency's (DARPA) Advanced Space Technology (Lightsat) Program which will demonstrate advanced technologies to improve space systems' operational support to military commanders. This and future launches are to demonstrate the utility of small, mobile, fast-reaction spacecraft in the role of reconstituting diminished space assets, reinforcing existing space capabilities during stress, and in covering remote areas of the world.

The Scout program is managed by NASA's Langley Research Center. The 73-foot-long, four stage, solid-propellant rocket motor launch vehicle is built by the Missiles Division of LTV Missiles and Electronics Group, Dallas, Texas. The Scout Program has had 56 successful missions in 57 attempts during the past 23 years.

Welch Selected to Attend Simmons Executive Program

Sharon S. Welch, aerospace engineer in the Spacecraft Controls Branch, has been selected to attend the Simmons College Program for Developing Executives. Welch 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.

Welch led a research effort in the development of optical sensors and optical memory elements. In collaboration with a colleague, she developed that concept from the idea stage to a laboratory demonstration. The concept is now under patent application. In addition, she has projected application of the concept to devices that can be used for sensing motion in large flexible space structures.

Welch feels that the Simmons program will benefit her in her expanded supervisory role, providing experience in financial planning and in coordination of the efforts of personnel under her supervision in accomplishing research goals. The Boston-based program will afford Welch the opportunity to interface with other participants from different areas of the country and from both the public and private sector organizations.

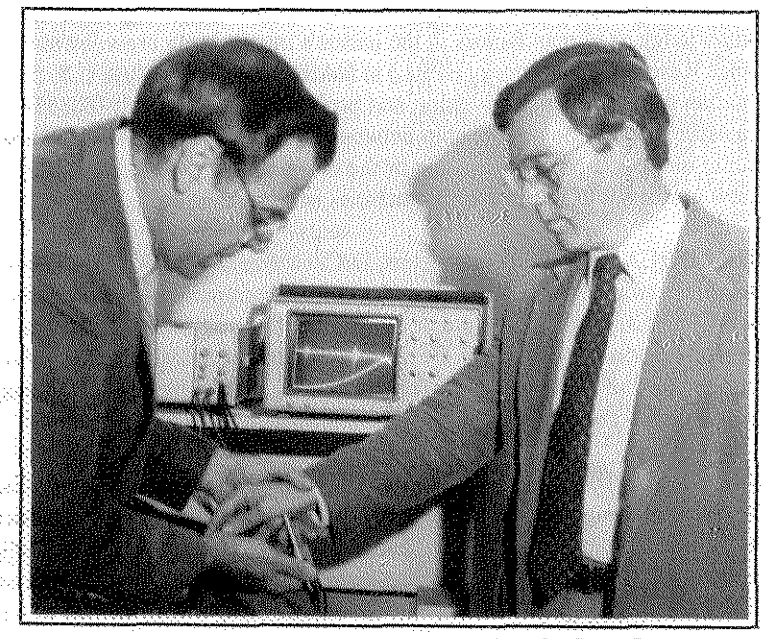
STS-35 CREW. Columbia's commander, Vance D. Brand (center front) is flanked by Guy S. Gardner, pilot, and John M. Lounge, mission specialist; (back row, L to R) Robert A. R. Parker, Ronald Parise, Jeffrey A. Hoffman and Samuel Durrance. **See mission story, page 7.**

Technology Transfer Aids Burn Treatment

-by Craig Murden

Sound waves, used to detect microscopic flaws in materials destined for use in spacecraft, have been refocused by NASA scientists on human burn victims to speed diagnosis and treatment.

The new application capitalizes on nondestructive, ultrasound techniques developed to assess quality, fatigue and age of the variety of materials and products NASA uses in its space and aeronautical ventures. Two Langley research physicists, Dr. John H. Cantrell and Dr. W. T. Yost of the Nondestructive Measurement Science Branch, have spearheaded this technology transfer which signals a new level of insight for the difficult problems of burn diagnosis.



-photo by Carol Petrachenko

Dr. W. T. Yost (left) simulates the measurement of a burn on fellow research physicist Dr. John H. Cantrell. The Langley duo, both members of the Nondestructive Measurement Science Branch, will be honored next week by the Federal Laboratory Consortium for their work in the area of burn diagnosis.

The crucial problem in burn diagnosis, says Cantrell, is to know how deep the damage goes. This is especially true in second and third degree burns when the outer layer of skin, the epidermis, is burned through into the underlying dermis (second degree) or entirely penetrates that layer so that no skin is left (third degree). Since the depth of the burn relates directly to the treatment required, including the need for prompt skin grafts or life threat determination, a precise way to gauge the burn's penetration is essential to successful treatment and recovery, he adds.

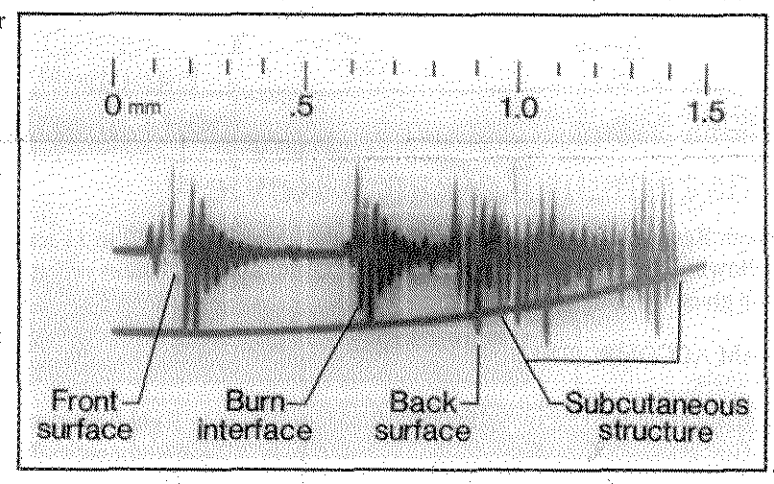


Figure at left shows an ultrasonic reflection from a chemical burn. The first reflection indicates front surface of skin; the second, the burn interface. Reflected signal beyond back surface indicates living skin. Ultrasonic data indicates that the lesion is a deep second degree burn.

Until recently that process was entirely subjective because physicians had no way to "see" the actual condition beneath the damaged area and their wound assessments were thus only correct about half the time, according to David M. Heimbach, M..D., writing in the September 1984 issue of *The Journal of Trauma*.

"That is why the untraumatic nature of our work with ultrasonic technology, which is designed to penetrate and measure the microstructural properties of materials, lends itself so very well to a human health initiative involving the skin," Cantrell stated

The technology Cantrell and Yost employ in their normal course of work involves the basic application of ultrasonic waves--very high frequency sound waves--which, when emitted into a material, are partially reflected from abrupt changes in the material. These echoes identify the location, for example, of cracks and delaminations that might occur in aerospace mateirals.

The spinoff to burn depth assessment applies those same principles of ultrasonic waves to a burn. The physicists have found that the burn forms an interface between burned and healthy skin tissue. The echoes from this interface can then be translated to depth measurements by a trained operator for the attending physician, Yost stated.

The research for this project was conducted under the federal government's Technological Utilization Office (TUO) and, in addition to NASA's role, also involved clinical testing at The Medical College of Virginia in Richmond where Dr. Anthony Marmarou, assistant head of the Department of Neurosurgery, and Dr. B. D. Haynes, chief of the Burns Unit, played prominent parts in validating the technique. Another participant is the firm of Jack Cantwell, Incorporated, which is NASA's commerical, marketing parner in the enterprise; a relationship mandated by the TUO as part of the funding structure for government supported technology transfers, according to Yost.

Cantrell and Yost will each be presented an Award for Excellence in Technology Transfer by the Federal Laboratory Consortium in ceremonies to be conducted May 9 in Denver, Colorado. The awards are the highest honor given by that agency for technological transfer projects and the competition is very keen among all federal laboratories in the country, says John Samos, Langley's Technology Utilization Officer.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly announced the retirement of Dr. John W. Townsend, Director of NASA's Goddard Space Flight Center, Greenbelt, Md. Truly has named Dr. John Klineberg as Townsend's successor. Klineberg, a 20-year NASA veteran, has been director of Lewis Research Center, Cleveland, Ohio, for the past three years. In addition, Truly named Lawrence J. Ross director of NASA Lewis. Ross joined NASA in 1963 and has been deputy director at Lewis since December 1987. The appointments are effective July 1.

AMES RESEARCH CENTER, Mountain View, Calif. --- NASA has unveiled its latest research laboratory designed to answer fundamental questions about long-term human spaceflight and to expand the knowledge of human factors in the nation's increasingly crowded airspace system. The Human Performance Research Laboratory (HPRL) at NASA Ames is the first U.S. facility designed and built to study the human role in advanced aviation and prolonged space travel. The HPRL will help scientists answer questions about the relationship between humans and complex machinery. Ambitious space goals, like a lunar outpost, a Mars expedition or the National Aerospace Plane, depend on a better understanding of how humans will interact with machines in these missions.

HEADQUARTERS, Washington, D.C. --- Sue Mathis Richard has been named deputy associate administrator for NASA's Office of communications. The appointment was effective April 9. Richard works directly with the associate administrator on all matters concerning the news media, public services and television development. Before coming to NASA, she served as vice president of industry communications for the National Cable Television Association, overseeing press, publicity and public relations activities for the cable industry.

AMES-DRYDEN FLIGHT RESEARCH FACILITY, Edwards, Calif. --- The X-29 research aircraft is demonstrating in flight much better control and maneuvering qualities at high angles of attack than wind tunnel tests, computational methods and simulations models predicted. The current flights, using the second of two X-29s, are investigating high-angle-of-attack characteristics and military utility of the aircraft's unique forward-swept-wing/canard configuration as part of a joint NASA-Air Force program.

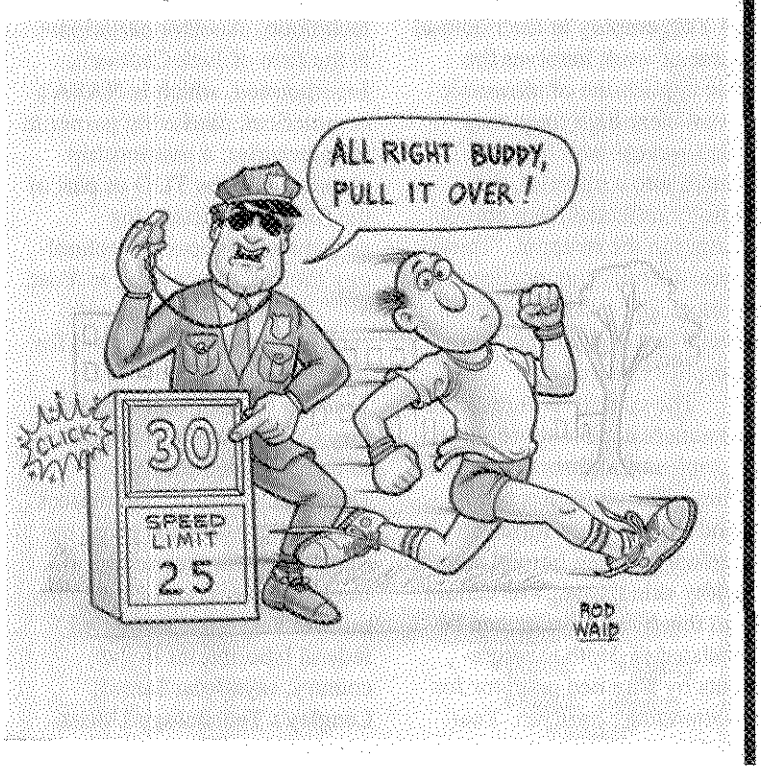
WALLOPS FLIGHT FACILITY, Wallops Island, Va. --- Two NASA sounding rockets were launched from the White Sands Missile Range, New Mexico, carrying scientific instruments above the Earth's atmosphere to observe the recently discovered Comet Austin. Both rockets were two-stage, sub-orbital Black Brant IXs. The first rocketborne payload carried Johns Hopkins University's Faint Object Telescope (FOT) and a spectrograph to observe the comet in the far ultraviolet spectral range. The second experiment carried a far ultraviolet spectrometer for the University of Colorado. This payload will study the spectral emissions from Comet Austin.

Senior Management Research Review

The Senior Management Research Review will be held Monday, May 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 ACCOMPLISHMENT	SPEAKER
9:30	Numerical Study on the Use of Sulfur Hexaflouride in Wind Tunnels	Kyle Anderson (Aeronautics/FLDMD)
9:45	F-18/HARV Thrust Vectoring System	Mary Mason (Aeronautics/AAD)
10:00	Integrated Controls-Structures Optimization for a Large Space Structure	Sharon Padula (Structures/IRO)
10:15	Effects of Biomass Burning Emissions on the Ozone Budget Over the Amazon	Jennifer Richardson (Space/ASD)
10:30	Flight Tests Validated Knowledge-Based Systems Concept for Primary Flight Display Information Management	Wendell Ricks (Flight Systems/FLMD)
10:45	Integrated Control-Structure Design Methodology Development for a Class of Flexible Spacecraft	Peiman Maghami (Flight Systems/GCD)

Lankley



As promised, the results of the land sailing competition highlighted in the April 20 issue follow:

And the results are:

Land Yacht Sailor Takes Second Place in International Competition

The Portland Oregon land yacht racer, whose collaboration with NASA Langley aeronautical engineers in building a wheeled sailcraft which uses a vertically mounted aircraft-type wing instead of a cloth sail, finished second in the World Cup Regatta held April 8-13 near Las Vegas.

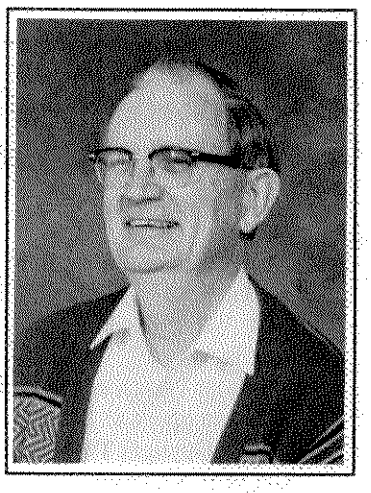
Philip M. Rothrock dueled closely with the winning yacht from New Zealand as the two bested a field of 50 machines from a variety of foreign countries and the U.S. Final results from the three heat series had the Kiwi driver winning two with Rothrock second twice, and the American winning one heat with the New Zealander the runner-up.

"I'm extremely happy with the wing design and with the fine advice of the NASA engineers from Langley," said Rothrock. Langley's Harry Morgan, has worked with Rothrock and his father Art for several years in adapting existing NASA research data to this racing application.

Editorials

Langley

Headquarters Forum



Asbestos, PCBs and PCTs, dioxin and ozone--not too many years ago these were terms known primarily to the construction worker, the chemist and the atmospheric scientist. Not any more! Today these are household terms known to even most of our school-age children, and with good reason.

One of our major responsibilities in the Systems Engineering and Operations (SE&O) directorate is that of assuring compliance with the many current environmental protection regulations. It is evident that this decade will see environmental issues increasingly high on the agenda of public concerns. "Save the Bay" efforts and "Earth Day" programs are examples of increased public awareness. Our activities here at the Center have already undergone and will continue to undergo change as we move to ensure our research and operations fully meet this critical challenge.

In Fiscal Year 1988, the Center conducted an Environmental Protection Agency (EPA) assessment which was followed by an EPA site audit. No major environmental problems have been surfaced; however, we are continuing to move toward a period of substantially increased regulation by federal, state and local environmental authorities.

To cite just a few examples of our efforts, we are well into a program to rid the Center of all electrical transformers and capacitors containing PCBs. An aggressive program for addressing asbestos is in place which handles both containment as well as removal when that action is appropriate. Major changes have been instituted in the handling of waste effluent from our photographic processing, and projects are planned for upgrading our underground storage tanks to preclude contamination of ground water.

You have probably read about the Virginia State Water Control Board concerns regarding PCB/PCT contamination of the Back River and Tabbs Creek. Studies have been conducted to ensure that the Center has no active sources for such contamination, and we have already initiated efforts to eliminate the residual contamination in some of our storm sewers, left from operations of many years past. Additionally, a major ($2M) modification was performed on our refuse trash-burning plant two years ago which resulted in it becoming one of the cleanest (from an emissions standpoint) in the whole country (testing performed with EPA oversight).

The proper control, movement and disposal of chemicals, solvents and drummed oil required for operation and maintenance of our research facilities remains a major challenge, but with the support of all parties involved, we are developing an efficient procedure that meets all regulatory requirements as well as user needs.

In the future we see increased emphasis for mandatory environmental sampling not only in these areas mentioned, but also in meeting increased clean air requirements. The Center has already moved to make major modifications ($6.5M) to our Transonic Dynamics Tunnel to reduce our operational freon losses.

SE&O is fully committed to assuring we do not contribute to environmental problems.

R. L. Swain
Director of Systems Engineering and Operations

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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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Marine Scientists and NASA Engineers Test Bay Clean-Up Technology

-by Craig Murden

New vitality may come to the Chesapeake Bay as a result of a pilot program to improve the bay's water quality. Through a unique blend of marine science and aerodynamic research, the Virginia Institute of Marine Science (VIMS) and NASA Langley have joined forces in project "Water Wings."

The project began when marine scientists at VIMS confronted the problems of serious damage to marine life from low levels of oxygen in some bottom regions of the bay. This condition occurs during the summer when low saline water forms a fixed or stratified layer over denser, saltier water just as atmospheric inversions capture smog in major cities. In this case, the denser layer of water stops oxygen from moving downward. Organic decay uses up the remaining lower level oxygen creating an environment hostile to most aquatic life and impeding continuation of the food chain. Oysters are most sensitive to this problem.

In seeking a solution, Professor Don Wright, head of the VIMS Division of Geological and Benthic Oceanography and his colleagues looked for a way to generate turbulence at the point of stratification so that the oxygen-rich water could move downward to replenish the bottom supply. Their proposals focused on use of the tornado-like flow patterns, called vortices, which form behind aircraft wings. These vortices are often observed as the familiar contrails behind high flying aircraft where ice crystals make the swirling patterns visible.

After initial consultation with Dennis Bushnell, associate chief of Langley's Fluid Mechanics Division, the VIMS scientists were referred to research engineer George Greene, NASA's authority on aircraft wake vortices. Together, they began looking at the feasibility of placing an underwater aerodynamic structure, like a wing, at the stratification level. Designed to always be oriented to the tidal current, the "water wing" would use the flow of the tidal water instead of air to create the same tornado-like turbulence as from an airplane. This action would break up the stratified boundary layer and achieve the desired oxygen dispersal to the bottom.

Greene says the first step of the feasibility project was to capitalize on the large amount of research done by NASA Langley in its Wake Vortex Research Program. This effort had already made significant contributions to problems involving vortex effects on airliners in congested airport environments and, in particular, in determining how vortices behave in stratified air layers. The challenge was to spin-off these results to the underwater environment in the most uncomplicated and inexpensive way. The initial effort was a simple, straight, wooden wing similar to those used on small, light aircraft. Initial testing was in the York River.

The York River was chosen as the first test site because of its proximity to both agencies and the bay and because its current, bottom contours and flow characteristics are well known to the VIMS scientists. The first deployment, which was monitored by both divers and underwater instrumentation, was very successful, according to Wright. The vortex turbulence created by the flow of water over the wing was conclusively demonstrated and, as a result, a revised, second phase configuration was prepared for testing.

That is where the project now stands. The current shape is a swept wing design, 20 feet long and with a four-foot chord. Its testing will continue through the summer of 1990 and those results will herald a third and more ambitious stage when multiple arrays of wings will be used to treat large areas as the conclusion to the feasibility portion of the test program.

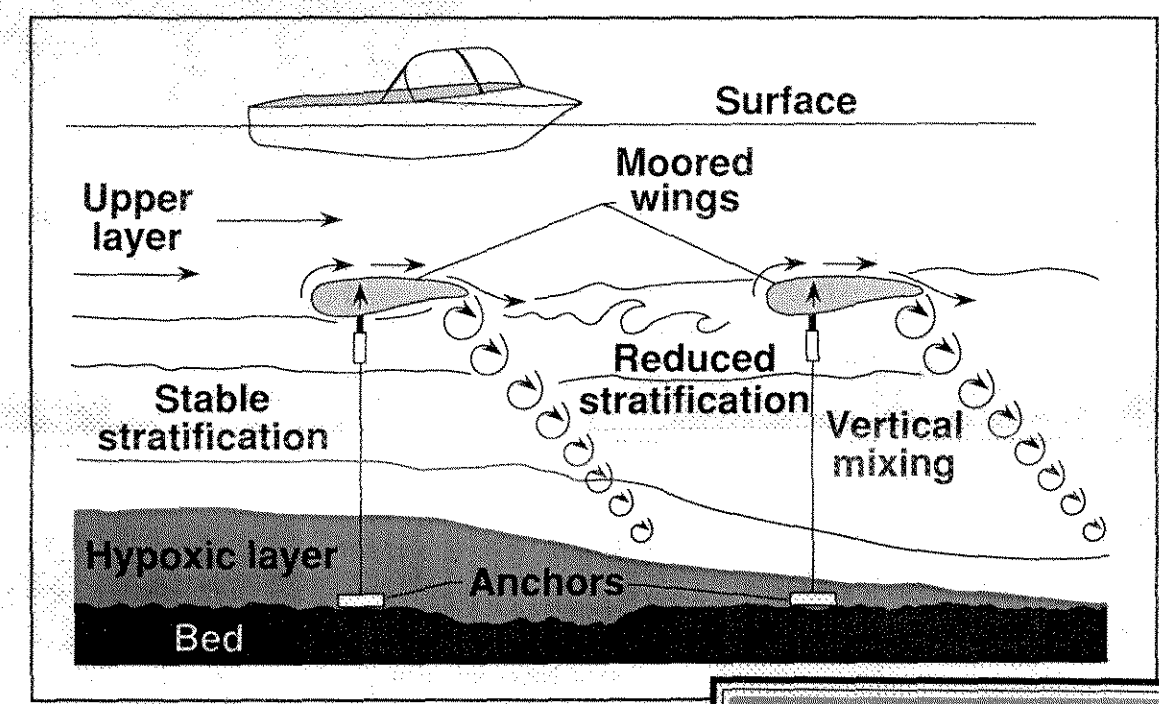
Wright and Greene are both optimistic about the concept as testing continues. And, as Greene points out, "the taxpayer has already paid for the NASA research and its highly beneficial application to commercial aviation safety. The fact that we can now use the same results in a new and exciting environmental venture, makes the basic work we've done here at Langley all the more worthwhile."

Wright states that the technology capitalizes on the natural energy of water currents which, "gives us greater flexibility for eventual deployment options throughout the bay." He visualizes widespread placement of the wings in virtually any part of the bay and its tributaries where there is sufficient water depth and tidal current. "Of course they'd be out of main channels and carefully marked with their own distinctive buoys," he adds.

Also participating in the project were Shahid Siddiqi and Teck-Seng Kwa, research engineers with Hampton-based Analytical Services & Materials, Inc. (AS&M), a company which specializes in aircraft design and flight test research. AS&M built the second stage wing now being tested. The firm had earlier been selected as NASA's 1989 Minority Contractor of the Year based on a variety of services in other areas.

The feasibility testing is being conducted under the auspices of the Virginia Sea Grant College Program of the National Oceanic and Atmospheric Administration. "Water Wings" is but one of a series of projects focused on environmental effects research on the Chesapeake Bay.

VIMS is the York River campus of the Graduate School of Marine Science, College of William and Mary. In addition to Professor Wright, other VIMS participants are Bob Gammisch and Professors J. D. Boon and J. P.-Y. Maa.

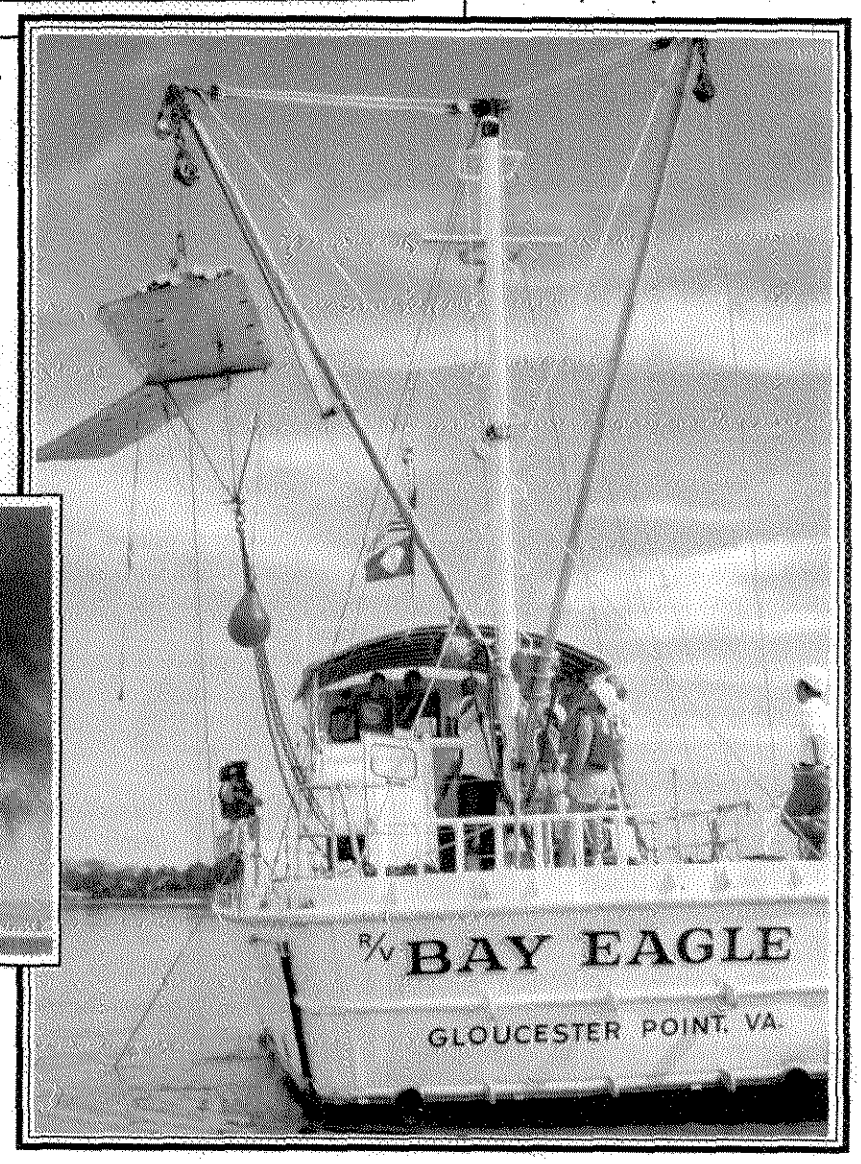


WATER WINGS. A unique blend of marine science and aerodynamic research has formed the basis for a pilot program to improve Chesapeake Bay water quality as the Virginia Institute of Marine Science (VIMS) and the NASA Langley Research Center join forces in project "Water Wings."

Built like the wing of a light aircraft, the structure is placed in the water where tidal currents create the same turbulent vortices its airborne counterpart generates. The swirling effect breaks up the boundary between layers of high and low-salinity water, allowing oxygen to reach bottom regions of the Bay where aquatic life is threatened.

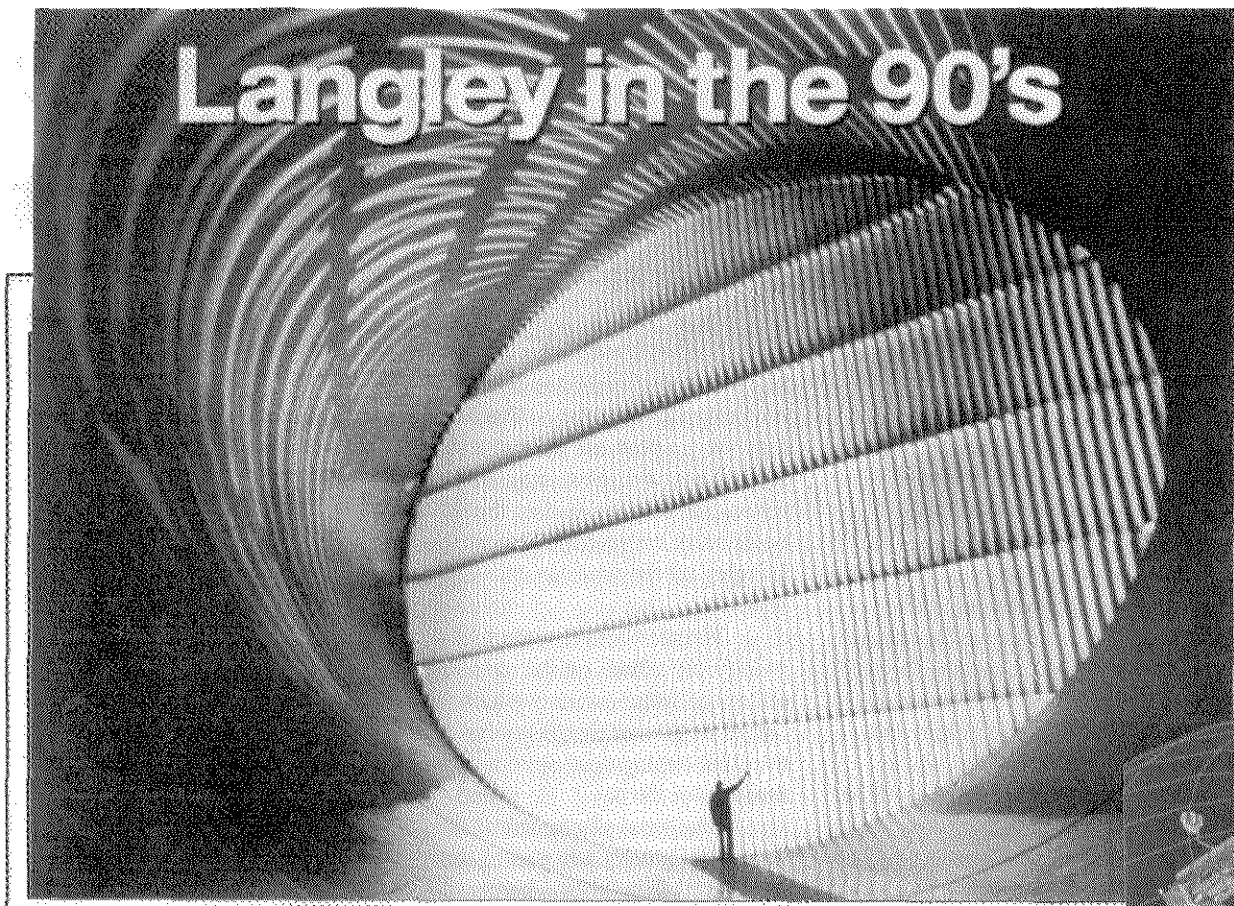
The air flow from the wing of this agricultural airplane is made visible by a technique that uses colored smoke rising from the ground. The swirl at the wing tip traces the airplane's wake vortices, a source of problems in aerial application of spray material. The vortex, as can be seen here, exerts a powerful influence on the flow field behind the airplane.

-photo by Carol Petrachenko



The newest test version of the water wing, a 20-foot-long, swept-back design, is deployed for the first time by VIMS marine scientists and Langley engineers into the York River a few miles off the Chesapeake Bay.

Langley in the 90's



"In the 90s we will see the construction and initial operation of Space Station Freedom and the launch of the first platform of the Earth Observing System as well as test flights of the X-30 Aerospace Plane. More important, we will see the first efforts on the Space Exploration Initiative which will ultimately take men and women back to the Moon and on to Mars."

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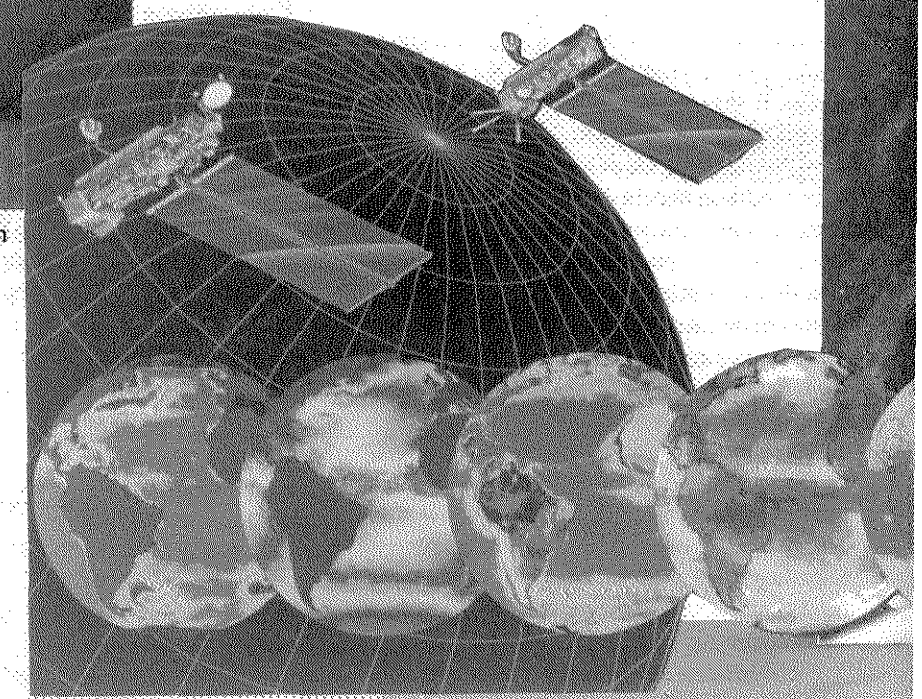


Langley will play a major role in the Earth Observing System, the first increment of Mission to Planet Earth

Administration Support

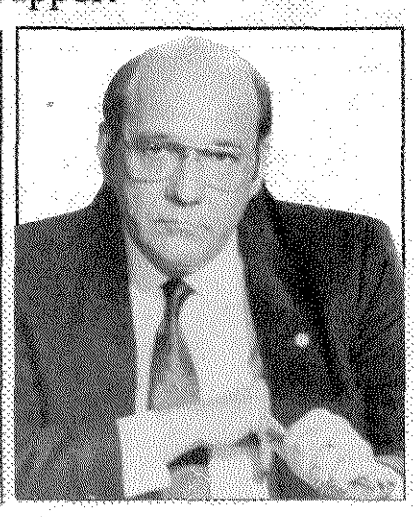
July 20, 1989: President Bush committed this country and NASA to a leadership role in exploring the solar system.

The President, for the third year in a row, proposed an increase of more than 20 percent for the NASA budget.

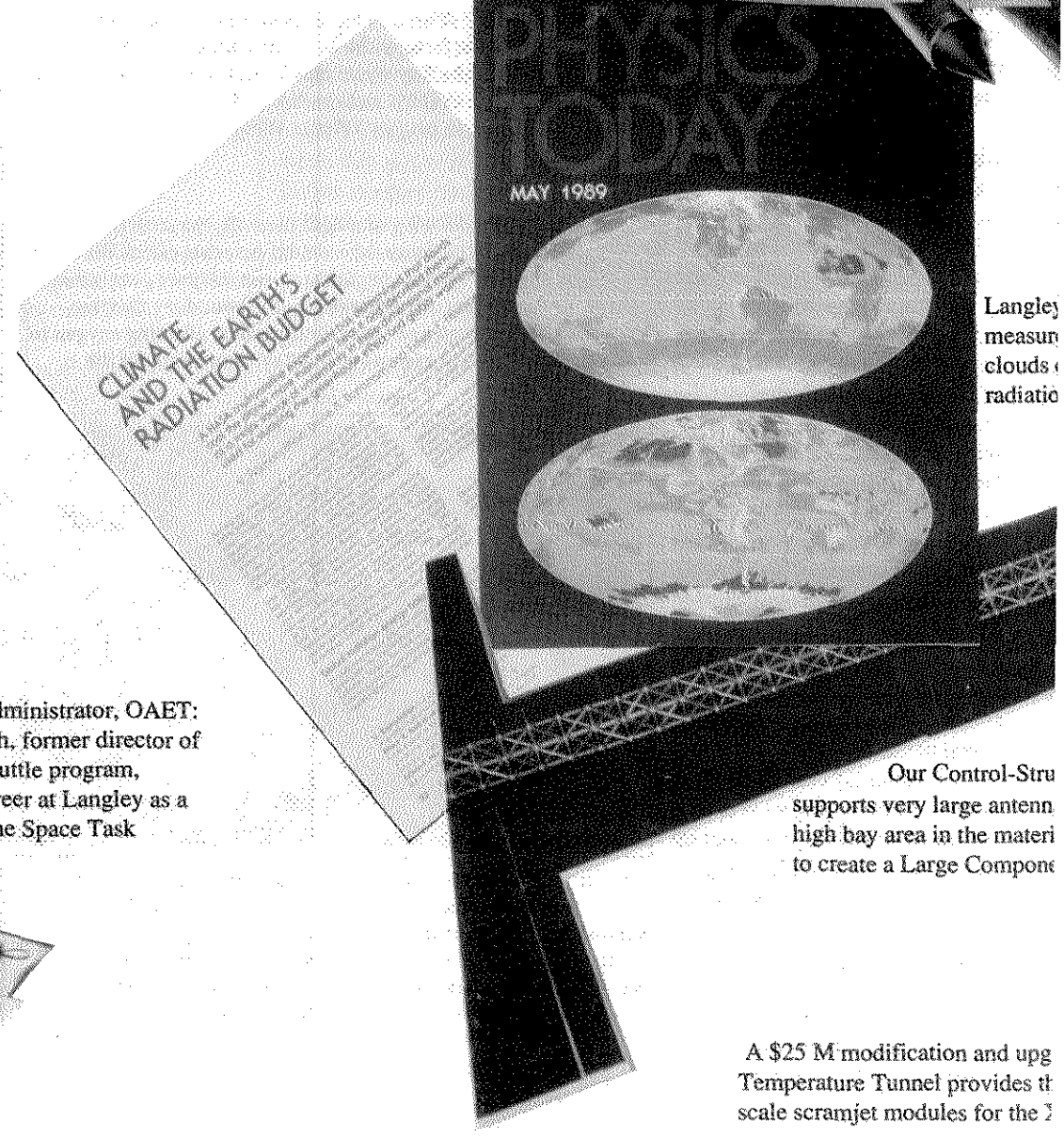
Langley is developing technologies for a High-Speed Civil Transport. Phase I focuses on environmental problems--we are currently studying ozone depletion, noise reduction and sonic boom reduction.

NASA Headquarters Support

Administrator: Dick Truly, a retired Navy fighter pilot, is a strong supporter of NASA aeronautics programs.



Deputy Administrator: J. R. Thompson, former director of Marshall Space Flight Center, is aware of both programmatic and institutional issues.



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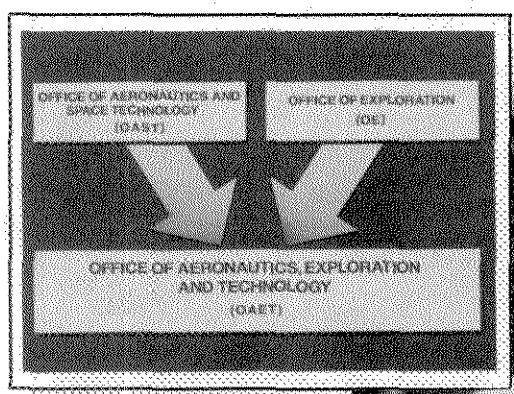
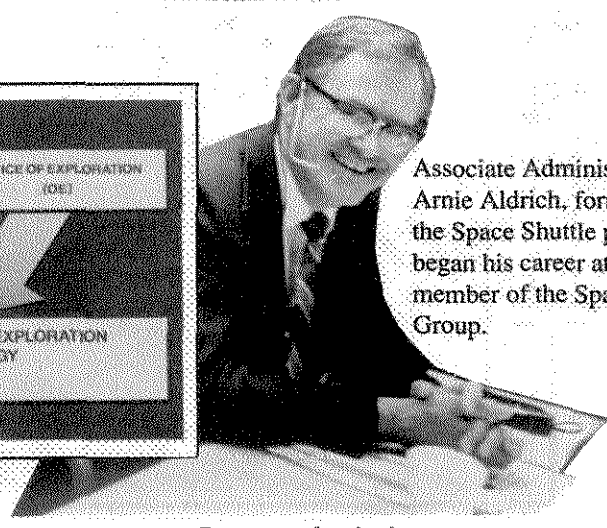




Associate Administrator, OAET: Arnie Aldrich, former director of the Space Shuttle program, began his career at Langley as a member of the Space Task Group.

Our Control-Stru supports very large antenn high bay area in the materi to create a Large Compone

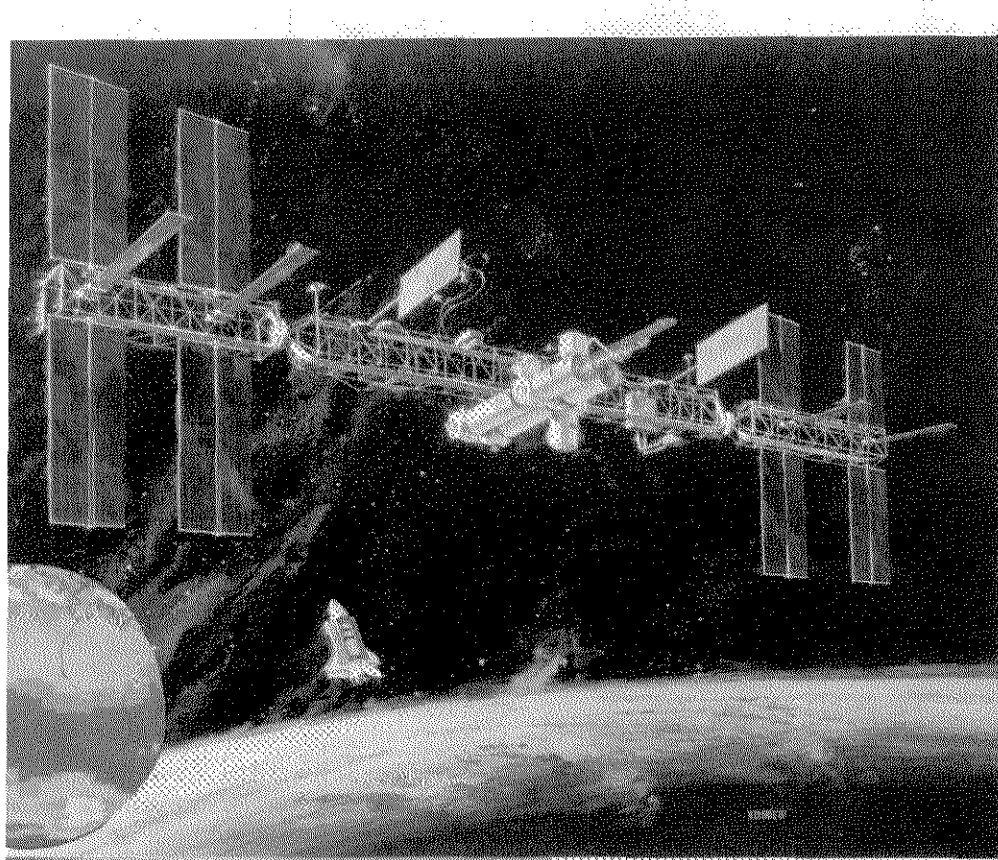
A $25 M modification and upg Temperature Tunnel provides th scale scramjet modules for the

Outlook for the 90s:

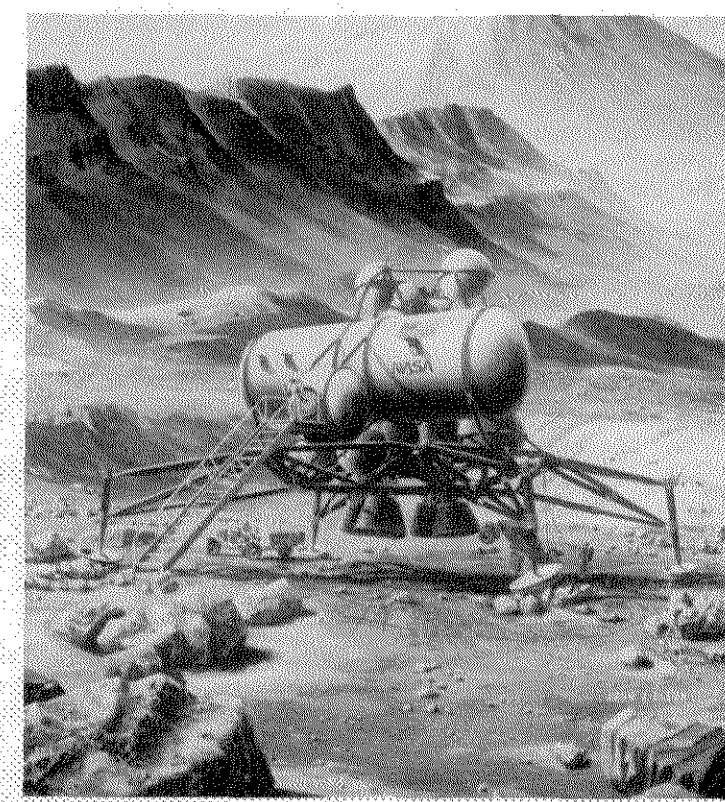
- o Increased mission
- o Increased budget
- o Increased manpower

ute-of-the-Center Address

tor Richard H. Petersen recently spoke to employees, support contractors and e state of NASA and the Langley Research Center. "The 90s will be a great SA and for Langley."

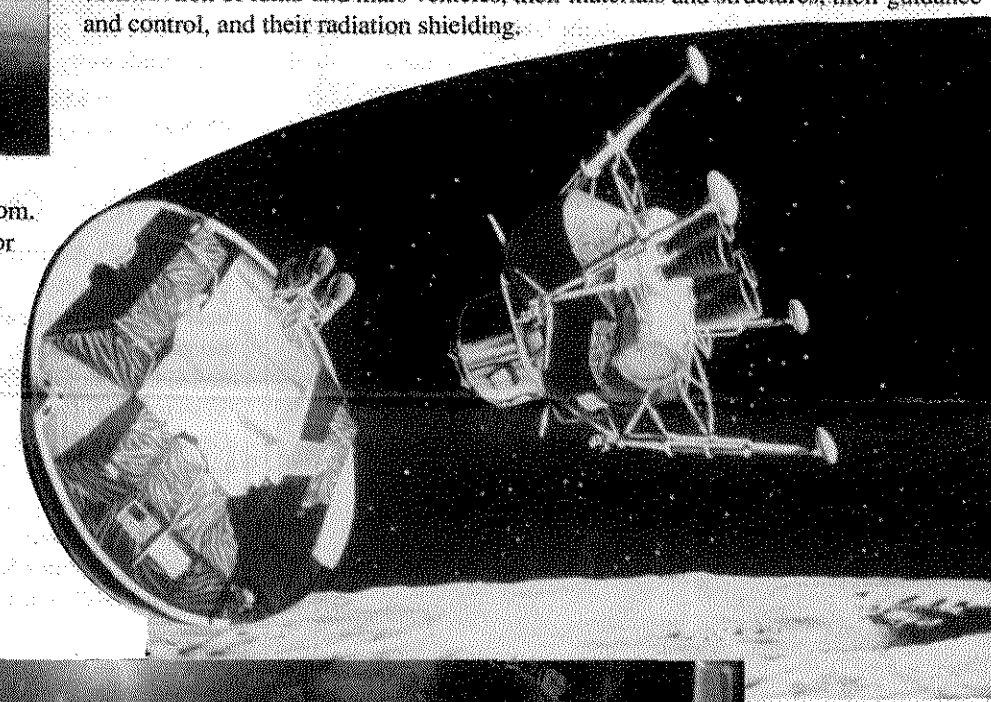


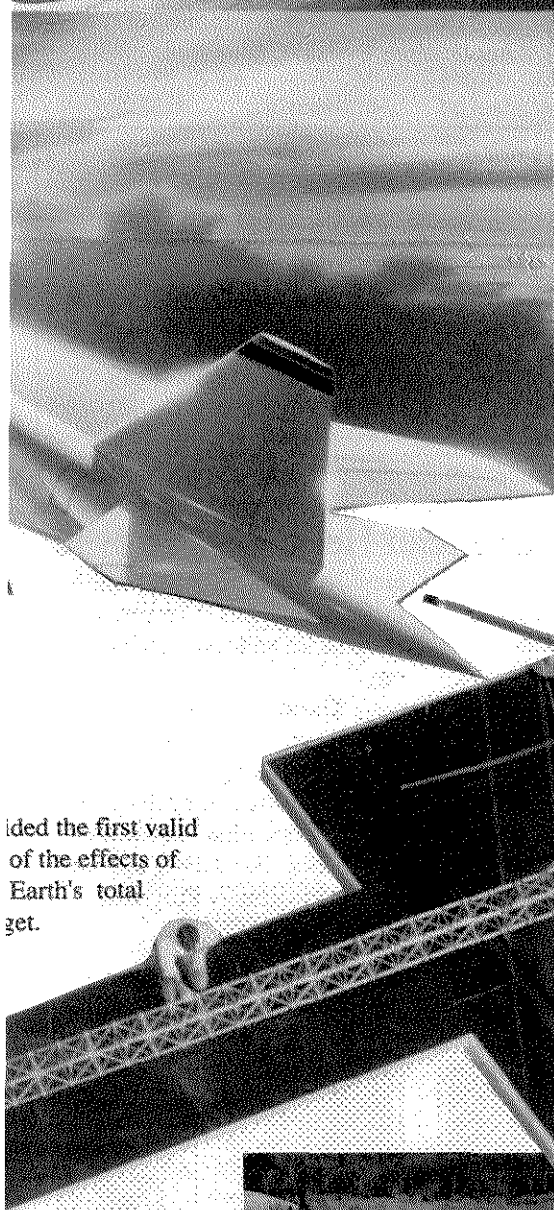
Langley has supported the development of Space Station Freedom. We are involved in the technology for construction of Freedom and its materials and structures.



NASA's Space Exploration Initiative (SEI) will be a major activity over the next 20 years.

Among other areas, we expect to contribute technology for the assembly and construction of lunar and mars vehicles, their materials and structures, their guidance and control, and their radiation shielding.





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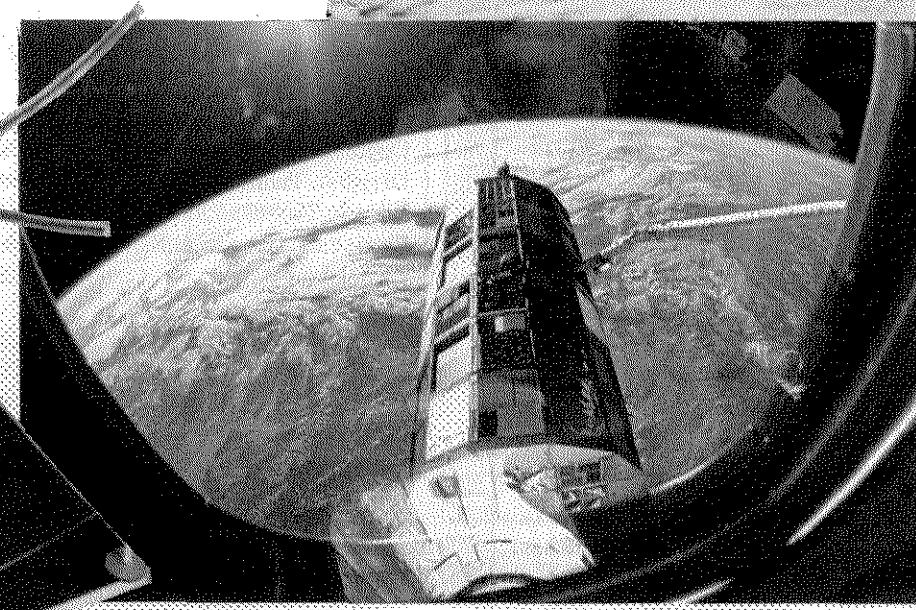
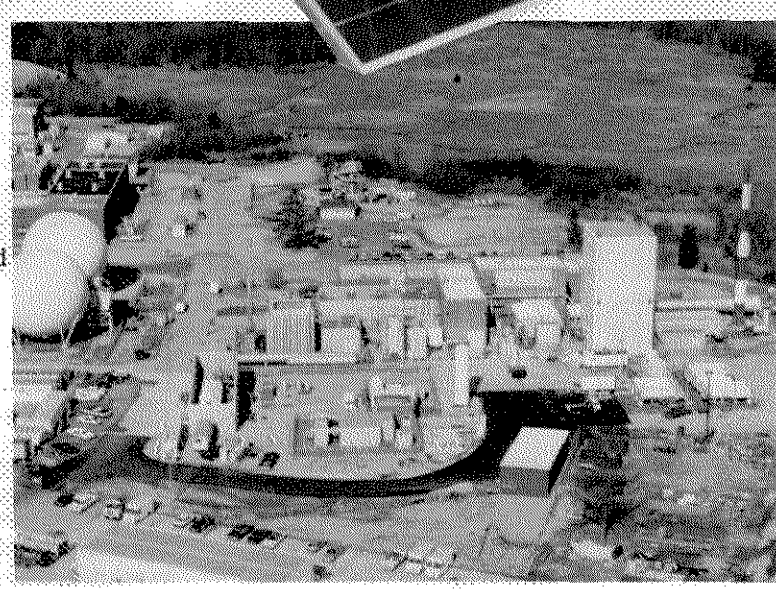


We expect heavy involvement in the technology for aerobrakes which can be used to slow a Mars vehicle as it arrives in Martian orbit--or lunar or Mars vehicles as they return to low-Earth orbit.

In space technology, we will support the development of new Earth-orbit transportation systems to supplement the Space Shuttle and we will continue to develop technology for the evolution of the Space Station into the 21st century. Langley will have a strong role in SEI, particularly in terms of aerobrakes, control-structures interaction and space construction. For Mission to Planet Earth, we will contribute technology for large space structures and their construction.



Interaction program arge platforms. The ilding was refurbished t Laboratory.

the 8-Foot High- bility to test full-

"The 90s will be an exciting time--with many challenges at Langley. NASA has strong support from the President and from the public and we have a very full plate with Space Station, Mission to Planet Earth, the Space Exploration Initiative, and an expanding aeronautics program. Langley is well positioned to continue as the premier Center for aerospace research and technology."

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.

ACD Attacked and Overtaken by UFOs

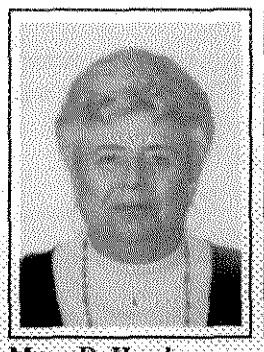
Langley's Analysis and Computation Division (ACD) is the first organization on Center to complete the NASA Headquarters directive to implement the agency-wide standardized classification filing system. Uniform File Organizers (UFOs) for the division and its six branches were presented certificates of completion by Barbara Newton, Langley's records manager, at a ceremony April 9.

Newton, who inspected the division's files, declared them orderly, structured and able to pass any audit. "The important thing is that the ACD file organizers worked together as a team," she said.

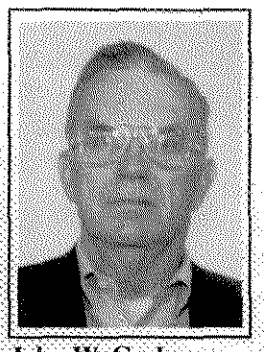
The UFOs met at the division level to devise a file plan that would identify both permanent records as well as official and unofficial files. This group then went a step further and established retention times for these documents. "Identifying how long a document needs to be retained will be the next step in the Uniform File Index (UFI) system. ACD is ahead of all of us on Center in this area," says Newton.

The UFI provides maximum uniformity and simplicity in maintaining and using agency records.

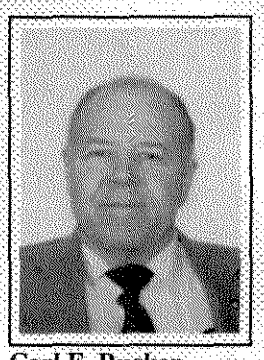
UFOs INSPECT ACD FILES. Taking one last look at the fruits of many hours of labor are Uniform File Organizers (L to R) Inez Byers, Computer Applications Branch; Teresa Hines, Flight Software and Graphics Branch; Tanya Mercer, Computer Management Branch; Janet Nagele, Analysis and Computation Division; Sonya Herndon, Analysis and Simulation Branch; Patti Deyerle, Communications and Network Systems Branch; and Lee Lillard, Computer Systems Branch.



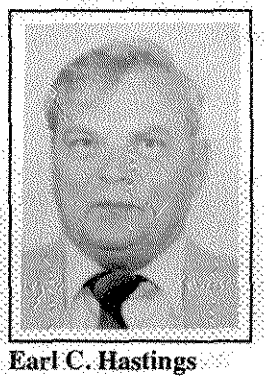
Mary D. Henderson



John W. Goslee



Carl E. Rucker



Earl C. Hastings

Recent Retirees

The following employees retired during the first quarter of 1990:

Nancy L. Taylor, Analysis and Computation Division, retired January 3.

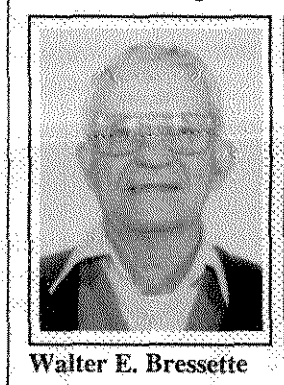
Mary D. Henderson, Facilities Engineering Division, retired January 30.

John W. Goslee, Space Systems Division, retired February 2.

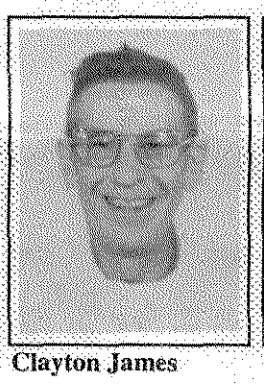
Carl E. Rucker, Materials Division, retired February 28.

Earl C. Hastings, Flight Applications Division, and **Clayton James**, Operations Support Division, retired March 2.

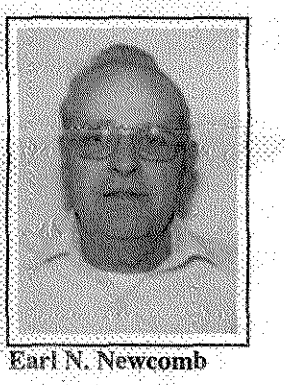
Walter E. Bressette, Atmospheric Sciences Division, **Earl N. Newcomb**, Operations Support Division, and **Doris L. Crumpler**, Research Information and Applications Division, retired March 30.



Walter E. Bressette



Clayton James



Earl N. Newcomb

Ormsby Named Suggester of the Year

Deputy Director Paul F. Holloway presents Glenn D. Ormsby, Fabrication Division, the award for Suggester of the Year. Adoption of Ormsby's suggestion, "Injection Molding of Stycast 2767FT," vastly improved the method of casting test articles/models using Stycast 2767FT material by virtually eliminating time required to fill or repair the model after it is removed from the mold.

Positions Open

90-55: AST, Aerospace Flight Systems, Aeronautical Engineer or Aeronautical Engineering Technician, GS-861-13 or 14; Office of the Director for Systems Engineering and Operations, Systems Engineering Division, Space Systems Division, Space Systems Engineering Branch, Spacecraft Systems Section. Open to LaRC. Closes May 9.

90-56: Lead Engineering Technician, GS-802-10 or 11; Office of the Director for Systems Engineering and Operations, Operations Support Division, Tunnels Operations Branch, Technical Support Section C. Open to LaRC. Closes May 9.

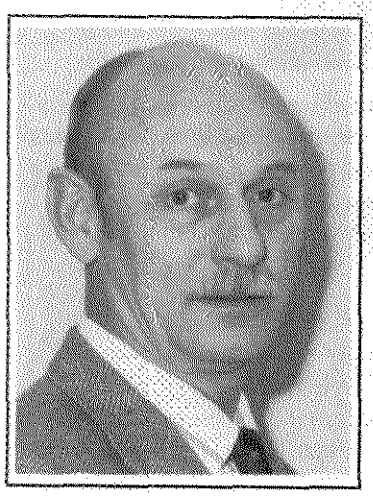
Asian Pacific American Heritage Observed

President Bush has proclaimed May Asian Pacific American Heritage Month, extending the traditional celebration of the first week in May to a month-long observance.

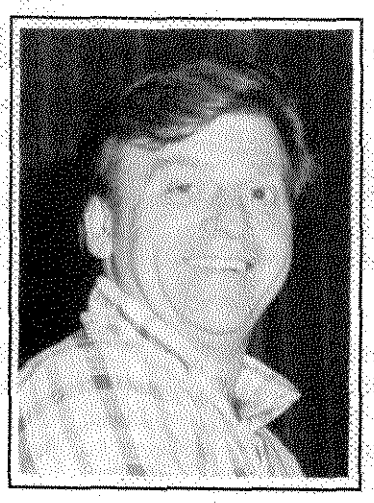
Asian Pacific Americans have been an integral part of American life since the beginning of our nation. Today, sixty Asian Pacific Americans are employed at the Center, contributing their talents to research in aeronautics and space technology.

During this month-long observance, Langley will pay tribute by serving special foods in the cafeteria and by disseminating information to interested employees. For details, call the Equal Opportunity Programs Office, ext. 43290.

Suggestion Awards



Ronald W. Rader

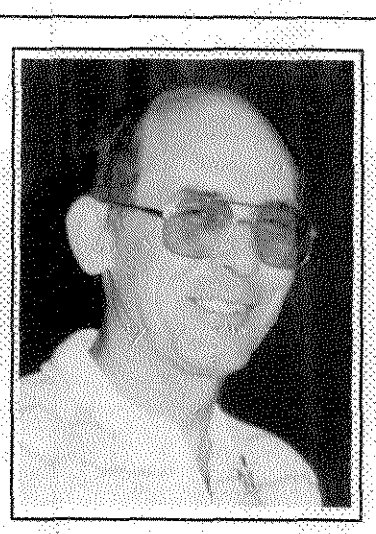


Curtis Swackhammer

Rader and Swackhammer were recognized for their suggestion, "Instrumentation Hook Up Station." They proposed permanent installation of wiring, tubing, etc. as a means of saving labor and materials on model tests.

Ronald K. Penner

Penner suggested adding a two-power teleconverter lens to the 35mm camera used for projecting images on a computer screen.



Edward G. Carden

Carden's suggestion, "Fan Blade Support Stand and Drilling/Boring Fixture," makes replacing fan blades easier and less time consuming.

George E. Dickerson

Dickerson's suggestion, Instrumenting Molding Presses," deals with experiments on composites and results in substantial savings in research time and material.

Mission STS-35: the Plan, the People

Liftoff of the tenth flight of Columbia is scheduled for 12:45 a.m. EDT May 16 from Kennedy Space Center, Florida, launch pad 39-A. Nominal mission duration is expected to be eight days, 19 hours, 55 minutes. Deorbit is planned on orbit 139, with landing scheduled for 8:40 p.m. EDT May 24 at Edwards Air Force Base, California.

After landing at Edwards, Columbia will be towed to the NASA Ames-Drydent Flight Research Facility, hoisted atop the Shuttle Carrier Aircraft and ferried back to the Kennedy Space Center to begin processing for its next flight.

Commander of the seven-member crew is Vance Brand. Pilot is Guy Gardner. STS-35 is Brand's fourth trip to space. He previously flew on the Apollo-Soyuz Test Project mission in 1975. He also commanded Shuttle missions STS-5 in November 1982 and STS 41-B in February 1984. Gardner previously piloted STS-27 in December 1988.

Mission specialists are Mike Lounge, Jeffrey Hoffman and Robert Parker. Lounge previously flew on STS 51-I in August 1985 and STS-26 in September 1988. Hoffman flew as a mission specialist on STS 51-D in April 1985. Parker's previous spaceflight experience was STS-9 in November 1983.

Mission STS-35: ASTRO-1, the Primary Payload

Highlighting mission STS-35, the 36th flight of the Space Shuttle, will be around-the-clock observations by the seven crew members using the ultraviolet astronomy observatory (ASTRO) and the Broad Band X-Ray Telescope (BBXRT). Both instruments are located in Columbia's payload bay and will be operated during 12-hour shifts by the crew.

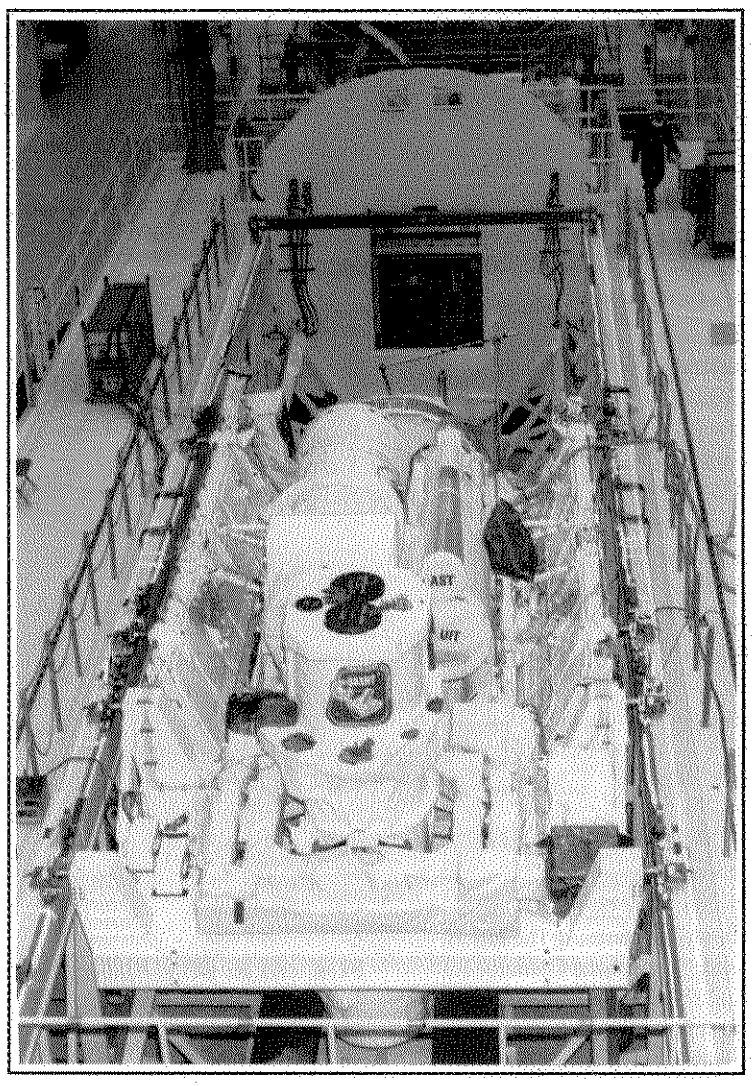
ASTRO will observe and measure ultraviolet radiation from celestial objects without atmospheric interference. It is the first in a series of missions that will make precise measurements of objects such as planets, stars and galaxies in relatively small fields of view. It uses a Spacelab pallet system with an instrument pointing system and a cruciform structure for bearing the three ultraviolet instruments mounted in parallel configuration.

The three instruments are the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE), the Ultraviolet Imaging Telescope (UIT) and the Hopkins Ultraviolet Telescope (HUT). The star tracker, which supports the instrument pointing system, is also mounted on the cruciform.

Observations of the outer planets of our solar system will be made to investigate aurorae and gain insight into the interaction of each planet's magnetosphere with the solar wind.

Also in the payload bay is the BBXRT which has two coaligned, imaging telescopes with cryogenically cooled Lithium-drifted Silicon detectors at each focus. Accurate pointing of the instrument is achieved by a Two-Axis Pointing System (TAPS).

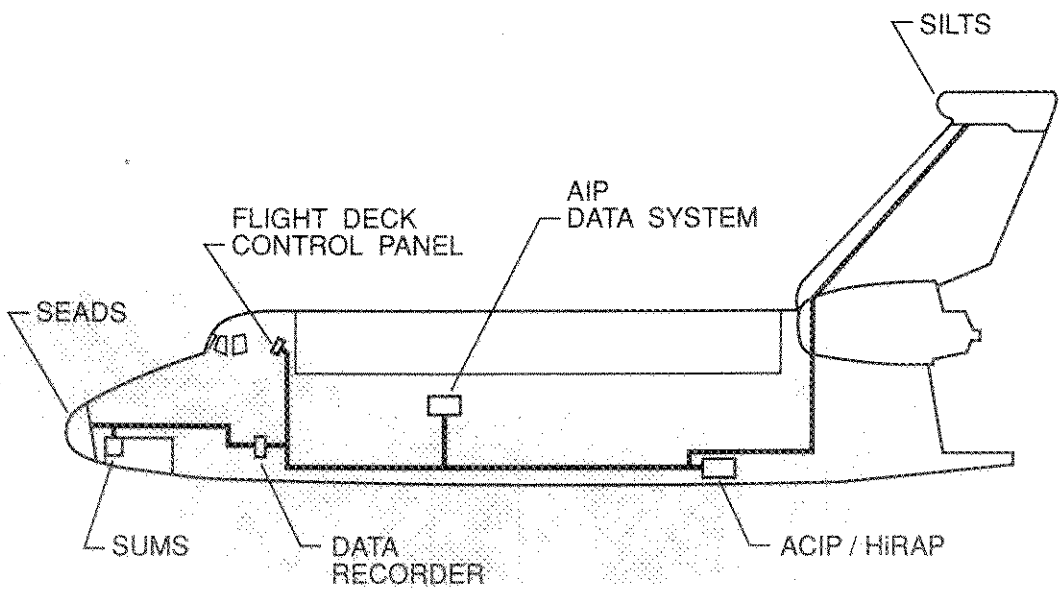
ASTRO observations will begin about 23 hours after Columbia has completed its maneuvering burn to circularize its orbit at 190 nautical miles. BBXRT will be activated approximately 13 hours after orbital insertion. ASTRO will be deactivated 12 hours before deorbit and BBXRT deactivation will be four hours before the deorbit burn.



Individual experiments on the ASTRO-1 payload, scheduled to fly aboard Columbia in May, are displayed at Kennedy Space Center. ASTRO-1 includes four complementary telescopes, including the Broad Band X-Ray Telescope (BBXRT), the Ultraviolet Imaging Telescope (UIT), the Hopkins Ultraviolet Telescope (HUT) and the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE). The STS-35 payload is the first horizontal payload flown since late 1985.

STS-35: Langley Involvement--Six OEX Experiments to Fly *-by Jean Drummond Clough*

Six Orbiter Experiments (OEX) will be flown on STS-35. Included among this group will be five experiments, conceived by Langley researchers. The five were intended to operate together as a complementary set of entry research instrumentation. This flight marks the first time since the September 1988 return-to-flight that the Langley experiments will fly as a complementary set.



SEADS

The Shuttle Entry Air Data System (SEADS) nosecap on the orbiter Columbia contains 14 penetration assemblies, each containing a small hole through which the surface air pressure is sensed. Measurement of the pressure levels and distribution allows post-flight determination of vehicle attitude and atmospheric density during entry. SEADS, which has flown on three previous flights of Columbia, operates in an altitude range of 300,000 feet to landing. Paul M. Siemers III, Langley, is the principal investigator.

SUMS

The Shuttle Upper Atmosphere Mass Spectrometer (SUMS) experiment complements SEADS by enabling measurement of atmospheric density above 300,000 feet. SUMS samples air through a small hole on the lower surface of the vehicle just aft of the nosecap. It utilizes a mass spectrometer operating as a pressure sensing device to measure atmospheric density in the high altitude, rarefied flow regime where the pressure is too low for the use of ordinary pressure sensors. The mass spectrometer incorprated in the SUMS experiment was spare equipment originally developed for the Viking Mars Lander. This is the first opportunity for SUMS to fly since STS 61-C in January 1986. Robert C. Blanchard and Roy J. Duckett of Langley are co-principal investigators.

Both SEADS and SUMS provide entry atmospheric environmental (density) information. These data, when combined with vehicle motion data, allow determination of in-flight aerodynamic performance characteristics of the orbiter.

ACIP

The Aerodynamic Coefficient Identification Package (ACIP) instrumentation senses the orbiter's motions during flight. ACIP provides the vehicle motion data which is used in conjunction with the SEADS environmental information for determination of aerodynamic characteristics below about 300,000 feet altitude. The ACIP has flown on all flights of Challenger and Columbia. David B. Kanipe, Johnson, is the ACIP principal investigator.

HiRAP

The High Resolution Accelerometer Package (HiRAP) instrument senses vehicle motions during the high altitude portion (above 300,000 feet) of entry. This instrument provides the companion vehicle motion data to be used with the SUMS results. HiRAP has been flown on 11 previous missions of the orbiters Columbia and Challenger. Robert C. Blanchard, Langley, is the HiRAP principal investigator.

SILTS

The Shuttle Infrared Leeside Temperature Tensing (SILTS) experiment uses a scanning infrared radiometer located atop the vertical tail to collect infrared images of the orbiter's leeside (upper) surfaces during entry, for the purpose of measuring the temperature distribution and thereby the aerodynamic heating environment. On two previous missions, the experiment obtained images of the left wing. For STS-35, the experiment has been reconfigured to obtain images of the upper fuselage. SILTS has flown on three Columbia flights. David A. Throckmorton and E. Vincent Zoby of Langley are co-principal investigators.

AIP

The Aerothermal Instrumentation Package (AIP) comprises some 125 measurements of aerodynamic surface temperature and pressure at discrete locations on the upper surface of the orbiter's left wing and fuselage, and vertical tail. These sensors were originally part of the Development Flight Instrumentation System which flew aboard Columbia during STS-1 through 5. They have been reactivated through the use of an AIP-unique data handling system. Among other applications, the AIP data provide "ground-truth" information for the SILTS experiment. The AIP has flown on two previous Columbia flights. David A. Throckmorton, Langley, is principal investigator.

Happenings

SPECIAL LAA SOCIAL. A *Spring Fling* party will be held Friday, May 11, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment by the J. Quincy Brown Band. $1 cover charge. Join in the fun.

NASA TOASTMASTERS will meet at 11:30 a.m. Wednesday, May 9, in the H.J.E. Reid Conference Center. Visitors are always welcome. For details, contact Christine Darden, ext. 45258.

STRESSBUSTERS, a relaxation and recharge group, meets every Wednesday, from 11:45 a.m. to 12:30 p.m., in Building 1212, Room 200. Location is subject to change, so call Steve Dahmen, ext. 44519, for confirmation.

CONSERVATION CLUB meets the third Tuesday of each month. The next meeting is May 15, at 4:45 p.m., in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call ext. 41537 for more information.

DISCOUNT TICKETS for area attractions available at the VC Souvenir Counter.

AEROBICS CLASSES are held Tuesdays and Thursdays, 5 to 6 p.m. in the NASA Gym. Cost for this low-impact workout is $12 per month. First class is free.

SCALE MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society is holding the Region II model contest September 21-22. No need to be an IPMS member. For information, contact IPMS Tidewater, P.O. Box 1651, Newport News, Va. 23601.

TELA-TAX SERVICE. Federal, state, individual, or business. Member of National Association of Tax Practitioners. By appointment. Call 874-3121.

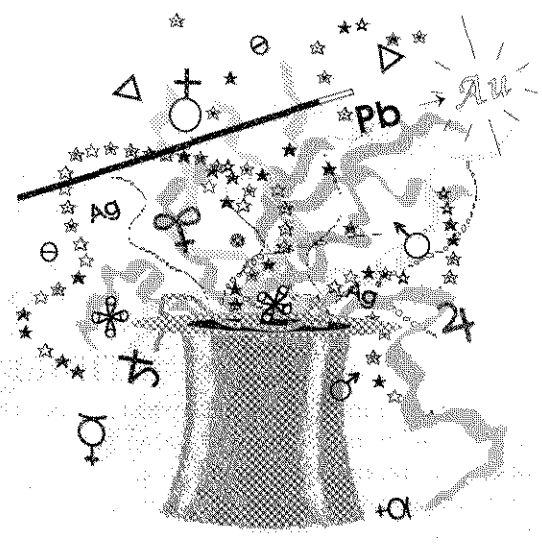
FOR SALE: HOME. 3 BR, 2 BA rancher in Riverpoint, minutes from NASA/LAFB. Seller will pay closing costs with full price contract. $99,500. Call 850-4278.

FOR SALE: BOYS' BIKE. 10-speed bicycle. $30. Call 898-3768.

NEEDED: CARPOOL. Virginia Beach from Great Neck Road and Shore Drive to NASA for the 8 a.m. to 4:30 p.m. shift. Call Carol at ext. 46528 or 481-4993 after 5 p.m.

Langley Colloquium and The Sigma Series

W&M Professors Demonstrate the Magic of Chemistry



Students in high school and college chemistry classes enjoy an occasional interruption from the lecture for a demonstration. Demonstrations are effective devices for illustrating chemical principles and they are usually entertaining--even when they do not work as planned. Students have better recall of a concept when they see it at work in a beaker before their eyes.

During two lectures in Hampton, Monday, May 14, Dr. Richard L. Kiefer and Dr. Robert A. Orwoll, both professors of chemistry at The College of William and Mary, will perform and explain some popular chemistry demonstrations. Their lecture and demonstration, "The Magic of Chemistry," will be presented to Center employees, contractors and retirees in the H.J.E. Reid Conference Center at 2 p.m. At 7:30 that evening, they will give the presentation at the Holiday Inn, Coliseum Hotel and Conference Center, as part of The Sigma Series. The Sigma Series is a series of free public lectures sponsored by the Virginia Air and Space Center, the Daily Press and NASA.

In these talks, Kiefer and Orwoll will demonstrate acid-base reactions with colorful displays. Another experiment will be a "clock reaction" in which Mother Nature seems to have trouble finding equilibrium. The demonstrations will be televised and projected on a large screen to enable the audience to see the experiments close up.

Kiefer is a native of Pennsylvania. He earned his bachelor of arts degree at Drew University and his doctorate at the University of California at Berkeley. He has been a member of William and Mary's chemistry faculty for 25 years and has served as chairman of the chemistry department.

Orwoll was born and raised in Minneapolis. His bachelor of arts degree is from St. Olaf College and his doctorate from Stanford University. He has been at William and Mary since 1969. He teaches physical and polymer chemistry as well as freshman chemistry. He serves as interim director of William and Mary's new program in applied science.

Both Orwoll and Kiefer have research interests in polymeric materials. Their studies on the effects of the space environment on polymers are presently being supported by a NASA cooperative agreement with William and Mary.

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Public Service Recognition Week, May 7-13 Researcher News

A STAR IS BORN! Photo Lab secretary Ann Wilson was surprised Monday morning, April 23, by a visit by representatives of local radio station WPEX. Nominated by Louise Sykes, Wilson was chosen "Secretary of the Day" and received a bouquet of flowers. Radio personalities Allan Scott (right) and Joe Moore delivered the bouquet. Sykes said, "We wanted Ann to know that Photo Lab appreciates her during Secretaries Week and all year long."

Sailing Lessons

The Langley Yacht Club will hold windsurfing classes beginning May 5, June 9, July 7, August 4 and September 8 for ages 11 and up. The classes run Saturdays from 9 a.m. to 1 p.m. for four weeks. The cost is $65 for LYC members and $75 for non-members. Classes are limited and on a first come-first served basis.

Basic and advanced sailing classes for juniors (ages 10-17) begin June 18 and July 16, and run each morning for four weeks. The cost is $120 for LYC members; $145 for non-members.

Adult basic sailing classes begin June 5, July 5 and August 7, and run Tuesday and Thursday evenings for four weeks. The cost is $80 for LYC members; $100 for non-members. Applications are available at the Yacht Club or contact Clifford Obara, 865-6659, after 5 p.m.

AIAA Course

The Hampton Roads Section of the American Institute of Aeronautics and Astronautics will hold an educational short course, Applied Mathematics for Engineering and Multidisciplinary Applications, June 6-7, in the H.J.E. Reid Conference Center, Building 1222.

Designed as a refresher course for managers, scientists and engineers, the program will review the mathematical foundations of, and latest research trends and opportunities in, fluid dynamics, structures, controls and optimization. Topics covered will include Computational Fluid Mechanics, Unsteady Aerodynamics and Aeroelasticity, Structural Mechanics and Computational Structural Mechanics, Multidisciplinary System Optimization, Aeroservoelasticity and Control Theory. For more information, contact Dr. Vivek Mukhopadhyay, (804) 864-2835.

Retirement Party

Bob Jones will be honored at a retirement party Friday, May 18, at 6 p.m. in the Radisson Hotel, Hampton. Cost is $17.50/person; $34/couple including gift. Separate gift donations are welcome. Make checks payable to Sherri Yokum, Mail Stop 353, ext. 43736. Reservations are requested by Friday, May 11.

NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

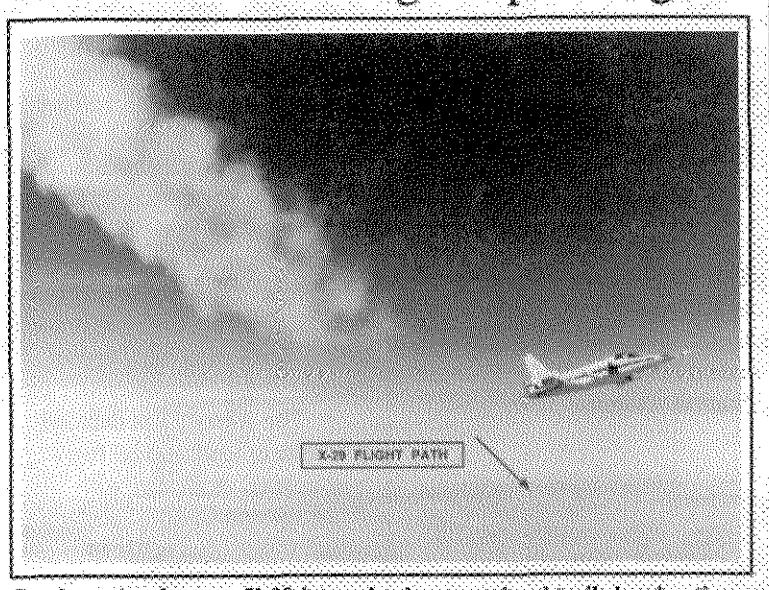
Volume 4, Issue 10 May 18, 1990

Bi-Weekly Employee and Contractor Publication

X-29 Unexpectedly Maneuverable in 'High-Alpha' Flight

The X-29 research aircraft is demonstrating in flight much better control and maneuvering qualities at high angles of attack than wind tunnel tests, computational methods and simulation models predicted.

The X-29 is an advanced technology demonstrator aircraft based at NASA's Ames-Dryden Flight Research Facility, Edwards, Calif. The current flights, using the second of two X-29s, are investigating high-angle-of-attack characteristics and military utility of the aircraft's unique forward-swept wing/canard configuration as part of a joint NASA-Air Force program.



Condensation from an X-29 jet engine leaves a visual trail showing the flight path of the unique aircraft during a research flight.

Angle of attack is an engineering term that describes the angle of an aircraft's body and wings relative to its actual flight path. At extreme angles of attack, also called "high alpha," the airflow around an aircraft can produce conditions in which the wings do not create enough lift to maintain altitude.

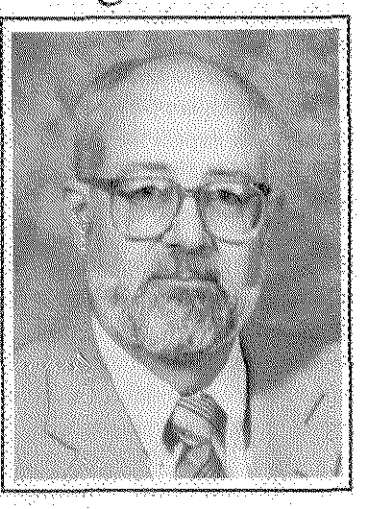
According to Steve Ishmael, one of NASA's X-29 project pilots, the aircraft's excellent control response in the 25-45 degree angle-of-attack range was unexpected. "We have much more control than we thought we would have at these angles," said Ishmael. "We have good roll control and we have modest yaw control."

X-29 project officials do not yet fully comprehend why the plane responds so well in the high alpha regime. Possible explanations include interaction of the canards with vortices of air coming off the nose or some unexpected effect of the plane's forward-swept wings.

"This maneuvering capability is really a bonus for us, but we don't fully understand what is causing it," explained Gary Trippensee, X-29 project manager at Ames-Dryden. "It's something we're really looking forward to exploring."

The second X-29 reached a 50-degree angle of attack on its 23rd flight in the current research phase of the technology demonstrator program. The aircraft achieves its high alpha controllability without leading edge flaps on the wings for additional lift. It also doesn't have movable vanes on its engines to change the direction of thrust, a capability that enhances stability and control at high alpha.

Powell Attends Carnegie Mellon



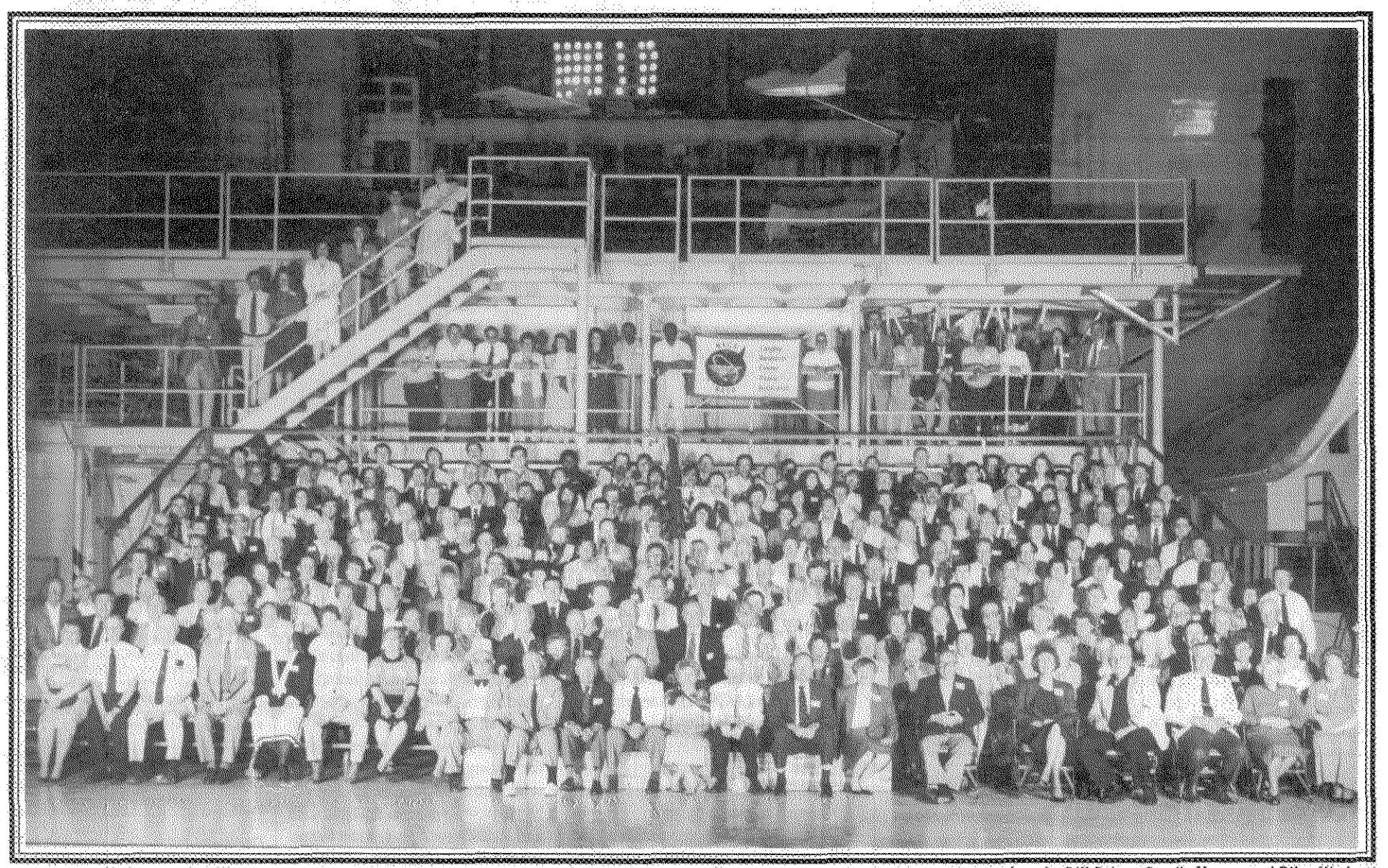
Clemans A. "Andy" Powell, head of the Structural Acoustics Branch, has been selected to attend the Senior Executive Seminar at Carnegie Mellon University, Pittsburgh, Pa., Powell was selected for the seminar in a NASA-wide competition.

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 sector.

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.

"The Carnegie Mellon opportunity will help me develop better understanding of the political, social and economic processes that affect government agencies," said Powell. "I also hope to gain a better understanding of organizational behavior and management concepts and techniques through interaction with participants from diverse organizations."

Powell specializes in investigating problems associated with acoustics and has led research programs in active noise control, aircraft interior noise, sonic fatigue and effects of aircraft noise and sonic boom on people. He began his NASA career in 1964 as as aerospace technologist in the Dynamic Loads Division. In 1981, he was named assistant head of the Structural Acoustics Branch and, in 1983, was selected to head that branch.



-photo by Bill Salyer, Sandie Horsey and Pilar Kitchen

REMINISCENT OF DAYS GONE BY. Langley employees, retirees, spouses and friends gathered April 23 in the 30- by 60-Foot Full-Scale Tunnel to celebrate the 75th anniversary of the establishment of the National Advisory Committee for Aeronautics (NACA). A highlight of the celebration was the opportunity to come together to be photographed on the bleachers just as NACA employees had done in the past. The task of identifying the more than 300 participants pictured falls to Ann Suit, event coordinator. **More on page 3.**

News Briefs

HEADQUARTERS, Washington, D.C. --- William W. L. Taylor of TRW, Redondo Beach, Calif., has been named Chief Scientist for the Space Station Freedom program. In this position, Taylor will be the principal advocate for the space science community in the space station program. Taylor had been with TRW since 1978, most recently as assistant department manager of the physical sciences department of the Applied Technology Division. Prior to joining TRW, Taylor worked with NASA where he was program scientist for Spacelab 1.

AMES-DRYDEN FLIGHT RESEARCH FACILITY, Edwards Air Force Base, Calif. --- Flight testing of the first experimental wing surface designed to improve laminar (smooth) airflow at supersonic speeds will begin this month at NASA's Ames-Dryden facility. The flights, with a specially-modified F-16XL aircraft, are part of an effort to improve high-speed performance by reducing aerodynamic drag. Researchers expect the instrumentation monitoring airflow over the experimental wing section to produce data that will validate computer codes and aid in the design of future high-speed civil transports and high-performance military aircraft.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly met in Ottawa with representatives from the Highly Gifted and Talented Student program of the Manitoulin Island Board of Education, Ontario, Canada. As part of their curriculum, the Canadian students have spent the last year studying the development of NASA since its inception in 1958 and each student has completed one or two authentic scale models of a rocket, Skylab, the Space Shuttle or the Space Station. Admiral Truly was presented with a scale model of Skylab.

HEADQUARTERS, Washington, D.C. --- Nine finalists have been chosen for the NASA Excellence Award for Quality and Productivity for 1990. Finalists are: Barrios Technology, Inc., Houston; Bendix Field Engineering Corp., Seabrook, Md.; Boeing Computer Support Services, MSFC, Huntsville, Ala.; EG&G Florida, Inc., KSC, Fla.; Grumman Technical Services Division, Titusville, Fla.; Honeywell, Inc., Clearwater, Fla.; Marotta Scientific Controls, Inc., Montville, N.J.; Rickwell International Corp., Downey, Calif.; and Unisys Defense Systems, Houston.

Langley Holds Drive

Savings Bonds Have Lots to Offer

TAX ADVANTAGES. The interest on savings bonds is exempt from state and local income taxes, and federal tax reporting may be deferred until a bond is cashed or reaches maturity. Additional deferral is possible by exchanging EE Bonds with $500 or more for Series HH Savings Bonds.

TAX-FREE FUNDS FOR EDUCATION. Interest earned on savings bonds purchased on or after January 1, 1990, when used to pay the tuition and fees of institutions of higher learning, may be completely tax free. The exemption applies not just for children but for adults returning to school as well. Certain age and income restrictions apply, and bonds must be purchased by parents in their own name(s).

COMPLETE SECURITY AND SAFETY. Savings bonds are issued and fully backed by the U.S. government, making them one of the safest investments in America today. This means you get high interest rates and none of the risk associated with many investments. Bonds can be replaced free of charge if lost, stolen or destroyed.

GOOD FOR AMERICA. Bonds are not only good for buyers, they help our country as well. Savings bonds strengthen the national economy by increasing savings and reducing the cost of financing the debt.

There will be a Bond Information meeting, May 17, at 9 a.m. in Building 1192C, Room 124. A Treasury Department representative will be available to answer questions on the savings bond program.

STS-35 Delayed

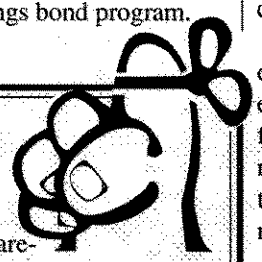
NASA managers have decided to replace an apparently faulty valve in the orbiter Columbia's freon coolant loop. The work will likely delay the launch of STS-35, previously scheduled for May 16, by two to three weeks. As of **Researcher News** press time, a new target launch date had not been identified.

Shuttle managers assessed the relative risks associated with performing the work at the launch pad, versus in the Orbiter Processing Facility, and decided that completing the replacement and checkout on the pad is as safe and effective.

"We are obviously disappointed that we are not ready to fly," said Space Flight Associate Administrator Dr. William B. Lenoir. "However, this particular system is absolutely critical to the safety of the crew and overall mission success, so we have decided to change the component.

The impact of this delay on remaining flights is still under evaluation. Once a target date for STS-35 is established, NASA managers will be able to assess the effect on the overall Shuttle manifest.

mail tips



The mail service at Langley can only be as efficient and effective as the people who use it. Here's another in our series of mail awareness tips to help improve and speed up Center communications.

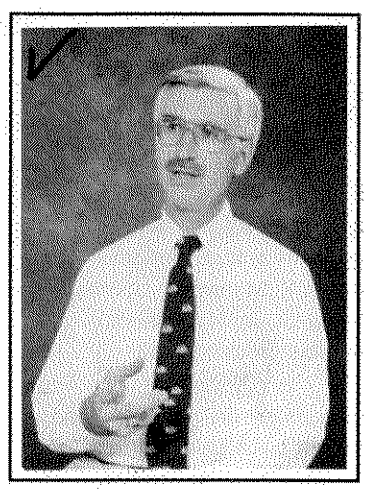
- Do not use self-addressed envelopes provided for your reply. The mailroom will not affix postage. For official business, use government indicia envelopes.
- Address indicia envelopes for mail to Langley AFB. The mailroom does not deliver to the Air Force in the delivery system.
- Use **Form 39** (available from supply) to inform senders of your current mail stop.
- Use **Form 41** (in the back of the telephone directory) for any internal location changes.

Remember: It is the responsibility of *each employee* to keep this information up-to-date.

Editorials

Langley

Headquarters Forum



A hot issue throughout the Agency for the last several years has been the institutional funding at the NASA centers. Historically, one of the major fund sources for institutional funding, Research and Program Management (R&PM), has been viewed by Congress and the Office of Management and Budget (OMB) as "overhead." As a result, this institutional funding source is often subjected to arbitrary cuts. This makes it very difficult for the centers to maintain a strong institutional base.

The Agency has debated the issue of institutional funding within itself as well as with Congress and OMB. Substantial progress has been made in stressing the importance of the need for institutional funding to get the research or program job done. For the first time in many years, I am optimistic that we will see some moderate growth in these very important fund sources for Langley in fiscal year 1991.

At Langley, R&PM funds three very critical areas: (1) fund source one, which includes salaries, benefits, awards and training; (2) fund source two, which includes travel dollars; and (3) fund source three, which includes operations of the institution--everything from utilities and telephone bills to the many support service contractors in the areas of transportation, security, maintenance of our "people buildings," as well as the cost of printing all research documents and reports.

In fiscal year 1990, Langley has taken a $3.4 million cut in our R&PM budget--all in fund source three. We were reduced from $49.2 million to $45.8 million. This was mainly due to across-the-board cuts for Gramm-Rudman-Hollings deficit reduction and Congressional funding for the drug awareness program.

We have been able to absorb most of this cut by not purchasing many of the critical goods and services necessary to get our jobs done. We will be able to pay our bills for support service contractors as well as key fixed costs such as utility and telephone bills. There is a possibility that some of this money will be restored within the next few weeks through a reprogramming action currently before Congress.

The good news is that right now the fiscal year 1991 budget is looking very good. Preliminary feedback indicates that the R&PM budget might make it through Congress without major cuts. This will allow full restoration to a "normal" operating year with allowance for inflation and an additional $5 million to purchase many of the goods and services needed to adequately support this Center. Not only will this money help us get back on track but, more importantly, it will help us provide some of the support that our customers are requesting.

Over the last several months, the Management Operations Directorate has conducted a survey of our customers. The Customer Survey Task Team polled all of the program directors, all but one of the division chiefs and 169 of the Center employees, representing all the skill groups. The data we collected from this survey are being analyzed and a set of recommendations and priorities will be developed shortly. This survey will help us prioritize the utilization of these additional moneys for what is most important in Management Operations--helping our customers get their research job done.

John F. Stokes
Director for Management Operations

OPM Implements Entry Program

On May 1, 1990, the Office of Personnel Management (OPM) implemented the Administrative Careers with America (ACWA) examination program. The program establishes two methods of entry (GS-5 or 7) into approximately 100 professional and administrative occupations.

One method delegates authority to agencies to recruit and hire directly candidates who have a 3.5 grade point average or who are in the upper 10 percent of their class or major subdivision. The second method divides the occupations into six major groups and announces the opening of a written examination for **each** group.

OPM will accept requests for testing until May 31, 1990, with testing in June and July in Norfolk, Petersburg, Richmond and Roanoke. Application forms are available at the job information counter in the Personnel Division, Building 1195C.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

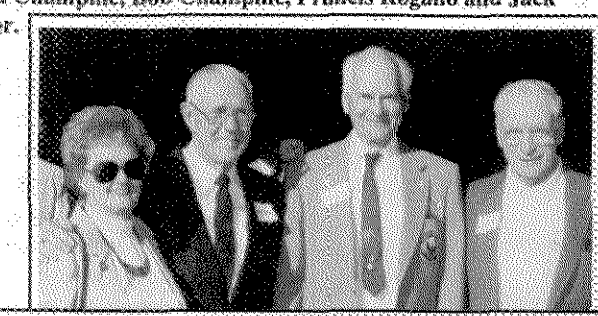
Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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 Anniversary

A closer look . . .

-photos by Sandie Horsey and Pilar Kitchen



Gloria Champine, Bob Champine, Francis Rogallo and Jack Reeder.

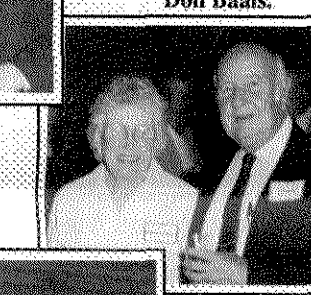
Mary Mesic, Jim Fay, Paul Fournier, Mercer Christian, Irene Christian, Wilmer Reed, Billy Gilbert, Jane Evans, Richard Wallsom, Norwood Evans and Norm Crabill.

Emanuel Boxer, Pat Clark, Helen Willey, Bill Williams, Henry Pearson and Henry "Hank" Fedgiuk.

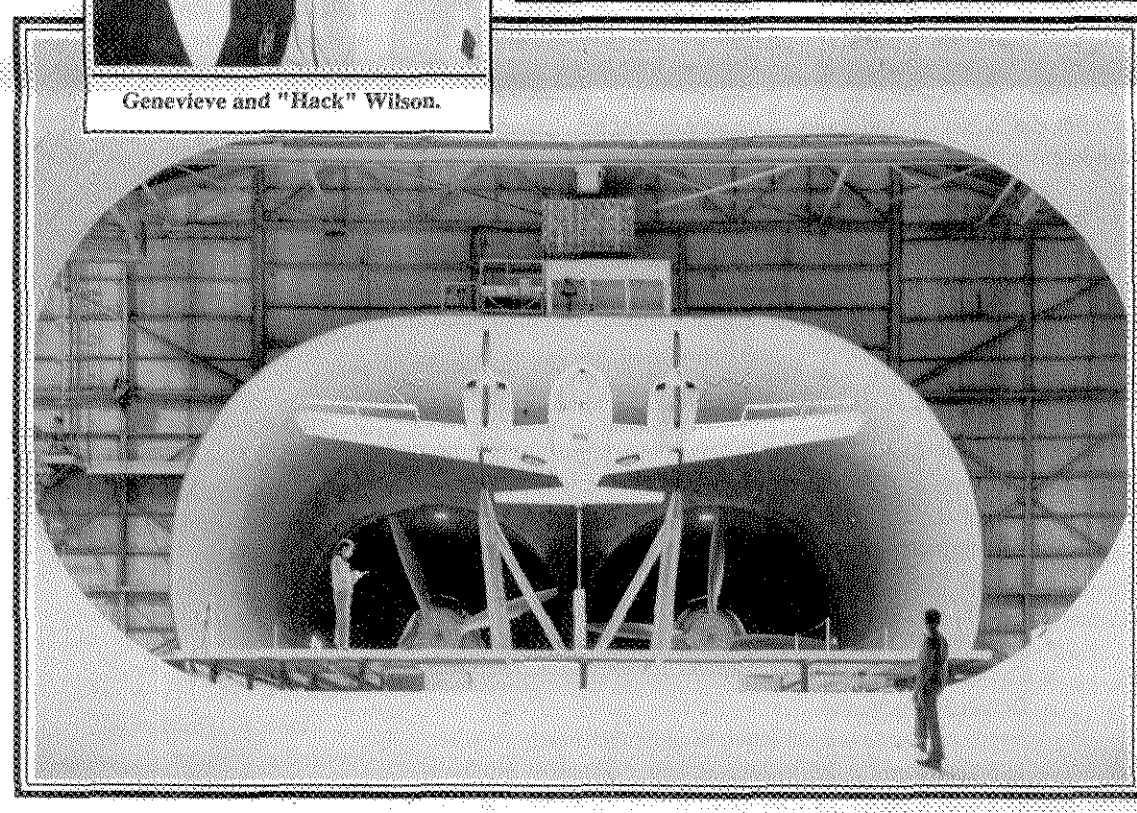
Ernest Phillips, Ed Brummer, Betty Brummer, James Sivells, Pauline Sivells and Dick Lindsay.

Ada Ward, Don Ward, Abe Leiss, Pete Petersen, Beverly Cortright, Ed Cortright, Peggy Stickle, Joe Stickle and Dick Whitcomb.

Genevieve and "Hack" Wilson.



Madelynne and Don Baals.



Dana Dunham, Gary Price, Gayle Blankenship, Charlie Blankenship and Bill Boyer.

Max Kurbjun, Eloise Kurbjun and Dick Yenni.

Full-Scale Tunnel is Site for NACA Celebration

On April 23--exactly 75 years from the date of the first meeting of NACA's main committee--Langley celebrated the formation of the National Advisory Committee for Aeronautics. Over 300 retirees, employees and guests gathered in the 30- by 60-Foot Full-Scale Tunnel to reminisce about NASA's predecessor.

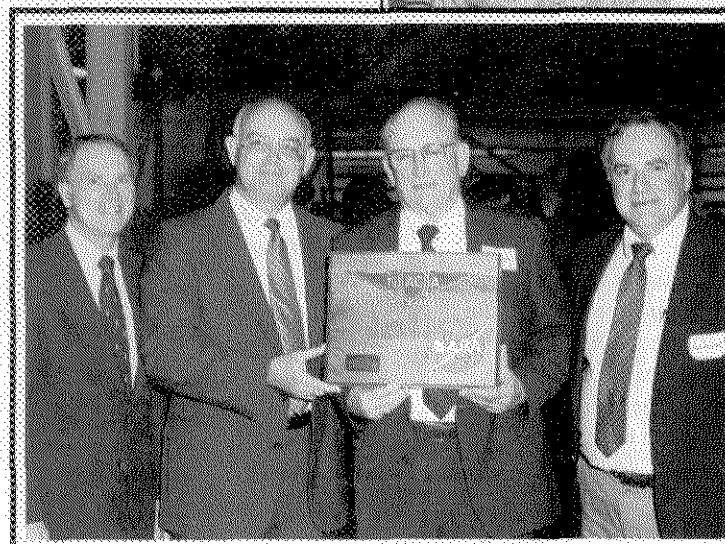
"With just a $5,000 initial outlay, " Center Director Richard H. Petersen reminded the crowd, "Congress established the NACA on March 3, 1915, only a dozen years after the first powered flight at Kitty Hawk. NACA's mission was to focus the capabilities of American science, technology and industry on the potential of aircraft.

"NACA accomplished this mission by becoming the world's premier aeronautical research and development organization. When the Space Age began in 1958, NACA was the foundation for the new NASA which led to American pre-eminence in aerospace technology.

"In one short decade, with NACA leading the way, the modern airplane began to evolve. And, of course, when we say NACA during this time period, we really mean Langley and facilities such as the Full-Scale Tunnel.

"The NACA legacy, and I'm proud to say Langley legacy, is still visible all around us," Petersen continued. "Reflected in every aircraft that passes overhead are NACA-developed technologies--advances in speed, range, reliability, safety, fuel economy, engines, structures and contruction techniques. NACA virtually invented American aeronautical engineering, the tools of aeronautical research and related disciplines. It created an infrastructure of research tools, facilities and institutions. Along the way, NACA and the NACA people showed how American science, technology and industry can work together to achieve national goals," Petersen concluded.

Following the director's comments, Joe Chambers, Flight Applications Division chief, presented a brief history of the Full-Scale Tunnel, noting its importance to the accomplishments of NACA and NASA.



Concluding the program, Joe Chambers made a special presentation to Joe Johnson, head of the Flight Dynamics Branch. Johnson's NASA career spanned 45 years and parallels the growth and accomplishments of the Full-Scale Tunnel. Pictured with Johnson (center right) and Chambers (center left) after the presentation of the NACA wings are Roy Harris (left), director for aeronautics, and Deputy Director Paul Holloway.

Working to Make Langley a Better Place to Work

SCAN Teams Make Interim Report to Langley Management

Awareness is being heightened, dialogue is increasing, concerns are being aired, and solutions to problems are being sought at this stage of the SCAN teams' look at "how we do things at Langley."

SCAN is an appropriate acronym for Strategic Culture Assessment for the Nineties, employee teams empowered by the Center director to look into Langley's practices in three targeted areas--communication, career development and rewards and recognition.

On April 27, approximately two months into a six-month concentrated review of Langley's culture, SCAN team leaders made their second presentation to Center management. According to the time line presented during an earlier report, the teams are on schedule with the data collection phase of the project. Although solutions are being considered at this time, recommendations will be made only after complete analysis of the compiled data.

Del Croom, leader of the awards and recognition team, reported on the accomplishments of the group as well as on their sources of information, both internal and external. The teams have interviewed countless individuals and several groups on Center to assess the climate at Langley. Think Tanks, small focus groups, have addressed

concerns in the three areas of interest by brainstorming what is positive and what can be improved at Langley. "This data collection method allows a great number of concerns related to the issue in focus to be aired without evaluation," said Croom. "In this way, the real problems, rather than individual dislikes, will be flushed out to be dealt with during the data analysis portion of the process."

In addition to Think Tank groups, subject matter experts, both on Center and off, have been interviewed for background information. Lahoma Hart, Janet McKinzie, Mary Lewis and others have given the SCAN teams valuable information about Langley's current practices that profoundly affect the Center's culture. Outside sources, such as Warner Burke Associates, the source of last year's culture survey, have also been consulted to provide a different perspective on factors defining organizational culture.

Cindy Lee, leader of the career development team, identified recurring themes that

are surfacing in all areas of the data collection process. Employee mobility, promotions, awards, information channels and career development planning are just some of the areas of concern that are consistently discussed. "We are attempting to categorize data into three designations--one, where current practice is good and no change is needed; two, where current practice is good in theory but does not work properly; and three, where current practice is ineffective or nonexistent." At this point the teams are clearly in the data collection mode, added Lee.

Rich Antcliff, leader of the communications group, briefed senior management further on

the Think Tank groups which are proving to be invaluable in this data collection phase. "The groups are chosen at random from across the Center to meet for a two-hour period to discuss a pre-selected topic," said Antcliff. The SCAN teams hope to form about 24 Think Tank groups prior to the data analysis phase, which means over 200 Center employees will be given an opportunity to describe their views regarding Langley's culture.

Antcliff also asked for enhanced participation by senior management during the data collection phase. "We want to ensure that the concerns being aired, as well as the intensity of these concerns, are apparent to those who are best able to implement the suggestions for change that will ultimately culminate from the SCAN team process." In short, the SCAN teams are asking for advocates at the senior management level.

Center Director Richard H. Petersen responded, "My reaction is very positive. The senior staff is very supportive of the SCAN teams' endeavors to make Langley an even better place to work. Any of us would be happy to become more involved in the process."

Croom noted that cooperation from Center management has been excellent. "In our interview process, we have not been rejected or even postponed by anyone we have asked to consult with us."

Data collection in all three targeted areas will proceed with gusto throughout May. The teams plan an off-site workshop in early June when analysis of the data will begin. Findings and recommendations for change are expected to be presented to the senior staff in July. Implementation of the recommendations will not signal an end to the SCAN team process. Evaluation and follow on are an important part of the plan, and will continue as needed to ensure that both short and long term changes in the Langley environment are effective.

Tidbits from Training

Your Opinion is Needed and Valued

Q: When is an evaluation not an evaluation?

A: When it's not received.

The goal of the Training and Education Section is to provide Langley employees with the highest level of training possible. In order to reach this goal we continuously have to identify areas that need to be improved, whether it be the course content or the instructor's ability to teach.

One of the methods used to determine areas needing improvement is through the training evaluation forms provided students at the conclusion of each class. The forms are carefully reviewed. The information derived from these evaluations is used by the training specialist to suggest changes in the structure and content of classes that will improve or tailor the course to meet Langley employees' needs.

The results of the evaluations are also given to the sponsoring organization and/or instructors to assist them in improving their courses, both in content and instructor capability. Passing on this information will, hopefully, assure that future training will meet your requirements and provide you with top-of-the-line classes.

Your support in completing the evaluation forms is most important if the Center is to maintain the highest standard of training possible. Who can best critique a Training and Education Section's course if not the attendees?

Notes of Thanks

Janet Edmondson writes: "I wish to thank all the individuals who donated leave on my behalf while I was on the Voluntary Leave Transfer Program."

"Gene" Hicks writes: "It is hard to find a way to convey my thanks to my many associates who contributed blood in my name during the March 28 Bloodmobile for my major surgery. I wish I could thank each of you in person."

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.

The following employees are approved leave recipients:

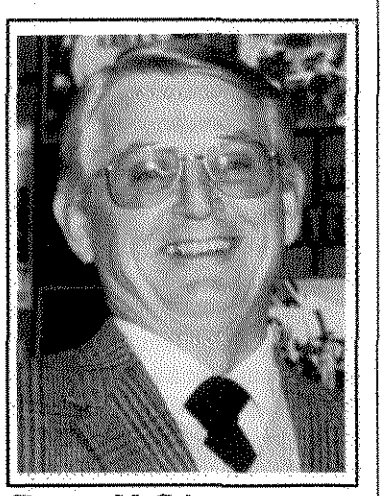
- Robert M. Connell Jr.
- Joy W. Italiano
- Kenneth M. Jones
- Catherine B. Worth
- Denna B. Zacharias

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

Service Awards

Center Director Richard H. Petersen presented service awards to two long-time employees. Walter E. Bressette, now retired, was honored for 45 years of service; Clarence M. "Skippy" Cole was cited for 40 years of government service.

Walter E. Bressette



Clarence M. Cole

Positions Open

90-58: Secretary (Stenography), GS-318-8 or 9; Office of the Director. Open to LaRC applicants with civil service status. Closes May 22.

90-59: AST, Project Management (Temporary, not to exceed one year), GS-801-14; Space Directorate, Space Exploration Initiative Office. Open to LaRC applicants with civil service status. Closes May 21.

Retirement Party

Dale G. Holden will be honored at a retirement party Monday, June 18, in the H.J.E. Reid Conference Center, Building 1222. A social will begin at 6 p.m., followed at 6:30 by an informal barbeque dinner. Cost, including gift is $11/person or $20/couple. Gift only contributions are also welcomed. Checks may be made payable to Nancy Green, Mail Stop 130, by June 8.

Swap and Shop

FOR RENT: HOME in Maxwell area, Newport News. 3BR, 2-1/2 BA. August 1990 to June 1991. $600. Call 930-0002.

FOUND: RINGS/WATCH. Man's gold wedding band and gold nugget ring found in men's room, Building 1194. Gold chain watch found between Buildings 1225 and 1195. Call Security Office, ext. 43416

Health Corner

May is Hypertension Month

The National Institute of Health has declared May "National Hypertension Month." In recognition of this, the clinic is sponsoring a program on hypertension as well as blood pressure screenings.

Blood pressure screenings well be held each Wednesday during May in the cafeteria, Building 1213, from 11 a.m. to 1 p.m. Screenings will also be held in the following buildings:

May 21	Building 643	9 a.m. to 10 a.m. Conference Room 103
May 22	Building 1209	9 a.m. to 10:30 a.m. Rear entrance foyer
May 24	Building 1221	7 a.m. to 8 a.m. Shop area

Other buildings may be added to the above schedule by contacting Maureen Hodson, ext. 43193.

"Hypertension Update" will be presented Thursday, May 24, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222. Dr. Richard D. Hansen, Langley's medical director, will be the featured speaker. In addition, Mary Mitchell, fitness coordinator, will speak on "Hypertension and Exercise."

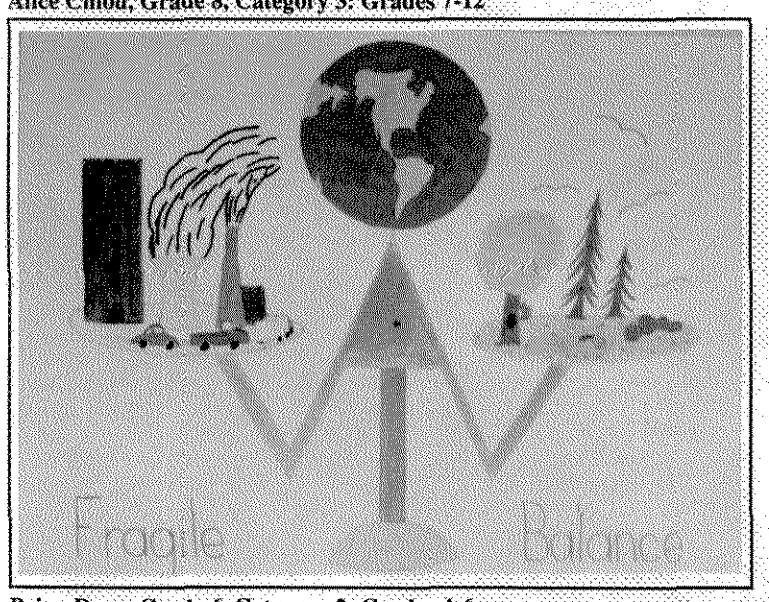
Employees who wish to attend the program on hypertension should charge their time to Job Order A-1619.

Earth Day Poster Contest Winners

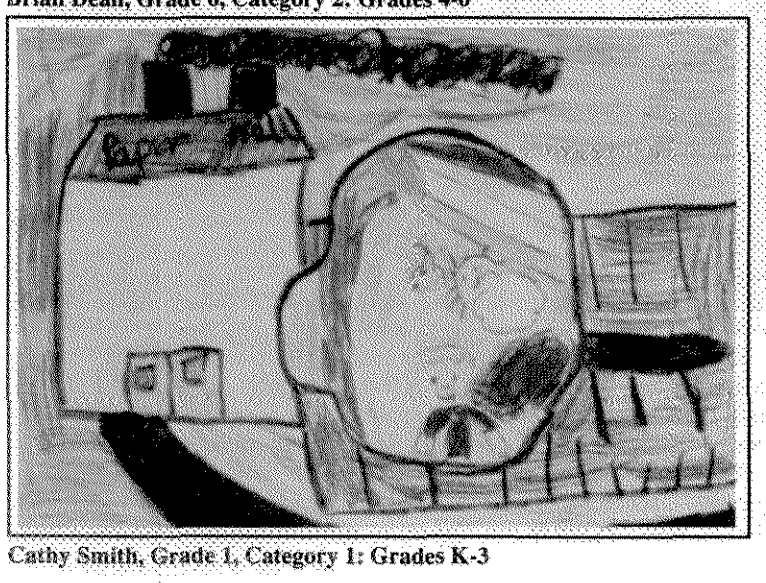
The Conservation Club is happy to announce the winners of the poster contest which focused on the environmental concerns highlighted by Earth Day 1990. First, second and third place winning posters are on display at the Visitor Center. First place winners in each of the three categories are:

-photos by Pilar Kitchen

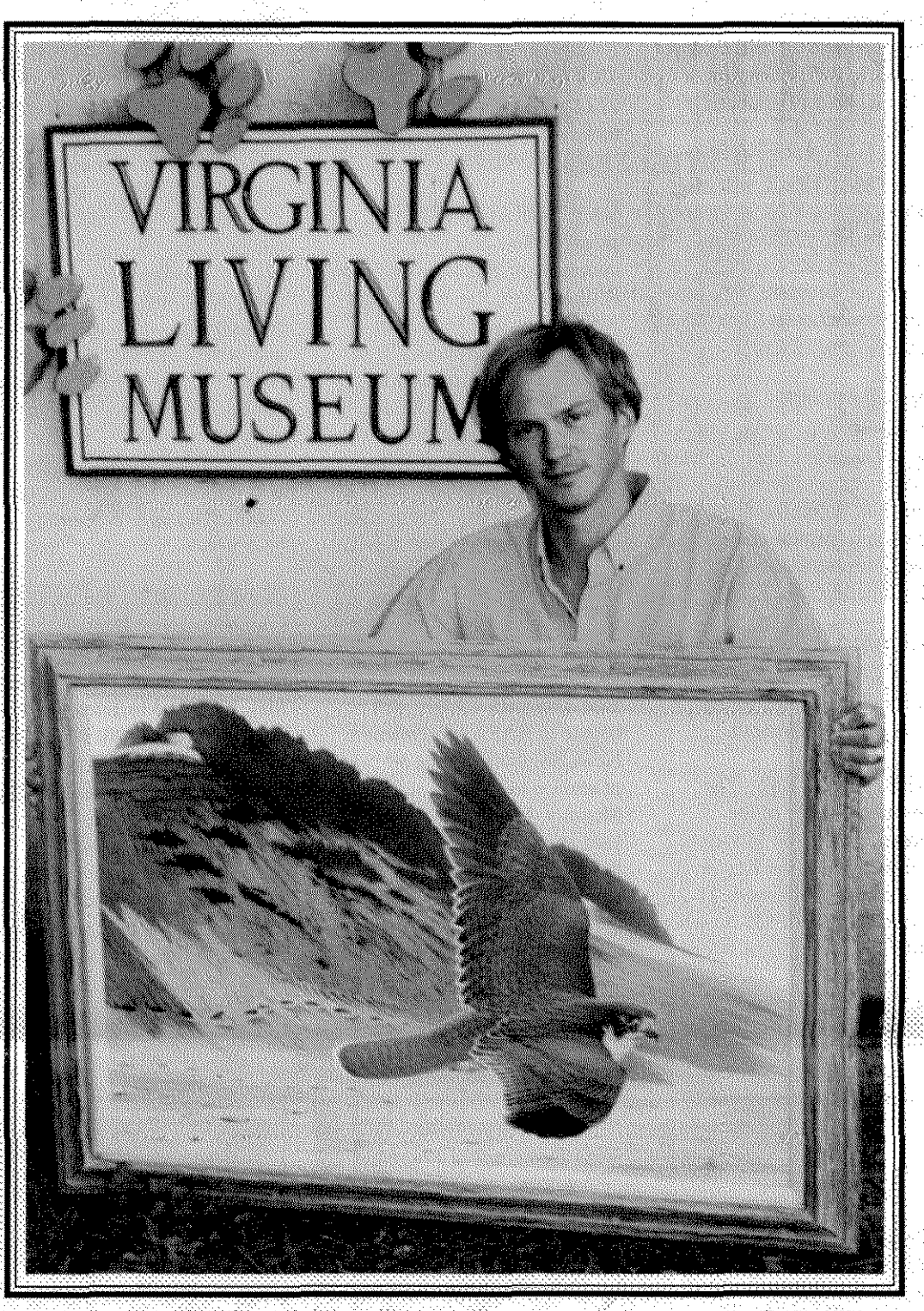
Alice Chiou, Grade 8, Category 3: Grades 7-12



Brian Dean, Grade 6, Category 2: Grades 4-6



Cathy Smith, Grade 1, Category 1: Grades K-3



-photo by Garland Wilson

Every Day Should Be Earth Day

Jim Wilson's commitment to preserving the environment is the focal point of his existence--both at work and after work.

Wilson, an employee of S. T. Systems Corp. assigned to Langley's Atmospheric Sciences Division, was the featured artist for the Peninsula's celebration of Earth Day 1990. Approached by representatives for Patrick Henry Mall, Wilson was asked to paint a mural depicting the elements of Earth Day in this area. Instead he painted "Coastal Watch--Peregrine Falcon," a 24- by 36-inch acrylic. But Wilson did not stop there. He wanted his work to serve a larger purpose--to create something which would last.

It became his plan that, in addition to his original work of art, 200 signed and numbered prints would be produced. The proceeds of the sale of these limited edition prints, Wilson is donating to the Virginia Living Museum (VLM) to build an exhibit to outlive Earth Day 1990. "I hope the exhibit will serve as a constant reminder to Peninsula residents of the need to conserve our natural resources," said the artist.

The thrust of Wilson's painting was to draw on things to which Peninsula people could easily relate. "I wanted to feature something successfully returned to the wild because of the original Earth Day focus. The peregrine falcon was an endangered species saved because of human intervention." Wilson placed the falcon among the sand dunes so characteristic of this area and reminiscent of the erosion problems that constantly face the region.

Wilson feels his work in the Environmental Research Division has been an inspiration to his painting. A long-time conservationist and naturalist, Wilson has become even more aware of problems facing our planet as a result of his NASA involvement.

Wilson's relationship to the VLM extends back to 1987 when he was chosen to produce a commemorative painting marking the museum's grand opening. "Our goals are interrelated. The museum is committed to public education. I have made it my task to arouse people to take notice, to preserve the beauty they see in my work," said Wilson. " I go to the museum constantly to do research for my paintings. It's a place where I can meet and study my subjects face to face."

Jim Wilson has remarked that April's Earth Day celebration seemed to be a point at which everything in his life came together. During activities both at the mall and the museum, he found himself surrounded by his works. In addition to the peregrine falcon, he was surprised to see more of his work in a NASA exhibit also on display which depicts the environmental research in progress at Langley Research Center. Wilson lives his commitment to the environment through his work and in his private life.

Prints of "Coastal Watch--Peregrine Falcon" are available for purchase by contacting the Virginia Living Museum, 595-1900.

Happenings

NO LAA SOCIAL next Friday due to Memorial Day holiday. Next social will be held Friday, June 8, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center.

TOASTMASTERS will meet Wednesday, May 23, at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Visitors are welcome. For more information, contact Christine Darden, ext. 45258.

STRESSBUSTERS, a relaxation and recharge group, will meet Wednesday, May 23, from 11:45 to 12:30 in Building 1212, Room 200. Location for the session is subject to change; call Steve Dahmen, ext. 44519, to verify meeting site.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays, 5-6 p.m., in the NASA gym. $12/month.

MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society will hold the Region II model contest September 21-22. No need to be an IPMS member to enter. For additional information, contact IPMS Tidewater, P. O. Box 1651, Newport News, VA, 23601.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, March 23, 9 a.m. to 3 p.m., in Building 1222. For information or to make an appointment, call the clinic, ext. 43195.

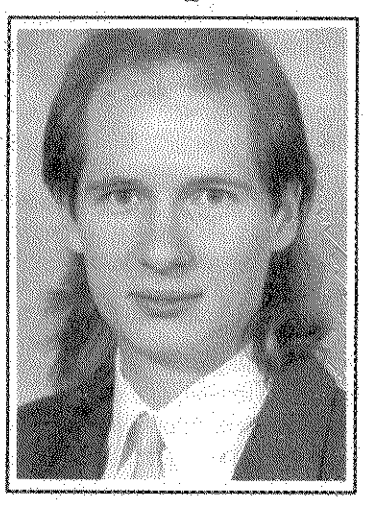
VA CHORAL SOCIETY presents their *Just for Fun* concerts tonight, May 18, at the Williamsburg Regional Library Arts Center, and May 19 at Christopher Newport College, Hampton. Both concerts begin at 8 p.m. Tickets are $5; senior citizen, student and military discount tickets are $4. In addition, a special concert honoring Virginia's former first ladies will be presented at 3:30 p.m., May 20, at the Wells Theatre in Norfolk. Tickets are $35 and $30. For information, call 591-0439 or 875-0542.

ENGINEERS CLUB will pay tribute to NASA and Newport News Shipbuilding for 50 years of service to the club at a dinner, Monday, June 11, in the Shipyard executive dining room. Dinner begins at 6 p.m. followed by a special program. Guest speaker will be Parke Rouse. Cost is $12. For reservations, call Abe Leiss, 877-2939, or Chris Malami, 838-4784, by June 8.

KIDS' STUFF SALE. The PTA of the Langley Child Development Center (LCDC) will sponsor a rummage sale Wednesday, May 23, from 11:30 a.m. to 1:30 p.m. and from 4 to 5 p.m. Donations may be brought to the LCDC May 21 thru May 23; donors will be given tax deductible receipts. LCDC is looking for children's clothes, toys, accessories--high chairs, cribs etc. Proceeds will be used to buy needed equipment and supplies. For more information, call Barbara Merrill or Kathryn Skinner, ext. 44827. The LCDC is located in Building 1231A near the Credit Union. In case of rain, the sale will be held Friday, June 1.

CONFERENCE. Fourth U.S. Light Hovercraft Design Conference and the 1990 National Hoverally will be held May 30-June 3 in Troy, Ohio. Racing activities will be featured and hovercraft will be on display. Call Mark Gorton, 722-7810, for information.

Scientist to Review Lunar/Mars Missions, Space Development



In 1989, President Bush identified new objectives for the U.S. space program, including the establishment of a permanent lunar outpost and a manned Mars mission. NASA is currently studying several options and schedules for these proposed missions.

On Wednesday, May 23, at noon in the Visitor Center theater, Eric Dahlstrom, a Lockheed senior engineer, will present "Lunar Bases, Mission to Mars and the Development of Space." This free lecture is co-sponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

Dahlstrom will provide an overview of current NASA studies on these objectives, review the history of previous lunar/Mars studies and examine other alternatives on the economic development of the moon.

The current NASA lunar and Mars program is oriented toward the goals of exploration, science, education, technology development, national pride and the potential for international cooperation. By 1992, NASA will decide whether or not to proceed with the development of these objectives.

The spider-like model shown below is part of a national touring exhibit which showcases the bicentennial celebration of the United States patent system. This local invention will be seen by over one million people during its two-year tour, states Dr. Harold W. Adams, patent attorney in Langley's Office of the Chief Counsel.

-photo by Carol Petrachenko

FROM NATURE...TECHNOLOGY. The dexterity of nature's ingenious spider has been captured by Langley engineers for use in space construction and repair with the invention of a three-dimensionally skilled, aluminum and fiberglass counterpart--the patented Space Spider Crane. The spider crane is designed to meet the challenges of moving and assembling components on or in the vicinity of permanent space structures. Its fully articulated four legs and two arms provide the mobility and flexibility needed to deal with curved structural surfaces or irregular geometric configurations. It can also take steps of up to 100 feet, allowing rapid coverage of large structures, according to its principal inventor, Ian O. MacConochie (right), shown here with the model builder, Thomas J. Abbott.

Researcher News

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Langley Researcher News

Volume 4, Issue 11 June 1, 1990

Bi-weekly Employee and Contractor Publication

Langley Creativity Recognized by Headquarters Official

Langley inventors and technology transfer proponents were recognized by NASA's Associate Deputy Administrator at the Fourteenth Annual Inventors and Technology Utilization Awards luncheon held May 9.

Samuel W. Keller made presentations to Langley employees who developed 43 patented inventions in 1989 and to 11 who were judged to have contributed the most to technology transfers for the last year. The recognition is designed to encourage NASA employees in the creative application of their specialties to the development of new hardware, systems and processes.

The Langley Research Center leads all of NASA in number of approved patents, according to Dr. George F. Helfrich, patent counsel in Langley's Office of the Chief Counsel. He also pointed out that NASA strongly encourages the pursuit of patentable ideas by assuring inventors of not only initial monetary awards but continuing payment of royalties and other income from the licensing of their inventions. He contrasted this new government royalty sharing approach to the practice of many commercial organizations which do not offer employees royalty incentives for their inventions and patents.

The patents awarded to Langley inventors in 1989 represent a dramatic cross-section of technology. They range from an earth-to-orbit vehicle providing a reusable orbital stage, to a medical diagnostic tool for rapidly quantifying the relative distention of a human bladder, to an airplane takeoff and landing performance monitoring system for commercial and private aviation.

The Technology Utilization program is a natural partner of the invention and patent process, says John Samos, Langley's Technology Utilization Officer. He states that, after a technology is developed, it becomes a candidate for use in other areas related to its intended focus or for an application totally divorced from its original conception. An excellent case in point, he adds, is transfer of a recently licensed invention in which the same sound waves used to detect flaws inside space construction materials are now used to measure burn depth in human skin. In this case, technology invented to signal internal cracks and delaminations from ultrasonic echoes has been directly spun-off to provide the same kind of diagnosis when the echoes are reflected from the interface between burned and healthy skin.

The award ceremony honored over 100 Langley employees who have distinguished themselves in these programs. See group photographs of awardees on page 4.

Walker Selected for ISU Fellowship

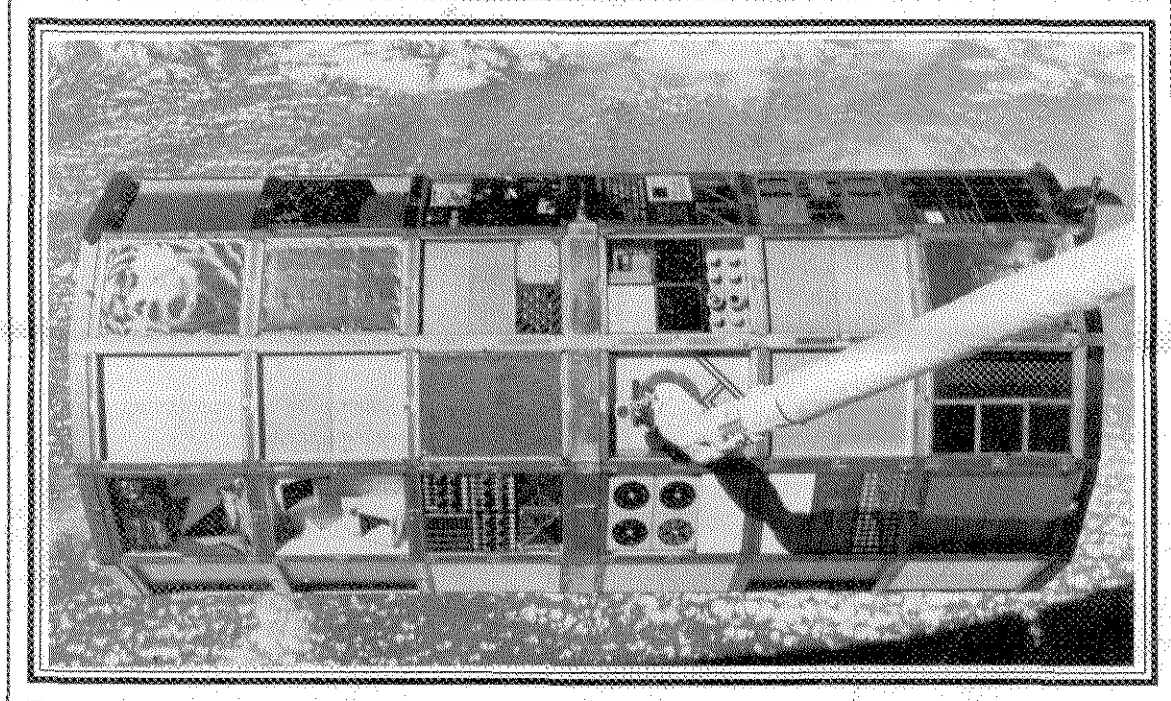
Carrie K. Walker, research scientist in the Systems Architecture Branch at NASA's Langley Research Center, has been chosen to attend the International Space University (ISU) summer session. The 1990 ISU program will be conducted at the Institute for Space and Terrestrial Science of the York University in Toronto, Canada.

The ISU is an innovative educational concept designed to educate future leaders in specific areas of space research and development. At ISU, the students participate in a broad interdisciplinary educational curriculum, meet and work with their colleagues from many nations, and sharpen their skills through an intensive design project experience.

Walker was selected for ISU through a Center-wide competition. "My primary objective in attending the ISU will be to get a more complete understanding of the many disciplines associated with the study and exploration of space," said Walker, who feels that computer science is becoming the ultimate cross-cutting technology. "Software engineering and computer science are increasingly important areas of research for NASA, as almost every aspect of aerospace research and mission operations are becoming dependent on technologies within these disciplines."

During her career at Langley, she has demonstrated exceptional technical and leadership skills in successfully advocating, directing and contributing to the development of a computer-aided software engineering (CASE) system. CASE capability allows a designer to automatically generate high level software codes from graphic specifications. Walker designed the interface and demonstrated that the CASE tool could be coupled to a commercially available computing system design and simulation tool. This combination allows the system designer to more effectively create and analyze computer systems. The CASE tool has been used to support the Advanced Launch System, a joint Air Force/NASA program.

Walker began her NASA career as a co-op student.



Experiments by Langley scientists cover about one-third of the area aboard the Long Duration Exposure Facility (LDEF). All experiment trays have been removed from the facility and are now in the possession of the principal investigators. Intensive analysis of these experiments is now underway. See page 3 for a Langley LDEF science preview.

Annual Awards

Langley's Annual Honor Awards Ceremony will be held Tuesday, June 5, at 1:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. NASA's and Langley's most prestigious honor awards will be presented to selected individuals and/or groups who have distinguished themselves by their outstanding contributions. NASA Administrator Richard H. Truly will be the special guest. Viewing will also be available in the cafeteria.

AIAA Names Fellows and Associate Fellows

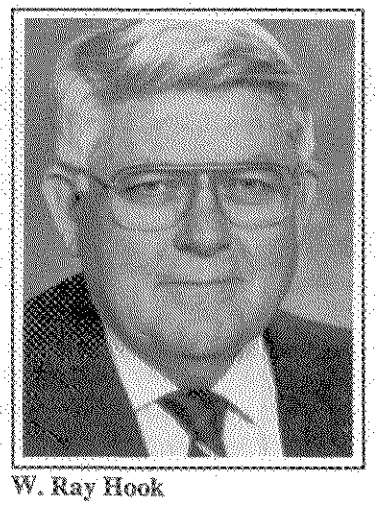
Twenty-one NASA Langley employees and two retirees have been selected for the rank of Fellow or Associate Fellow by the American Institute of Aeronautics and Astronautics.

Elevated to the rank of Fellow were Percy J. "Bud" Bobbit, former chief of the Transonic Aerodynamics Division; W. Ray Hook, Director for Space; Laurence K. Loftin, former Chief Aeronautical Engineer; Dr. Martin Mikulas, head of the Structural Concepts Branch and Jerry C. South Jr., head of the Computational Aerodynamics Branch. New Fellows were presented at the AIAA Annual Meeting held May 3 in Washington, D.C.

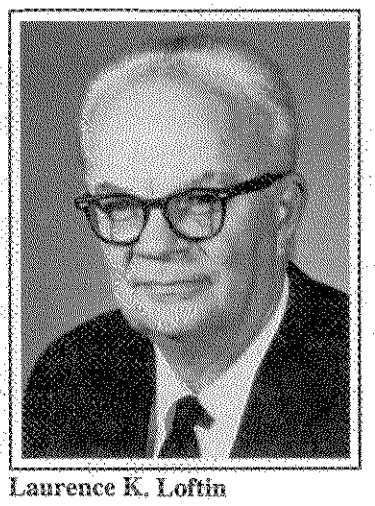
Named to the rank of Associate Fellow were William Adams, Dr. Frank Allario, Dr. W. Anderson, C. P. Blankenship, Bruce Conway, Dr. B. Grossman, Dr. W. L. Hallauer, Dr. A. Jakubowski, Dr. Jim Luckring, Domenic Maglieri, Dr. John Malone, John Preisser, Dr. Doug Price, Dr. Steve Sliwa, Cary Spitzer, D. Throckmorton and Sherwood Tiffany. Associate Fellows were honored at the annual AIAA Hampton Roads Section awards banquet Tuesday, May 15, in the H.J.E. Reid Conference Center.

Individuals are selected for these ranks in recognition of their outstanding contributions to aeronautics and astronautics.

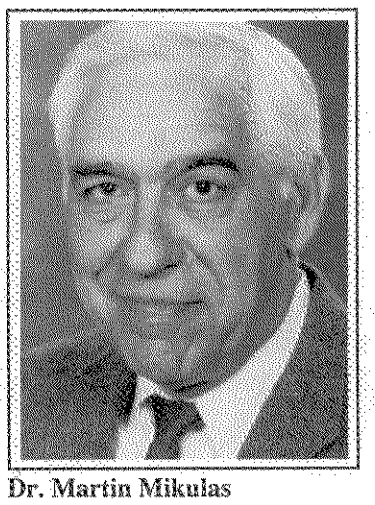
Percy J. "Bud" Bobbitt



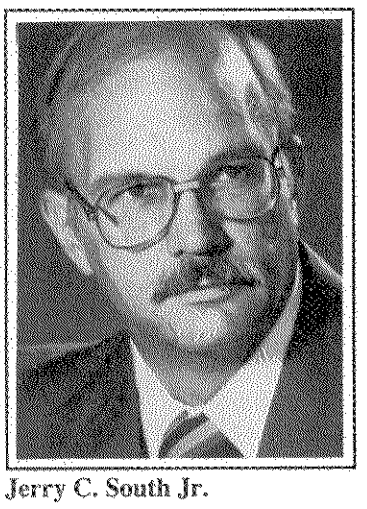
W. Ray Hook



Laurence K. Loftin



Dr. Martin Mikulas



Jerry C. South Jr.

News Briefs

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- NASA Marshall has awarded an approximately five-year-long contract to Lockheed Missiles and Space Co., Sunnyvale, Calif., for the design, development, test and evaluation of the Space Shuttle advanced solid rocket motor (ASRM). The new Shuttle motor will be phased in, during the mid-1990s, as a replacement for the current, redesigned solid rocket motor. It will provide improved safety, reliability and performance for the Shuttle flight program well into the 21st century.

AMES RESEARCH CENTER, Moffett Field, Calif. --- Cattle pastures that were once Brazilian tropical forests may be contributing to the buildup of greenhouse gases in the atmosphere. A team of NASA researchers sampled nitrous oxide levels in three ecosystems within Brazil's Amazon Basin: undisturbed rain forests, recently cleared and burned areas and land converted to cattle pastures. The researchers found that nitrous oxide emissions from recently cleared areas were not significantly higher than those from undisturbed rain forests. However, annual emissions from pastures were three times as high as levels obtained from representative samples of tropical forests. This is the first study showing the potential importance of tropical land use changes on greenhouse gases other than carbon dioxide. Given that tropical deforestation is occurring so rapidly, this effect could have global significance.

HEADQUARTERS, Washington, D.C. --- The "Ambler," a six-legged, 12-foot-tall, prototype, autonomous robot with the "brains" and motor skills to explore rugged terrain is being developed for NASA by Carnegie Mellon University's Robotics Institute, Pittsburgh. NASA officials and university researchers say the Ambler's technology could bring an important new dimension to solar system exploration. Because the robot literally walks, it can traverse rough terrain by stepping over crevices and large boulders. Future operational rovers, based on the Ambler design, could reach areas on the Moon and Mars inaccessible to wheeled vehicles or too dangerous for humans.

KENNEDY SPACE CENTER, Fla. --- Ulysses, a spacecraft that eventually will explore the sun, arrived at Cape Canaveral Air Force Station, Fla., May 17 to begin preparations for a launch in October aboard the Space Shuttle Discovery. The Ulysses mission is a NASA-European Space Agency (ESA) cooperative project to study the sun, the solar wind and interstellar space. The spacecraft's instruments will study the phenomena near the sun's north and south polar regions, which have never been examined by spacecraft. The 814-pound satellite, riding aboard an Air France 747 cargo plane, arrived after about a 10-hour flight from Amsterdam in the Netherlands. Ulysses was taken to NASA's Hangar AO prior to beginning final assembly and checkout.

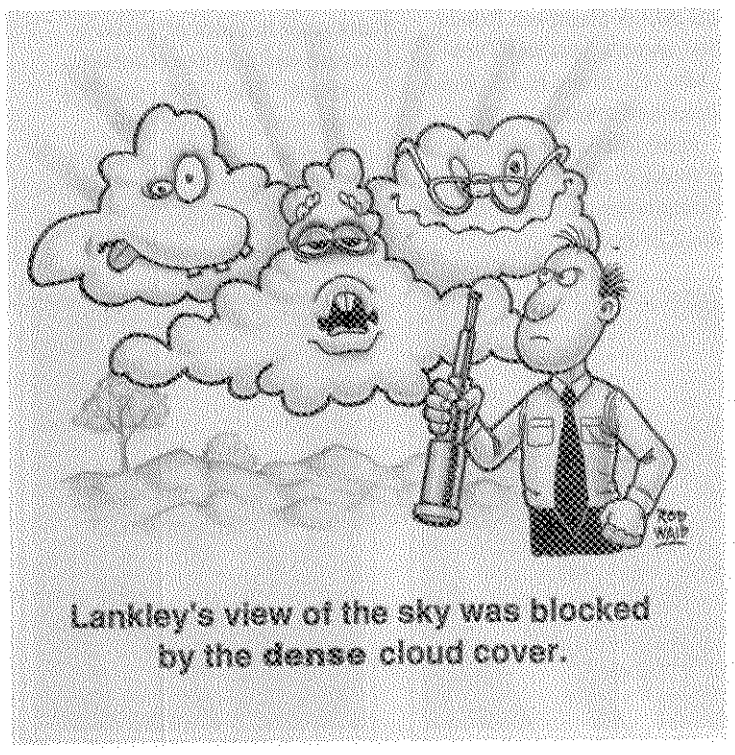
Editor's note: Surveys locally and at the Headquarters' level indicate that our readers are interested in NASA News Releases sumarized here. Copies are available by contacting Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request copies by headline and release number. See Current News Release box below.

Senior Management Research Review

The Senior Management Research Review will be held Monday, June 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	The Great Chinese Fire of 1987: A View from Space	Donald Cahoon (Space/ASD)
9:45	Precision Segmented Reflector Support Truss Developed	Harold Bush (Structures/SMD)
10:00	The Effect of Aqueous and Gaseous Environments on Fatigue Crack Propagation in Aluminum-Lithium Alloys	Robert Piascik (Structures/UVA)
10:15	Advanced High-Speed Civil Transport Concepts	James Fenbert (Aeronautics/AVD)
10:30	CO-O_2 Recombination Catalysts for CO_2 Lasers	David Schryer (Electronics/FED)
10:45	Analytical Upset Assessment Methodology	Victor Carreno (Flight Systems/ISD)

Lankley



Lankley's view of the sky was blocked by the dense cloud cover.

Note of Thanks

Dave Crockett writes: "Thank you for my recent retirement luncheon and gifts. This occasion and my many years of your friendship leave me with the fondest of memories. A special thank you to those who planned the event."

Current News Releases

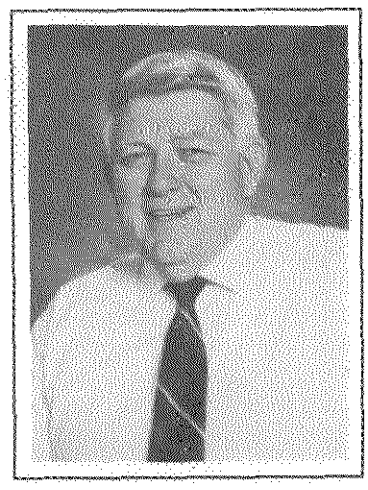
To obtain a copy of any of these NASA News Releases, contact Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by release number and headline.

90-67.....NASA Studies Effect of Tropical-Forest Burning on Greenhouse Gas
90-68.....NASA Awards Contract to Develop Advanced Solid Rocket Motor
90-69.....Carnegie Mellon University Develops Planetary Robot for NASA
90-70.....Ulysses Spacecraft Arrives at Cape to Begin Launch Preparations

Editorials

Langley

Headquarters Forum



On May 11, 1990, President Bush set a timetable for NASA's Space Exploration Initiative (SEI). Speaking at commencement exercises for Texas A & I University in Kingsville, Texas, he said, "We stand at a halfway point...Thirty years ago, NASA was founded and the space race began. And 30 years from now, I believe man will stand on another planet." The goal is to have humans on the surface of Mars before the 50th anniversary of the Apollo LEM landing on the Moon or before July 20, 2019.

In order to plan for Langley's full participation in SEI, last October, our Center Director commissioned an inter-directorate team to review the technical challenges required by a return to the Moon and for landing humans on Mars. Within three months, the team was to recommend technical areas where Langley could best contribute. The 30-member team, headed by Joe Talbot, reported to the Center Director and the senior staff in December. The decision was made that the Center would focus on two major areas critical to SEI--the aerobrake as well as the in-orbit construction and assembly, servicing and processing of space vehicles.

In February the Space Exploration Initiative Office was formed within the Space Directorate to provide a Center-wide focus for Langley SEI work. Brian Pritchard was named manager of the office and Jim Raper was selected to be his deputy.

This spring, the Center proposed expanded technology roles in aerobrakes, vehicle servicing and processing, radiation protection, space assembly and construction, and systems and multidisciplinary studies necessary to make the right technology and SEI system design selections.

Langley has a number of technology programs in place which are already contributing to making the return to the Moon and the trip to Mars more achievable through enhanced performance, safety and reliability. This research ranges from information systems to space vehicle structures and cryotanks to aerothermodynamics.

As in every government program, SEI is being subjected to strong budgetary scrutiny. However, prospects are good--the President's support is strong, the NASA budget is continuing to grow and NASA's top leadership is very capable.

W. Ray Hook
Director For Space

Key Positions Announced

The following individuals have been selected to fill key positions at Langley Research Center:

James L. Pittman, supervisory aeronautical engineer, AST, Aerothermodynamics, Aerothermal Loads Branch, Structural Mechanics Division, under CPP 89-71.

Richard A. Foss, supervisory aeronautical engineer, AST, Heat Transfer, Thermal Analysis Section, Engineering Analysis Branch, Systems Engineering Division, under CPP 89-93.

Mickey R. Gardner, supervisory engineering technician, Tunnel Support Section B, Laboratories Operations Branch, Operations Support Division, under CPP 89-100.

Bruce M. Adderholdt, supervisory engineering technician, Advanced Machining Development Section, Metals Applications Technology Branch, Fabrication Division, under CPP 89-101.

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

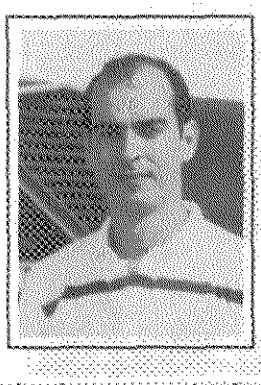
NASA Researchers Conduct Intensive Analysis of LDEF Experiments

-by Craig Murden

The principal research investigators for the Langley-originated experiments on the Long Duration Exposure Facility (LDEF) are well into their examination of what the onboard sensors, materials and detectors are revealing about the six-year space sojourn.

LDEF carried a total of 57 experiments involving scientists and engineers worldwide. Langley has principal and co-investigators for seven experiments as well as overall project responsibility for the program and the management and coordination of all LDEF experiments.

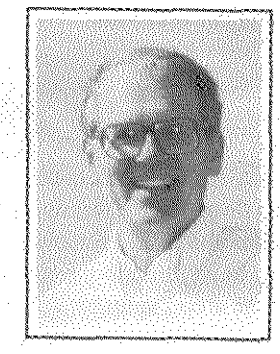
The evaluation of Langley's experiments will, in many cases, take several years as each investigator postulates what his test results mean in terms of answers to basic science questions. These answers will relate to such projects as construction of Space Station Freedom, along with lunar and martian habitats, the National Aero-Space Plane and the ability to monitor the Earth's air pollution and conduct thermal mapping.



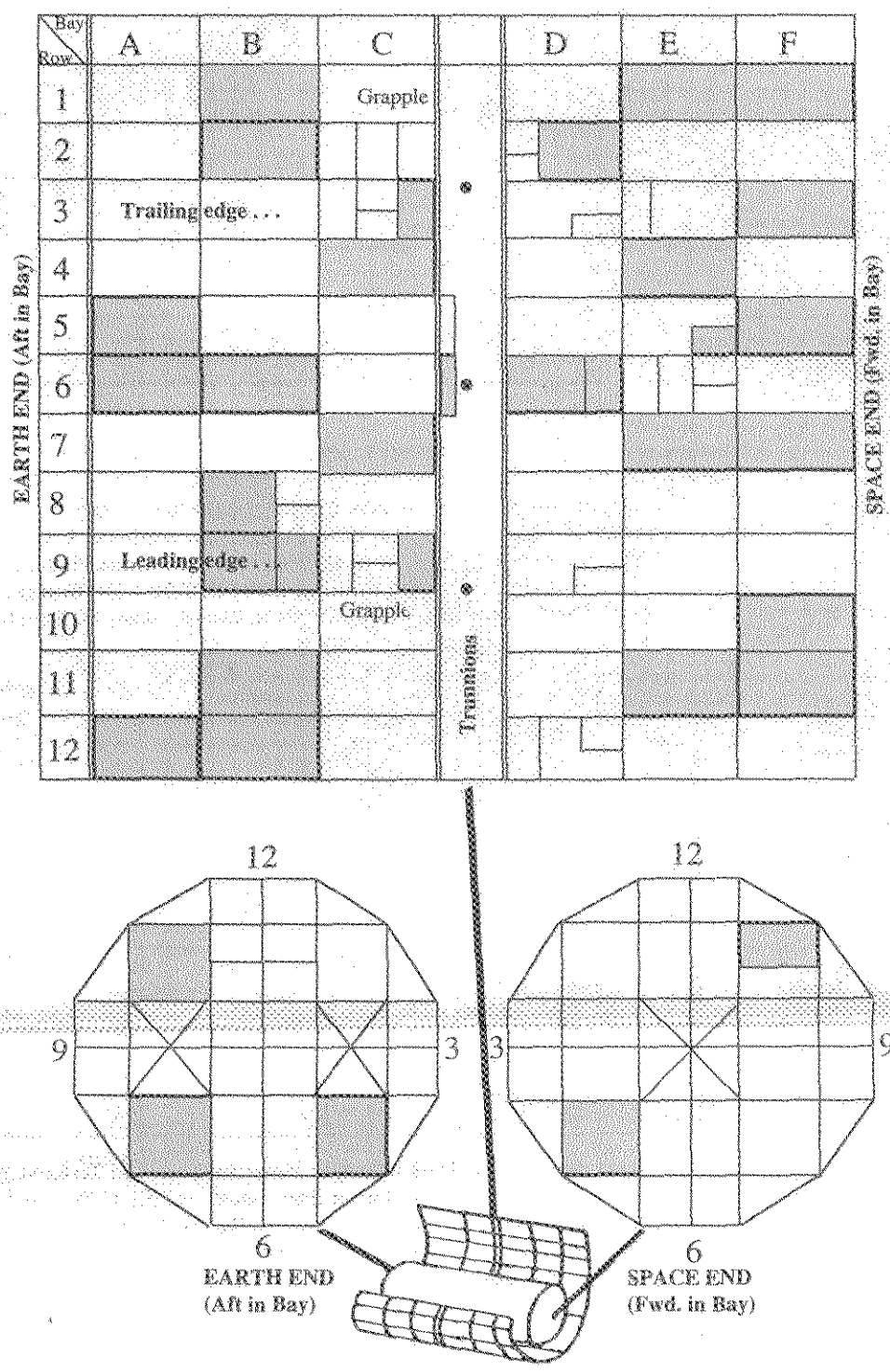
The experiment managed by William M. Berrios of the Spacecraft Systems Section is fundamental to all evaluations since it provides postflight LDEF temperature-time histories and develops new technology for the thermal control of future spacecraft. These data will be used by investigators to understand the thermal environment experienced by the LDEF experiments, a factor basic to successful analysis, according to Berrios. Temperature-sensing hardware was placed in seven different locations aboard the spacecraft to assess a variety of temperature variations, including the center ring, average interior, maximum structural long-term and transient temperatures, so that experimenters will be given an improved assessment of their experiments' thermal boundary conditions encountered during the mission.

The next investigator, Gale A. Harvey of the Chemistry and Dynamics Branch, is evaluating effects of space exposure on optical systems which will have increasing applications in space-based ventures and must, therefore, achieve increasing levels of sophistication. The LDEF results will be a major factor in that design and development evolution, says Harvey. Radiation detectors and selected optical components have been exposed to the space environment where hazards included radiation-induced discoloration, vibration and shock, erosion of coatings and optical contamination. The components were mounted on LDEF to simulate their likely surroundings in an operational system and for comparative analysis. Duplicate components have been maintained in the laboratory.

Another investigation to examine conditions which will shape future space hardware is the work being done by Donald H. Humes of the High Energy Science Branch. His objective is to establish the physical properties, population and size distribution of near-Earth meteoroids and the population of man-made debris in that same regime.



Prior assessments have had only a narrow focus on mass range with no overlapping measurements, states Humes. This experiment uses a uniform size detector--an aluminum plate--to detect material over a very large size range. The size distribution of the craters caused by meteoroids will be used to determine their population and size. Similarly, the shape of the craters, the impacting particle material found on the crater walls and the location of the impacts on the spacecraft will be used to separate meteoroid strikes from those of man-made debris.

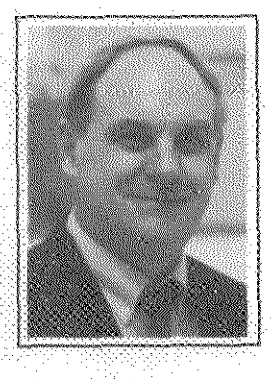


The illustration above depicts the Long Duration Exposure Facility (LDEF) unrolled and flattened. The shaded sections show areas of Langley involvement. LDEF carried 57 experiments into space for an unprecedented six-year duration. The experiments have now been removed from the structure and returned to their principal investigators for analysis.

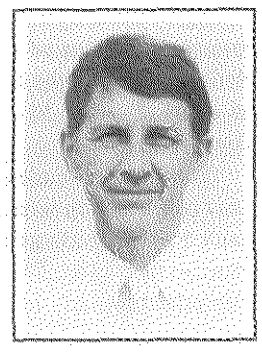
Further exploration of the make-up of space environs where future NASA activity will take place is being investigated by Philip C. Kassel, Jr. of the Photo-Optical Instrumentation Section.

His study of interplanetary dust, also known as cosmic dust or meteoric dust particles, is designed to study particle mass and velocity and to undertake correlative analysis with other LDEF experiments. This pursuit has been historically plagued with low data rates and, therefore, statistically inadequate data analysis, he says. Now, for the first time, the flight of an experiment with a large effective area should provide statistical confidence. Metal-oxide-silicon capacitor-type impact sensors were placed in four locations around the periphery and at each end of LDEF. Since a major source of these micrometeoroid materials is comets, the experiment's results may also give important insight into the cometary phenomenon, Kassel adds.

The next two experiments consider the space environment in terms of viability of spacecraft construction materials and coatings. Under the direction of Wayne S. Slemp, Applied Materials Branch, these efforts recognize that as space systems become large, more complex and expensive, they will require much longer lifetimes in space to be economically feasible. The first evaluation is of the near-Earth orbital environment upon the physical and chemical properties of laminated, continuous-filament composites and composite resin films to be used in the construction of large space structures and advanced spacecraft. These materials offer unique advantages due to their superior strength and stiffness-to-weight ratios and their low coefficient of thermal expansion, Slemp states. While ground laboratory testing programs are in progress, they are impaired by lack of data on the effects of the space environment on the properties of these materials. The second, related experiment assesses the performance of thermal control coatings since degradation of these protective coatings from space radiation can cause spacecraft to overheat, leading to problems with sub-systems and mission lifetimes. The approach here is to compare the long-term space environmental effects with preflight measurements and ground-based laboratory effects.



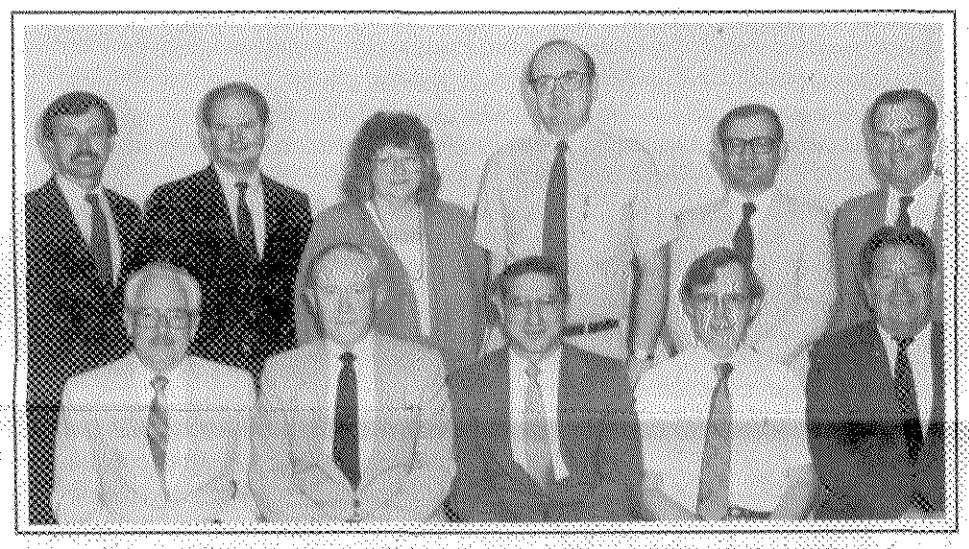
The last experiment departs from the other efforts by investigating the effects of long duration space exposure and launch environment on the performance of infrared detectors used in monitoring air pollution and in thermal mapping of the Earth. These effects must be understood to ensure validity of air pollution and Earth mapping measurements, according to Dr. James B. Robertson of the Crew/Vehicle Interface Research Branch, and principal investigator. The thrust of this experiment is to test pyroelectric detectors which are prime candidates to fill NASA's thermal detector requirements. They would replace current detectors which need large, complex and expensive cooling systems. The approach is to repeat preflight measurements for detector responsivity, detectivity, spectral response, pyroelectric coefficient and dielectric-loss tangent to determine the amount and type of damage suffered during launch and exposure.



These LDEF experiments and their Langley investigators will be featured further as test results are compiled and findings developed.

-photos by Sandie Horsey and Pilar Kitchen

Forty-eight Langley Research Center inventors who received U.S. patents in 1989 were honored at the annual Inventors' Luncheon held May 9. Honorees include (first row, L to R) Paul M. Hergenrother, John P. Stack, Patricia P. Davis, Ronald F. Hoyt, Dr. Billy T. Upchurch, Dr. Joseph S. Heyman, Elvin L. Ahl Jr., Harlan K. Holmes, Lawrence W. Taylor Jr., Thomas C. Moore Sr., Donald L. Progar; (second row) George F. Helfrich, patent counsel; Harold D. Burks, Charles J. Camarda, Robert L. Stallings Jr., David F. Johnston, Dr. Ping Tcheng, Anne K. St. Clair, Dr. John W. Connell, Irvin M. Miller, Frank H. Supplee Jr., Robert V. Hess, James I. Clemmons; (third row) Dr. Terry L. St. Clair, Floyd D. Wilcox Jr., David R. Schryer, Melvin C. Gilreath, Richard M. Wood, James C. Patterson Jr., Dr. James A. Martin, David B. Middleton, Johnny W. Allred, Dorsey E. White III, Dr. Ronald A. Outlaw, Philip O. Ransone. Benjamin T. Updike and William R. Phillips were honored posthumously. Not shown are Linda M. Blackburn, Dr. William T. Yost, Robert F. Berry, James B. Miller, Barry D. Sidney, Dr. George M. Wood, Dr. Robert S. Rogowski, Lee H. Person Jr., Travis N. Blalock, Diane M. Stoakley, Bruce D. Little and Gregory M. Buck.



Amendments to the Technology Innovation Act allow Langley patent holders to receive royalties for their inventions. Royalties are generated when patents are licensed to private industry. Show are (first row, L to R) Dr. Vernon L. Bell, Dr. John D. Buckley, Donald J. Progar, Robert J. Swaim, Harold W. Adams, patent counsel; (second row) Robert J. Fox, David F. Johnston, Anne K. St. Clair, Dr. Terry L. St. Clair, James I. Clemmons Jr., George F. Helfrich, patent counsel. Not shown are Dr. James B. Robertson and Ernest W. Millen.

Twelve Langley researchers received Technology Transfer awards for their accomplishments during 1989. Shown are (first row, L to R) Dr. Christine M. Darden, Dr. Joseph S. Heyman, Dr. Norman Barnes, Dr. Terry L. St. Clair; (second row) Anne K. St. Clair, Paul M. Hergenrother, Lawrence J. Bement, John M. Franke and John Samos, technology utilization officer. Not shown are James F. Meyers and Dr. John H. Cantrell Jr.

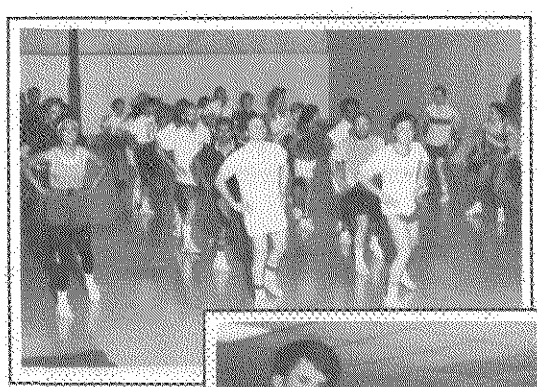
Langley Celebrates Federal Fitness Day

NASA employees and contractors participated in athletic activities at the LAA gym on Wednesday, May 16, Federal Fitness Day.

The Langley Fitness Center held an open house and provided an assortment of information on diet, exercise and health-related topics. In addition to education, competition was also part of the itinerary. Several athletic contests were held. "Jackpot," a contest similar to a casino slot machine, was integrated into a stairmaster workout. Participants had a one out of 25 chance to win. Other contests included "Beat the Clock" and "Go the Distance," which inspired participants to complete the most miles or to obtain the longest time exercising.

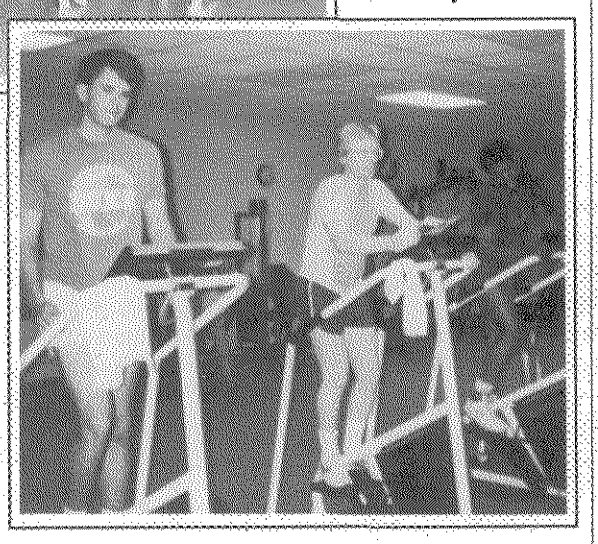
At noon, employees and contractors were invited to take part in a free, low-impact aerobics class in the gym. The same type aerobic classes, taught by Dr. Michele Macaraeg and Dr. Craig Streett, are held regularly on Tuesdays and Thursdays from 5 to 6 p.m. in the LAA gym. Classes have approximately 45 members--30 women and 15 men. After exercising, participants were invited to enjoy fresh fruit, juice and an assortment of nutritional muffins.

The NASA Exchange also participated in Federal Fitness Day by reducing prices on fruit and the salad bar in the cafeteria. Organized by the Office of Personnel Management, it is hoped Federal Fitness Day will be an annual event at Langley.



Michele Macaraeg and Craig Streett lead a special noon-time demonstration of her low-impact aerobics class on Federal Fitness Day.

-photos by Sandie Horsey



Langley Fitness Center participants compete in "Jackpot" on the stairmasters. This contest was a special event of Federal Fitness Day.

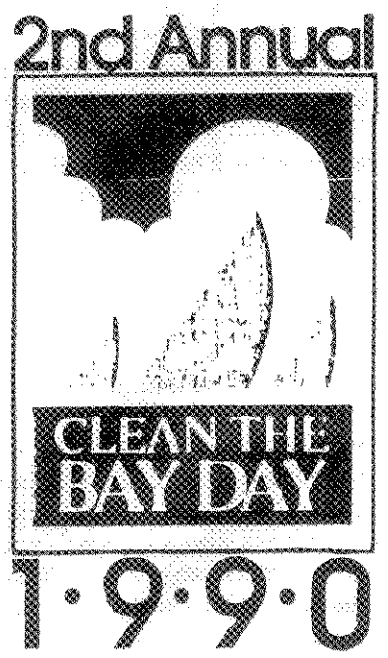
Langley Joins in 'Clean the Bay Day'

The LAA Conservation Club will participate in the beach cleanup sponsored by the Center for Marine Conservation and the local communities of Hampton, Portsmouth, Chesapeake and Virginia Beach Saturday, June 9, during the second annual "Clean the Bay Day."

Langley employees, contractors, retirees and their families and friends are urged to join in the clean-up. This is a community event intended to demonstrate concern for the environment and raise the level of awareness regarding conservation and recycling. The primary activity is a concentrated three-hour effort to clear beaches and inland waterways of litter. In addition to the clearing of these areas, valuable data is collected to help pinpoint the principal sources of litter.

Last year's inaugural event was an unqualified success. With the help of over 3,000 volunteers, over 30 tons of litter was collected and disposed of. The success of this effort did not go unnoticed. The 1989 "Clean the Bay Day" was a first place winner in the Virginia "Take Pride in America" contest.

Join the citizens of Hampton Roads in this effort to provide a cleaner, safer, more beautiful environment. For more information, contact Jean Peters Do, LAA Conservation Club president, at ext. 41538.



People & Places

Don't Play Games With Your Eyes

Baseball is the all-American pastime and the number one children's sport. It teaches the value of teamwork, the thrill of competition and the importance of practice. Unfortunately, like any vigorous activity, it presents hazards.

According to a study conducted by the U.S. Consumer Product Safety Commission, baseball injuries to children ages five to 14 are estimated at 359,000 each year. Forty percent of these injuries are to the head, face and eyes. The need for protection is obvious, and the solution is available.

The National Society to Prevent Blindness believes that the Home Safe Baseball Face Guard should be standard equipment for every baseball player. The face guard features a clear, polycarbonate face shield, permanently attached to a batting helmet, with a chin strap to secure it in the proper position. The face guard has undergone vigorous testing in the laboratory and on the field. Experts agree that the use of the face guard can substantially reduce the frequency and/or severity of injuries to the head, face and eyes. The Home Safe Face Guard has been approved by Little League, Pony, Dixie, and Babe Ruth Leagues.

Have You Seen . . . .

The following items have been reported missing. If you have any information or know the whereabouts of any of them, please contact the Equipment Management Section, ext. 42055 or 42056.

- Calculator, Elex. Display, ECN 0530502
- Model, Space Station, ECN 0259425
- Code-A-Phone Telephone Answering Machine, ECN 0259654
- Teleprinter, ECN 0464972
- Gauge, Capacitance, ECN 0429913
- Gauge, Capacitance, ECN 0429321
- Camera, Motion Picture, ECN 0531640
- Display Unit, Digital Equipment, ECN 0548694
- Calculator, Elex. Display, Prog., ECN 0427516

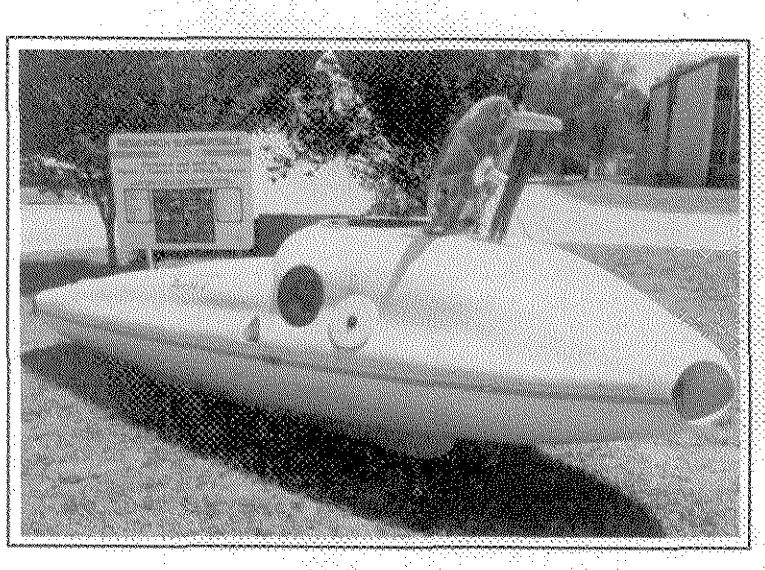
Swap and Shop

FOR RENT: HOME in Maxwell area, Newport News. Furnished, 3 BR, 2-1/2 BA, August 1990 to June 1991. $600/mo. Call 930-0002.

FOR SALE: AUTOS. '82 Ford EXP, yellow w/ black louvers, AM-FM cassette, new tires. $1250. '80 Dodge Colt, gold w/ sun roof. AM-FM cassette, 2-door. $750 Original owners. Call 868-6818.

AIAA Picnic

The AIAA Hampton Roads Section will hold its spring picnic Wednesday, June 6, from 4:30 to 8 p.m. on the Activity Center grounds. Cost is $5 for members and guests; $7 for non-members; $3 for students; $2 for children (6-12); children under 6 are free. For information and reservations, call Ferd Grosveld, ext. 43586, or Jim Youngblood, ext. 44509, by Monday, June 4.



Submersible on Display at Harborfest

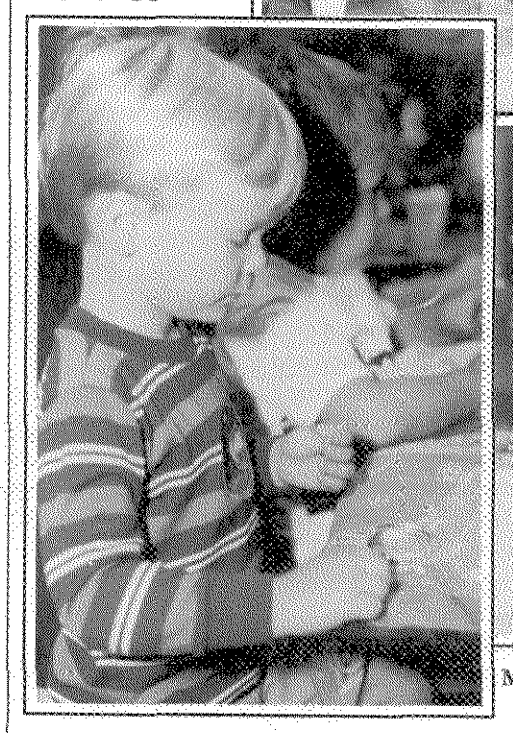
Pacita I, a one-atmosphere submersible, will be on display June 1, 2 and 3 at Harborfest. The submarine was built by Pacita Tiemsin, Guidance and Control Division, and Jeffrey Knutson, Systems Engineeing Division.

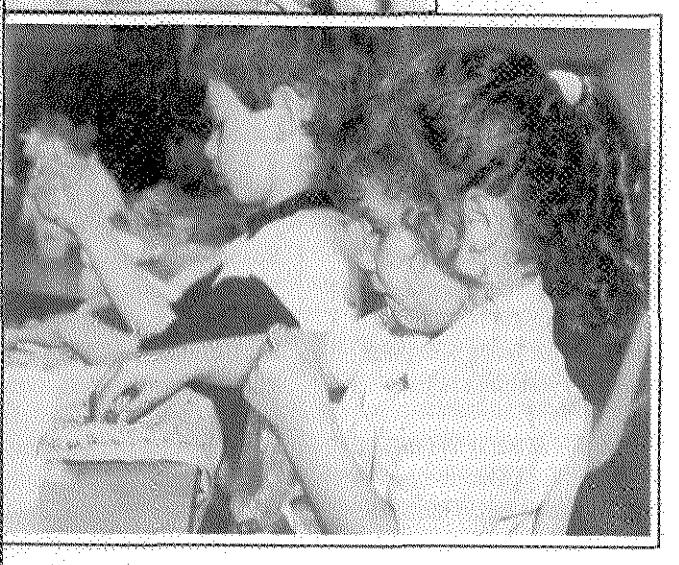
Prompted by a desire "to do ocean exploration in a shirt-sleeve environment," Tiemsin and Knutson have spent over eight years on their pet project. The thrust now is on exploration of the continental shelf.

Based on the premise that the continental shelf is largely unexplored, the goal of the project is to gain unrestricted access to the conshelf for both research and exploration. Their plan is to develop and deploy a manned exploration system, which includes both the manned submersible and a support vessel.

Kristofor Haugh is fascinated with his magnifying glass.

Canright holds a pretend "seed" for Liandren Buck (center) to observe through the sense of smell while Nick Beskenis (left) and Jimmy Burley (right) look on.





Morgan Massie (right) and Tomer Kishoni sort pretend "seeds."

SEEDS Story Told at CDC

LDEF Science Impacts All Age Levels

-story and photos by Carol Petrachenko

"Long, long ago, even before you were born...the Space Shuttle carried a very special cargo..."

If you had to teach three- to five-year-olds the story of the Long Duration Exposure Facility (LDEF) and Space Exposed Experiment Developed for Students (SEEDS), how would you begin? What could you do so they would understand that the tomatoes were experimental and not to be eaten?

Marchelle (Shelley) Canright, education and information specialist in Langley's Office of External Affairs, recently visited the Langley Child Development Center and met this challenge.

Canright uses a multi-disciplinary approach. In an hour, the students enjoy a story, create artwork, dance, explore scientific tools, and garden. They receive a thorough presentation of LDEF and SEEDS geared to their age level.

Even before she begins the "Long, long ago story," Canright starts with something more familiar--Jack in the Beanstalk.

The magic beans in the fairy tale are an excellent introduction to the growing process, from seed to plant.

At the end of the story, Canright asks, "Is this a real story or a pretend story?"

"Pretend," comes the answer.

"So, we're going to do some pretending," and she hands out tied bundles of colored scarves. When the students open their sacks, they find a magnifying glass, a measuring stick, and a bag of color-coated chocolate candies. The students are about to experience the scientific method.

"I'm ready," calls out a little girl as she begins to sort her candies. Another child is mystified by the magnifying glass. The students measure the candies, which are a substitute for the seeds, and examine them under the glass.

"Remember, we're pretending," says Canright as she holds up the candies. "These are the seeds." The students learn that they must not eat their experiments. "Observe!" she says. "Use your eyes to see, your hands to touch, your nose to smell and your ears to hear."

"I want to use my mouth to eat," says one enterprising youngster.

"Scientists do not eat their experiments," repeats Canright . The children are learning.

After working with the pretend seeds, the students hear the LDEF story. Canright has brought models of the satellite and the Space Shuttle. They learn about seeds that have been in space.

Then, they dance--feeling how a seed pushes through the ground and grows to the sky. Finally, Canright shows them some real seeds.

"Oh, man, they're little," says one child.

"Much tinier than me," says another.

It is obvious that the children like the little seeds very much and want to make sure they will grow well. Canright instructs them to draw a picture of a scientist on the cup which will hold the soil. The "scientist" will watch over the children's seeds even when the students are not in school.

Canright's program is over. The students have not just been taught. They have felt, created, learned and experienced. They know what seeds are about. They know their tomato seeds are special because they were in space. The classroom teachers, Lisa Gross and Roxie Mertz, will supervise the actually planting.

Shelley Canright, who has been a Langley employee since June 1985, is much more than an expert in designing preschool science programs. She works at all levels of education, from local elementary schools to universities, as well as state and national educational organizations, including museums and planetariums. She develops and conducts educational programs which support NASA research and technology.

Prior to her employment at Langley, she was a classroom teacher. Her experience includes the instruction of talented and gifted students in science, math, and reading. She is presently a member of the Newport News School Board. To have a better feel for the aeronautics side of her programs, she is currently pursuing a pilot's license.

Happenings

LAA SOCIAL will be held Friday, June 8, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Join your co-workers for some end-of-the-week celebrating.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1212, Room 200. The location is subject to last-minute change. For site confirmation, contact Steve Dahmen, ext. 44519.

TOASTMASTERS will meet Wednesday, June 13, at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are welcome. Contact Christine Darden, ext. 45258, for additional information.

LOW-IMPACT AEROBICS classes meet Tuesdays and Thursdays in the NASA gym. Cost is $12/month; $30/three months. First class is free.

NASA RETIRED WOMEN will meet for a Dutch-treat luncheon at 1 p.m. Thursday, June 7, at the Western Sizzlin' restaurant, Cunningham Drive. Discussion topic will be "The Aging Process." Call Eloise McGhee, 838-4146, Edna Davidson, 898-3868, or Irene Collins, 898-8188, for details.

Space Focus

Space Exploration Initiative Overview

The Space Exploration Initiative Office (SEIO) has been established at Langley to assure that this Center is vitally involved in the nation's program for space exploration of the solar system.

An objective of the SEIO is to keep all elements of Langley informed of the Space Exploration Initiative. On Friday, May 11, President Bush, speaking at Texas A&I University, stated, "I believe that before Apollo celebrates the 50th anniversary of its landing on the Moon, the American flag should be planted on Mars."

What does this mean to NASA and to Langley?

This question and others will be addressed by Brian Pritchard, manager of the Langley SEIO, in a status report on the Space Exploration Initiative program Tuesday, June 12, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222. His report will include current study activities, planning and schedules, and technology needs as well as the status of the Exploration Technology Program.

UVA Summer Seminar

"Disturbing the Universe: Space, Time and the Human Mind" is the title of a summer seminar to be held June 18-20 at the University of Virginia, Charlottesville. Discussions on the cosmos, the wonders of the Universe and the exploration of space will be led by space policy experts, astronomers, aerospace engineers and scholars.

Topics include the future of the U.S. in space, the history of air and space flight, astronomy's evolving frontiers, science fiction and social values, scientific exploration of space and America's next steps in space--manned flights, space station and planetary exploration. NASA's Deputy Administrator J. R. Thompson will speak on "The Next Steps in Space Exploration."

For registration information, call UVA, (804) 924-7141 or toll-free 1-800-FIND-UVA.

Langley Colloquium

Spitzer Presents 'Digital Avionics --A Cornerstone of Aviation"

In the last decade, digital avionics has built on microelectronics technology to make possible incredible new capabilities for aircraft. Flight-critical fly-by-wire flight controls have entered production. Full color flat panel displays are ready to enter service. Digital data links have sparked major changes in airline operational communications. The exponential growth in avionics capabilities and applications is predicted to continue.

Examples of the state of the art in digital avionics will be presented by Cary R. Spitzer, manager of Program Plans and Contracts, Advanced Transport Operating Systems Program Office, during a NASA Langley colloquium Monday, June 11. Spitzer will address employees, contractors and retirees at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222.

During his slide presentation "Digital Avionics--A Cornerstone of Aviation," Spitzer will offer thoughts on some revolutionary future trends in digital avionics and an assessment of international activity in the field.

In his position since 1985, Spitzer maintains industry liaison with airline and aircraft manufacturers and provides definition for future research programs for transport aircraft operations. From 1978 to 1985 he formulated research programs in avionics (aviation electronics) for advanced aircraft and spacecraft.

Spitzer began his NASA career in October 1962.

Participate in the 'Clean the Bay Day', Saturday, June 9.

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Researcher News

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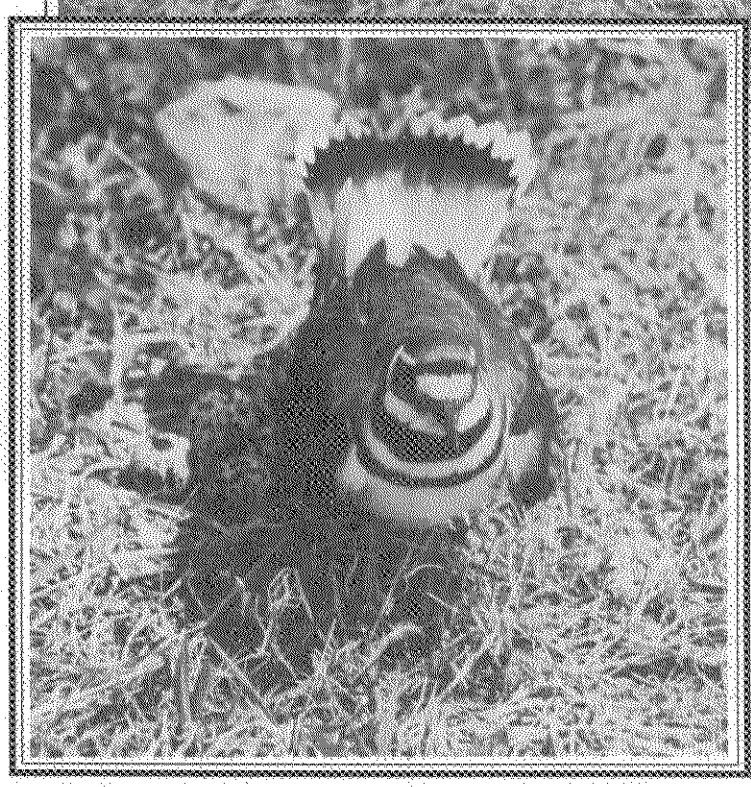


-photos by Allen Waters

PART OF THE LANGLEY FAMILY. Viewed outside of building 1237-T, Mama killdeer keeps close watch on those who pass by.

Viewed up close, one can just barely make out three speckled eggs to her right, camoflauged both by their coloring and her shadow. The *Charadrius vociferus*, a protected species, have been nesting in this area for a number of years. Mama raises her voice and fans her tail feathers as seen here when Langley work or workers encroach upon her domain.

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 12 June 15, 1990

Bi-weekly Employee and Contractor Publication

Truly Officiates at Annual Awards Assembly

Petersen Awarded NASA's Highest Honor

Forty-five individuals and 38 groups representing over 900 individuals were presented Langley and NASA honors at the June 5 Annual Honor Awards ceremony.

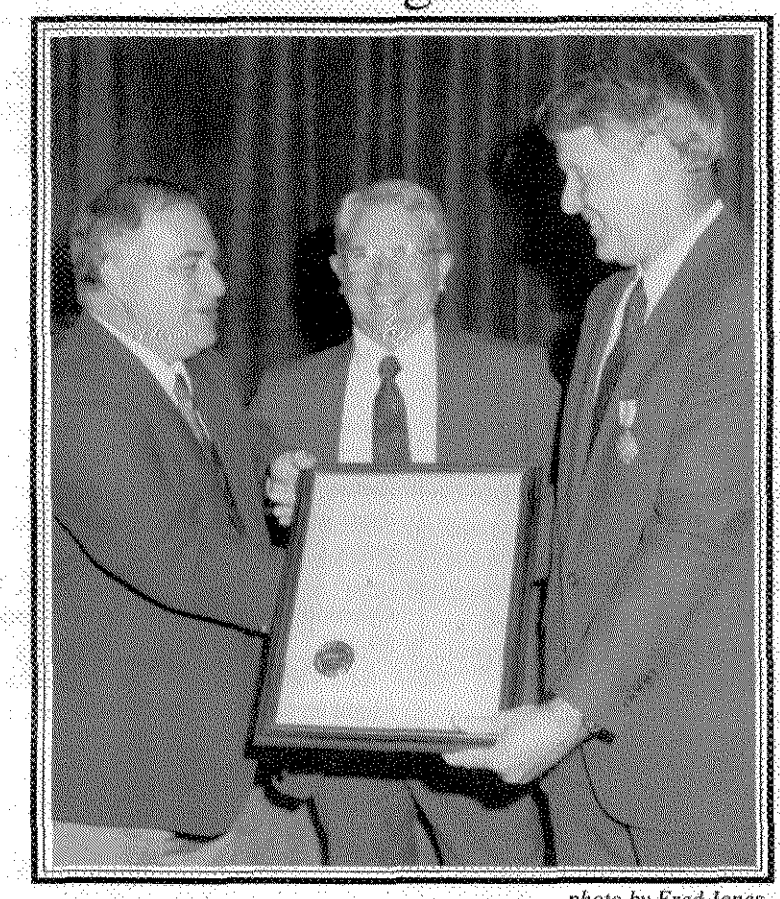
NASA Administrator Richard H. Truly, in his address to Langley employees, honorees, their families and guests who filled the H.J.E. Reid auditorium, emphasized that "it's not the project, the facility or the wind tunnels, but the people that count." Noting that 1989 was one of the greatest years in NASA history, Truly cited recent NASA accomplishments--10 Shuttle flights in 18 months, five superb expendable launches, a marvelous year in space science. "Today is the day we honor those who have made it happen."

In a surprise presentation at the conclusion of the ceremony, Truly presented Langley Director Richard H. Petersen with the Distinguished Service Medal "in recognition of his outstanding achievements which have contributed to the United States' preeminence in aeronautics and space exploration." This is the highest honor that NASA confers.

Petersen's continued advocacy for a strong hypersonic aircraft technology program led to the establishment of Langley as NASA's lead center for the National Aero-Space Plane (NASP) program. He has committed over 200 Langley researchers to work with industry to assist in the development of the NASP vehicle for flight during the mid-1990s. Under Petersen's direction, Langley has pioneered computer-aided engineering tools which placed the Center in a unique position to lead objective, independent reviews of Space Station Freedom options. Results of these efforts have been primarily responsible for major Agency decisions on Space Station. Finally, under Petersen's leadership, Langley has played a key role in supporting the nation's atmospheric sciences program. Satellite instruments developed here have been crucial in determining ozone trends, measuring the Earth's radiation budget, and demonstrating the crucial role played by clouds in determining Earth's climate.

Administrator Truly joined Petersen in recognizing Joseph Getsug, Systems Safety, Quality and Reliability Division, for 50 years of service to NASA. Getsug began his NASA career in 1949 as a junior electrical engineer.

Langley awardees, NASA medal winners and group awards are listed on pages 3 through 6.



-photo by Fred Jones

NASA Administrator Richard H. Truly (center) presents Langley Director Richard H. Petersen with NASA's highest honor, the Distinguished Service Medal. Deputy Director Paul F. Holloway (left) made the announcement at the Annual Awards Ceremony held June 5.

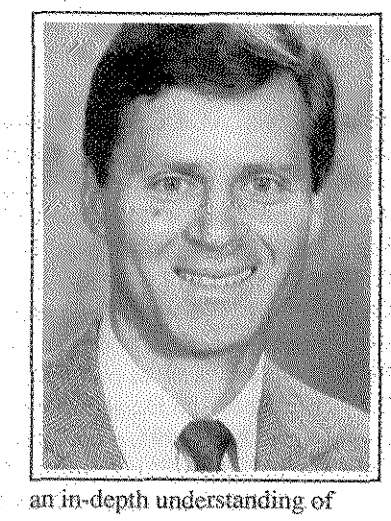
Baker Named Sloan Fellow

Ronald L. Baker, head of the Systems Development Branch, has been selected an Alfred P. Sloan Fellow for 1990-91. He will enter a 12-month course of study leading to a master of science degree in management at the Massachusetts Institute of Technology, Cambridge.

MIT has selected 58 mid-career executives from the United States and abroad as Sloan Fellows. This will be the 59th year of the program, the first executive education program in the world. "The original concept of broadening typically specialized managers for general management positions still guides the direction of the program," said Alan F. White, associate dean for executive education at MIT's School of Management and director of the Sloan Fellows Program. "Graduates of the program have risen to significant leadership positions in their organizations throughout the world."

"The Sloan program will provide me the curriculum as well as the dedicated time, educational environment and distinguished faculty to develop an in-depth understanding of management principles, techniques and concepts," said Baker. "It will strengthen my knowledge and understanding of the basic principles of management and expose me to new ideas and modern concepts for organizational management. The interaction with world class instructors and corporate business leaders from all over the U.S. and abroad will expand my view of and permit me to better interface with domestic and foreign profit and non-profit organizations."

Baker began his NASA career in 1969 as a design engineer and analyst in the Systems Engineering Division.



Struhar, Ogiba Named to Management Ops Posts

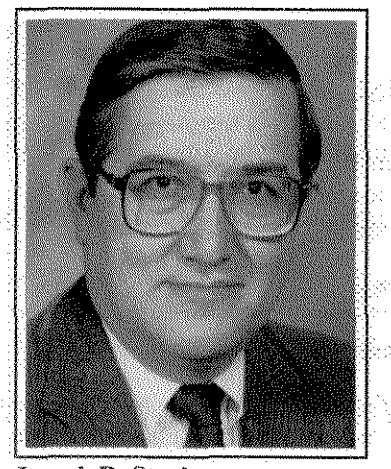
Joseph R. Sruhar has been selected to head the Programs and Resources Division, Management Operations Directorate. He replaces Dr. Belinda H. Adams, who is serving as a Sloan Fellow at the Massachusetts Institute of Technology. Filling Struhar's vacated position as chief of the Financial Management Division is James H. Ogiba, who moved up from assistant of that division.

Struhar is responsible for assisting Center senior management officials in planning and implementing research and development programs through analysis of money, manpower and facility programs. He also prepares budgets and program operating plans, monitors the budget process and supports Langley divisions in resource policy and procedure.

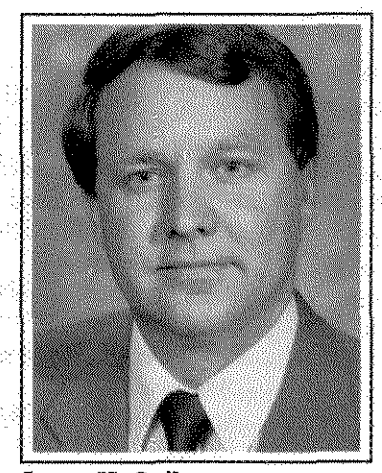
He began his Langley career in 1960 as a staff accountant.

Ogiba's responsibilities include the development, coordination and maintenance of the fiscal, audit, accounting and financial reporting system which covers the resources of the Langley Research Center. He also directs the operations of a passenger transportation function and oversees non-appropriated fund activities.

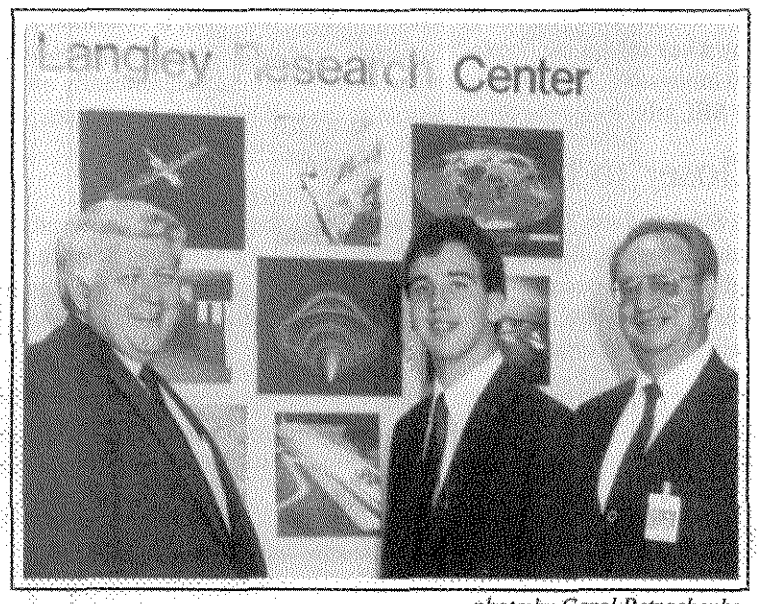
Ogiba joined NASA in 1972 as an auditor in the Headquarters NASA Management Audit Office with duty at Langley.



Joseph R. Struhar



James H. Ogiba



-photo by Carol Petrachenko

Director for Space W. Ray Hook (left) greets NASA scholarship winner Timothy O. Jarrett and his father Olin Jarrett.

Another Langley Dependent Awarded NASA Scholarship

For the second consecutive year, a Langley dependent has been awarded a NASA scholarship. Timothy Olin Jarrett, a 1990 graduate of Menchville High School in Newport News, 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. Tim is the son of Olin Jarrett, an aerospace engineer in Langley's Fluid Mechanics Division.

Menchville co-salutatorian and National Merit Finalist, Tim will attend the University of Virginia as an Echols Scholar. In addition to the NASA scholarship, he is also the recipient of an American Institute of Aeronautics and Astronautics (AIAA) scholarship. He plans to major in physics at UVA and minor in literature or political science. Graduate work at Stanford or Princeton may be in his future as well.

Tim was a semi-finalist in the Westinghouse Science Talent

Continued on page 2.

News Briefs

HEADQUARTERS, Washington, D.C. --- The Department of Defense and NASA have announced the immediate establishment of a national team of contractors to continue to do challenging research and development of the National Aero-Space Plane (NASP). With the engineering and technology bases available from Rockwell International, McDonnel Douglas, Pratt and Whitney, General Dynamics and Rocketdyne, the federal government expects to benefit from the synergism of ideas from these five organizations. With the national contractor team, the Department of Defense and NASA take a unique first step in formulating a single team of contractors working together to develop technologies for future hypersonic aircraft. The team will conduct the design and development activities necessary to proceed with the X-30 research aircraft and develop a competititve technology base for future systems.

JOHNSON SPACE CENTER, Houston, Texas --- Astronaut crew assignments have been made for three Space Shuttle missions scheduled for early to mid-1991, bringing the total number of Shuttle crews currently in training to 12. Navy Capt. David M. Walker will command a crew aboard the Space Shuttle Atlantis on STS-44, a Department of Defense-dedicated flight currently targeted for March 1991. Air Force Lt. Col. Terence T. "Tom" Henricks will serve as pilot. Mission specialists for the flight will be F. Story Musgrave, M.D.; Navy Lt. Cmdr. Mario Runco Jr., and Army Lt. Col. James S. Voss. Marine Col. Charles F. Bolden Jr. will command Shuttle flight STS-45 (ATLAS-01), a mission dedicated to studying atmospheric phenomena from a laboratory aboard the Space Shuttle Columbia. Air Force Maj. Brian Duffy will serve as pilot. Mission specialists are payload commander Kathryn D. Sullivan, Ph.D.; C. Michael Foale, Ph.D.; and Navy Capt. David C. Leestma. Payload specialists for the mission, currently projected for April 1991, are Michael L. Lampton, Ph.D., and Byron K. Lichtenburg, Ph.D. Air Force Col. John E. Blaha will command STS-43, a five-day mission to deploy the Tracking and Data Relay Satellite, TDRS-E, planned for May 1991. Serving as pilot aboard Discovery will be Navy Cmdr. Michael A. Baker. Mission specialists will be Shannon W. Lucid, Ph.D.; G. David Low and Army Lt. Col. James C. Adamson.

HEADQUARTERS, Washington, D.C. --- NASA has announced a second competition under the National Space Grant College and Fellowship Program. Phase II, which will result in the selection of Space Grant State Consortia, provides all states not now a part of the program the opportunity to compete. The District of Columbia and Puerto rico are also eligible. The National Space Grant College and Fellowship Program was authorized by Congress to help strengthen and enhance, through the nation's universities, U.S. capabilities in aerospace science and technology.

AMES RESEARCH CENTER, Moffett Field, Calif. --- Research into how astronauts can grow their own food, live and work on the moon and safely explore the harsh environment of Mars will be the prime focus of the newly created Advanced Life Support Division at NASA Ames. William E. Berry, who heads the new organization, said the goal is to support President Bush's plan for a permanent lunar settlement and an astronaut mission to Mars. The new division will focus its efforts on developing new technologies that will allow humans to live and work productively in space for long periods of time.

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has announced that NASA has launched an outreach program to seek new and innovative ideas, systems and technologies to carry out the nation's Space Exploration Initiative (SEI). The outreach program is in response to Vice President Quayle's request to "cast the nets widely" for new approaches to space exploration. Former astronaut Lt. Gen Thomas P. Stafford, USAF (Retired), is chairman of the Synthesis Group, which will play a key role in the outreach program. The program seeks approaches to mission and system concepts; and innovative, high leverage technologies that could significantly affect cost, schedule and performance for SEI, which sets the future course of the U.S. civil space program.

Closer to home . . .

On Sunday, June 3, NASA Administrator Richard H. Truly delivered the commencement address for the inaugural graduation of the Mississippi School for Math and Science. The two-year public residential high school was established by the Mississippi University for Women in Columbus, the oldest women's college in the state. The school is for academically-advanced students. The senior class president Angela Lang plans to co-op at Langley.

Editor's note: To obtain a copy of NASA News Releases summarized above, contact Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by headline and release number. See Current News Release box below.

Positions Open

90-60: AST, Experimental Facilities Development, GS-801-13 or 14; Facilities Program Development Office. Open to employees of all NASA installations with civil service status. Closes June 15.

90-66: Audio-Visual Production Officer, GS/GM-1071-12 or 13; Research Information and Applications Division. Open to employees of all NASA installations with civil service status. Closes June 22.

90-67: Supervisory Engineering Technician. GS-802-12 or GM-13; Fabrication Division. Open to NASA Langley employees with civil service status. Closes June 18.

90-68: Supervisory Aerospace Engineer, GM-861-13 or 14; Systems Engineering Division. Open to NASA Langley employees with civil service status. Closes June 20.

Key Positions Filled

Patsy L. Campbell, equal opportunity specialist, Office of Equal Opportunity Programs, under CPP 89-103.

Allen C. Royal, supervisory aeronautical engineer, AST, Aerospace Flight Systems, Aeronautical Engineering Section, Aeronautical Systems Engineering Branch, Systems Engineering Division, under CPP 89-105.

Barry D. Meredith, AST, Technical Engineering Operations Management, Space Station Freedom Office, under CPP 89-107.

Frank W. Cazier Jr., aeronautical engineer (temp.), AST, Flight Systems Program Management, Office of the Director for Structures, under CPP 89-109.

John M. Inman, AST, Facilities Program Management, Office of the Chief, Facilities Program Development Office, under CPP 89-110.

Laurence D. Leavitt, supervisory aeronautical engineer, AST, Fluid and Flight Mechanics Program Management, Propulsion Aerodynamics Branch, Applied Aerodynamics Division, under CPP 90-1.

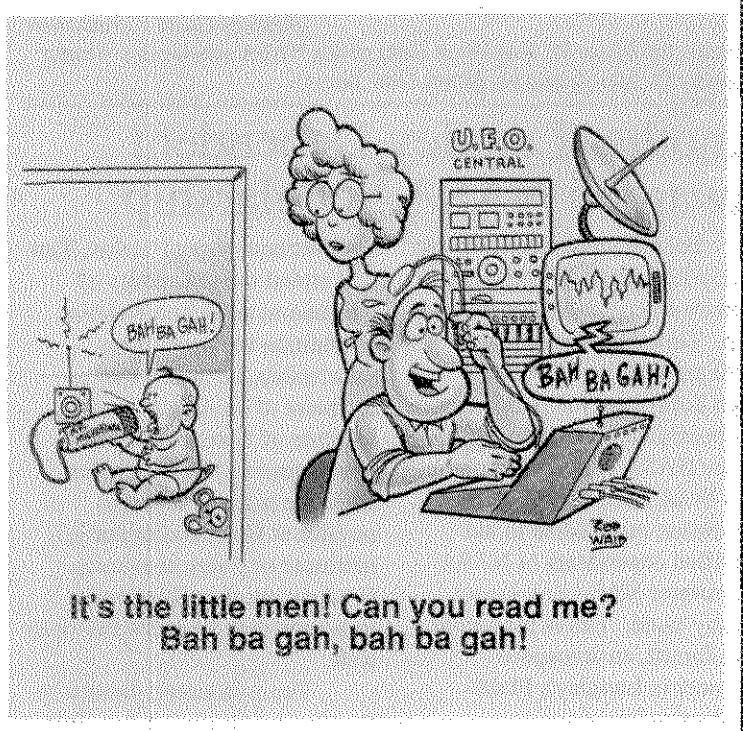
Student Wins NASA Scholarship

Continued from page 1.

Search honors group, attended the Virginia Governor's School for Science and Technology and is a lifetime member of the Virginia Junior Academy of Science. He was a member of Menchville's "It's Academic"--Tidewater Challenge team, the National Honor Society, Key Club and orchestra. Through his advanced study at New Horizons Technical School, he participated in mentorship projects in cybernetics and cryogenic engineering at CEBAF during his junior and senior years. He has already begun work as a CEBAF technician again this summer. A free lance writer for both his school yearbook and newspaper and a contributor to the literary magazine, Tim has also been named to *Who's Who Among American High School Students.*

Olin Jarrett is understandably proud of his son's accomplishments. "I am honored that the organization I work for has chosen to recognize my son with this fine distinction."

Lankley



It's the little men! Can you read me? Bah ba gah, bah ba gah!

Space Shuttle News at Your Fingertips

A toll-free telephone number for information about Space Shuttle missions is now available.

By calling 1-800-SHUTTLE, callers can hear a 45-second recorded message which includes an updated Shuttle launch schedule.

This service is sponsored by Spaceport USA, which operates tours and a visitor center at NASA's Kennedy Space Center in Florida.

Current News Releases

90-71.....DOD/NASA Announce NASP Contractor Team
90-72.....Shuttle Crews Named for 1991 Missions
90-73.....New Advanced Life Support Division Established at NASA Ames
90-74.....NASA Administrator Announces Exploration Outreach Program
90-75.....Space Grant College and Fellowship Program Phase II Announced
90-76.....Apollo 204 Capsule to Remain at the Langley Research Center

Discount tickets for area attractions are available at the Visitor Center Souvenir Counter. Call 864-1585 for details.

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

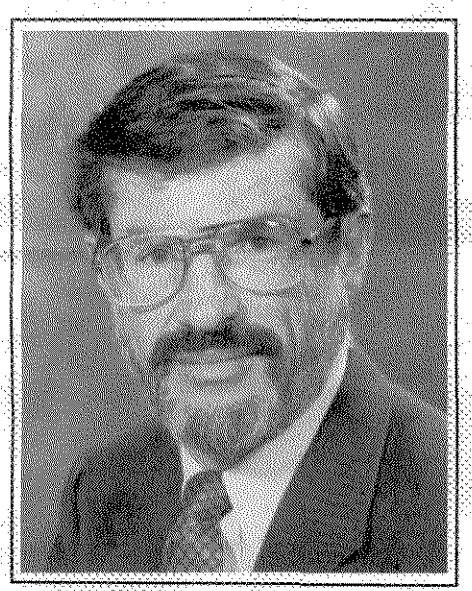
The privilege of advertising in this publication is restricted to the employees and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

H.J.E. Reid Award

-photo by Fred Jones

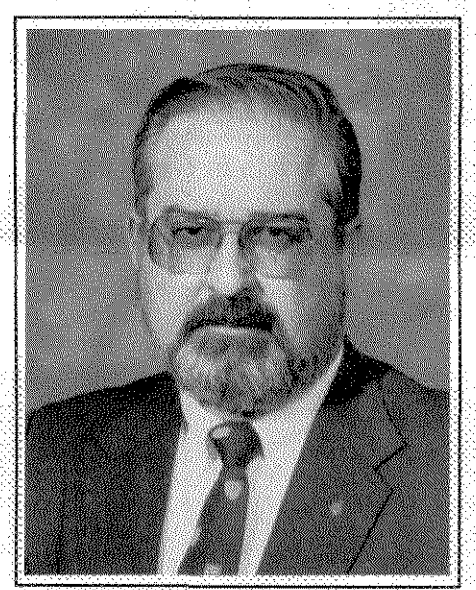
Langley's highest award, the H.J.E. Reid Award, recognizes the outstanding scientific or engineering paper written by a Langley Research Center employee or group of employees. Center Director Richard H. Petersen (right) congratulates Reid Award winners (L to R) M. Patrick McCormick and Lamont R. Poole, cited for their paper entitled "Polar Stratospheric Clouds and the Antarctic Ozone Hole."

NASA HonorAwards--Outstanding Leadership Medal



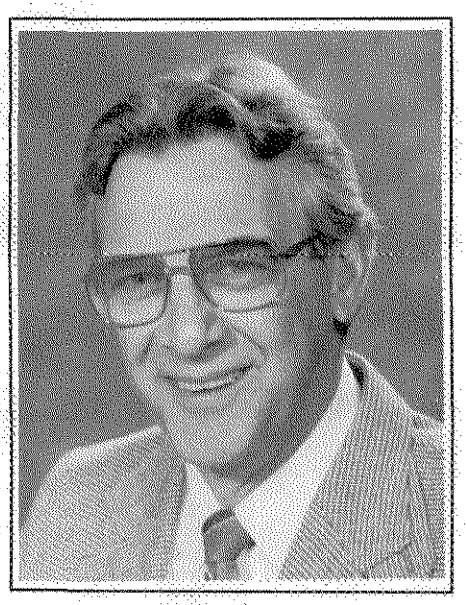
Jeremiah F. Creedon

"For outstanding leadership in defining high-payoff research programs and in developing productive research organizations to successfully implement the programs."



James L. Raper

"For outstanding leadership of the Halogen Occultation Experiment Project during design, development and testing of the flight instrument for the Upper Atmosphere Research Satellite mission."



Maurice K. Morin

"For outstanding leadership in development and management of scientific computing facilities and services."

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 June 5 in the H.J.E. Reid Conference Center.

NASA Administrator Richard H. Truly and Langley Director Richard H. Petersen presented the NASA medals and Langley awards. They were assisted by Paul F. Holloway, deputy director.

Langley Group Achievement Awards

Special Achievement Awards for Group Accomplishments recognize groups and individuals for performance substantially beyond expectations on a specific assignment or job function. The services awarded are in the public interest and are connected with, or related to, official employment. Receiving group awards were:

Basic Aerodynamics Research Tunnel Development Team, "For development of the Basic Aerodynamics Research Tunnel Computational Fluid Dynamics Code Validation Facility."

CFL3D Development Team, "For timely development of an aerodynamic analysis theory and computer code, CFL3D."

Close-Range Photogrammetry Team, "For development and application of photogrammetric techniques that provide precision measurements of minute structural deformations, movements or positions in research projects throughout Langley Research Center."

Commercially Developed Space Facility Concept Definition Team, "For sustained exceptional performance in accomplishment of the Commercially Developed Space Facility study."

Computer-Generated Image System Integration Team, "For outstanding technical performance in the definition and integration of a Computer-Generated Imaging system to provide state-of-the-art visual scene simulation for Langley Research Center's flight simulators."

Cosmic Radiation Total Absorption Team, "For developing an accurate and validated theory which predicts total probability of interaction between cosmic radiation and matter for all nuclear absorption reactions."

Data Transcription System Team, "For development and implementation of data recover techniques resulting in recovery of data that might have been lost from the Long Duration Exposure Facility."

En Route Noise Test Research Team, "For defining long-range atmospheric propagation of en route noise for advanced turboprops."

Experimental Test Range Development Team, "For advancement of compact range technology through development of an Experimental Test Range."

Film Cooling Team, "For development of film cooling database and design guidelines for the National Aero-Space Plane scramjet structure and coordination of government and industry research."

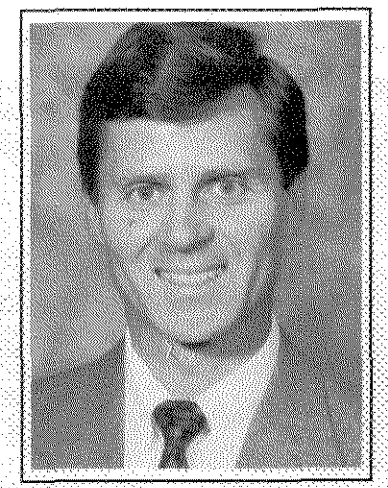
Halogen Occultation Experiment Gas Response Test Design, Development and Implementation Team, "For design, development and implementation of the Halogen Occultation Experiment Gas Response Test capability."

Higher Harmonic Control of Helicopter Blade-Vortex Interaction Noise Team, "For exceptional team effort in the interdisciplinary study of helicopter rotor blade-vortex interaction noise and vibration reduction, using higher harmonic control.

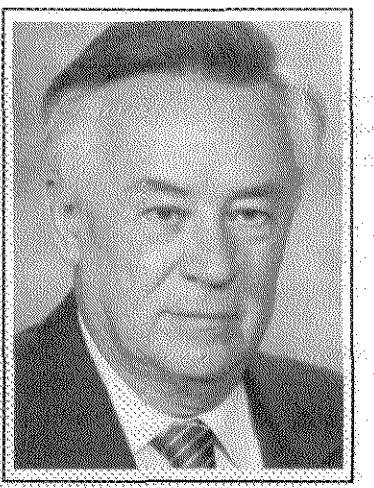
Continued on page 6.

Awards

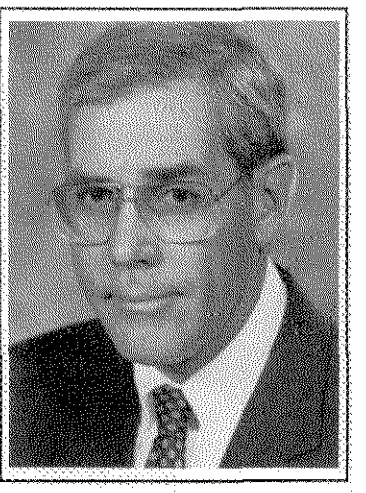
Exceptional Service Medal



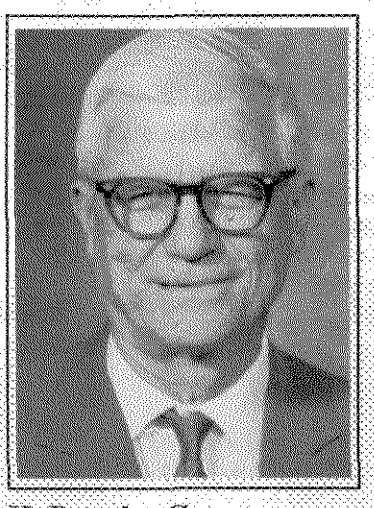
Ronald L. Baker
"For exceptional engineering contributions in the development of atmospheric remote sensors for NASA aerospace programs."



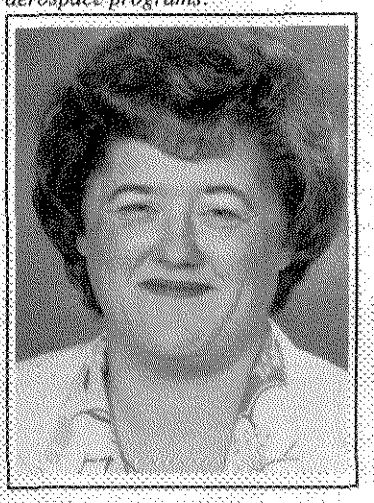
Alfred G. Beswick
"For engineering excellence in Halogen Occultation Experiment gas cell development, calibration and testing."



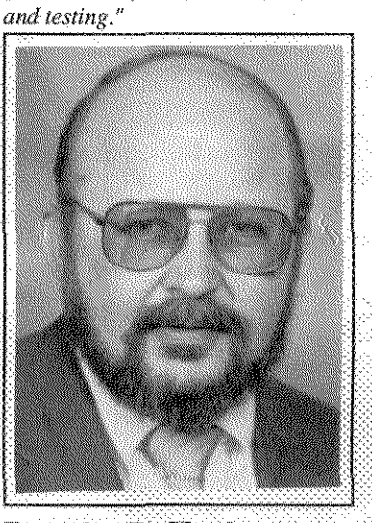
David F. Caplan
"For exceptional leadership and legal services in support of Langley Research Center."



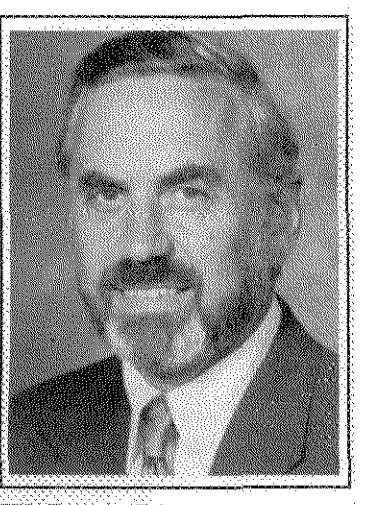
H. Douglas Garner
"For exceptional contributions in the advancement of guidance, navigation and control of aerospace measurements."



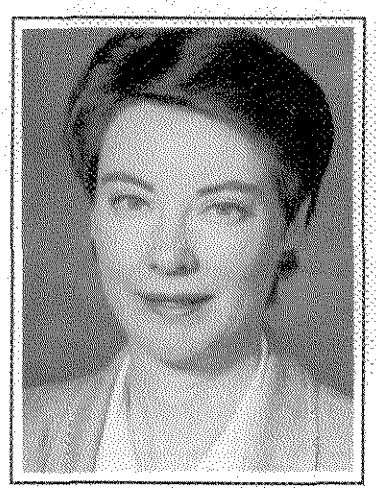
Patricia F. Gates
"For exceptional dedication and service in developing, coordinating and managing Langley Research Center's conference-related activities."



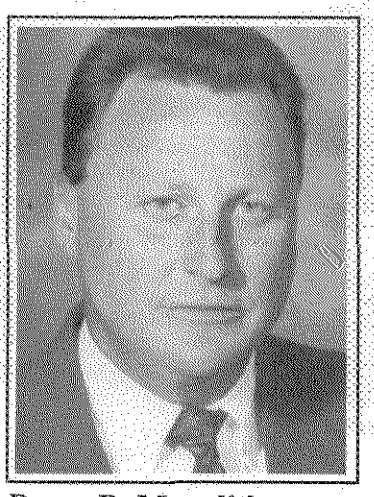
Brantley R. Hanks
"For exceptional service in planning and executing the Controls-Structures Interaction Research Program which will enable vital Earth observations and other high precision large space structures."



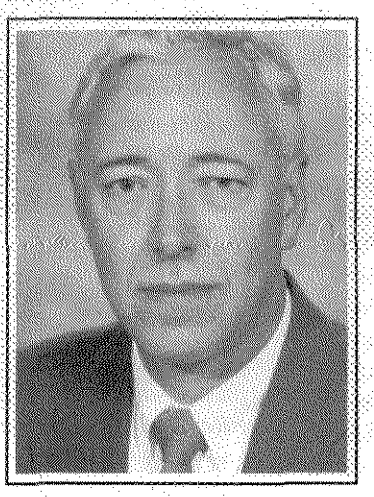
W. Barry Lisagor
"For outstanding leadership and technical contributions to the Agency's metals research program."



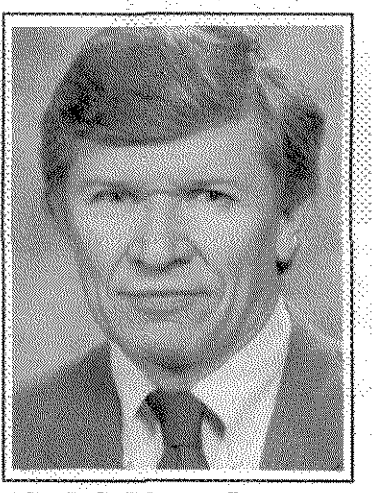
Alice C. Massey
"For exceptional service in support of Langley Research Center's institutional budget."



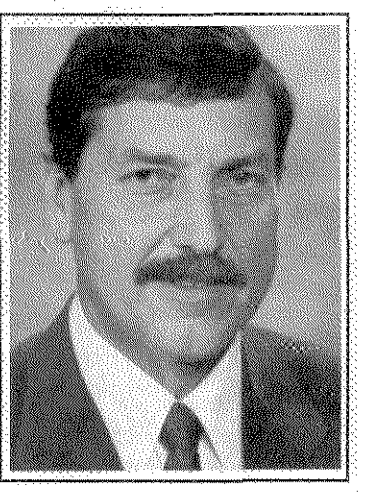
Barry D. Meredith
"For exceptional service in establishing Space Station Freedom evolution configurations to meet future national needs; particularly, to support missions to the Moon and Mars."



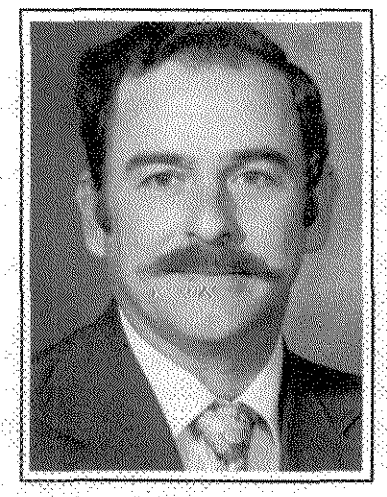
William E. Miller
"For engineering excellence in providing science detectors for the Halogen Occultation Experiment."



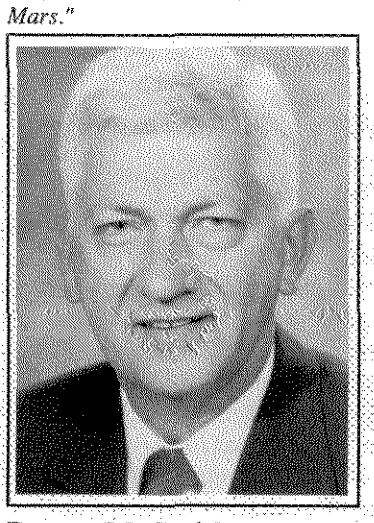
Alvah S. Moore Jr.
"For exceptional service in engineering management of the Halogen Occultation Experiment, resulting in development, demonstration and timely delivery of the precision, remote atmospheric sensor."



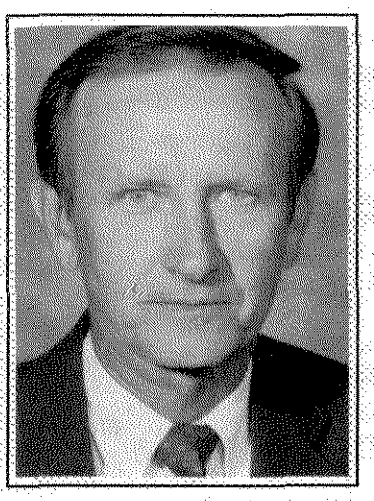
Warren R. Nichols
"For exceptional service and dedication in implementing the Quality Assurance Program for the Halogen Occultation Experiment, resulting in delivery of a flight-worthy scientific instrument."



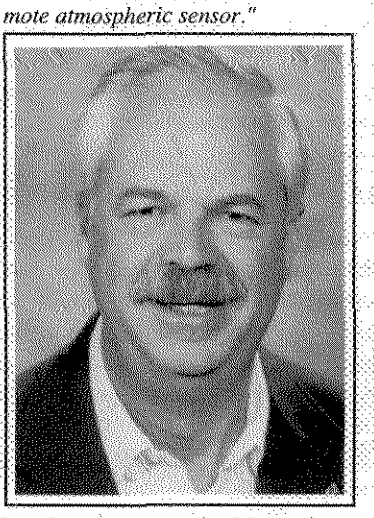
William M. Rollins Jr.
"For exemplary leadership of the National Transonic Facility fan blade fabrication team."



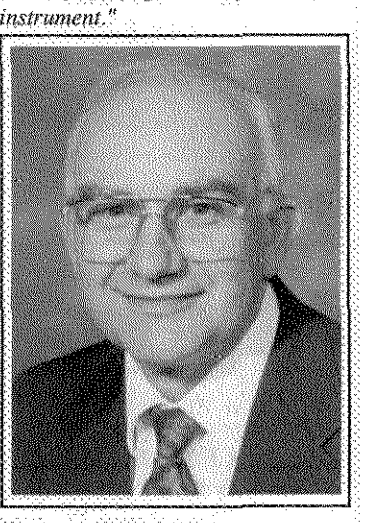
Dewey M. Smith
"For exceptional service and dedication in engineering management of the Halogen Occultation Experiment Project, resulting in delivery of a flight-worthy scientific instrument."



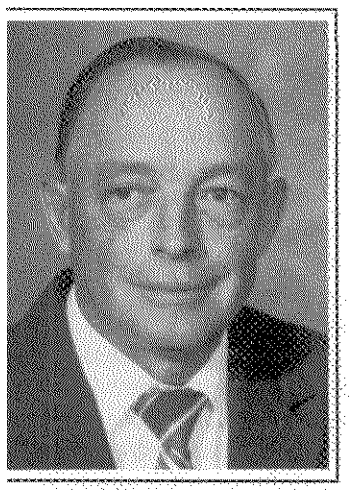
Charles W. Stump
"For engineering excellence in Halogen Occultation Experiment electronic systems development, calibration and testing."



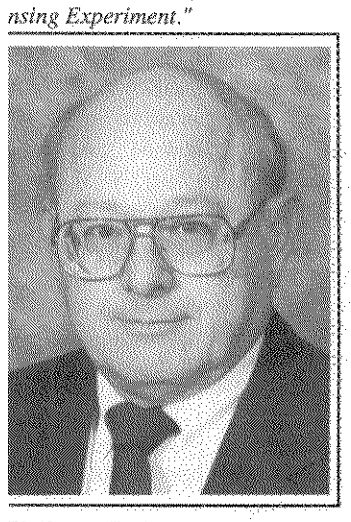
Nathan D. Watson
"For outstanding technical contributions in design, analysis and development of spaceflight systems and complex aeronautical ground test facilities."



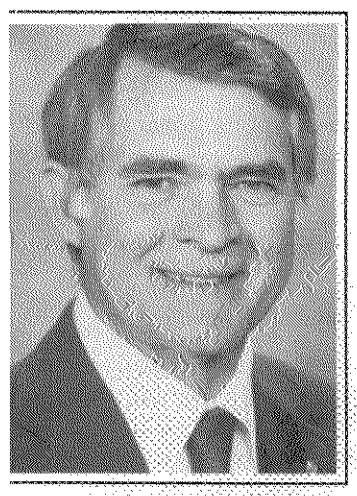
Dave E.Williams
"For exceptional service in engineering design, assembly, testing and early delivery of a flight-worthy Halogen Occultation Experiment scientific instrument."



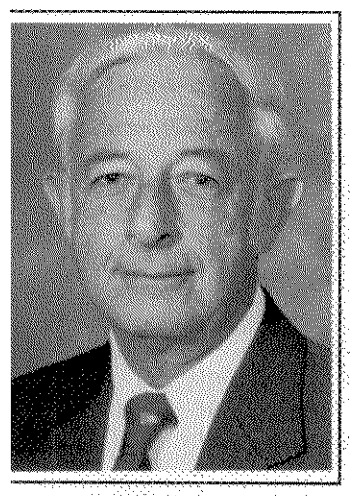
ufus K. Dail
'or exceptional service in engi-ering management of the Shuttle 'rared Leeside Temperature nsing Experiment."



/illiam E. Howell
'or conceiving, implementing and contributing to search programs which have made substantial con-butions to aircraft operating systems technology, rvivability of fighter aircraft control systems, and hievement of diffraction-limited performance from rge space telescopes."

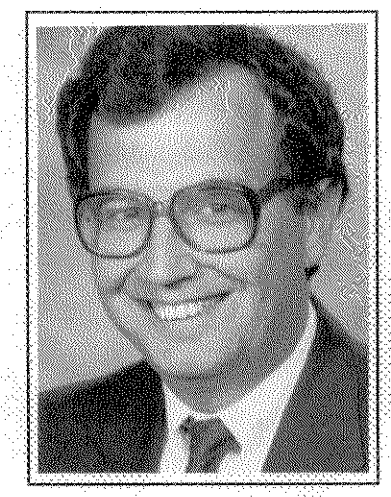


ee H. Person Jr.
or exceptional contributions that ve advanced the state of the art in ot/vehicle/air traffic control ncepts, and for outstanding serv- as a research test pilot."

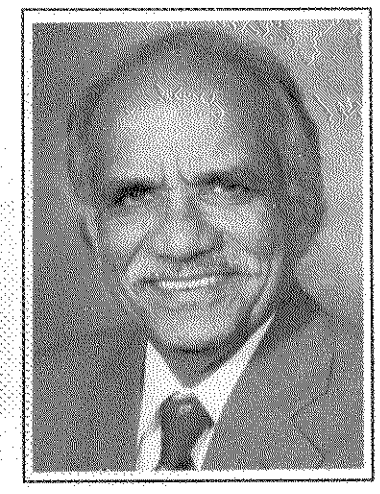


ohn C. Wilson
or exceptional contributions in th leadership and research roles uich have created and sustained a rld-class program in rotorcraft rodynamics research for NASA, D and the aerospace industry."

Exceptional Scientific Achievement Medal

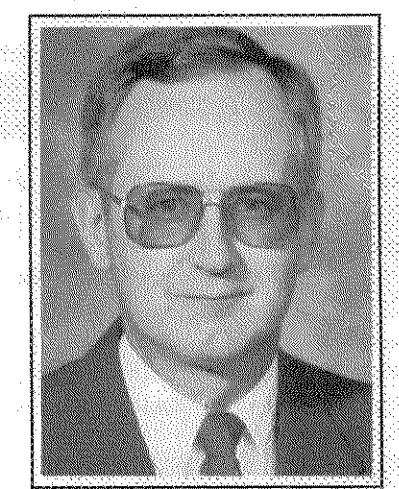


Peter A. Gnoffo
"For development of a computa-tional fluid dynamic simulation of hypervelocity flows in thermal and chemical nonequilibrium."

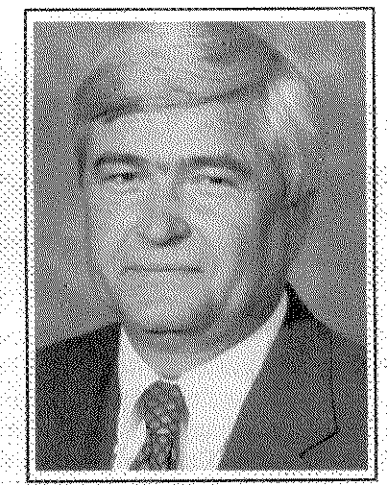


Jag J. Singh
"For exceptional contributions toward the advancement of aero-space measurement science and technology."

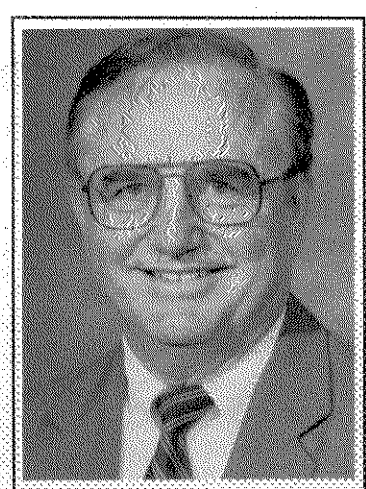
Exceptional Engineering Achievement Medal



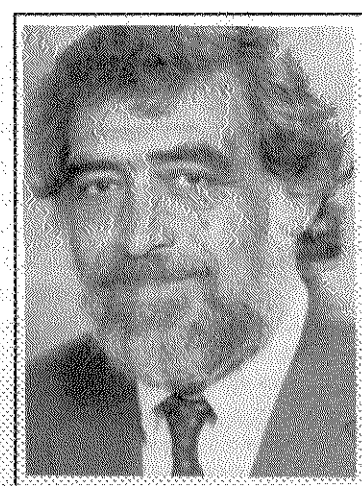
Johnny W. Allred
"For engineering design of critical and unique research facilities at Langley Research Center."



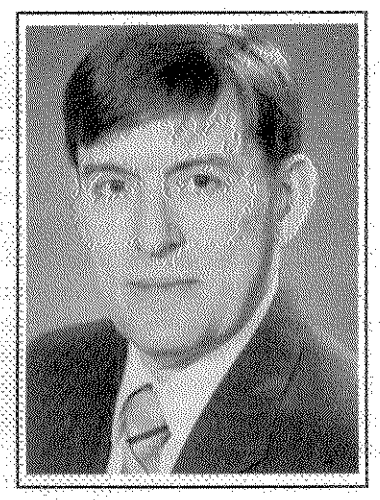
Bobby L. Berrier
"For development of multiplane vec-toring nozzles which provides unique operational capabilities for fighter aircraft."



James L. Hunt
"For developing the technology for conceptual design and performance analysis of hypersonic, airframe-integrated, scramjet-powered ve-hicles."

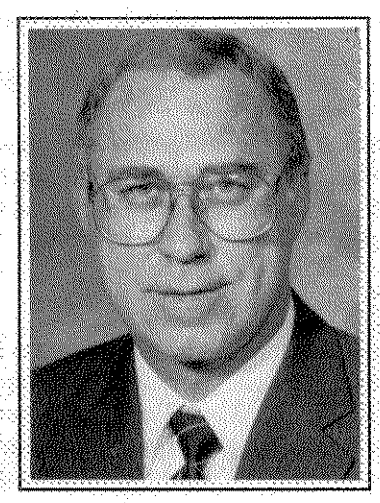


Alfred J. Meintel Jr.
"For defining and conducting a re-search and development program that has significantly improved readiness of telerobotics technology for NASA space missions."

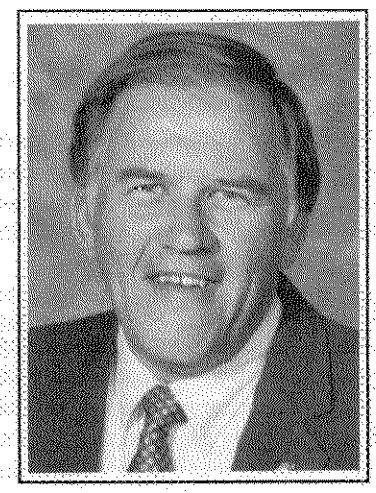


James N. Moss
"For developing and applying com-putational methods for simulating hypervelocity rarefied flows over aerospace vehicles."

James C. Newman Jr.
"For development of a unified fatigue life prediction methodology for aerospace metallic materials."

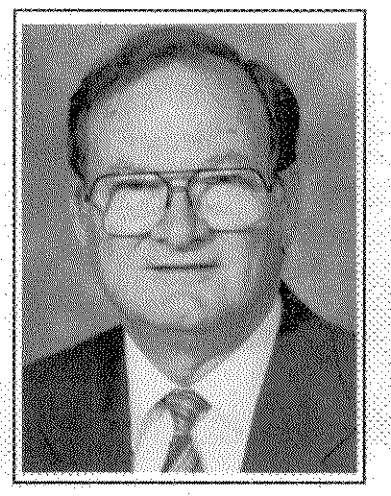


Kenneth Sutton
"For advancing aerothermodynamic technology for space transportation and planetary entry vehicles."



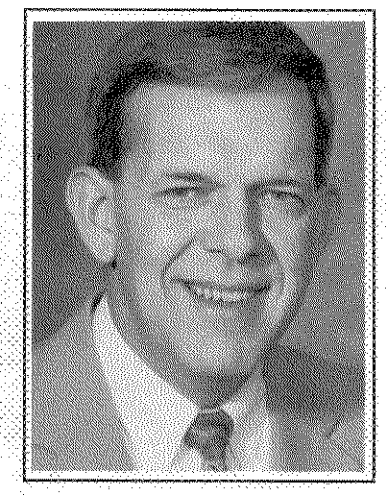
Thomas J. Yager
"For conducting and directing re-search in aircraft landing dynamics and runway friction measures leading to improved aircraft safety during ground operations."

Public Service Medal



Robert B. Spiers Jr.
ST Systems Corporation (STX)

"For exceptional service and dedication in designing, characterizing and testing the optical system of the Halogen Occultation Experiment resulting in delivery of a flight-worthy scientific instrument."



Leroy F. Matthews
Lockheed Engineering & Sciences Co.

"For outstanding contributions in fabrication, assembly, testing and verification of the flight-worthy Halogen Occultation Experiment instrument for the Upper Atmosphere Research Satellite."

Langley, NASA Recognize Group Accomplishment

Continued from page 3.

Human Exploration Inititative Assessment Team, "For outstanding teamwork and significat contributions which identified and quantified options for involvement of Langley Research Center in the future Space Exploration Initiative."

Joint NASA/FAA Runway Program Test Team, "For providing substantial contributions toward better understanding of aircraft ground handling performance under a variety of adverse weather conditions."

Langley Research Center award Fee Assessment Team, "For outstanding leadership in achieving significant cost savings, through fee reduction, on support service contracts without loss of performance."

Long Duration Exposure Facility Ground Operations and Phase III Safety Review Team, "For performing the DELTA Phase III Safety Analysis and conducting ground operations associated with successful deintegration of the Long Duration Exposure Facility in a highly professional and timely manner."

Long Duration Exposure Facility Project Office Operations Team, "For outstanding accomplishment of all Long Duration Exposure Facility retrieval operations."

National Transonic Facility Fan Blade Fabrication Team, "For technical excellence in fabricating new fan blades in a timely manner for the National Transonic Facility, following the mishap event in January 1989.

National Transonic Facility Mishap Investigation Support Team, "For effective support toward the investigation of the 1989 National Transonic Facility mishap, and the expertise and skill displayed in pinpointing the cause of failure, documenting the conclusion and recommending corrective action."

National Transonic Facility Mishap Recovery Assessment, Design, Installation and Checkout Team, "For assessment of various tunnel components and design, implementation and checkout of repairs and modifications to the National Transonic Facility in a timelty manner, following the mishap event in January 1989."

Proof Test Evaluation Team, "For conducting the technical evaluation that led to establishing the government and industry position on pressure proof testing the fuselage of aging aircraft."

Research and Technology Report Team, "For outstanding team effort leading to the redesign and production of Langley Research Center's *Research and Technology* report series.

Small Business Innovation Research Team, "For implementing a highly effective and efficient process in carrying out Langley Research Center's Small Business Innovation Research Program."

Team for Environmental Rehabilitation of the Facility 1268 Complex, "For design and management of multiphase heating, ventilating and air conditioning rehabilitation projects of Facility 1268."

Training Assessment Team, "For outstanding implementation of the new training assessment process."

X-29 Drop Model Team, "For outstanding teamwork in conducting drop model tests of the X-29 configuration which contributed significantly to defining its high-angle-of-attack flight dynamic characteristics and control system requirements, and for providing vital support to the full-scale flight program."

Outstanding Volunteer Service Awards

A number of our employees are engaged in numerous voluntary efforts in the local communities, serving with community organizations and providing leadership to various projects aimed at improving the quality of life for all. These Center employees, who devote their off-duty time and talents to such voluntary efforts, deserve recognition and appreciation for their exemplary community service. Volunteer service awards were presented to:

Lawrence B. Cooper III, "For outstanding volunteer service in supporting the Newport News Volunteer Fire Department, disabled veterans and handicapped citizens."

Leslie S. F. Ferguson, "For active involvement in meeting needs of the community in areas of youth development and education."

Joan G. Funk, "For outstanding volunteer service to residents of the Virginia Peninsula in the areas of crisis intervention, working women and social services."

John R. Gleason, "For distinguished community service through volunteer efforts in the area of emergency services at local and state levels."

Franklin O. Mayhew, "For dedicated public service through volunteer efforts, spanning local and national interests, in areas of youth and adult programs."

Langley Public Service Awards

This award is given to non-NASA citizens and organizations to show appreciation for contributions made to Langley Research Center in the accomplishment of its missions, functions, services or operations as a public service.

John R. McPhee, Wyle Laboratories, "For management and leadership of the Langley Research Center National Transonic Facility Operations Support Contract Team."

Technology Applications, Incorporated, Hampton, Virginia, "For excellence in developing nondestructive examination procedures for the West Area steam system."

NASA Honor Awards

The National Aeronautics and Space Administration bestows singular honor in recognition of achievements by the following groups and individuals.

Certificate of Appreciation

R. Craig Leggette, "For dedicated and consistently strong performance in supporting operations of the Carbon-Carbon Research Laboratory at Langley Research Center for the period 1985 through 1989."

Public Service Group Achievement Award

Rotonet Helicopter Noise Prediction Program Development Team of Lockheed Engineering and Sciences Company, "For developing, validating and disseminating a helicopter systems noise prediction program."

Group Achievement Awards

Active Flexible Wing Project Team, "For significant contributions toward development of multidisciplinary analysis, design and test methods associated with application of active controls technology to flexible flight vehicles."

Airborne Wind Shear Program Development Team, "For the Wind Shear Program development and implementation effort which provided the cornerstone of the FAA National Integrated Wind Shear Program Plan and crucial technical results to industry."

Controls-Structures Interaction Mini-Mast Team, "For rapid and successful development of the first very large, flexible space-structure control experiment facility."

Halogen Occultation Experiment Instrument Development Team, "For outstanding contributions in design, fabrication, assembly and verification of flight-worthy performance of the Halogen Occultation Experiment instrument for the Upper Atmosphere Research Satellite."

High Performance Materials Development for the National Aero-Space Plane Team, "For leadership and guidance in formulation and execution of materials development programs critical to success of the National Aero-Space Plane."

Laser Catalyst Research Team, "For exceptional contributions to advancement of aerospace laser measurement technology."

NASA F-18 High-Angle-of-Attack Aerodynamic Team, "For superior efforts in definition of complex aerodynamics at high-angle-of-attack conditions and aggressive application of computational fluid dynamics methods in the NASA High-Angle-of-Attack Technology Program."

Patent Counsel Staff, "For outstanding support of Langley Research Center programs and protection and enhancement of the government's intellectual property rights."

People & Places

Tidbits from Training

Supervisory Training Offered

The Career Studies in Supervision Training Program, formerly known as the Pre-Supervisory/Management Training Program, is a five-course program offered on-site by Thomas Nelson Community College. A minimum of 12 employees must enroll for the course to be offered. The program is designed to instruct participants in the knowledge and skills required by supervisors. Emphasis is on the principles of supervision, communication, organizational behavior and human resource management.

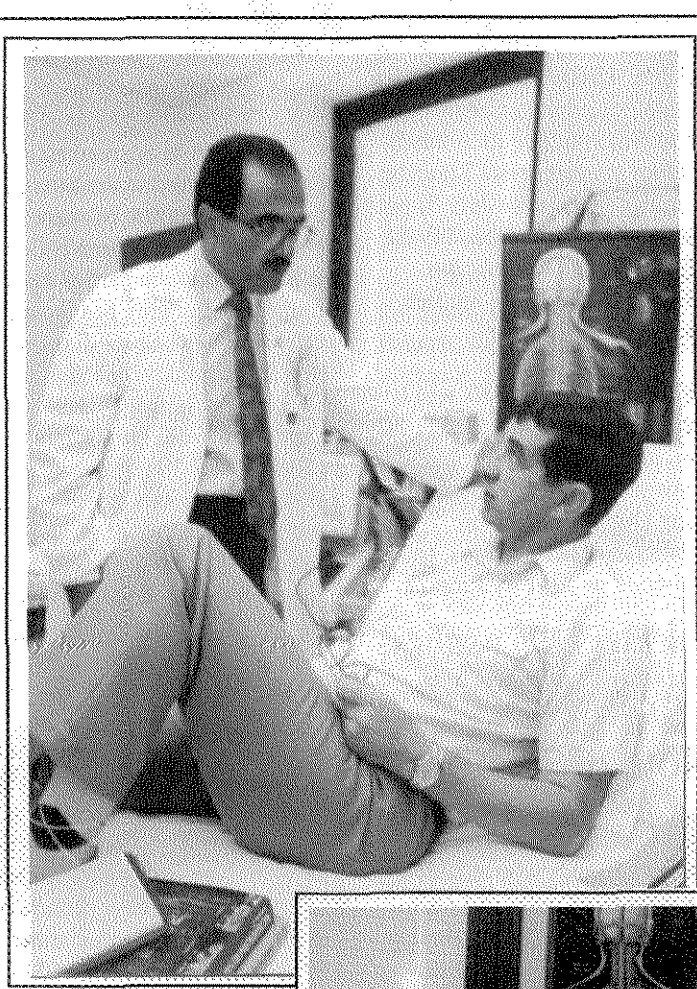
This program is intended to help those employees who aspire to become first-line supervisors. New supervisors may also find the courses of value in adjusting to their role as managers of people and resources. However, these courses do not count toward the NASA training requirements for new supervisors. Nor does completion of the program constitute a commitment or obligation on the part of management to promote employees at some future date. Since its initiation in 1979, 69 employees have graduated from the program; 20 percent of the graduates have been promoted to supervisory positions.

Each of the five courses carries three semester hours of college credit. Tuition is paid by Langley; the registration fee and the cost of books are paid by the student. Generally, one course is offered on-Center each semester from 4:45 to 7:45 p.m. A state certificate is awarded upon completion of the program.

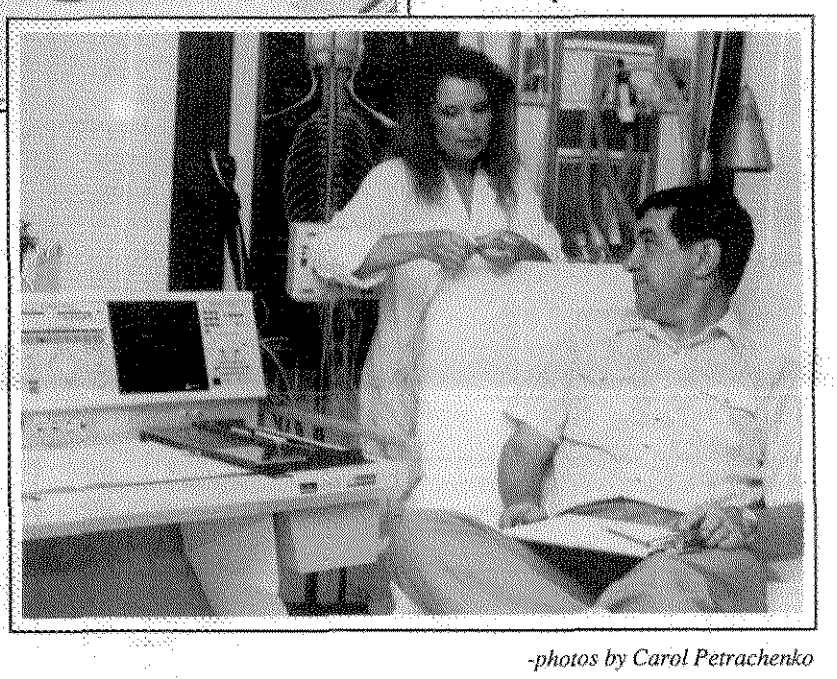
Contact your training coordinator for more information or for registration materials. Following is a schedule of course offerings:

Career Studies in Supervisory Training

BUS 111	Principles of Supervision	Fall 1990
BUS 115	Organizational Behavior	Spring 1991
SPD 110	Introduction to Speech Communications	Fall 1991
BUS 205	Human Resource Management	Spring 1991
BUS 236	Communication in Management	Fall 1992



Steve Horvath takes a break from his work to discuss test results with Dr. Arastoo Nabizadeh, chief neurologist at the Veterans Administration Hospital.



Neuro-technician Savannah Azimi prepares Horvath for an EEG, a procedure which records brain wave activity.

-photos by Carol Petrachenko

Langley Newsmakers

Outstanding Property Custodian Named

David Chestnutt, head of the Applied Acoustics Branch, has been selected Outstanding Property Custodian for the first quarter of 1990. He was presented a certificate of appreciation by Ronald R. Krodel, chief of the Management Support Division, in a ceremony April 4. One of several nominees, Chestnutt was selected because of the outstanding manner in which he has performed his responsibilities as property custodian.

Clemmons Continues to Serve NASA

Vigyan Associates' employee James I. Clemmons was presented an Honorary Superior Accomplishment Award by Dr. Willard Anderson, chief of the Guidance and Control Division.

Clemmons, Spacecraft Controls Branch, was honored for his "superior performance and high quality contributions in support of research and development of advanced optical sensor systems." He is responsible for the development of the control and processing electronics for electro-optic sensors for sensing the position of large space structures.

Prior to joining Vigyan, Clemmons served 20 years as a NASA employee in the Measurement Physics Branch, Instrument Research Division.

A Cooperative Approach Benefits All Involved

-by Allen C. Hanrahan

Langley's Personnel and Fabrication Divisions locked arms recently and marched to a different drummer benefitting NASA, the Veterans Administration (VA), the Food and Drug Administration (FDA), the Medical College of Virginia (MCV) and an employee experiencing unfortunate circumstances.

Stephen P. Horvath, a ten-point veteran of the U.S. Navy, is a periodic patient at the VA's Kecoughtan Medical Center where he is treated for epilepsy. A few months ago, a physician there suggested he take part in the evaluation of an experimental drug sponsored by the FDA and being tested at MCV. Horvath, a production controller whose duties--like those of his fellow employees at Langley--ultimately supports research, agreed to participate. However, he noticed that he had very little to do during the test periods. He took the medicine, had blood samples taken, and then just had to be there for observation for possible negative reactions to the medication.

It occurred to Horvath that a part of his work was such that he could be doing it during those idle times at the hospital. The head of his section, James Puffenberger, responded positively to his suggestion, as did the now-retired branch head, Robert McGee. They obtained approval from higher division management, and pursued the idea with Personnel Division's John Cox and Janet McKenzie. Ultimately, it was Linda Park of the Employee Relations Section who determined, after studying Horvath's situation, that he did indeed meet the very selective conditions. That is, one, the work was very specific, accurately measurable and definable; two, the work could be measured against established qualitative and quantitative norms; and three, allowing the work to be done away from the normal, established workplace was "not for the convenience of the employee," because Horvath was participating in the study as a service to the FDA, VA and MCV. Any benefit that he could receive from the evaluation would be years in the future, and tenuous even then.

Horvath furnished his supervisor with a daily log of the hours he spent at MCV accomplishing the tasks his section and branch heads had identified in the original request. Satisfied that his accomplishments could withstand any audit, a formal request was submitted to Personnel. Acting on the request, the chief of the Personnel Division, Irwin Schauer, granted Horvath partial duty status while participating in the study, thus allowing him to save 20 hours of sick leave.

Leave is measurable, obviously. Difficult to measure but important nonetheless are the consideration and cooperation manifested in this situation.

As John Stokes, director for Management Operations put it, "Langley's work hours have a lot of flexibility built into them, even though we don't have formal flex-time. Working through line management and the Personnel Division, we always try to cooperate--within the guidelines--to the employees' benefit."

Happenings

SPECIAL LAA SOCIAL. TGIF will be held Friday, June 22, from 4 to 8 p.m. on the Activities Center picnic grounds. Entertainment by *Foxfire*. Enjoy yourself with your friends at the first TGIF at NASA.

CONSERVATION CLUB will meet on Tuesday, June 19, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call ext. 41537 more information.

STRESSBUSTERS, a relaxation and recharge group, meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1212, Room 200. To verify the meeting site, call Steve Dahmen, ext. 44519.

NASA TOASTMASTERS meet the second and fourth Wednesdays of each month. The next meeting is June 27, 11:30 a.m., in the H.J.E. Reid Conference Center. For more information, contact Christine Darden, ext. 45258.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA gym. Cost is $12/month. First class is free.

MUSIC UNDER THE STARS. The U.S. Continental Army Band will continue its summer outdoor concert series Thursday evenings (except for July 5) until August 30 at Continental Park, adjacent to the Chamberlin Hotel. Performances are free and begin at 7:30 p.m.

AFCEA LUNCHEON will be held Tuesday, June 26, at 11:30 a.m. in the LAFB NCO Club. Lenwood Clark will speak on the Long Duration Exposure Facility. For reservations, call 764-6648 or 2951 by June 22.

FOR SALE: GOLF SHOES, men's size 9, worn one time. $15. Call 595-4593.

Note of Thanks

Buddy Young writes: "I want to thank all my NASA Langley friends who attended my retirement party and especially those who participated in the program. I also wish to thank my NASA Wallops friends for their gifts and remembrances. Most of all, I want to thank my wife Donna for her love and support over the years. The party was excellent and the gifts were great. I shall always cherish my years at Langley and the opportunity to work with so many outstanding people."

At the Visitor Center this Summer

Pritchard to Discuss the Future of Manned Space Missions

NASA is aggressively moving forward in the area of human exploration of space, and NASA Langley Research Center is preparing to be part of that initiative. Langley has recently established the Space Exploration Initiative Office (SEIO) and appointed E. Brian Pritchard to head the office. On Thursday, June 21, at 7:30 p.m., Pritchard will give a special presentation in the Visitor Center theater entitled "Langley's Role in the Exploration of Space."

Pritchard will discuss the innovative technologies and development options needed for future manned missions and he will provide an overview of current activities.

As the newly appointed head of SEIO, Pritchard's role is to ensure that the Center is vitally involved in the nation's program for space exploration.

President Bush has challenged the U.S. to place the American flag on Mars before the 50th anniversary of the Apollo voyage to the Moon.

Visitor Center Offers a Summer Full of Space Exploration

June kicks off the Visitor Center's summer quarter which is dedicated to Space Exploration.

In June, E. Brian Pritchard will detail the exciting future of space exploration and manned missions to the Moon and Mars at a special presentation at 7:30 p.m. on Thursday, June 21.

On Saturday, June 30, at 10 a.m. the Visitor Center is offering their most requested children's program, "Life Aboard the Space Shuttle." The one-hour program is free. Reservations are required and may be made by calling ext. 46000.

In July, "A Trip Through the Universe" children's program will entertain and educate children on the wonders of the universe. The one-hour program will be offered several times during July. Six to eight-year-olds are scheduled from 9 to 10 a.m. and nine to 12-year-olds will attend from 10:15 to 11:15 a.m. Call ext. 46000 for available dates and for reservations.

Spend a warm summer evening in July exploring the planet Mars. On Thursday, July 19, at 7:30 p.m., Dr. Joel Levine will give a visual presentation "On to Mars" in the VC theater.

The dog days of August will bring a treat to theVisitor Center. Dr. Gerald Fishman, a principal investigator for the Gamma-Ray Observatory (GRO) at Marshall, will make a special trip to Langley to talk about GRO and the upcoming mission. Mark August 23 at 7:30 p.m. in the Visitor Center theater on your calendars for Dr. Fishman's special presentation.

For children, the Visitor Center will repeat "Life Aboard the Space Shuttle" at 10 a.m. on August 25. For further information or a copy of the VC News, call Chris Heithoff at ext. 41579.

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Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

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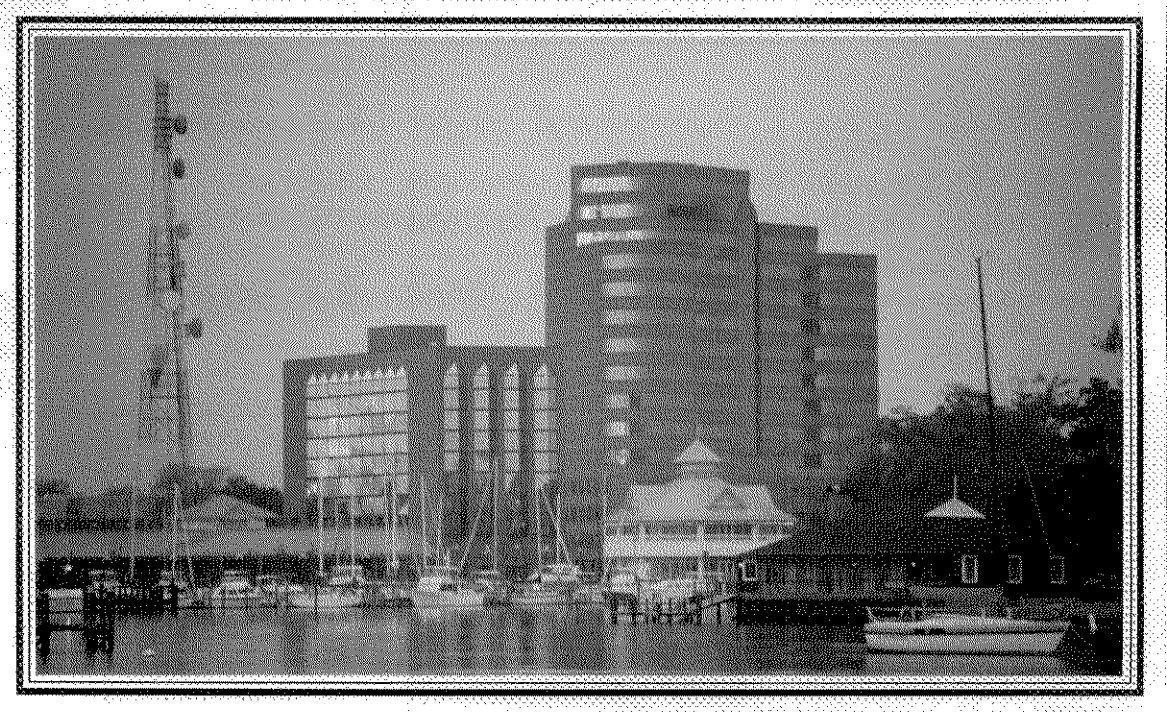
Researcher News



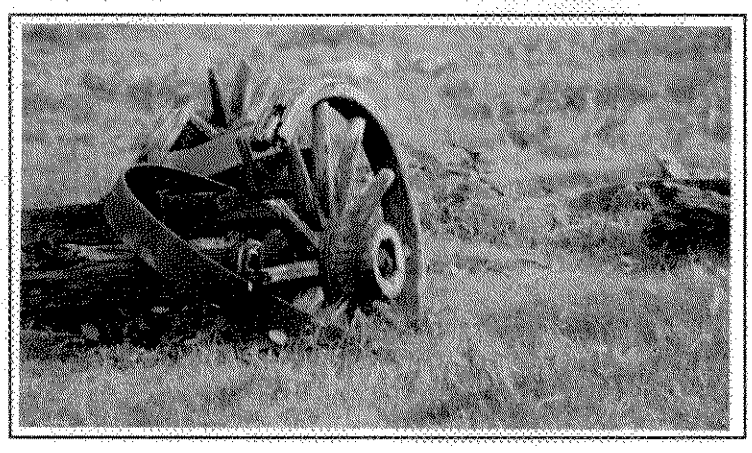
TNCC Library Features Woodell Photography

The photography of an engineering technician in Langley's Information Systems Division is being featured locally.

The works of Glenn Woodell will be on exhibit in Wythe Hall, Thomas Nelson Community College library, throughout June and July. The exhibit is free and library hours are Monday through Thursday, 8 a.m. to 10 p.m., and Friday, 8 a.m. to 12:30 p.m.

While at NASA, Woodell works on microgravity crystal growth. He is also pursuing a bachelor's degree in chemistry at Old Dominion University and is a volunteer in the trauma center at Riverside Regional Medical Center.

Many of the photographs in the exhibit were taken on the Peninsula and surrounding areas. "When I travel for NASA," said Woodell, "I always take my camera equipment in case I come upon a good photo opportunity." Although he has done some commercial work and photographed a few weddings, Woodell insists he is still in the learning stage. "I just enjoy capturing special moments, whether for myself or others."



NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 4, Issue 13 June 29, 1990

Bi-weekly Employee and Contractor Publication

GLASNOST COMES TO LANGLEY. Center Director Richard H. Petersen, accompanied by James H. Starnes Jr. (left), acting head of the Structural Mechanics Branch, and Dennis M. Bushnell (right), associate chief of the Fluid Mechanics Division, recently toured aeronautical facilities in the Soviet Union as part of an invited NASA delegation. The Langley trio is shown here in Moscow's Red Square. Petersen reports on the revolutionary trip in today's Headquarters Forum editorial. Please see page 2.

Couch Returns to Langley to Head HTO

Lana M. Couch has been named manager of the Hypersonic Technology Office. She replaces Robert A. Jones who retired March 30.

Couch is responsible for management of Langley's Generic Hypersonic Research Program, systems studies and analyses of hypersonic vehicles. She also manages the development of interdisciplinary analytical and experimental techniques for use in such complex problems as hypersonic propulsion integration and vehicle thermal management. In addition, she is responsible for the coordination of all Langley activities and involvement in support of the National Aero-Space Plane (NASP) Program.

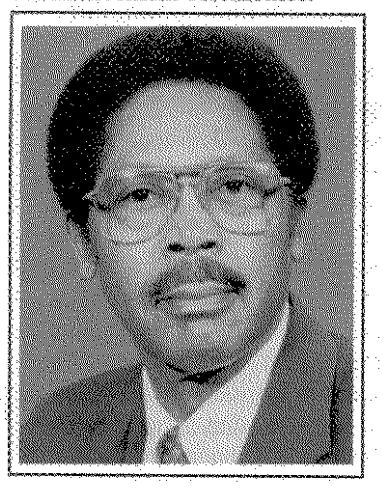
Couch began her NASA career at Langley in 1963, conducting research in fluid flow phenomena on subsonic through hypersonic aircraft and launch vehicles. From 1975 through 1980, she managed aerothermal loads research programs and the operation of a complex of unique hypersonic wind tunnels at Langley. Following completion of a fellowship at Syracuse University, she transferred to NASA Headquarters, Washington, D.C., and held several positions in the Office of Aeronautics and Space Technology (OAST).

In 1985, Couch was appointed the OAST head of the NASP Program, and was responsible for that program through its advocacy, approval and initiation. In March 1987, she accepted a Congressional fellowship and joined Senator Donald W. Riegle's staff, working with the Commerce, Science and Transportation Committee. She returned to NASA in January 1988 as

deputy director for Space Research and Technology. From January 1989 to May 1990, she served as the acting director for Space for OAST and was responsible for the overall advocacy, direction and budget allocation for NASA's Space Research and Technology Program.

Massenberg Honored at Virginia Tech Graduation

Dr. Samuel E. Massenberg, Langley's university affairs officer, was named a "Distinguished Alumnus" for the College of Education of the Virginia Polytechnic Institute and State University in recent commencement ceremonies.



The award recognizes past graduates of the College of Education who have become eminent in the field of education. The presentation to Massenberg, who earned his doctorate at VPI, was made by Dr. James J. Buffer Jr., dean of the college. Buffer cited the diversity of Massenberg's contributions to education as a field and to society at large. Buffer also heralded Massenberg's extraordinary service to Langley, to NASA and to the government's educational focus.

In accepting the award, the first to a federal government educator, Massenberg told the graduating educators of the need for increased emphasis on science, technology and mathematics in educational systems at all levels. He challenged them to not only accept that initiative but to look for ways to serve the needs of society beyond their educational activities.

Dr. Don G. Creamer, professor of higher education, nominated Massenberg for the award which is sponsored by the VPI College of Education Faculty Association. Creamer had served as Massenberg's major advisor for doctoral studies and had overseen course and clinical work as well as the development of Massenberg's thesis. He said Massenberg was a "star graduate" of the VPI College of Education by the manner in which he has applied his education to such a variety of meaningful endeavors.

As Langley's university affairs officer, Massenberg is responsible for the planning, interpretation and coordination of research grants between Langley and more than 100 universities. He also manages all the university-related programs with university professors and graduate and undergraduate researchers. His office is the focal point for all university personnel contact with the Center.

He joined the Langley staff as an employee development specialist in 1980, after serving as dean of men at Hampton University for 11 years.

Truly Announces Exploration Outreach Program

NASA Administrator Richard H. Truly has launched an Outreach Program to seek new and innovative ideas, systems and technologies to carry out the nation's Space Exploration Initiative (SEI). The program is in response to Vice President Quayle's request to "cast the nets widely" for new approaches in space exploration.

Truly announced the appointment of former astronaut Lt. Gen. Thomas P. Stafford, USAF (retired), as chairman of the Synthesis Group, which will play a key role in the Outreach Program. This group will study innovative ideas and recommend two or more significantly different alternative architectures, as well as technology priorities and early milestones. The group will report to Truly.

The Outreach Program seeks approaches to mission and system concepts as well as innovative, high leverage technologies that could significantly affect cost, schedule and performance for SEI, which sets the future course of the U.S. civil space program.

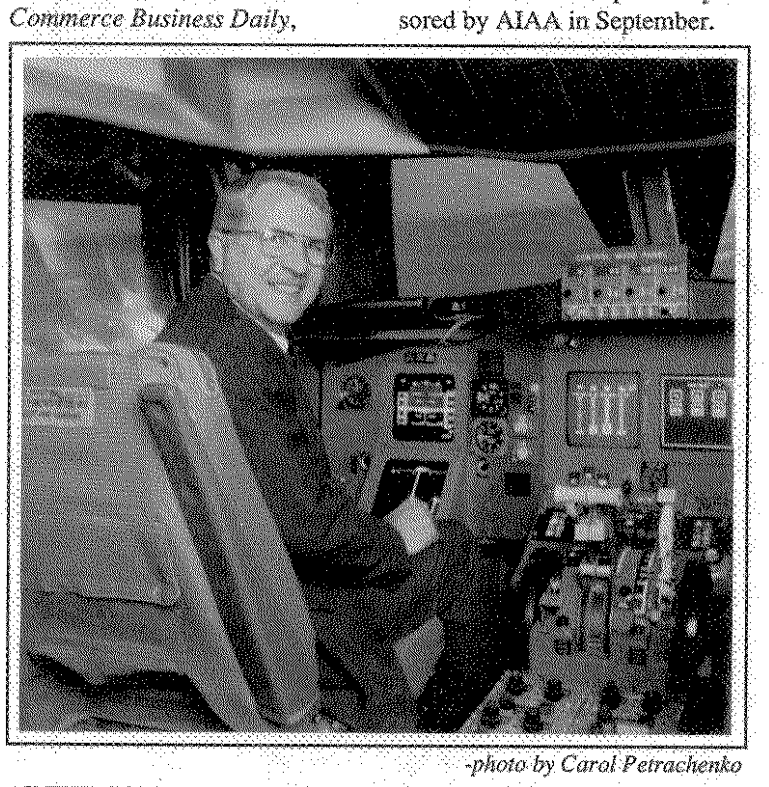
President Bush announced the SEI on July 20, 1989, the 20th anniversary of the Apollo 11 lunar landing. At that time, the President proposed a long-term continuing commitment to complete Space Station Freedom, return permanently to the Moon, and send a manned expedition to Mars. On May 11, 1990, in a speech at Texas A&I University, Bush declared that before the 50th anniversary of the Apollo 11 lunar landing (2019), "the American flag should be planted on Mars."

Truly said the SEI outreach program is "solid and thorough" and "will leave no stone unturned to reach out to the very best and brightest in our nation." To gather information, concepts and data from the most creative minds in government, industry, academia and elsewhere, Truly said the program takes a three-pronged approach. This consists of direct solicitation of ideas; a review of federally sponsored research; and a study by the American Institute of Aeronautics and Astronautics (AIAA).

The solicitation effort will include a letter from Truly to organizations that can provide the highest leverage, such as universities, professional societies, associations and others. It also will include an announcement in *Commerce Business Daily*, which reaches aerospace and non-aerospace industries.

The Rand Corporation will conduct an initial screening and assessment of submissions and report to an external Synthesis Group to be composed of government and non-government individuals. This group will report directly to the Departments of Defense, Energy and other organizations. The results of this activity will also be made available to the National Research Council for review.

The AIAA study is already underway. Its purpose is to solicit and assess innovative approaches to SEI from AIAA's 40,000-person membership and technical working groups. Reports will be coordinated at a conference/workshop to be sponsored by AIAA in September.



-photo by Carol Petrachenko

AT THE CONTROLS. NASA Administrator Richard H. Truly sits in the cockpit of the Transport Systems Research Vehicle (TSRV) simulator during a recent visit to Langley.

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA will sponsor a two-day conference November 27-28, 1990, to promote, within industry, a greater awareness of the agency's emerging technologies through its Technology Utilization Program. Planned as an annual event, Technology 2000 will be the first industrial exposition and conference to showcase the transfer of the agency's technology to American business. Preliminary plans for the Washington D.C. conference include such topics as software engineering, materials sciences, sensor technology, computational fluid dynamics, communications, biomedicine, robotics and artificial intelligence.

JOHNSON SPACE CENTER, Houston, Texas --- Dr. Dale Compton, director of NASA Ames, Mountain View, Calif., has named Astronaut Steven A. Hawley as the Center's associate director (acting). He will assume his duties on July 29 as the Center's third-ranking executive. Hawley, 38, has served as deputy chief of the Astronaut Office since 1987 and most recently as mission specialist aboard the Space Shuttle Discovery on Mission STS-31 in April of this year. Hawley has logged over 412 hours in space.

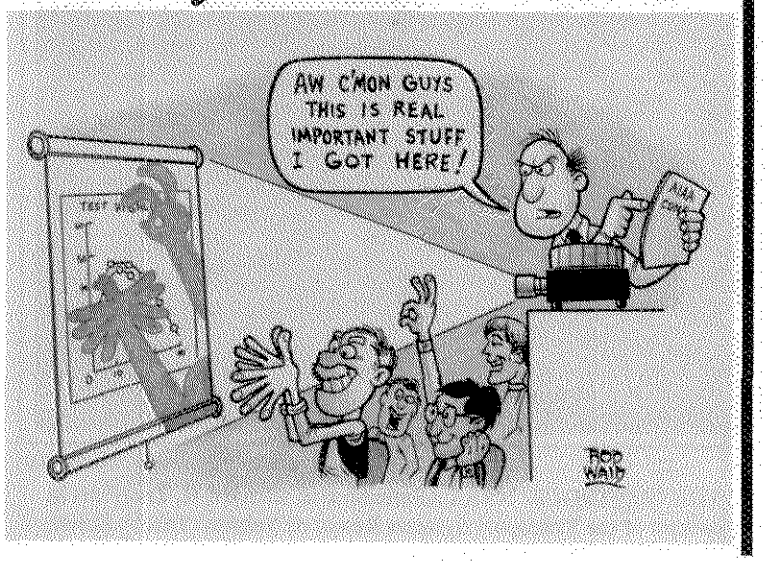
HEADQUARTERS, Washington, D. C. --- NASA has announced the termination of its Orbital Maneuvering Vehicle (OMV) program. Citing budgetary pressures "across the Space Flight realm" for the next several years, together with a lack of firm, near-term requirements for such a vehicle, NASA's Associate Administrator for Space Flight, Dr. William B. Lenoir, concluded that it was necessary to terminate OMV which had been scheduled for a maiden flight in 1995. As originally conceived, the OMV was to have been a reusable, remotely controlled low-Earth orbit free-flying "space tug" to perform on-orbit satellite servicing and retrieval missions.

AMES RESEARCH CENTER, Moffett Field, Calif. --- The first working model of a "salad machine" that eventually will provide a variety of fresh vegetables for astronauts on long voyages is now growing its first crop at NASA Ames. One of the first things astronauts and submariners ask for, following days or weeks of eating freeze-dried or preserved foods, is fresh produce. The presence of plants and the ability to "cultivate" a garden can also improve crew members' morale by providing something for them to nurture and by offering a creative outlet during their free time.

HEADQUARTERS, Washington, D.C. --- NASA Deputy Administrator J. R. Thompson witnessed the signing of a memorandum of understanding (MOU) between NASA and representatives of a newly formed academic consortium of six minority universities. The MOU establishes the NASA Space Technology Development and Utilization Program consortium (STDP), designed to increase minority universitives' involvement in NASA research and technology development. The consortium includes North Carolina A&T State University, Greensboro; New Mexico Highlands University, Las Vegas; Central State University, Wilberforce, Ohio; Southern University, Baton Rouge, La.; Jackson State University, Jackson, Miss.; and Tuskegee University, Tuskegee, Ala.

HEADQUARTERS, Washington, D.C. --- NASA has announced support for plans to develop a system for launching and recovering commercial spaceborne experiments. Sponsored by the Office of Commercial Programs, the objective of the Commercial Experiment Transporter (COMET) program is to develop both hardware and infrastructure to facilitate the commercial development of space by the U.S. Carried aloft by an expendable launch vehicle, the COMET free-flyer will contain both a service module and a recovery system. The two components will separate prior to reentering the atmosphere so that most experiments will be returned to Earth in the recovery system, while others not requiring retrieval, could continue their mission aboard the service module.

Lankley



Editorials

Langley

Headquarters Forum--Glasnost Comes to Langley

My State-of-the-Center Address in April predicted changes in the 1990s due to "peace breaking out." I'm happy to report on one revolutionary example of this change.

During the last week in May a formal delegation of NASA officials visited Moscow to tour several Soviet aeronautical research facilities and get acquainted with their senior managers. The delegation was led by Dr. Robert Rosen, deputy associate administrator for the Office of Aeronautics, Exploration and Technology (OAET). Also participating from OAET were Marty Stein and John McCarthy. I, accompanied by Dennis Bushnell and Jim Starnes, represented Langley. John Klineberg and Neal Saunders from NASA Lewis, and Dale Compton, Ken Zsalai and Jim Arnold from Ames/Dryden completed the group.

The facilities we visited were the Central Aerohydrodynamics Institute, called TsAGI; the Central Institute of Aviation Motors, called TsIAM; the Flight Research Institute, called LII; and the All-Union Institute of Aviation Materials, called VIAM. Although these institutes are well known, none had been visited by outsiders until about 18 months ago. Because of the Soviet secrecy, neither NASA nor Langley had allowed Soviet visitors to see our aeronautical research facilities. In the last year and a half, however, the Soviets have invited several U.S. visitors to TsAGI and TsIAM.

The purpose of our visit was to begin a more open communication with our Soviet counterparts, made possible by the new spirit of Glasnost (openness). The intent was for a high-level NASA aeronautical delegation to tour the Soviet facilities. In return, a similar Soviet delegation will visit the NASA aeronautical research facilities in the U.S. Following these formal, get-acquainted meetings, we expect to explore areas of potential cooperation in aeronautical research.

I was a strong proponent and supporter of this first step to get acquainted, and I am pleased that the meetings went very well. The Soviets were good hosts and made us feel welcome, both technically and socially. They were reasonably open, both in showing us their facilities and in discussing their aeronautical research. In most cases, they seemed anxious to develop communication and investigate areas where we might work together.

Of greatest interest to the Langley contingent was the tour of TsAGI, which is roughly equivalent to Langley and Ames combined. Established in 1918, TsAGI is located on the outskirts of Moscow and employs over 10,000 people. It specializes in aerodynamics, flight controls and structures. In the Soviet system, the aircraft manufacturers do not have research or development facilities so TsAGI does more development work than Langley does, particularly in the structures area.

The first facility we visited at TsAGI was especially interesting to those of us from Langley. Basically a duplicate of our 30- by 60-Foot Tunnel, this subsonic wind tunnel is scaled up to approximately 45 by 80 feet (14 by 24 meters) and was built about five years after our tunnel. We also saw a supersonic wind tunnel located underground. The test section is 2.25 meters square, capable of Mach numbers from 0.5 to 4.0, and it operates up to four atmospheres as a blowdown tunnel (run times varying from 0.5 to 10 minutes). Next, we visited a very modern transonic wind tunnel with a test section 2.75 meters square. This closed circuit wind tunnel is capable of Mach 1.7 and up to four atmospheres pressure. It has five interchangeable test sections. One of the test sections has porous walls which allow different amounts of porosity in 128 regions to reduce wall effects. We also visited an arc-heated hypersonic wind tunnel about one meter in diameter which is capable of Mach numbers between 10 and 20.

For structural testing we visited a large building where full-scale airplanes can be load tested and repeatedly loaded to simulate their service life. Being tested was the Tu-204, which is similar to a Boeing 767 and is nearing certification by the Soviets. Also being tested was a MiG-31 fighter aircraft.

Center Director Richard H. Petersen (right) presents German I. Zagajnov, director of the Soviet Central Aerohydrodynamics Institute with a copy of *Wind Tunnels of NASA*.

We were shown a very large thermal vacuum chamber for testing of hypersonic vehicles. This had been used to test a five-meter-long section of the Buran space shuttle, which included the middle portion of the payload bay and sections of the wings spanning roughly six or seven meters. During testing, the pressure in the chamber is lowered to near vacuum and heat lamps are used to simulate reentry temperatures. Tests had also been done on the nose of the Buran vehicle.

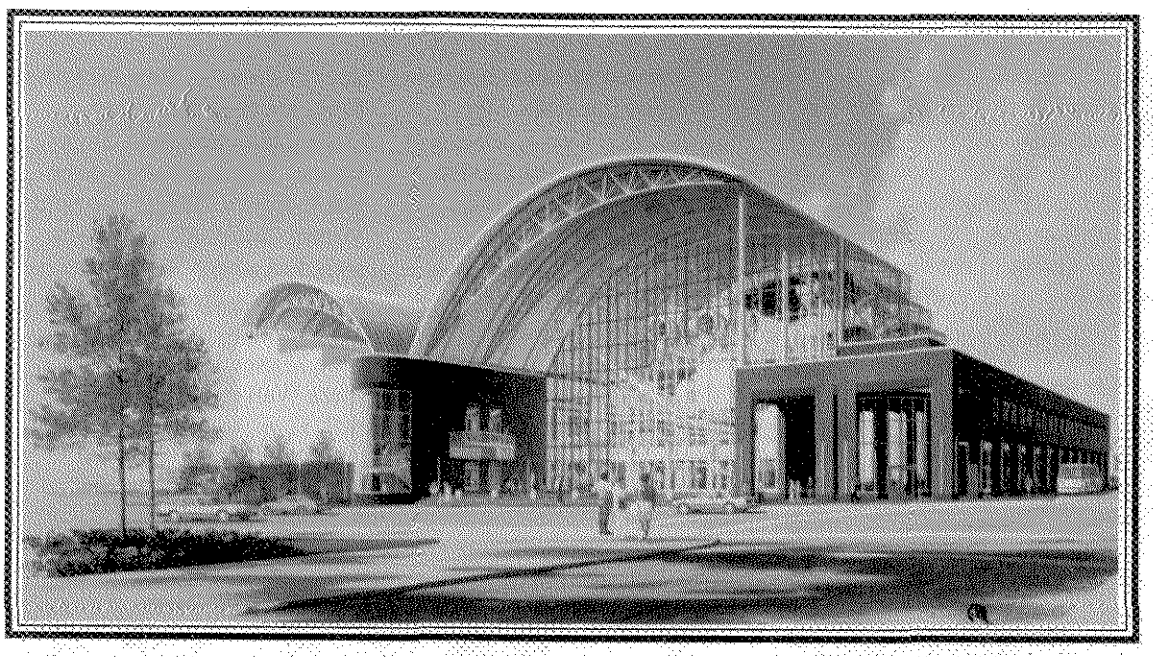
Another particularly interesting visit was to the Flight Research Institute which adjoins TsAGI. The Soviets do most of their military and civil testing from this airfield and we were told that we were the first Western visitors to LII. Our two-hour visit was unfortunately short, and there were obvious security precautions. However, they had lined up about six of their research aircraft and we were allowed to inspect them freely. Of special interest were two Il-76 transports used for testing new propulsion systems. This aircraft is a high-wing, four-engine transport similar to a C-141, and the left inboard engine station is used for testing new engines. One aircraft was carrying a large high-bypass ratio turbofan engine which is used on the Tu-204, and the other aircraft had a large, advanced, counter-rotating turboprop engine installation. We also got to see the MiG-29 and Su-27, which are the latest generation of Soviet fighters.

Again, of particular interest to the Langley contingent was a Tu-154 used for research on advanced transport cockpits. Compared to the Langley ATOPS aircraft, this facility is very crude. The research flight station is in the front cockpit on the left side with a safety pilot on the right. One large cathode ray tube and a side stick controller are used during testing. There are six or eight racks of instrumentation in the back cabin.

In general, we were impressed by the Russian facilities. They are clearly weak in computers and solid-state electronic equipment, but their wind tunnels and other facilities are very competitive with ours. We are looking forward to their visit, which will probably occur in October, and to further discussions of potential cooperation.

Though we must move cautiously and it will probably take several years to start up some cooperative work, I am excited about these potential new relations with the Soviet Union in aeronautical research. By the year 2000, I think we could be working as well with them as we do now with our friends in Europe. I hope you will all join me in welcoming the Russian delegation when they visit this fall.

Richard H. Petersen
Director



Armed with a cardboard replica of the structure, city engineer Chuck Pomeroy (foreground) and museum director Ralph Johnston conduct the "first tour" of the Virginia Air and Space Center.

Museum to 'Change Hampton Skyline Forever'

Hard hats were part of the required dress on a recent tour of the construction site of the Virginia Air and Space Center-Hampton Roads History Center. Hard hats--because, even during a recent general site orientation, construction was progressing full steam ahead.

The $30 million project, scheduled to open in 1992, is enthusiastically supported by NASA, the Air Force, the City of Hampton and the Smithsonian. In fact, the operation and exhibits of the Langley Visitor Center will be housed in the world class structure. The Center's theme--"From the Sea to the Stars"--will integrate the region's abundant history with its rich aerospace legacy.

Museum director Ralph Johnston announced the project to be at four percent completion as tour participants tramped through the dirt, deftly avoiding wood pilings and steel jutting from the ground. Hampton senior civil engineer Chuck Pomeroy, whose primary responsibility is to work with the general contractor, W. M. Jordan Co., took a different view. He noted that the most complicated of the construction tasks--from the entry of all the utilities to the construction of the spine which supports the roof--is in the ground now. "A good share of the work of supporting the entire structure is in the concrete and steel that will go on top of the pile caps already in place," said Pomeroy.

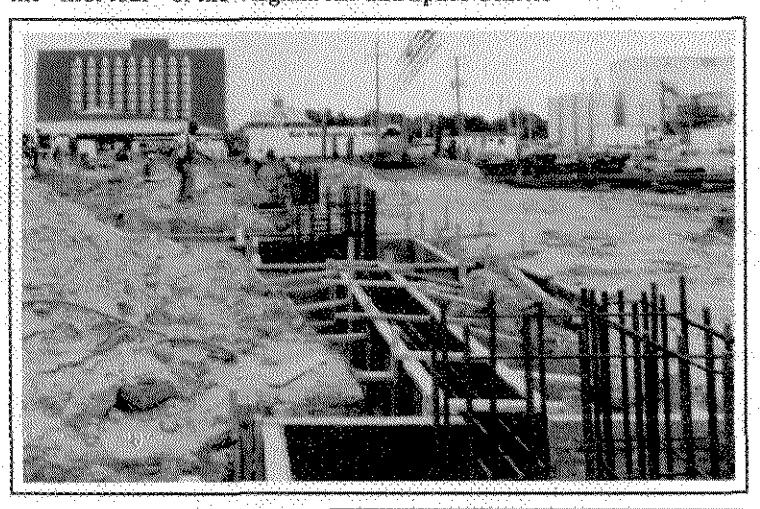
The team of Johnston and Pomeroy led this first tour through the facility that will, in Pomeroy's words, "change the Hampton skyline forever." Beginning in the area of the 66-seat orientation theater where the museum's general story will be told, participants moved to the site of the main exhibit area, which will rise nearly 100 feet to the ceiling--tall enough to house the near-by Radisson Hotel. Johnston couldn't resist whetting the appetite of these first tourists with the promise of exhibits as dramatic as 15 airplanes flying in formation suspended from the gallery's ceiling. The main floor will showcase the Apollo 12 command module, currently on display at the Visitor Center, as well as a full-scale aircraft--a Pitts Special--moving in a continuous barrel roll, half the skin removed to expose the structure of the craft. "Meant to be more than amusing, we hope this interactive exhibit will provoke questions in aerodynamics."

On the opposite side of the very visible, complex spine will be the 17th century exhibits leading to the history area. "One of the more challenging aspects of our exhibits and public programming has been to integrate the broad regional history with more specific stories of air and space," said Johnston. "We plan to use the history exhibits to explain what unique characteristics of this area gave rise to our region's unique and important contributions to air and space. By weaving these stories together we avoid any perception that we're two separate, unrelated institutions under one roof but, instead, one integrated experience."

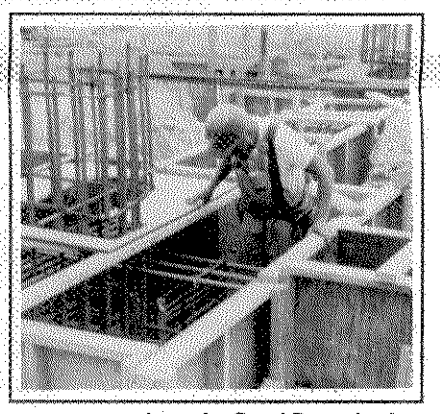
The second deck will house the space exhibits. "The result," said Johnston,"will be three distinct kinds of exhibit experiences: the brightly lit main room, the history exhibit area lit by natural light spilling in from the main room, to the dark, dramatically lit space area."

The enthusiasm was contagious and participants were soon convinced that "something amazing is, indeed, growing in Hampton Roads." Following the tour, Hampton Mayor James L. Eason introduced the city's appointees to the Center's Board of Directors, who will be responsible for setting policy and will serve as the governing body of the Center. Appointees included A. Lewis Allen, Raymond V. Bottom Jr., J.W.W. Chisman Jr., Thomas P. Chisman, Linda Newman Ezell, Andrew S. Fine, William M. Grace, William R. Harvey, Robert J. O'Neill Jr. and Stephen J. Wright. Langley will appoint five members to the board.

Board member and Center president Thomas P. Chisman concluded by announcing a $1 million second phase of the Center's capital campaign. Capital funding for the project has been provided by the Commonwealth of Virginia, the City of Hampton and private donations. Upon successful completion of the 20-month capital campaign, the project will be fully funded. Chisman called this ambitious project "a footprint of the future"--typical of the remarkable achievements of the Hampton Roads area.

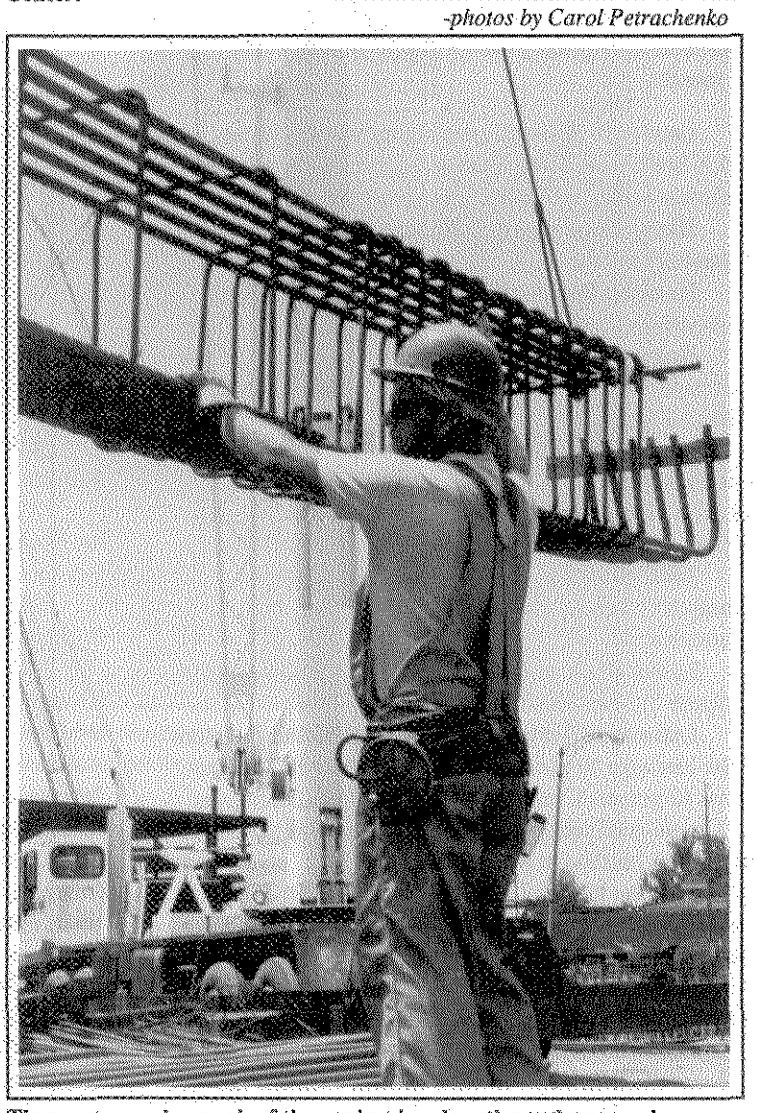


Construction revolves around the complex spine which will hold the world class structure together as well as support the roof and hanging exhibits. The main gallery is so expansive it could house the Radisson Hotel pictured in the background.



Right, a worker "immerses" himself in his job as he crawls into the exposed spine of the Center.

-photos by Carol Petrachenko



The most complex work of the project involves the underground structure which will support the concrete blocks, the steel and bricks visible to the visitor when the museum opens in 1992.

A Tribute to Voluntarism

Humorist Erma Bombeck in a recent column utilized her unique sense of humor to propose a royal family for America--a hierachy who would have no political power but would symbolize what we are all about and set the tone for our nation. Bombeck proposed the Royal Family of Volunteers.

Members of this Royal Family are unrecognizable . . . nameless and even faceless. They are often taken for granted.

Bombeck concludes, "So how do you know you're royalty? It's the crown jewels that give you away--that sparkling tiara of smiles you have given and tears you have shared, and the rich legacy of caring that characterizes you!"

Meet some of NASA Langley's royalty.

NASA Volunteer Honored by LAFB

Visitor Center volunteer Suellen Lansell has been named LAFB volunteer of the year. She is also the recipient of the Angel Pin award. The Angel Pin recognizes members of the Air Force family who dedicate themselves to volunteer activities on the base or in the community. In addition to her Visitor Center dedication, Lansell volunteers as a Red Cross case worker, a home tutor for family services, works in the LAFB thrift shop and is active in her church.

Visitor Center Applauds Volunteers

The NASA Langley Visitor Center recently honored a corps of over 30 volunteers. Center Director Richard H. Petersen gave the keynote address, and A. Gary Price, head of the Office of External Affairs, gave an update on the progress of The Virginia Air and Space Center.

With the help of these dedicated volunteers, over 200,000 visitors from all over the world are able to trace man's aerospace achievements from the Wright Brothers' primitive "Flyer" to Space Station Freedom and beyond. These NASA volunteers, of all ages and backgrounds, share a common bond in their commitment to aeronautics and space. They fill several key positions, from greeting and touring visitors to the Center to assisting educators at the Teacher Resource Center.

During the recognition ceremony, the volunteers were presented certificates of appreciation.

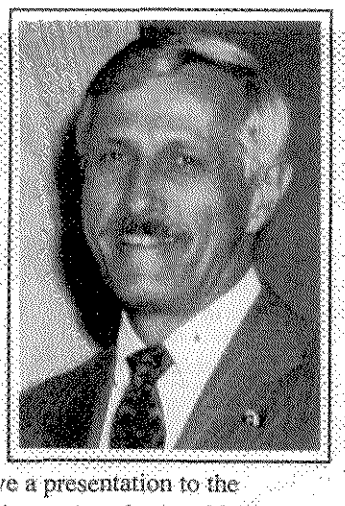
Volunteers from Hampton are William Beczkalo, Mar Burtnette, Ken Curtis, Maxine Copeland, Maria Crete, Judith Curtis, Doris Eagle, Michael Fremaux, Gladys Hardrath, Susie Himes, Frank Jenkins, Suellen Lansell, Mary Levin, Kristine Lynch, Cornell Poitier, Frank Quinto, Seiichi Kawabe, Willie Sessions and Lisa Williams.

Volunteers from Newport News are Neil Bates, Ray Grasso, Nita Hamilton, Peggy Hewes, Marolyn Parker, John Slack, Robert Winger and Shirl Wrenn. Southside volunteers include Kathryn Barclay, Hilary Benoit, Margaret Gray, Betty Harless, Raymond Heineman, John Martin, Randy Wagner, Mark Walker and Diane Warnell.

Center Director Petersen (right) made special presentations to (L to R) Ray Grasso, Marolyn Parker and Ken Curtis who had donated the most volunteer hours to the Visitor Center during the past year.

Speakers Bureau Volunteers Tell the NASA and Langley Stories Near and Far

For the second consecutive year, Lenwood Clarke, Space Station Freedom Office, has been named Langley's Speaker of the Year. Clarke has been a Speakers Bureau member for over five years.



The Langley Speakers Bureau is composed of a volunteer staff of civil service and contractor personnel who provide informational and educational programs to groups across Hampton Roads and beyond.

Following is a list of programs given by Langley volunteers during the past six months.

Laurence Bement gave a presentation to the AIAA Southwest Texas Section and students at New Horizons Technical Center on pyrotechnics;

Harry Benz spoke on imbedded computer technology for the IEEE;

Herman Bohon presented "Space Shuttle" at St. Andrews Presbyterian Church, Suffolk;

Roger Breckenridge gave a presentation on Space Station Freedom for the Morgantown, W. Va., Rotary District 733;

Wayne Bryant gave a presentation entitled "Information Science Technology in NASA's Next Space Mission" for the Louisville, Ky., Data Processing Association;

John Buckley gave an overview of Langley Research Center to the Clemson, N.C., Chamber of Commerce;

Lance Bush spoke to the Blackstone Rotary Club on Space Station Freedom;

Lenwood Clark spoke on Space Station Freedom to the Heritage Republican Women's Club, the Professional Engineers Club of Ft. Belvoir, Va., attendees at the Charleston National Engineers Week Banquet and the United Methodist Men's Club, Fox Hill; gave a presentation at the Langley Visitor Center on LDEF and its recovery; and presented both of these subjects at the Math and Science Center, Richmond;

Ray Comstock spoke on human factors in aviation to the Psi Chi, Old Dominion University;

Christine Darden presented "Historically Black Colleges--Is It Extinct" to the Minerals Management Service, U.S. Department of the Interior;

Robert Daugherty spoke to the Norview Lions Club on Space Shuttle landing research;

Rodney Duncan gave a presentation to the Langley Alumni Association on the Scout Project;

Peter Edgette spoke on smoking and its side effects at R. O. Nelson Elementary School, Newport News, and gave a presentation on government contract monitoring at Thomas Nelson Community College;

Frank Farmer presented "Transfer of Technology to the Medical Field" at the Rehabilitation Institute of Virginia; spoke on medical spinoffs to the American Association of Retired Persons and spoke to the Poquoson Exchange Club on spinoffs from aerospace technology;

Melvin Ferebee spoke to students at North Hampton County Schools on NASA science and engineering;

Bruce Fisher spoke to the Tabernacle Methodist Church Men's Club on NASA storm hazards research;

Joan Funk and **Vickie Johnson** spoke on NASA careers to students at Western Branch High School;

Thomas Gatski gave a presentation on the NASP project to the James City County Rotary Club;

Teresa Graham spoke on hearing conservation at the Hidenwood Presbyterian Pre-School;

George Helfrich gave a presentation entitled "Intellectual Property" at the University of Virginia;

George Hickman presented an overview of NASA Langley to Hampton's Batchelor Benedict Club and spoke on NASA careers at Palmer Elementary School, Newport News;

Bruce Holmes presented "Careers in Aerospace Science and Engineering" at Hampton Roads Academy;

W. Edward Howell spoke to the Peninsula Civitan Club and the senior citizens of the Jewish Community Center on aircraft landing gear and tires;

Mike Langford gave a presentation on engineering careers at Booker Elementary School, Hampton;

Joel Levine presented "Global Atmospheric Change: An Uncontrolled Experiment" to employees of the City of Newport News Waterworks, students at Amherst County High School, the Hampton Roads Jaycees and for Earth Day programs at the Science Museum of Virginia and The College of William and Mary; gave a presentation entitled "On to Mars" for the Newport News Lions Club and Central Virginia Governor's School for Science and Technology, Lynchburg; spoke on "Global Climate Change and Latin America" for the Tidewater Latin American Symposium; spoke on "Ozone Depletion in the Stratosphere" and "The Greenhouse Effect and Global Warming" at an Earth Day celebration in Loudoun County, Va.;

Greg Manuel gave a presentation on aeronautics flight testing and the Space Shuttle at the Cub Scout Banquet, Larchmont School, Norfolk;

Sam Massenberg gave a presentation entitled "The Work Environment" for the American Society of Military Comptrollers and spoke on the "NASA Mission" to Stalag Luft III Former Prisoners of War;

Robert Miserentino spoke on spacecraft structures research for the Palmdale, Calif., AIAA; to Norfolk's Military Order of the World Wars on large space structures; and on supporting the national aerospace program at Davis and Elkins College, Elkins, W. Va.;

Bob Pegg gave a presentation on the NASP project to the Warwick Rotary Club and spoke on the National Aero-Space Plane to the Langley Computers and Communications Wive's Club;

Frank Quinto spoke on astronaut training to Psi Chi Phi, Tidewater Community College; on aircraft design at James Hunt High School, Wilson, N.C.; on aerospace careers also at James Hunt High School;

Buddy Poe spoke to the Langley Alumni Association on Aging Aircraft;

Brian Pritchard gave a presentation on the Space Exploration Initiative for the Smithfield Kiwanis Club;

Lester J. Rose gave a presentation on spinoffs from aerospace technology to the IEEE, Norfolk Chapter;

Bill Sleeman spoke on NASA programs at Pemberton Elementary School, Richmond;

Leroy Spearman spoke to the Men's Club of the Hidenwood Presbyterian Church on the growth of aviation technology and to the Suffolk Rotary Club on the progression of aviation;

David Throckmorton spoke to the Armed Forces Communication Electronics Association on Space Shuttle Orbiter Experiments;

William Vogler gave a presentation on Space Shuttle tires and landing systems for the Hampton Kiwanis Club;

Richard Wallsom, spoke to the Newport News Kiwanis Club and at the annual meeting of Clancy and Theys General Contractors on large space structures;

Myra Walton spoke on the role of a NASA engineering technician at the Annual Youth Seminar, Hunnington Middle School, Newport News;

Joe Watts gave a presentation on the National Aero-Space Plane for the Society of Military Engineers;

Joan Taylor Wright spoke on NASA careers at Phoebus High School;

Kenneth Wright presented "Preparing Today for Your Future" at Eaton Fundamental School, Hampton;

Jim Yu spoke to the University of Michigan's Sigma Gamma Tau Engineering Honor Society on aeroacoustic research challenges at NASA.

People & Places

NASA Honor Awards

Group Achievement Awards

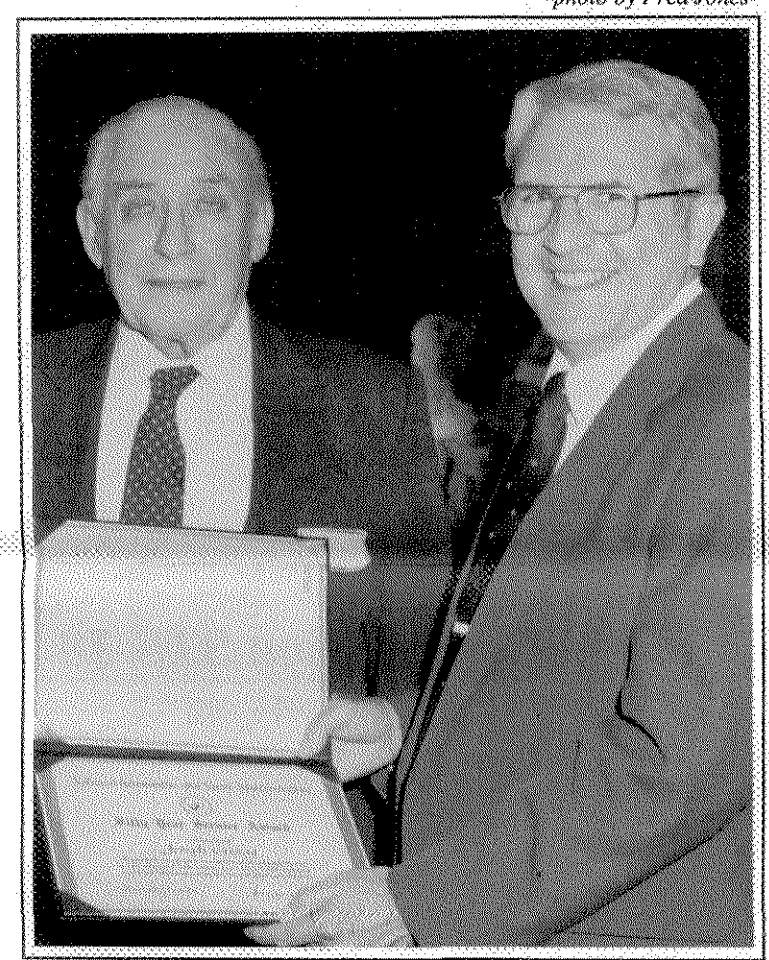
NASA has bestowed singular honor in recognition of achievements by the following groups which were inadvertently omitted from the listing in the June 15 issue of the **Researcher News.** Apologies to those individuals who contributed to these very valuable efforts:

Shuttle Infrared Leeside Temperature Sensing Experiment Instrument Development Team, accepted by Rufus K. Dail, "For outstanding contributions in design, analysis, fabrication, testing and integration of the Shuttle Infrared Leeside Temperature Sensing Space Flight Experiment."

Synthesis of High Performance Polymers Team, accepted by Terry L. St. Clair, "For meeting NASA and the aerospace industry's needs in synthesis and development of high performance polymers."

Technical Analysis Team for the National Aero-Space Plane Program, accepted by James L. Hunt, "For exceptional effort in providing an analytical assessment of design and performance potential of the National Aero-Space Plane vehicles with emphasis on propulsion systems."

-photo by Fred Jones



50-Year Veteran Honored

At Langley's Annual Honor Awards Ceremony held June 5, NASA Administrator Richard H. Truly (right) recognized Joseph Getsug, Systems Safety, Quality and Reliability Division, for fifty years of federal service. Getsug is the first Langley employee to achieve this distinction.

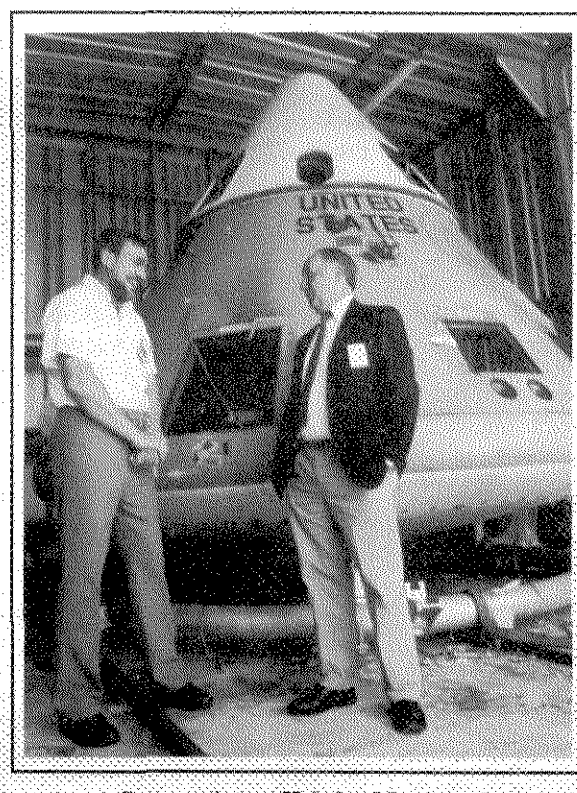
Getsug began his Langley career in 1940 as a junior electrical engineer for NACA. He is currently staff chief engineer for Systems Engineering and Operations.

Deadline-Distribution Dates Announced

For your convenience, **Reseacher News** deadline and distribution dates for the second half of 1990 are listed below. Please clip and save.

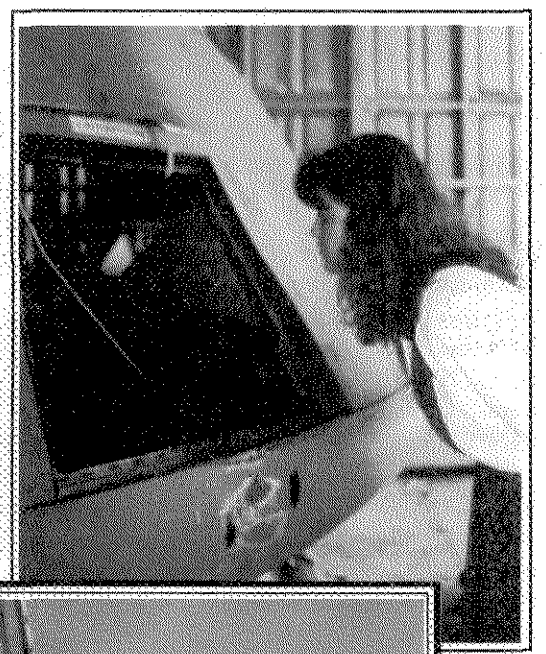
Deadline	Distribution Date
July 2	July 13
July 17	July 27
July 31	August 10
August 14	August 24
August 28	September 7
September 11	September 21
September 24	October 5
October 9	October 19
October 23	November 2
November 6	November 16
November 20	November 30
December 4*	December 14

*December 14 is the last **Researcher News** issue of the year. Please note the December 4 deadline when making holiday plans.

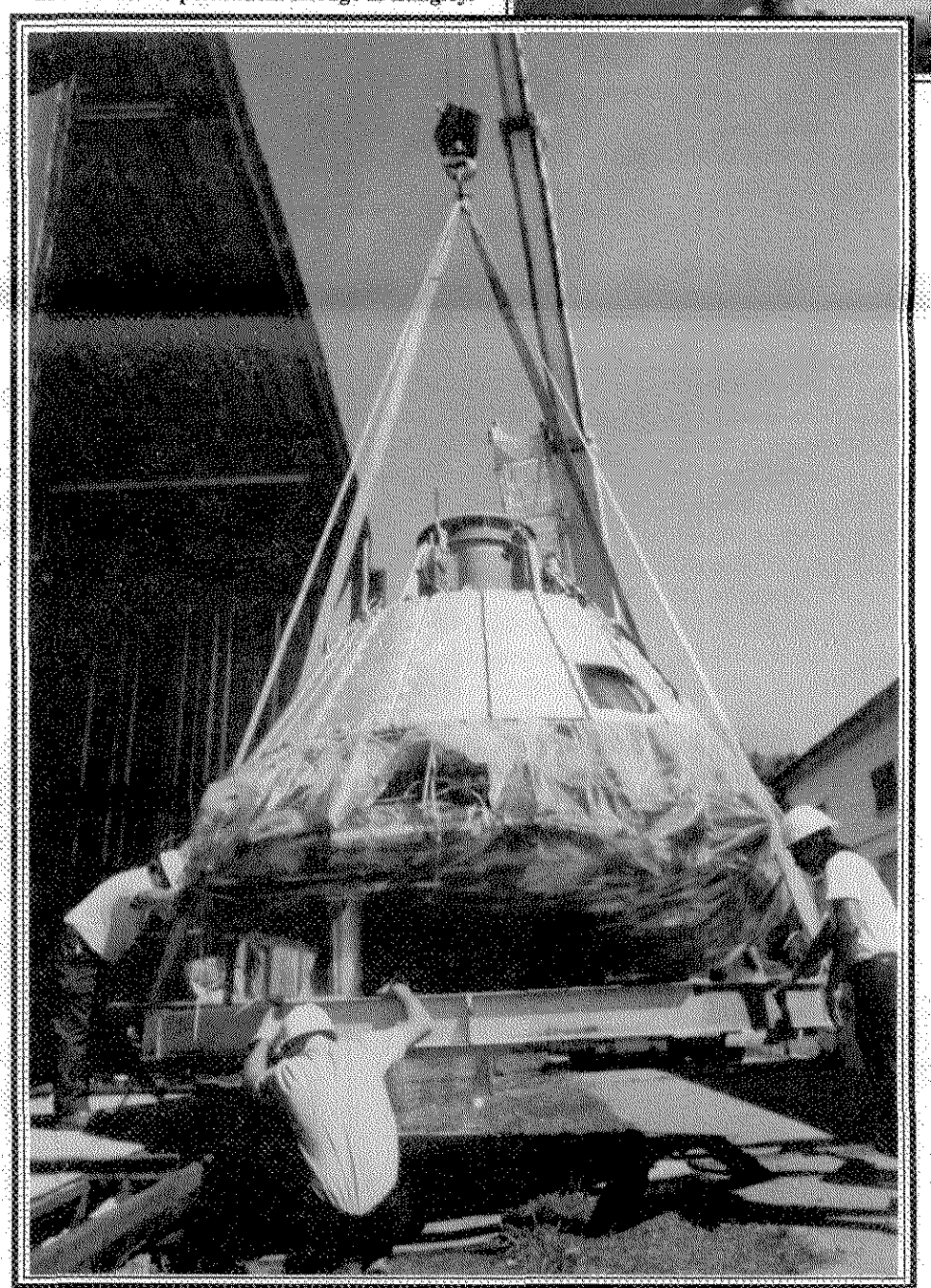


Claude R. Watts Jr. (left), head of the Transportation and Warehousing Section and Charles "Gary" Evans, head of the Logistics Management Branch, confer in front of the Apollo 204 heat shield. The two have overseen the storage of the capsule and heat shield according to the specifications set forth by the Apollo 204 review board.

-photos by Carol Petrachenko



Summer intern Kristina Murden takes a look into history as she peers into an opening in the Apollo 204 heat shield. The capsule and heat shield were displayed for the media prior to their return to permanent storage at Langley.



EG&G riggers place the Apollo 204 command module carefully onto the permanent rails in the metal container as they return the capsule to permanent storage at Langley.

Apollo 204 Capsule to Remain at Langley

The Apollo 204 capsule will remain stored at NASA Langley for an indefinite period.

NASA Administrator Richard H. Truly reversed an earlier decision which would have taken the remnants of the Apollo craft and placed them in the Florida missile silo that contains remains of the Space Shuttle Challenger.

Astronauts Virgil I. "Gus" Grissom, Roger B. Chaffee and Edward White II perished in the Apollo 204 spacecraft fire on January 27, 1967. Their deaths occurred on Launch Complex 34, Cape Canaveral Air Force Station, Fla., during prelaunch tests for the first manned Apollo mission.

Truly's decision was made following discussions involving NASA officials, members of the families of Apollo 204 astronauts, former Apollo astronauts and officials at the National Air and Space Museum.

Happenings

NO LAA SOCIAL this Friday, July 6, due to the July 4 holiday.

NASA TOASTMASTERS meet the second and fourth Wednesdays of each month. The next meeting is July 11, 11:30 a.m. in the H.J.E. Reid Conference Center. For more information, contact Christine Darden, ext. 45258.

STRESSBUSTERS meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. Direct questions to Steve Dahmen, ext. 44519.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA gym. Cost is $12/month. First class is free. For details, contact Michele Macaraeg, ext. 42295.

NIGHT ON THE NILE. An evening of Middle Eastern dance to benefit the Leukemia Society will be held July 14 at the Fort Magruder Inn, Williamsburg. Doors open at 7 p.m.; show at 8. Hors d'oeuvres served at intermission. Cost is $12. Call 877-1373 for reservations by July 10.

LARC RETIRED WOMEN will not meet in July due to the July 4 holiday.

LAFB ANNUAL COMMUNITY APPRECIATION DAY will be held Saturday, July 14, from 9 a.m. to 4 p.m. F-15 aerial demonstration plus Army's All American Parachute Team and a look at the Stealth F-117A. Free admission. Call 764-2010 for more information.

TELA-TAX SERVICE. Year-round tax preparation and bookkeeping services. Member National Association of Tax Practitioners. Call 874-3121.

ALUMNI ASSOCIATION will not hold luncheon meetings in July or August.

LOST: NASA BICYCLE with tag number 270. Please call Davis Wright, ext. 47259.

FOR SALE: PUPPIES. Siberian Huskies, AKC reg., 4 females, 3 males. Black and white with blue eyes. $200. Call 874-9483.

FOR SALE: AUTO. 1984 Z-28 Camaro. AC, PS, PB, AT w/OD, T-tops. Low mileage. Below book value. $5,000. Call 874-9483.

FOR SALE: 2 TICKETS, Paul McCartney World Tour, July 6, Washington, D.C. 838-0873.

Retirement Party

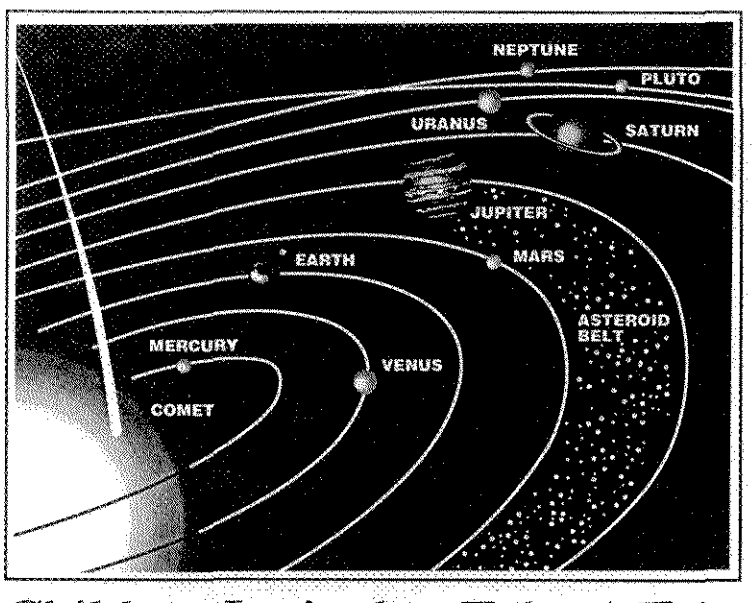
James S. Post Jr. will be honored at a retirement party on Friday, July 13, in the H.J.E. Reid Conference Center, Building 1222. A social at 6 p.m. will be followed by dinner at 7. Cost, including gift, is $11/person or $21/couple. Gift only contributions are also welcomed. Checks may be made payable to Wayne Hogge, Mail Stop 171, by July 6.

Note of Thanks

Walter A. Vahl writes: "My family and I wish to thank all those who participated in my retirement luncheon. The thoughtful "touches" and gifts were especially appreciated. I will think often of the enjoyable years spent at Langley and the great people with whom I was associated."

Call for Papers

The Workshop on Aerospace Applications of Magnetic Suspension Technology will be held in the H.J.E. Reid Conference Center, Building 1222, September 25-27. One-page abstracts of proposed presentations are requested. For registration information, contact Emily Kornegay, administrative chairperson, at ext. 46606.



Children Invited to Take A Trip Through the Universe

The Visitor Center will offer children an entertaining and educational program entitled "A Trip Through the Universe" throughout July. The one-hour program will explore the wonders of the solar system.

Classes are offered in two age groups. Six- to eight-year-olds are scheduled from 9 to 10 a.m. and nine to 12-year-olds will attend from 10:15 to 11:15 a.m. Reservations are necessary. Call the Visitor Center at 864-6000 for available dates.

Summer Fun at a Discount

Discount tickets for area attractions are sold at the Visitor Center Souvenir Counter. For your convenience, discount tickets will also be sold at the cafeteria on Fridays during the summer.

Researcher News

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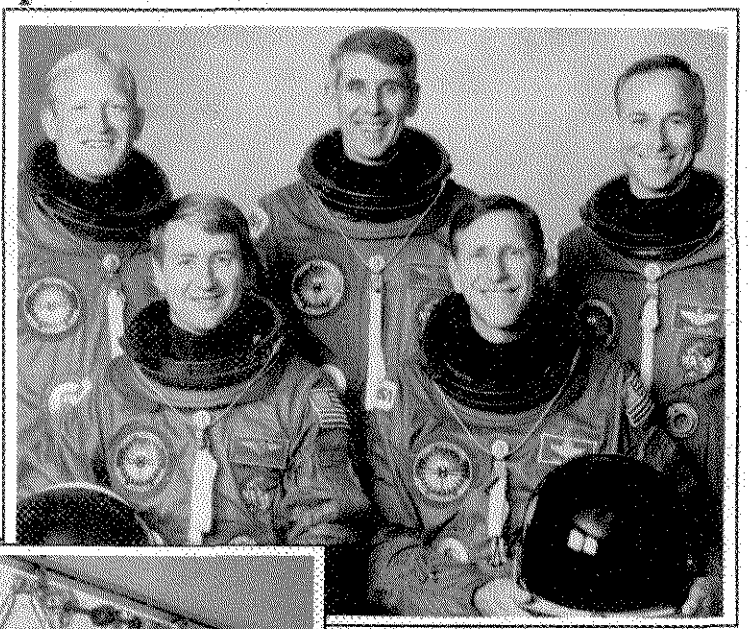
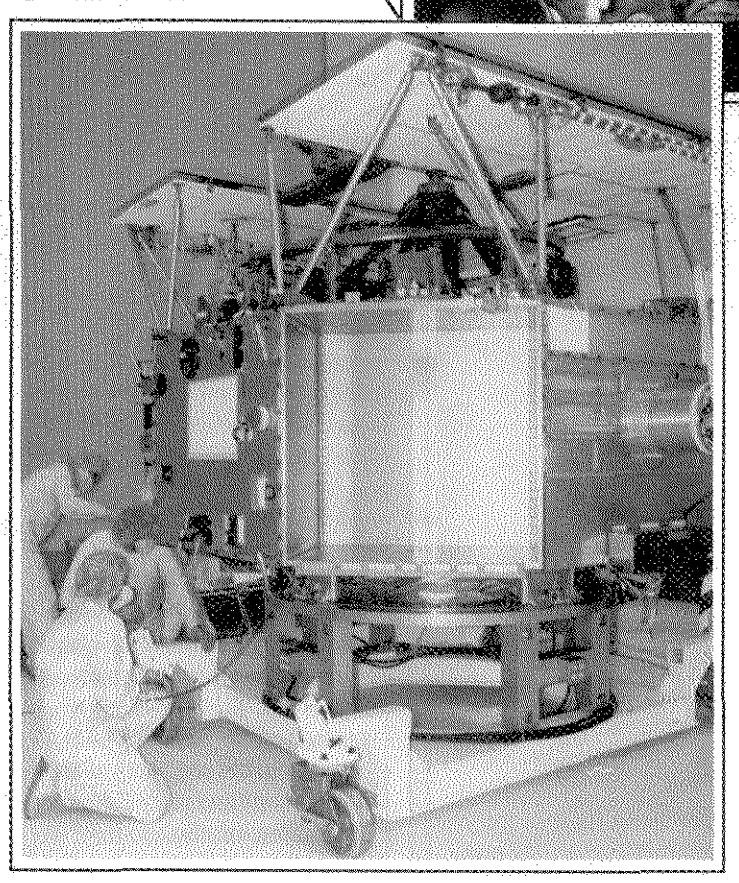
July Launches: Space Shuttle: Mission STS-38



STS-38, a classified DOD mission scheduled for launch in mid-July, will be piloted by (front row, L to R) USN Cmdr. Frank L. Culbertson and commanded by USAF Col. Richard O. Covey; mission specialists are (back row) USA Capt. Charles D. "Sam" Gemar, USMC Col. Robert C. Springer and USAF Maj. Carl J. Meade.

Expendable: CRRES



CRRES, the Combined Release and Radiation Effects Satellite, shown to the left in a test stand at the KSC Payload Hazardous Servicing Facility, will be lofted into orbit July 9 by Atlas-Centaur 69. The joint NASA-Defense Department payload will study the radiation environment high above the Earth which can damage satellite systems.

NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 14 July 13, 1990

Researcher News

Bi-weekly Employee and Contractor Publication

Langley Colloquium and The Sigma Series

Dunbar To Describe Historic LDEF Retrieval

NASA, the nation and the world waited anxiously as the astronauts of the Space Shuttle Columbia retrieved the school bus-size spacecraft that had been in Earth orbit nearly six years--The Long Duration Exposure Facility (LDEF). On January 12, 1990, Mission Specialist Dr. Bonnie J. Dunbar guided Columbia's robot arm to grapple the spacecraft.

During two lectures in Hampton Monday, July 16, 1990, Dunbar will relive those historic moments as she presents "Mission Highlights STS-32; Retrieval of LDEF." Her lecture and slide presentation will be presented to Langley employees, contractors and retirees in the H.J.E. Reid Conference Center at 2 p.m. That evening, she will give the same presentation at 7:30 at the Holiday Inn, Coliseum Hotel and Conference Center, as part of The Sigma Series. The Sigma Series is a series of free public lectures sponsored by the Virginia Air and Space Center, the Daily Press and NASA.

In her presentations, Dunbar will highlight the STS-32 mission, the longest Space Shuttle mission to date, and describe the retrieval of the 21,400-pound facility. The LDEF, a free-flying satellite designed to test the effects of prolonged space exposure, was developed and managed by NASA Langley.

The LDEF contained 57 science and technology experiments and was the first spacecraft designed to place experiments in space for an extended period and then return them to Earth for detailed laboratory analysis. The more than 200 LDEF investigators represent private companies, universities, Department of Defense laboratories, foreign countries and NASA.

The LDEF retrieval mission was Dunbar's second trip into space. Her first Shuttle flight was as a mission specialist on the crew of STS 61-A, the West German D-1 Spacelab mission, which launched from the Kennedy Space Center, Florida, on October 30, 1985. Dunbar became a NASA astronaut in August 1981. Her technical assignments have included assisting in the verification of Shuttle flight software at the Shuttle Avionics Integration Laboratory, serving as a member of the Flight Crew Equipment Control Board, participating as a member of the Astronaut Office Science Support Group, supporting operational development of the Remote Manipulator System and as chief of the Mission Development Branch. Her current technical assignments include Astronaut Office interface for "secondary" payloads and lead for the Science Support Group.

Stephens Selected for Harvard Management Program

David G. Stephens, chief of the Acoustics Division, 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 fifteenth 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.

Langley's Acoustics Division is the largest government research facility in the United States devoted to aircraft noise reduction. It is responsible for identifying aircraft noise issues of national and international importance and for directing research programs to resolve these issues. Stephens feels that the Harvard program will provide him with a greater understanding of how NASA programs and goals are impacted by both political and social environments.

Stephens began his NASA career in 1959 as an aerospace engineer specializing in structural dynamics and fluid mechanics of space vehicles. In 1969, he was appointed head of Langley's Environmental Systems Section. He was named head of the Structural Dynamics Branch in 1971 and, later, became head of the Noise Effects Branch. In 1983, he was selected assistant chief of the Acoustics Division and was named chief in 1988.

Researcher News Feature:

Book Review

Guggenheim Medal winner Fred Weick celebrates his 91st birthday tomorrow, July 14. Become acquainted with this aeronautical pioneer via his autobiography, *From the Ground Up*, reviewed on page 2. Aerospace enthusiast and director of the Virginia Air and Space Center, Ralph Johnston provides an intuitive look at Weick, whose NACA cowling won Langley its first Collier Trophy.

NASA Returns to Oshkosh

NASA to Feature Aeronautics and Space at EAA Convention

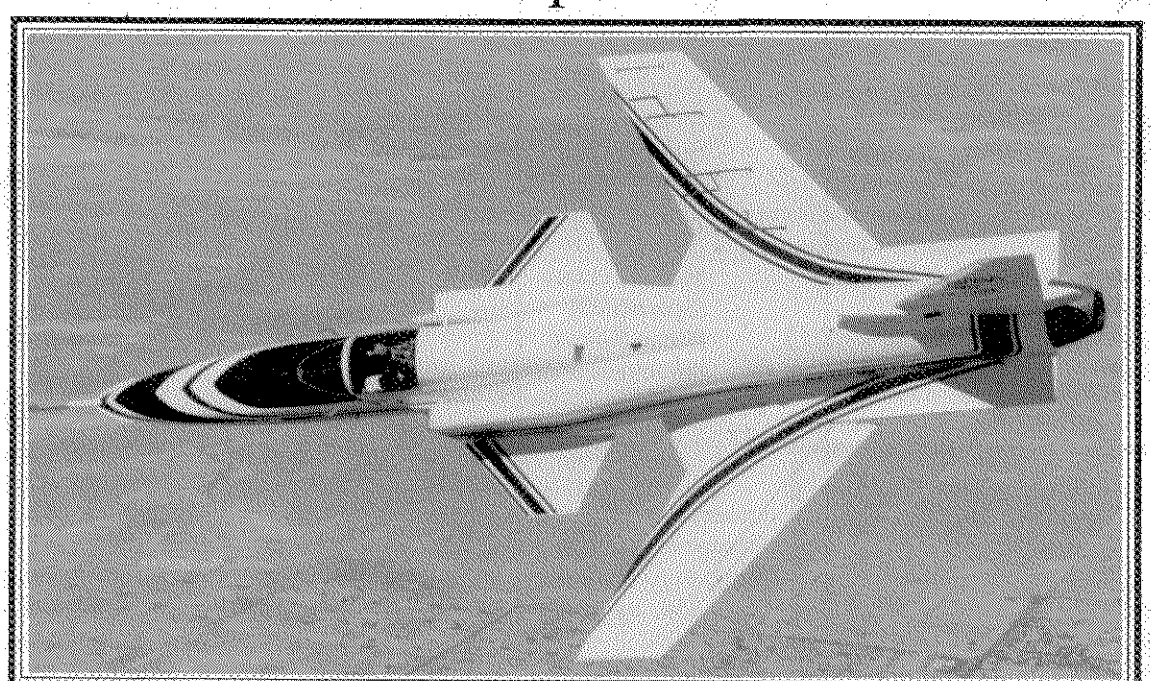
-by H. Keith Henry

NASA returns to Oshkosh, Wisconsin, July 27-Aug. 2 for the 38th Annual Experimental Aircraft Association (EAA) International Fly-In Convention and Sport Aviation Exhibition with a new exhibit. Entitled "NASA: Technology for America's Future," the exhibit will highlight research and technologies being developed for future flight vehicles; for safer, more efficient flight; and for space science and exploration.

A highlight of the exhibit is the NASA/USAF X-29 forward-swept-wing research aircraft, scheduled for one of its first public displays away from its Southern California base. Other highlights of NASA's participation include the return of technical forum speakers and the popular NASA craftsmanship display.

Supporting the NASA exhibit are the agency's aeronautics field centers--Ames, Ames-Dryden, Langley and Lewis. Goddard Space Flight Center will provide the SARSAT van, a mobile exhibit telling the story of the Search and Rescue Satellite System. Also on display will be the AEROVAN travelling exhibit.

More than two dozen NASA speakers will conduct technical forums throughout the convention, ranging from "Research Results Using the World's Largest Motion-Base Piloted Simulator" to "Environmental Aspects of the High Speed Civil Transport" to "The Dream Continues - Back to the Moon and On to Mars."



RESEARCH AIRCRAFT READY FOR DISPLAY. The X-29 advanced technology demonstrator aircraft will be on static display at airshows this summer in Dayton, Ohio, and Oshkosh, Wisconsin.

Throughout the seven-day convention, visitors to the NASA exhibit will be treated to a wide range of display topics and research hardware.

Outside, in front of the NASA exhibit building, the X-29 jet aircraft will be on display. Its distinctive wing design and other advanced aerodynamic, structural and avionic technologies were tested during 242 flights over a broad range of speeds. NASA is partners with the U.S. Air Force and the Defense Advanced Research Projects Agency in the flight test program. The program is managed by Ames-Dryden and the Air Force Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio. A second X-29 is now being flight tested for maneuverability at high angles of attack -- the angle of the aircraft wings and body relative to the flight path.

While there will be no aerial demonstration of the X-29 at the air show, vistiors can get a first-hand look at this unusual experimental aircraft. Pilots and support staff will be available at the display site to answer questions.

Inside the exhibit building, visitors will see exciting new shapes, materials, and propulsion concepts and learn how advances in supercomputers give NASA researchers breakthrough computational codes that can better predict flight performance.

The exhibit will relate NASA's progress in its all-important research into safety factors such as icing, heavy rain, and windshear avoidance, as well as studies involving human interaction in the flight process.

A new era of space science is beginning. The space science area will feature NASA's Great Observatories, just four of the missions that may radically alter mankind's view of the universe.

Human explorers in space will be assisted by robots that will perform many tasks associated with the operation of Space Station Freedom. On display will be examples of recent achievements in robotics technology, as well as vehicles that are being developed for short-haul space transportation.

Back by popular demand is a new NASA craftsmanship display, operated by technicians from the Langley and Lewis Research Centers. The display highlights fabrication crafts with displays of selected metal and composite structures, aeronautical models, test equipment and data measurement hardware.

News Briefs

JET PROPULSION LABORATORY, Pasadena, Calif. --- Scientists and engineers at NASA JPL have begun an extensive period of field testing of a semi-autonomous navigation system on a computer-operated robotic vehicle prototype for possible use in future planetary explorations. Developing new technologies, including a new generation of planetary rovers, is seen as critical to the success and cost effectiveness of the Space Exploration Initiative (SEI) program announced by President Bush last July. The Planetary Rover project will develop systems for the manned and unmanned vehicles needed for surface transportation.

HEADQUARTERS, Washington, D.C. --- Continuing its efforts to encourage the next generation of scientists and engineers, NASA has selected 37 graduate students at U.S. universities to take part in the Global Change Fellowship Program. These Global Change Fellows, students pursuing Ph.D. degrees, were selected by a panel of representatives from the Earth Science and Applications Division, Office of Space Science and Applications (OSSA) and the Educational Affairs Division at NASA and from professional scientific societies and universities. Fellowships of $22,000, beginning in the 1990-91 academic year and renewable for three years, will be awarded based on research proposals submitted by the selected applicants. The students, from the United States and 10 other countries, represent 28 institutions of higher learning. Their proposals included research in atmospheric physics and chemistry, biogeochemistry, data and information systems, ecosystems, hydrology, oceanography and solid-Earth sciences.

KENNEDY SPACE CENTER, Fla. --- A propellant loading test of the STS-38 Space Shuttle vehicle, slated to conduct a dedicated Department of Defense mission in mid-July, revealed a hydrogen leak. Although similar to the leak that caused the postponement of the STS-35/Astro 1 mission, the leak appears to be smaller than the one detected during the tanking exercise on the STS-35 vehicle prior to its rollback to the Vehicle Assembly Building and demating.

HEADQUARTERS, Washington, D.C. --- NASA's Office of Aeronautics, Exploration and Technology (OAET) has selected 11 proposals for development of space flight technology experiments and four proposals for further study in its In-Space Technology Experiments Program (IN-STEP). Since 1987, IN-STEP has stimulated the aerospace engineering community to work with NASA in making greater use of the Space Shuttle, expendable launch vehicles and Space Station Freedom for space research and technology experiments.

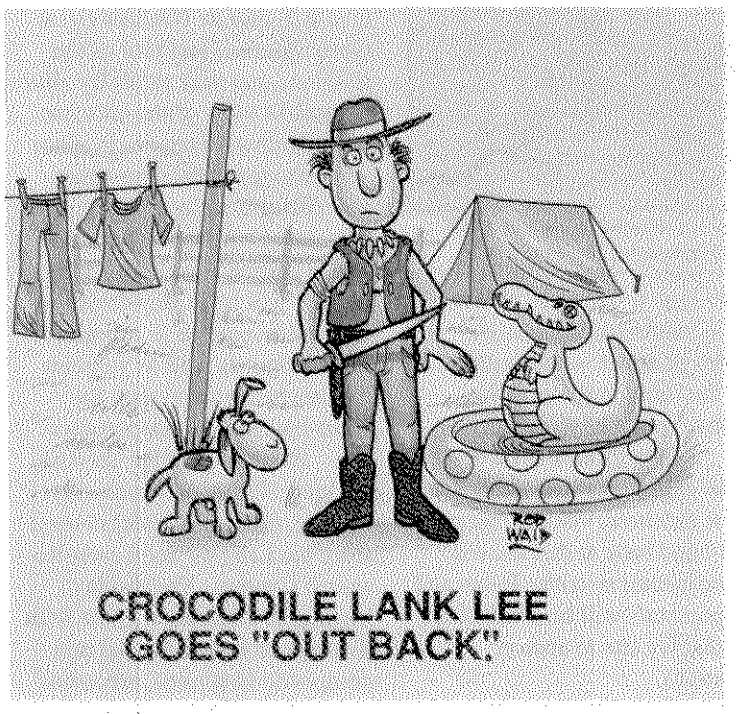
AMES RESEARCH CENTER, Mountain View, Calif. --- Rest during long-haul flights improves pilot alertness. This is the conclusion of a recently completed study at NASA Ames, providing the first concrete evidence that there may be substantial safety benefits from allowing pilots to obtain limited rest in the cockpit during long-haul, international flights. These findings confirm previous studies that showed international flight crews often experience considerable fatigue and sleep loss. There is now direct scientific evidence that short, carefully controlled rest periods can act as a 'safety valve' to reduce fatigue and improve alertness during the most important phases of flight, such as descent and landing.

Senior Management Research Review

The Senior Management Research Review will be held Monday, July 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	Ground-Based Science for Microgravity Crystal Growth Experiments	Archibald Fripp (Flight Systems/ISD)
9:45	Anomalous Behavior Characterization of the Fault-Tolerant Multiprocessor (FTMP)	Peter Padilla (Flight Systems/ISD)
10:00	Shock Containing Supersonic Jet Plume Analysis Using Adaptive Grid	Paul Pao (Aeronautics/AAD)
10:15	Microwave Monitoring of Stratospheric Ozone: An Element of the Network for Detection of Stratospheric Change	Brian Connor (Space/ASD)
10:30	A Method of Optimizing the Placement of External Masses on Arbitrary Spacecraft Geometries	Melvin Ferebee (Space/SSD)
10:45	Moderate Transpiration Cooling Ineffective in Reducing Type IV Shock-on-Lip Heat Flux	Robert Nowak (Structures/SMD

Lankley



Reminder:

Don't forget to return your reservation form for the August 8 reception honoring the LDEF team to Arlene Levine, Mail Stop 154, by August 1.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

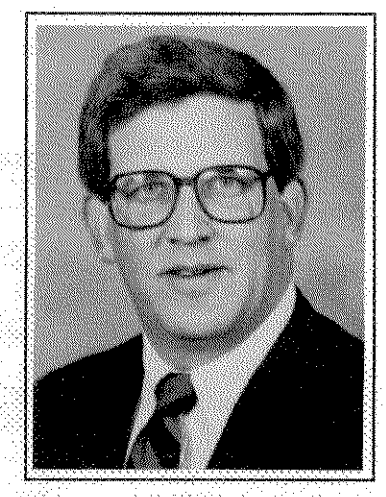
Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Editorials

Book Review

Weick Judged Admirable for His Values as well as His Achievements



Until my first visit to Langley Research Center, I had always considered it the cradle of the manned space flight program. Langley's history prior to 1958, while important, was largely taken for granted. Like so many other first-time visitors, I went first to the Visitor Center. And like so many others of my space-minded generation, I expected to see a piece of the Lunar Landing Research Facility (LLRF), a few photos of the original Space Task Group, and, if lucky, perhaps Caldwell Johnson's drafting table. On the way, I was vaguely aware that these grounds had been walked by aeronautics pioneers such as Max Munk and Chris Kraft. And nothing to be seen at the Visitor Center, I was convinced, would be more impressive than the Apollo spacecraft.

Of course, I was wrong. The sight of five Collier trophies lined up in a display case readily restored my sense of historical perspective. It was immediately clear, as it should have been all along, that the triumph of Apollo, a legacy of 50 years of brilliant work in aeronautics, was really just a recent chapter in Langley's success. After all, the NACA tradition of excellence in research provided the space program with its leadership. Perhaps I had glossed over a few pages of required reading in aerospace history. Perhaps I should know more about the work that earned those Collier trophies. Perhaps it was time to do some homework.

No homework assignment was ever more enjoyable than reading *From the Ground Up*, Fred Weick's autobiography (Smithsonian Institution Press, 1988). This unassuming first-person account of a brilliant career in aircraft design both informs with its broad insights and delights with its charming anecdotes. Gemlike stories such as the one about Weick advising Glenn L. Martin to move his company to Newport News are interspersed among landmark events such as the design of the Ercoupe and the development of the Collier-winning NACA cowl.

Weick was a leader for more than five decades bracketing flight's golden age, and he would have been a major contributor to aviation no matter what career he had pursued in the industry. It was fortunate for Langley that he spent so many of his early years here. And it is fortunate for so many sport fliers and air passengers that he ultimately chose to devote his work to increasing air safety. As Langley's resident historian and Weick's coauthor, Jim Hansen writes in his introduction, "Fred Weick's dream was to build safe and small airplanes at reasonable cost for private owners, and thereby make the joys and conveniences of aviation directly accessible to middle-class Americans." Tricycle landing gear is just the best-known and most pervasive of Weick's many innovations in this area.

In his preface to the book, Weick's NACA colleague Robert T. Jones mentions "Fred's strictly rational approach" as an engineer. Weick may be rational in his functional approach, but he is also imaginative and creative in his willingness to challenge existing design notions, and his book documents countless examples of this. Readers will not confuse rationality with conservatism.

From the Ground Up is filled with history and with warmth. This "rational" man turns out to have quite a bit of heart to accompany his engineering integrity, and his emotions sometimes show. Weick is made sad and resentful by the tort lawyers who oversimplify technical issues and deny the risk inherent in all flying in their eagerness to fix blame for accidents on airplane design. Weick's genuine and deep affection for many of his colleagues is evident throughout the book. Perhaps the most persuasive example of this is one that pushes at the bounds of rationality. Weick loyally defends his friend and employer Bill Piper, who lost much of his power in a hostile takeover of the publicly-owned company he had founded and managed for many years. Fred Weick comes through clearly as an engineer of brilliance and a man of principle; in all, a person to be admired not just for his significant professional achievements but also for his values and feelings.

Ralph Johnston

Johnston is the executive director of the Virginia Air and Space Center and Hampton Roads History Center scheduled to open in 1992.

Editor's note: Copies of *From the Ground Up* are available for sale at the Visitor Center Souvenir Counter.

NASA Langley Scientists Pioneer Laser Catalyst Research

-by Craig Murden

Langley scientists and the graduate school staffs of three universities have collaborated to produce a major innovation in laser applications for meteorology, space exploration, industry and health care.

The endeaver has involved a cooperative effort between Langley's Instrument Research and Flight Electronics Divisions in a continuing partnership with the University of Florida, Old Dominion University and the University of California, San Diego. This multi-faceted teamwork has placed NASA-sponsored research in the forefront of world-wide expertise in the development of catalysts for carbon dioxide lasers.

The breakthrough is a new catalyst that sustains the desired laser-gas composition which allows the laser to function continuously in a sealed, unattended space environment. The research for this capability came out of the need for a self-contained laser to precisely measure wind velocity when carried aboard the new satellite NASA is designing for its Laser Atmospheric Wind Sounder program.

Langley's catalyst research activity began at the suggestion of physicist Robert V. Hess, head of the Laser Technology and Applications Branch. The project then gained momentum when the Center's Director, Richard H. Petersen, saw the potential, albeit high risk, and used his discretionary fund to seed the effort. "In this case, his confidence was well placed as the exploratory work, initially headed by Dr. Robert S. Rogowski and currently by analytical chemist Dr. Billy T. Upchurch and physical chemist David R. Schryer, eventually brought the project into formal NASA research channels because of their foresight and leadership," said John Samos, Langley's Technology Utilization Officer. It was that same leadership which brought the universities into the project in one of the best examples of NASA's intent to involve the academic community in its cutting-edge research, added Samos.

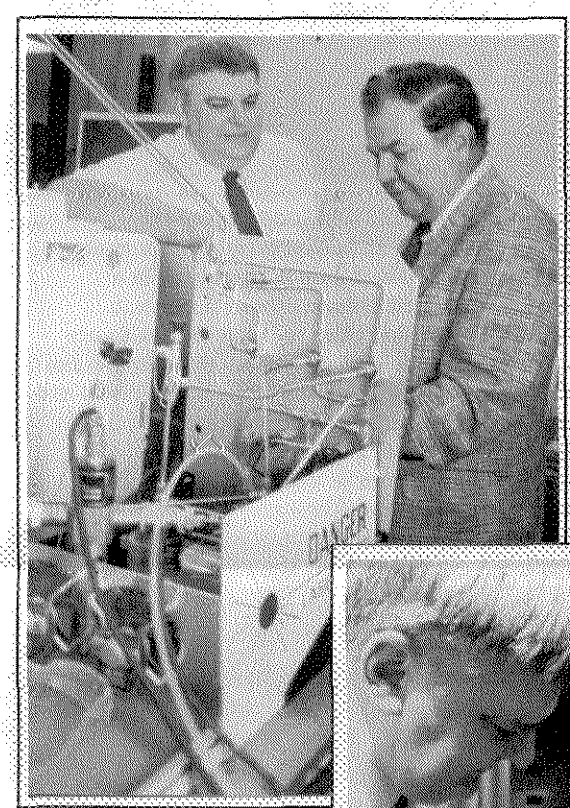
What is a laser?

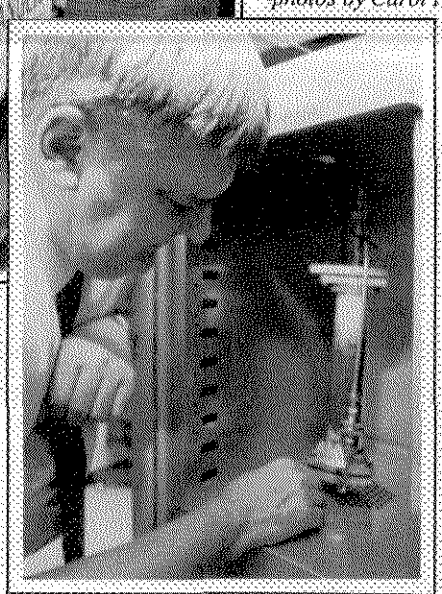
To understand the importance of the new technology, a primer in laser science is useful.

A laser operates on the basis that the molecules of chemical elements can be "excited" or raised to greater levels of energy by a source such as electrical current. However, they cannot sustain that heightened state of agitation and will spontaneously drop to a lower level. When that happens, light is emitted. The laser scientist's job is to take the randomness out of that process so that the drop occurs on demand and is simultaneous for all the molecules, according to Schryer. This produces the controlled, piercing needle of light which characterizes a laser discharge.

Why a CO_2 laser?

NASA plans to use a carbon dioxide (CO_2) laser for its wind measurement initiative because it can be made safe to the human eye and is one of the most mature technologies in the laser family. Industry also employs the CO_2 approach in a variety of applications.





Analytical chemist Dr. Billy T. Upchurch (right) and physical chemist David R. Schryer adjust controls on Langley's carbon dioxide laser. The two scientists teamed to head research which produced a catalyst that will allow the laser to function unattended in space.

-photos by Carol Petrachenko

At left, David Schryer examines the vessel containing the new gold/manganese catalyst prior to another test of the carbon dioxide laser.

What is the problem?

But CO_2 lasers have problems with loss of the CO_2 gas as the lasing process continues. What happens is that, during the process of the electrons smashing the CO_2 gas molecules to raise their level of activity, some CO_2 molecules break apart and decay into carbon monoxide (CO) and oxygen (O_2). This loss of CO_2 and buildup of O_2 will degrade the laser's performance with each pulse, states Schryer.

In laboratories and in industry, the problem is solved by reintroducing fresh CO_2 from heavy, complicated and expensive replenishment systems. That is fine when it is practical to provide an outside source of CO_2. But, the NASA system must be self-contained and light in weight aboard the satellite, able to continue producing laser emissions for years. Therefore, there must be an ingredient or catalyst in this closed system which will continually reconvert the degrading CO_2 to its original composition, says Upchurch.

A possible solution . . .

The world-wide laser science community has long been working on this problem, not just for space use but because such a catalyst makes the whole process cheaper and more flexible. As a result, several catalysts have been developed and the NASA team has looked at their potential for optimization and use in the space environment. Unfortunately, another problem is the heat and high oxygen concentration required to make these catalysts work. High temperature would place unacceptable power demands upon the spacecraft and high oxygen concentration has bad effects on electrical current flow.

A new approach . . .

After exhausting the potential of existing catalysts, the NASA team began a whole new scientific exploration for elements with properties that, when combined as a catalytic agent, would provide continuous regeneration of CO_2 in a closed system, at room temperature and with low oxygen concentrations. That investigation led to a five-year intensive search for combinations of what are called noble metals (platinum, palladium, gold, etc.) and elements with reducible oxides like copper, tin and manganese. This was the first concentrated effort to investigate beyond previously developed catalytic technology and to actually understand how these catalysts work in order to improve them, Schryer says.

Result--new catalysts.

The result of this joint research effort is a new series of very promising catalysts. So far, the best is gold combined with manganese-dioxide (Au/MnO_2). This combination has been found to be particularly outstanding in high initial activity and low decay rate and in fulfilling the other requirements of heat and oxygen concentration, according to Upchurch. The extrapolated half-life is three years. Further testing and optimization continues and a patent has been filed for this catalyst.

Patents Granted

- o Reactivation of a Tin Oxide Catalyst--May 1989
- o Isotope Exchange in Oxide Containing Catalyst--June 1989
- o Process for making a Noble Metal--August 1989
- o Catalyst for Carbon Monoxide--March 1990

Other Applications . . .

The CO_2 laser, which will go into the new wind measurement satellite, is but one potential application of the new technology. Wind velocity will be calculated throughout the atmosphere when the satellite-mounted laser bounces its beam off the dust carried by those winds. When the beam rebounds from the moving dust particles, the frequency of the laser's light changes. This is known as the Doppler Shift and an on-board computer translates this shift of frequency to wind speed. This same approach is envisioned for determining the presence of dangerous micro-burst winds in and around commercial and military airfields. The laser could be mounted in the nose of aircraft and lasers placed around the perimeters of airports to detect the conditions which have proven hazardous in the past, says Schryer.

A spin-off application involves air purification in space exploration vehicles and fixed space stations which must remain sealed for long durations. In this environment, various human activities generate carbon monoxide which can eventually reach deadly levels. The new laser catalyst can oxidize the toxic carbon monoxide to harmless CO_2 which is much easier to deal with, says Upchurch.

In industry, the catalyst's use could represent major economies since it can eliminate the elaborate support hardware, associated maintenance and the high cost of large quantities of bulk CO_2.

Another possible spin-off for this NASA innovation, is use of compact CO_2 lasers in the health care arena where the new catalyst again allows self-contained flexibility without the threat to human vision posed by other lasers, suggests Schryer.

The people . . .

The research team embraces a variety of academic sub-disciplines as well as geography. From the University of Florida, Gainesville, chemistry graduate student Steven Gardner actually made the first of the successful new catalysts designed by Langley scientists. His mentor and also a very active researcher in the project is chemical engineering professor Gar Hoflund. Closer to Langley, physical chemistry professor Kenneth G. Brown from Old Dominion University, his assistants, chemist Erik J. Kielin and technician Jacqueline Schryer, together with graduate students Susan Ohorodnick and Donna Duarte, are participating in all aspects of the testing. On the West Coast, chemical engineering professor Richard K. Herz, University of California, San Diego, is responsible for converting powdered catalytic material developed in the laboratory to a robust coating medium necessary for actual laser use. Another key participant is Barry D. Sidney, a Langley physicist who, with Schryer, develops detailed models of how the catalysts work.

A reward . . .

The Langley research team recently received a Group Achievement Award from NASA Headquarters and has also been granted four patents. "But we are far from the end of the project. Good as the new catalyst is, it can still be improved," says Schryer. Upchurch adds, "We've got a lot of good ideas which we haven't had time to try. These CO_2 lasers and their spin-offs have a tremendous future."

Tidbits from Training

Nominations Sought for Seminars, Conferences, Fellowships

Langley is seeking nominees for Office of Personnel Management (OPM) executive seminars, Brookings management conferences and NASA fellowships. All directorate and division offices have received memoranda which list these programs, eligibility guidelines and recent Langley participants who can share personal experiences with a particular program.

Management education programs at the OPM executive seminar centers in Oak Ridge, Tenn.; King's Point, N.Y.; and Denver, Colo., are two-week seminars covering a variety of topics. These seminars are open to GS/GM-13s and above who have not attended an OPM seminar in the previous five years. Brookings Institution conferences are for senior-level managers, GM-15 and Senior Executive Service (SES). Many of these one-week conferences are offered in Williamsburg and cover broad policy issues. Competition for OPM and Brookings programs is limited to Langley civil servants.

NASA fellowships are available for both managers and non-managers from GS-12 to SES. The management fellowships offer an opportunity to study at Harvard, MIT, Stanford, Carnegie Mellon, Penn State, Syracuse or Simmons College for periods from one week to one year. NASA also offers, in conjunction with the National Space Club, three fellowships which are open to non-management employees. These three allow recipients to pursue research or coursework at any institution in the United States or abroad, where a faculty sponsor is found. Competition for NASA fellowships begins at the Center. Center nominees then enter the Agency-level competition, which ends in December.

Applications for all of these programs may be initiated by the individual and must be passed on to the directorate level. However, Center nominations must have directorate endorsement. Directorate nomination deadlines are ususally late July or early August. For additional information about seminars, conferences and fellowships, contact Joe Mathis, ext. 42592.

New Policy Announced for Academic Program Participants

The Training and Education Section has noted that some Langley personnel are in violation of regulations (LMI 3410.1) by registering for degree credit courses before the appropriate approvals have been obtained. In most cases, there is obviously no intent to evade regulations; nevertheless, such careless procedure can result in awkward situations between the Center and the educational institutions involved.

In some cases, Langley personnel could be required to pay the costs involved, which would be most unfortunate. Langley personnel participating in formal academic programs are urged to schedule the necessary approvals to allow adequate time for this process to be completed before registration deadlines. As of June 30, 1990, no letters of authorization or purchase requests will be issued unless the required approval form has been received by the Training and Education Section. Upon receiving the proper form, Training will send the employee a copy of the letter of authorization ensuring the employee that their registration cost will be covered by the Center. This procedure will also be used for research hours.

Your cooperation is requested. Should you have questions or concerns, contact George Allison, ext. 42594.

Langley Cited for Partnership

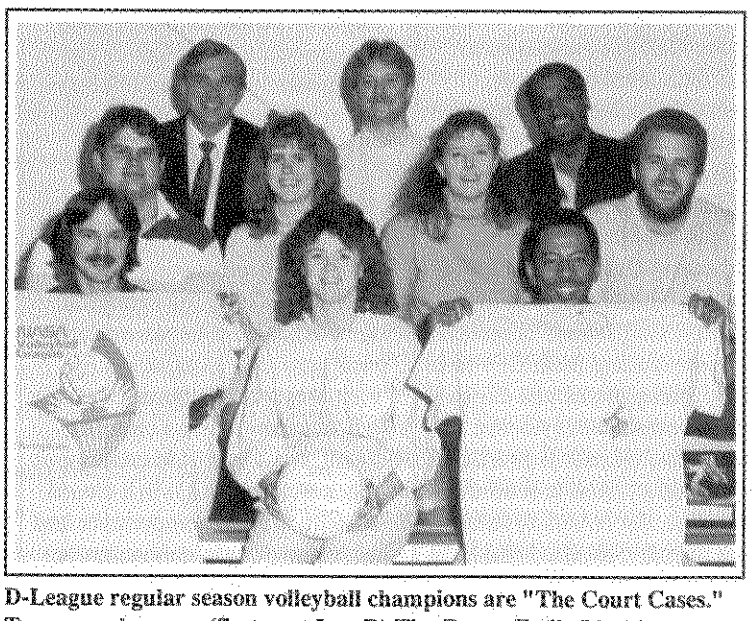
Langley Research Center has received state level recognition for its efforts with Thomas Nelson Community College by helping to prepare students for employment in electronics and mechanical technology. Ann Y. Gregory, chair of the Virginia Council on Vocational Education, made the presentation to Frederick M. Thompson, manager of the Technician Co-op and Apprentice Programs, during an awards program in Richmond, honoring contributions to excellence in vocational-technical education.

The apprenticeship training partnership began in 1972 and was designed out of a need by NASA for a better trained work force. The program prepares students for employment in electronics technology and mechanical technology through course study and cooperative work experience.

When a student graduates, he or she has an associate degree and 1040 work hours experience and is eligible to begin at the GS-4 pay grade. Approximately 600 students have been served since 1972. Ninety-eight percent of those students completing the program have been converted to full time positions.

MOO DAY BRINGS OUT THE BEAST IN SOME. MOO Day, Management Operations Olympics, is an annual event which invites employees of the Management Ops Directorate to participate in a variety of competitive activities. Each division chooses a theme, a mascot and presents a skit. Taking first place for their 1990 skit were the RIADical Dudes. Shown with the "dude," portrayed by Rod Waid, Graphics Section, are (L to R) Lynn Jenkins and Chris Ryan, Visual and Printing Services Branch; Peggy Pancoast, Photographics Section; Antionette Lynch, Technical Library Branch; Anita Goodson and Sandie Horsey, also of the Photographics Section. The dude's Ninja Turtle costume was designed and produced by Larry Merrill, Graphics. The Acquisition Division took first place in the total competition.

"The Misfits" earned regular season and tournament champion honors in the Fall Volleyball C-League. Team members are (first row, L to R) Paul Bagby, Anita Goodson, Sandie Horsey; (second row) Mark Frassinelli, Bill Nelson and Andy Gibbs.



D-League regular season volleyball champions are "The Court Cases." Team members are (first row, L to R) Tim Berry, Emily Linthicum, Carlite Barnes; (second row) Ed Ford, Debbie Sullivan, Tina Hawks, Craig "Beef" Hyle; (third row) Tom Frasher, Steve Harrah and Phil Robinson. Not pictured is Melanie Long.

Retirement Parties

Jesse D. Timmons will be honored at a retirement party Friday, August 10, at the Wharf Restaurant, Mercury Blvd and Armistead Ave., Hampton. Cash bar will begin at 6:30 p.m.; dinner will be at 7:30. Cost is $18.50/person or $35/couple, which includes gift. Donations to gift only are also welcomed. For reservations, make checks payable to Joann Belsches, Mail Stop 430, ext. 47004, by August 2.

Jane S. Hess will be honored at a retirement party Thursday, August 16, at the Langley Officers' Club. Festivities include hors d'oeuvres and cash bar beginning at 5 p.m. Cost is $13/person which includes gift. Contributions for gift only are also welcomed. Checks may be made payable to Antoinette Lynch, Mail Stop 185, by August 2.

New Minimum Set for Payroll Savings Bonds

The U.S. Treasury Department has announced that, effective October 1, $50 and $75 Series EE Savings Bonds will no longer be issued through employer-sponsored payroll savings plans.

The minimum denomination available to payroll savings plan participants beginning October 1 will be the $100 bond, which has a purchase price of $50. All $50 and $75 savings bonds will be automatically converted to $100 denominations through the payroll beginning pay period September 23-October 6, 1990. Affected participants will be notified before the conversion.

The changes do not affect over-the-counter sales. Fifty and seventy-five dollar denomination bonds will continue to be available for purchase at financial institutions.

First Call for FY '90 PRs

Purchase orders for services will expire September 30. If it is necessary to continue these services, begin processing purchase requests with specifications or statements of work through the system. If the effort can only be provided by one source, e.g., software or equipment maintenance, also furnish a justification for other than full and open competition explaining why no one else can perform the requirement. To prevent a lapse in service, a complete package must be received in the Purchase Branch no later than July 20, 1990. Some orders will take 60 days to process.

People & Places

Medical Corner

Sunglasses Prevent Eye Damage

Just as our skin needs protection from the sun, so do our eyes. Bright sunlight can damage the cornea (the outer transparent part of the eye that transmits light to the retina), the lens (the part of the eye responsible for focusing), and the retina (the innermost layer of the eye that transmits an image to the brain).

The sun transmits visible blue and visible violet rays, as well as ultraviolet (UV) rays which are undetected by the naked eye. All of these rays can be harmful to your eyes. The UV rays, however, pose the most potential for damage. To prevent eye damage from the sun, the National Society to Prevent Blindness recommends you choose sunglasses that screen out all the UV rays, plus the visible blue and violet rays.

Check the light transmission factor on sunglasses. It is recommended that lenses should not transmit more than 30 percent of visible light. This, however, can vary with the situation. In areas where light is intense, such as at the beach (especially white sand) or on snow, as little as 10 to 15 percent transmission is preferred.

The color of the sunglasses lens is important also. Neutral gray or "smoke" lenses provide the best color perception. Other good choices are green or brown tints. Dark lenses may be preferred by those whose eyes are especially sensitive to light. Tints such as red, orange, blue or purple are unsuitable because thay may interfere with color perception and tend to let in too much light compared to other color lenses.

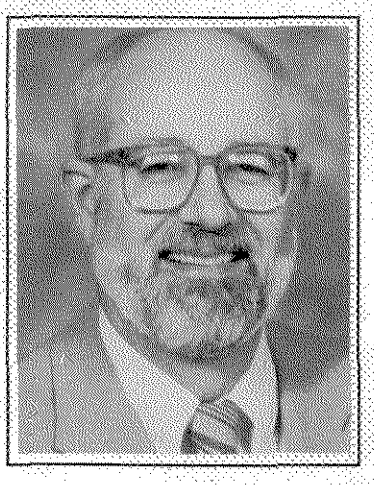
Langley Newsmakers

Hudson Heads Fracture Testing

C. Michael Hudson, head of the Fracture Mechanics Engineering Section, has been elected chairman of the American Society for Testing and Materials (ASTM) Committee E-24 on Fracture Testing. He will serve a two-year term as head of the 564-member standards writing committee. A member of Committee E-24 for 16 years, he was made a Fellow of the Society in 1987.

Committee E-24 is one of 134 ASTM technical committees that develop voluntary consensus standards for materials, products, systems and services. ASTM is one of the largest voluntary standards development systems in the world.

Powell Named ASA Fellow



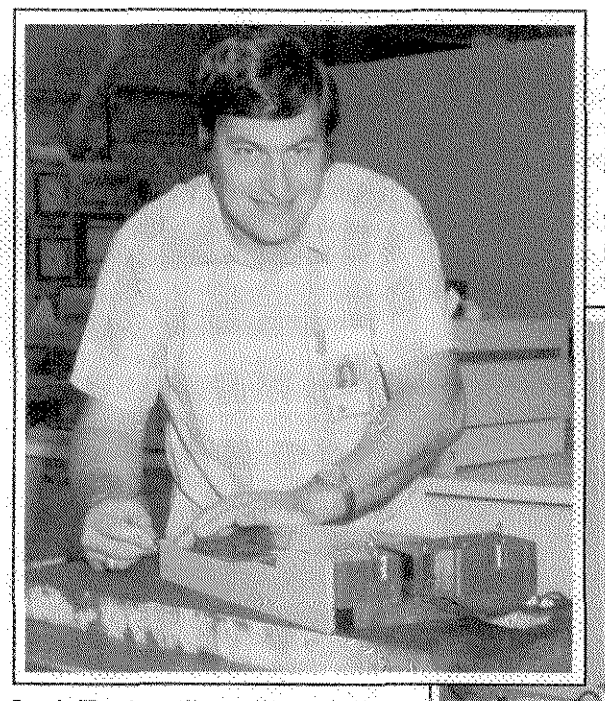
Dr. Clemans A. Powell, head of the Structural Acoustics Branch, has been elected a Fellow of the Acoustical Society of America (ASA). This action was taken by the Executive Council, the governing body of the society, at a meeting May 15 at Pennsylvania State University.

The purpose of ASA is to increase and diffuse knowledge of acoustics and to promote their practical applications. The society has approximately 6,500 members representing 60 countries.

In Memoriam

Sympathy is extended to the family of Mae L. Tillerson, who died recently.

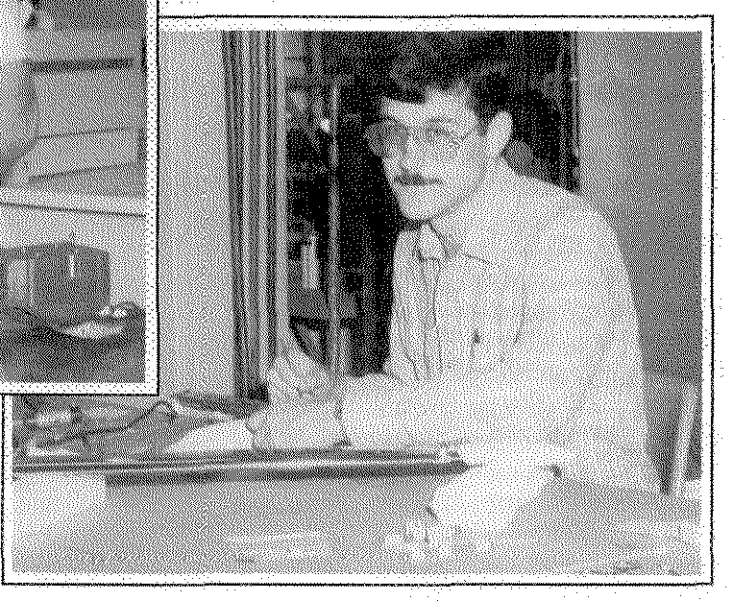
Highly committed to community service, Tillerson had been an American Red Cross volunteer for 32 years. She became known to many Langley employees through her dedicated participation in Bloodmobiles on Center.



Lewis Horsley prepares a two-dimensional airfoil for cryogenic testing.

For eight hours each day, Langley employees have a NASA focus. Personnel Profiles give us an expanded view of ourselves. It is always interesting to see how our employees spend after-work hours.

Tom Hall, Fabrication Division, installs pressure instrumentation for the NTF 65-degree delta wing wind tunnel model.



Personnel Profiles

Employees Take Time to Serve Others

-by Allan Hanrahan

For those of us slipping and sliding all-too-swiftly and unceremoniously through the dawn of our fifties, words like "coronary" and "cardiac arrest" begin to creep insidiously into our consciousness. So, in a society that sometimes seems to be growing increasingly self-serving, it is of some reassurance and comfort to know that volunteer Emergency Medical Technicians (EMTs) such as Lewis A. Horsley are about in the land.

Horsley, engineering technician in the Materials Processing and Development Section, is not the only EMT among the Center's workforce. "There are quite a few on the field," Horsley said. In fact, his coworker, E. Thomas Hall, was a volunteer EMT for many years before family and other obligations wouldn't allow him to continue. Both Horsley and Hall are presented as representative of a breed of employee noted for giving and self-sacrifice.

Born, reared and educated in Gloucester County, Horsley came to the Center in the autumn of 1967, fresh out of high school. During that same year he became a member of the Gloucester Volunteer Fire Department, and is a member still. The following year he became a charter member of the Gloucester Rescue Squad and passed the eighty-hour Advanced First Aid course given by the American Red Cross. He received his EMT certification four years later, after completing the first Emergency Medical Technician course offerred in the area, a grueling 120 hours at what is now Sentara Hampton General Hospital. Every four years the certification can be renewed by taking 40 hours of refresher training. Last year, Horsley was elected president of the Gloucester County Volunteer Fire and Rescue Department.

"When I'm on a call I look upon myself as a sustainer, primarily," Horsley said. "My philosophy is to get the person to professional care as soon as possible. Every case has to be taken on an individual basis; you go with the situation, rely on common sense. There were over a thousand rescue runs made last year from our fire station," which is a 300 percent increase over a scant two years ago, a result of Gloucester County's recent growth.

Every six days he serves a 14-hour shift. Thankfully, his school teacher-wife Linda approves of this activity. Another of his activities is disapproved of heartily by the deer and turkey population of Virginia; Lewis belongs to a King and Queen County hunt club.

Thomas Hall's wife Darlene not only approved of his EMT service but is the reason for it. In addition to preceding Tom as an EMT, she taught Emergency Medical Technology at Thomas Nelson Community College for a number of years. Hall is proud of her, "If it weren't for her, we wouldn't have the quality of people who serve--or the quantity of people. She has done a lot (for the EMT program). . . . And she gets people interested. At Hall's encouragement, she took a position as a professional cardiac technician with the Newport News Fire Department. In addition to her regular duties, she teaches EMT classes for the Tidewater Regional Fire Academy.

When he served, Hall was on duty one night a week and was in charge of a crew with the Northampton Rescue Squad. He says, "You never knew what you were going to run into. We were usually the first people there. It's fascinating, in a way; it's a joy and exciting when you really help someone. But it can be very sad--when you see young lives wasted.

"You don't save everybody," he continued. "There are a few that just aren't going to make it, but if you give one hundred percent you have the satisfaction of knowing you did what you could to help them. And it gives the family a good feeling" (to know that efforts were made to save their loved one.)

"The thing that really bothers me is the needless injuries that happen because people don't wear seat belts," Hall lamented. While on the subject of vehicular safety, he talked about driving the ambulance. "We know we have to be very careful and get the patient to the hospital safely. The red lights and siren don't give us the right-of-way; we are asking for the right-of-way."

Hall's progression to EMT paralleled that of Horsley's somewhat. He began serving with the Hampton Fire Department as part of the Northampton Rescue Squad in January, 1978, and earned his Cardiopulmonary Resuscitation (CPR) card. He then became an ambulance trainee with CPR, took advanced first aid classes (some taught by his wife), and progressed to EMT.

He has taught some himself-- CPR here at the Center for the American Heart Association, for example, because "I know that CPR can save lives," he stated.

Hall also came to the Center just out of high school -- Hampton High School, class of 1971. He is a graduate of Thomas Nelson Community College and has attended Old Dominion University.

Happenings

SPECIAL LAA SOCIAL will be held Friday, July 20, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment by J. Quincy Brown Band. $1 cover charge.

CONSERVATION CLUB will meet on Tuesday, July 17, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call ext. 41537 for more information.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, July 25, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center, Building 1222. Give the best gift of all--the gift of life. Give blood.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. For additional information, contact Steve Dahmen, ext. 44519.

NASA TOASTMASTERS meet the second and fourth Wednesdays of each month at 11:30 a.m. The next meeting is July 25 at the H. J.E. Reid Conference Center, Building 1222. Guests are welcome.

TAC SUMMER CONCERTS. USAF Tactical Air Command Band will present evening concerts on Tuesdays beginning July 24 at Hampton's Mill Point Park and on Wednesdays beginning August 1 at the Williamsburg Lodge. All concerts are free, open to the public and begin at 7 p.m.

SCALE MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society is holding the Region II model contest September 21-22. No need to be IPMS member. For information, contact IPMS Tidewater, P.O. Box 1651, Newport News, Va. 23601.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA Cafeteria, Building 1213. Cost is $12/month. For details, call ext. 42295.

AFGE LOCAL 2755 will meet at 4:10 p.m. Wednesday, July 18, in the Hampton Room of the H.J.E. Reid Conference Center, Building 1222, to elect officers for the next term. $80 membership door prize will be drawn. Must be present to win. A cold cut buffet will be served following the meeting. For further information, contact Sandra Zumbrun, ext. 44548.

LAFB COMMUNITY APPRECIATION DAY will be held tomorrow, July 14, starting at 9 a.m. See aircraft ranging from the Air Force's newest fighter, the F-117A Stealth, to the vintage 1939 North American NA-64. Concessions and souvenirs available. For more information, call 764-2010.

SMOKING CESSATION workshops for husbands and wives available soon. Spouses of Langley employees are invited to attend sessions offered by the Occupational Health Services. Call 43190 for details.

WANTED: HOUSEMATE for neat residence 2.5 miles from NASA. New condo. Available bedroom 13' x 15' with private bath and extras. No smoker--no pets. Prefer sports-minded person. $350/month includes utilities. Call 867-9164.

WANTED: TO BUY pressure cooker canner and canning jars. Call 898-8160.

FOR SALE: 8 TICKETS. Paul McCartney World Tour. July 22, Raleigh, N.C. Call Mark, 838-0873.

FOUND: SCARF. Burgundy/blue plaid scarf. Call Security, ext. 43416.

Mars May Hold Answers to Origin of Life on Earth

Did life ever exist on Mars? Are the clues to the origin of life on Earth preserved on the surface of Mars? What information about the depletion of the Earth's ozone layer and global climate change can be learned by studying Mars? These are questions that will be addressed by NASA's proposed manned exploration of Mars. On Thursday, July 19, at 7:30 p.m. in the Visitor Center Theater, Langley scientist Dr. Joel S. Levine will present "On To Mars."

Levine, senior research scientist in the Atmospheric Sciences Division, will review what NASA has learned from the past 25 years of planetary exploration, compare and contrast the atmospheres of Earth and Mars, and discuss the reasons for sending humans to Mars.

Levine is Langley's representative to the NASA Center Exploration Program Scientists Committee. The committee was tasked to develop the scientific rationale for sending humans back to the moon and on to Mars. Last July, on the 20th anniversary of the first lunar landing, President Bush proposed a manned mission to Mars. In response, the committee presented its information in a NASA report for the President detailing human exploration of the moon and Mars.

According to Levine, a mission to Mars is essential to understanding the origin of life on Earth. The geological record of the Earth's earliest history has disappeared due to crustal movement, known as plate tectonics. However, the geological record on Mars is presently preserved due to the absence of plate tectonics. Also, the atmosphere of Mars, which has not been impacted by man-made gases, will provide new and important insights into the chemical destruction of ozone.

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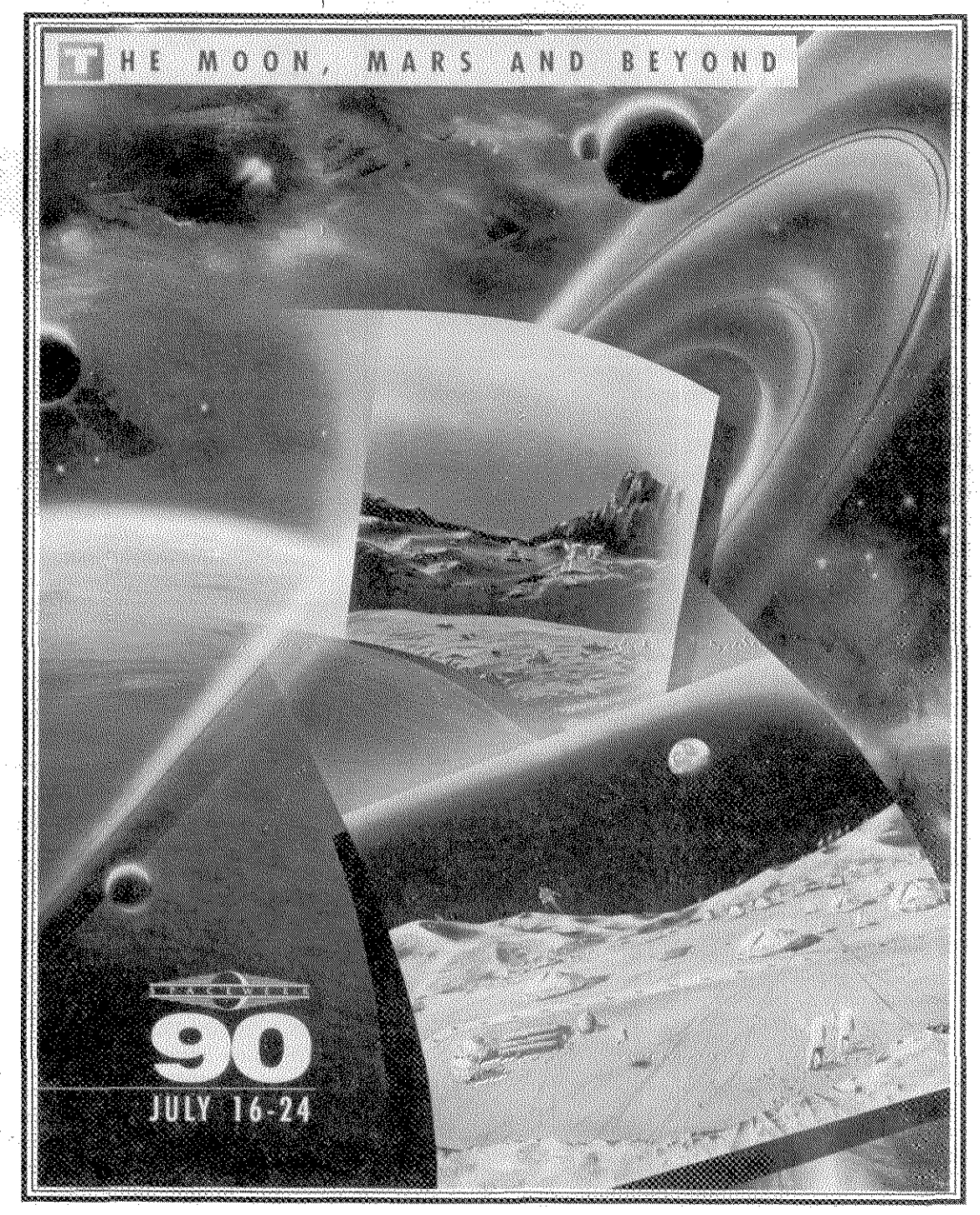
Researcher News

Celebrate SPACEWEEK July 16-24.



NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 15 July 27, 1990

Bi-weekly Employee and Contractor Publication

NASA and Canadian Scientists Cooperate in Global Atmospheric Study

Scientists from NASA and U.S. universities have joined Canadian researchers in an expedition to study pollution at high northern latitudes and emissions of methane, an important greenhouse gas, from tundra, forests and marshes.

NASA's new northern venture, titled the Atmospheric Boundary Layer Experiment-3B (ABLE), will let scientists look at changes in chemical composition that occur when pristine Arctic air masses, which influence air quality and climate over North America, Eurasia and the northern oceans, mix with air masses contaminated by pollution.

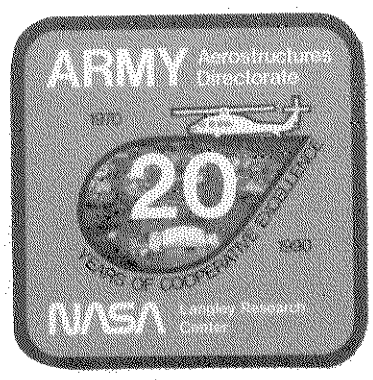
Observations of Arctic atmospheric chemistry will be linked to studies by the Canadian Institute for Research in Atmospheric Chemistry (CIRAC) of the soil of lowland marshes near Hudson Bay. The soils under observation are a source of methane, which plays a critical role in atmospheric chemistry and possible global warming. Like carbon dioxide and other "greenhouse" gases, methane traps heat near the surface of the Earth that would otherwise irradiate into space, warming the atmosphere. Over several decades, higher temperatures could prompt other phenomena, such as the melting of light-reflecting sea-ice, that could lead to even more warming.

The CIRAC Northern Wetlands Project will study the sensitivity of methane emissions to changes in surface temperatures in order to predict how these emissions may change in a warmer climate. The main NASA sampling platform is the Agency's Lockheed Electra aircraft, stationed at the NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Va. The Electra, a converted turboprop airliner, is scheduled to make 14 flights in the Hudson Bay lowland area and in Quebec. A Canadian DeHaviland Twin Otter aircraft will fly 50 research missions during the same period. Ground sampling activity will involve towers and surface chambers. Research activity began July 5 and will conclude August 20, 1990.

The ABLE project is managed by Langley's Atmospheric Sciences Division for NASA's Office of Space Science and Applications. The program was established in the early 1980s to study the chemistry of Earth's atmosphere and its interaction with the land and the oceans. Other principal investigators are from NASA's Ames Research Center, Mountain View, Calif., and Stennis Space Center, Bay St. Louis, Miss., and from numerous U.S. and Canadian institutions.

-photo by Paul Bagby

Dr. Robert W. Talbot, formerly of Langley and now associated with the University of New Hampshire, measures atmospheric aerosols using an air sampling system aboard the NASA Electra aircraft. The measurements were taken during a test flight in preparation for the Atmospheric Boundary Layer Experiment (ABLE) 3-B expedition in Canada this month.



NASA Langley and the U.S. Army celebrate 20 years of teamwork. **See the story on page 3.**

Colloquium to Feature CEBAF

Professor John Dirk Walecka, scientific director at the Continuous Electron Beam Accelerator Facility (CEBAF) in Newport News, will be the colloquium speaker August 13. Walecka will present "CEBAF: A Laboratory for Nuclear Physics" at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222.

CEBAF is the top priority new construction project for the field of nuclear physics in the United States. In addition to describing the facility, Walecka will discuss the motivation for CEBAF as well as the scientific planning now in progress.

Prior to joining CEBAF, Walecka was chairman of the physics department at Stanford University. He is currently the Governor's Distinguished CEBAF Professor at Large in the Commonwealth of Virginia.

NASA Headquarters Selects Langley Employees for Professional Development

Three Langley Research Center employees have been selected to participate in NASA's Professional Development Program (PDP) for the period August 1, 1990, to July 31, 1991.

James L. Harris, assistant head of the Computer Management Branch, will be assigned to the Information Systems Branch of the NASA Headquarters Office of Space Science and Applications.

Howard R. Puckett Jr., Langley's industry relations officer, will work in the Logistics and Security Office while at NASA Headquarters, Washington, D.C.

John T. Suttles, assistant head of the Radiation Sciences Branch, will be located in the Earth Science and Applications Division of the Headquarters Office of Space Science and Applications.

Harris will work with Joseph Bredekamp, chief of the Information Systems Branch. He will be responsible for formulating and implementing a program in advanced science information systems as well as managing high performance computing resources to support scientific research.

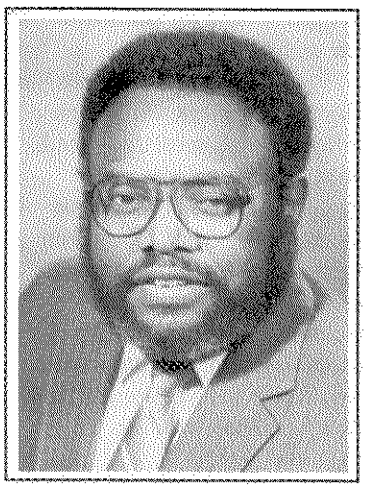
Harris has been instrumental in the acquisition and installation of Langley's supercomputing network subsystem, of which the CRAY-2 computer is the main resource. "I feel the PDP experience will serve to broaden my perspective on the use of computers and related technologies in solving current and future computation and data handling needs of Langley and the Agency," he said.

Puckett will work with Jeffrey E. Sutton, director of the NASA Headquarters Logistics and Security Office. He will be responsible for several projects associated with supply and equipment, aircraft management and security.

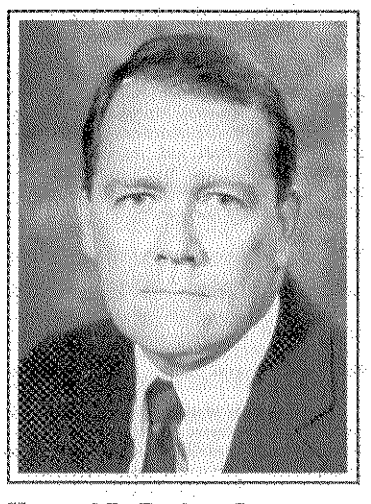
Puckett provides guidance and support to Langley in the areas of support service contracting, resources management, labor/management relations and manpower analysis. "The PDP experience will give me the opportunity to function in the Headquarters environment where I will participate in policy formulation and oversight activities," he said. "My assignment to several Headquarters functional areas will allow me to interact with a wide array of NASA and inter-Agency personnel not normally encountered in my previous assignments."

Suttles will work with Dr. John S. Theon, chief of the Radiation, Dynamics and Hydrology Branch, and will serve as the acting program manager of the Atmospheric Radiation Program. This $6 million research and development program deals with radiative exchange processes in the Earth's atmosphere and at its surface. Suttles conceived and led the establishment of the Surface Radiation Budget Satellite Data Analysis Center, a major research program at Langley. The analysis center is a key element in the NASA and World Climate Research Programs. "Participation in the PDP will afford me the opportunity to understand the new NASA initiative in Earth radiation and climate processes from a broad, programmatic context. It will also aid me in establishing valuable contacts and resources in this important environmental research area."

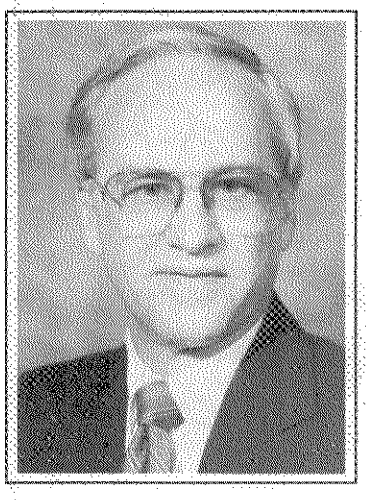
Since its formation in 1973, the PDP has given over 50 Langley employees opportunities for professional development at the Agency level. The goal of the program is to give participants an Agency-wide perspective of NASA activities as well as valuable programmatic experience.



James L. Harris



Howard R. Puckett Jr.



John T. Suttles

News Briefs

JOHNSON SPACE CENTER, Houston, Texas --- Two veteran Shuttle crew commanders have been removed from flight assignments for violations of Johnson Space Center flight crew operations guidelines. They are Navy Cmdr. Robert L. "Hoot" Gibson and Navy Capt. David M. Walker. Gibson, crew commander for Shuttle mission STS-46, has been removed from the flight and from T-38 jet trainer flight status for one year for violation of a policy which restricts high risk recreational activities for astronauts named to flight crews. Air Force Col. Frederick D. Gregory will replace Walker as crew commander on Shuttle flight STS-44, a dedicated Department of Defense mission set for March 1991.

KENNEDY SPACE CENTER, Fla. --- A computer problem with the spacecraft's command and data processing system will delay the launch of the Combined Release and Radiation Effects Satellite (CRRES) one to two weeks. CRRES, originally scheduled for launch July 17, will conduct complex scientific research in what is referred to as "Earthspace"--the space environment just above Earth's atmosphere which, far from being empty, includes the ionosphere and magnetosphere containing a dynamic ocean of invisible magnetic and electrical fields and particles. Much as a high school physics student spreads iron filings around a magnet to "see" its invisible magnetic field, CRRES will carry 24 canisters of various chemicals into orbit and release the chemicals over a period of time. When released, the chemicals will be ionized by the Sun's ultraviolet light creating large luminous clouds that will elongate along Earth's magnetic field lines, briefly "painting" these invisible structures.

WALLOPS FLIGHT FACILITY, Wallops Island, Va. --- NASA will conduct a sounding rocket campaign in the South Pacific over the summer to better understand the Earth's ionosphere in the equatorial regions and the response of the ionosphere to electric fields and plasma cloud injections. Several of the rocket experiments will complement the science objectives of the Combined Release and Radiation Effects Satellite (CRRES).

JOHNSON SPACE CENTER, Houston, Texas --- The new Space Shuttle Endeavour was powered-on for the first time July 6 at Rockwell International Corp.'s Orbiter Assembly Facility in Palmdale, Calif., 10 days ahead of schedule. The event is a major milestone in the vehicle's construction signifying the initial flow of power to Endeavour's on-board electrical systems. The start of power-on tesing marks the beginning of an eight-month test period for Endeavour, the fifth operational orbiter built by Rockwell's Space Systems Division for NASA's Space Shuttle program.

Editor's note: To receive a copy of the NASA News Releases summarized above, contact Jolyn Rivenbark, ext. 43293.

Positions Open

90-75: Supervisory Cost Accountant, GS-510-11 or 12; Financial Management Division. Open to employees with civil service status in the Hampton Roads area. Closes July 31.

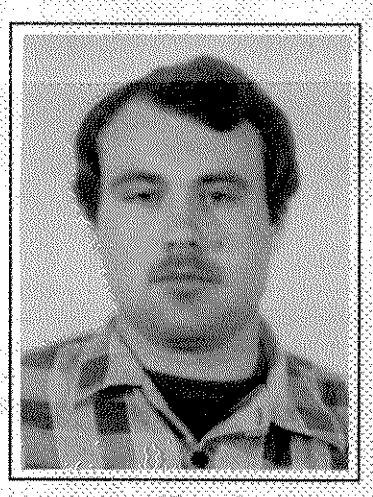
90-78: AST, Project Management, GM-801-14; Aeroassist Flight Experiment Project Office. Open to NASA Langley employees with civil service status. Closes August 2.

90-79: AST, Project Management, GS-801-13 or 14; Aeroassist Flight Experiment Project Office. Open to NASA Langley employees with civil service status. Closes August 2.

Employee Dies in Holiday Accident

Sympathy is extended to the family of Donald C. Hinson, who was killed in a traffic accident July 4. A technical specialist in the Operations Support Division, Hinson was a 1986 graduate of Langley's Apprentice Program and was pursuing a bachelor's degree at Old Dominion University.

"Don was a very energetic and dedicated technician, always willing to accept responsibility," said Vincent Foretich, head of the Fluid Systems Section. "He was well thought of by his peers, always willing to help when needed. He was very active in sports at the Center, including basketball, volleyball, softball and bowling."



Among Hinson's most recent accomplishments were organizing and implementing a computer program for tracking and controlling sensitive items in the Equipment Utilization Center. He also established a plan to evaluate Langley's research hydraulic systems for the presence of PCBs that is in keeping with Environmental Protection Agency regulations.

Lankley

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

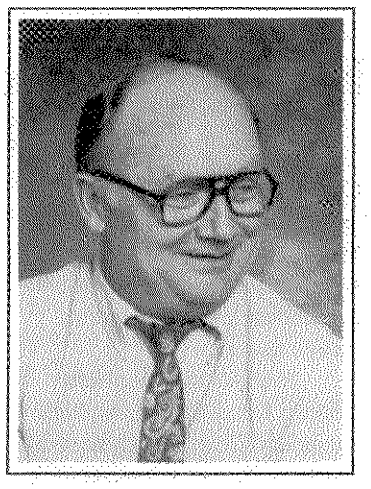
Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Editorials

Langley

Headquarters Forum



I hope what I have to say to you today will amount to a lot of rubbish--rubbish generated on Center that will be recycled because of a conscious commitment on your part to protect our environment.

NASA is committed to the environment. We can't help but be--the environment is an integral part of our research. The Space Shuttle has provided us with some of the clearest pictures of our planet. Taken from space, these photographs attest to the fragility of Earth and the need to protect our valuable resources. KSC Director Forrest McCartney credits Shuttle photos with arousing the consciousness of the world to environmental issues.

In addition, our atmospheric sciences research at Langley makes us all too aware of the role each of us plays in our own destiny. The decisions we make now will affect our planet for years to come. The following Environmental Protection Agency (EPA) statistics are staggering: It takes two to five months for paper to decompose; five years for milk cartons; 10 to 20 years for plastic bags; 50 to 80 years for plastic containers; 80 to 100 years for aluminum. Plastic foam never decomposes!

Today's generation has been labeled a "throw away" society. *U.S. News and World Report* writes that every American generates three-and-a-half pounds of trash each day. It's no wonder, then, that rubbish has become a major environmental issue. This issue, however, can be addressed by each one of us--each of us can **choose to recycle**.

Recycling efforts at Langley have been both management and employee initiated. The LAA Conservation Club, formed in the fall under the auspices of the Exchange Council, has launched into the collection of aluminum cans. Club membership, numbering over 100, has succeeded in collecting 3,200 pounds of aluminum since mid-January. That means, the all-volunteer, employee group has not only generated $800 in revenue for further conservation efforts but has also averted several hundred years of waste.

Club president Nathan Van Hooser notes that, while their initial effort is most commendable, club volunteers are gathering less than 50 percent of the aluminum cans brought on Center. Forty site coordinators are servicing aluminum receptacles in 33 buildings. The club could use more volunteers and would like to be collecting from every Langley building.

The EPA lists four ways to deal with rubbish: bury it, burn it, recycle it--or don't make as much in the first place. It seems clear that the watchwords are "reuse or recycle." The NASA cafeteria, also under the direction of the Langley Exchange Council, has spearheaded an effort to reduce the use of styrofoam products. Available for purchase in the cafeteria are reusable NASA plastic cups for both hot and cold beverages. As an added incentive to conserve, with the reusable cup you save five cents on each drink. Cafeteria manager Richard Weeks is glad to back the reuse or recycle trend while, at the same time, offering take-out service.

The most recent recycling effort is really a return to a former procedure. Beginning this month, Langley will resume recycling computer paper. According to the EPA, every ton of recycled paper requires 7,000 fewer gallons of water and about 4,100 kilowatt-hours less energy to produce than an equal amount of virgin paper. At the other end of the spectrum, every ton of recycled newspaper saves 17 trees and results in 60 pounds less air pollution.

Loretta Watkins, who has coordinated the acquisition of a contract to recycle paper, remembers the Center used to recycle 50,000 to 60,000 tons per year. Watkins is high on conservation--when we burn recyclable paper, we are actually burning our resources. Cardboard and other paper products not of recyclable grade will continue to be sent to the incinerator facility NASA shares with the City of Hampton. This facility, which burns trash to generate steam to provide power to Langley, is the oldest of our conservation efforts.

There is still much that can be done before Americans literally bury themselves in their own trash. I'm proud of the directions being taken at Langley. I urge you to be a forward thinker and commit to these recycling efforts. Our Earth is a terrible thing to waste.

S. F. Pauls
Associate Director

People & Places

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.

The following employees are approved leave recipients:

- David S. Aliff
- Robert M. Connell Jr.
- Janice R. Grow
- Joy W. Italiano
- Kenneth M. Jones
- Noel A. Talcott Jr.
- Catherine B. Worth
- Denna B. Zacharias

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

New at GWU

The George Washington University's School of Engineering and Applied Science at NASA Langley plans to offer a new set of courses leading to the the Master of Engineering Management degree beginning in the Fall semester 1990. Interviews will be arranged on Center Thursday, August 16, and Friday, August 17. If you are interested in entering this program, or desire further information on any GWU program, call the GWU-NASA office at 864-1982.

Extended Hours for Back Gate

For your convenience-- NASA Gate #5, located at Ames and Wythe Creek Roads, is now open from 6 a.m. to 6 p.m. Monday through Friday, excluding holidays.

Retirement Party

Stephen P. Horvath Jr. will be honored at a retirement luncheon Friday, August 17, beginning at 11:10 a.m. Details will be announced in the next issue. For reservations or further information, contact Dan Fisher, ext. 42763, by August 10.

Have You Seen . . . .

The following items have been reported missing. If you have seen any of them or have any information regarding them, please contact the Equipment Management Section, ext. 42055 or 42056.

- Interface Unit, ECN 0141570
- Mini-Computer, ECN 0410756
- Telephone Conference Set, ECN 0258515
- Power Supply, Low Volt/Med. Current, ECN 0474483
- Recorder, Tape, Video, ECN 0143746

Teamwork Continues

-by Kristina Murden

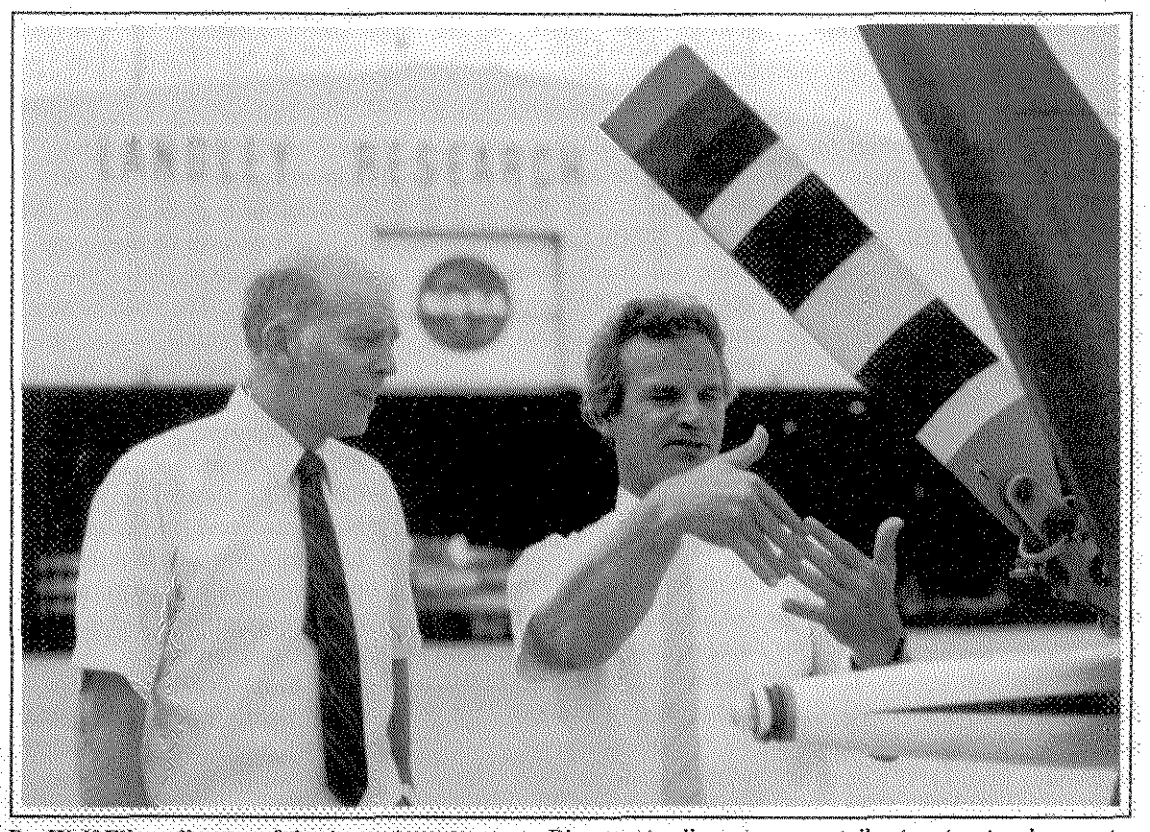
Langley Research Center and the U.S. Army are jointly conducting research devoted to electromagnetic (EM) aspects of advanced helicopter design in cooperation with five major companies as part of a newly established research consortium. The consortium, which was initiated in January at Arizona State University, has received a $100,000 research grant through NASA.

"The group is a unique, cooperative research effort between industry, government and universities," said George Barber, an Army electronics engineer assigned to the Antenna and Microwave Research Branch. "We are currently investigating advanced material fuselage configurations, wear on EM analysis codes, EM effects on aircraft charging/discharging, and advanced antenna technology." These areas define advanced helicopter electromagnetics.

The program grew out of a joint helicopter research effort between NASA Langley and the Army Avionics Research and Development Activity, Fort Monmouth, N.J. "It took us more than a year to conceptualize, formulate and work out all aspects of the industrial associates program," said Director Dr. Constantine Balanis. He is also director of the Telecommunications Research Center at ASU where much of the research is being conducted. Langley, the Army, and the telecommunications center were part of a joint advocacy encouraging the industries to participate in the consortium.

One of the primary purposes of the program includes technology transfer, said Balanis. "Both the industrial participants and the federal agencies will have a right to share in the technology that we develop through the program. The consortium will promote, advocate and extend all aspects of helicopter EM design and performance."

Employees, Contractors, Retirees:
Reservations for the August 8 LDEF reception are due to Arlene Levine, Mail Stop 154, by August 1.



Dr. Wolf Elber, director of the Army Aerostructures Directorate, discusses a new tail rotor structural concept with Langley's Director for Structures Charles Blankenship. 1990 marks 20 years of NASA/Army research.

NASA, Army Celebrate 20 Years of Teamwork

-by Kristina Murden

Twenty years ago Langley Research Center and the U.S. Army entered into a partnership that has yielded significant advances in aeronautical technology and has been instrumental in the evolution of Army aviation.

The Army Aerostructures Directorate has been co-located at NASA Langley since 1970. Initiated by the Army to build upon common research and development objectives shared with NASA, the partnership focuses on basic and applied research in structures and aeromechanics for rotorcraft.

"The Army recognized world class research facilities we couldn't get anywhere else, and NASA saw advantages to expand their spectrum of research," said Wayne Mantay, chief, Army Aeromechanics Division.

"There were immediate benefits from the joint venture," Mantay continued. Improved rotor designs for today's Army helicopters as well as superior design tools for future Army rotorcraft have resulted from the joint participation. The first fully automated helicopter landing, from hands off the controls to touchdown, was a result of NASA and Army teamwork. "This could never have been accomplished at this time without the unique mixture of Army and NASA talent. When we work on things together, things get done and ideas start to bubble all over the place. This teamwork is what we are trying to maintain."

In the structures area, there has been substantial progress in developing composites technology that can compete with metals to provide more durable structures at a lower cost and lighter weight. The progress of the structures research is a result of jointly-sponsored Army and NASA in-house and contracted studies. Teamwork provides substantial research leverage for insuring that today's composite materials meet future Army aviation needs. The payoff to the Army includes not only demonstrated technology for risk reduction and enhanced air-vehicle productivity, but also fewer structures-related chronic problems. "The principal reason the Army does structures research at Langley is the availability of unique research and testing laboratories," said Bob Huston, special assistant to Langley's Director for Structures.

Besides helicopter research, technological advances have been made that directly apply to the Space Station. NASA is doing research in areas of Army interest and the Army is working on some of the disciplines that apply to space research. "What we have here is a classic example of successful cooperation between two scientific agencies," said Mantay.

Today Langley and the Army have a balanced, reciprocal program advantageous to both sides. "This co-objective research makes the best use of common facilities, personnel and talents," said Mantay. The magnitude of the joint program allows Langley to support a growing number of necessary and unique research facilities. In addition, the Army gains significantly, because only through this kind of cooperation can it afford to take a creative role in aviation research so vital to future rotorcraft vehicles.

The Army is not just a separate group that is put into NASA to do its own thing. While Army personnel utilize many of Langley's facilities, the Army staff is also integrated into NASA support roles. Of the 68 Army employees on Center, about half are scientists and engineers while the other half are technicians and administrative support personnel, said Mantay.

The High Speed Rotorcraft initiative, a NASA endeavor that peaks Army interest, is expected to begin soon. "The planning is hot and heavy," said Huston. "It is more exotic than any helicopter applications for the military or civilian aircraft." NASA also shares an interest in an Army plan for Advanced Platform Technology (APT). "This research exploits advanced technology for the next generation of rotorcraft."

Another Langley program that NASA and the Army are collaborating on is the development of a rotor blade design process. "An example of this activity is rotor dynamic optimization involving optimally placed tuning masses for vibration reduction. The collaboration effort involves a plan to integrate these kinds of activities across disciplines of aerodynamics, dynamics, structures and acoustics," said Huston.

Also, optimization techniques developed for vibration reduction on helicopters are being utilized on controls-structures interaction studies for space station projects. Rotorcraft optimization applications will apply to both military and civil transportation issues to yield a smoother, quieter and more efficient helicopter. Higher harmonic control, vibration reduction and flight control are further joint efforts, said Huston.

"When the Army advocates its research programs, it is also advocating NASA and vice versa. We support each other. In the reality of today's fiscal world the synergism that we have is a good thing. Rather than a sign of weakness, partnerships are a sign of strength."

Happenings

LAA SOCIAL will be held from 4 to 6:30 p.m. Friday, August 3, in the H.J.E. Reid Conference Center, Building 1222. Join your co-workers for some end-of-the-week fun.

LOW IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. Classes will be held in the cafeteria, Building 1213, during August. Cost is $12/month.

NASA TOASTMASTERS meet the second and fourth Wednesday of each month. The next meeting will be August 8 at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are welcome.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. For information, call Steve Dahmen, ext. 44519.

LaRC RETIRED WOMEN and those formerly employed are invited to a Dutch-treat luncheon at 1 p.m., Thursday, August 2, at Western Sizzlin' restaurant, Cunningham Drive, Hampton. For reservations or additional information, contact Irene Collins, 898-8188; Edna Davidson, 898-3868; or Eloise McGehee, 838-4146; by August 1.

LEARN TO FLY at the Langley Aero Club. It's fun, practical and affordable. See aircraft design from the pilot's viewpoint. Call Pete or Judy, 764-7486, for details.

LOST: NECKLACE. A #1 made with small diamonds on a gold chain. Great, great sentimental value. Contact Boyer, ext. 46080.

FOUND: GOLD CHAIN. Found on steps of Building 1152 on July 13. Contact Security Office, ext. 43416.

FOR RENT: ROOM. Close to NASA and LAFB. Kitchen and washer/dryer privileges, cable hookup. $240/month. Call 874-2521 or 838-6000.

FOR SALE: CONDO. Timeshare on intercoastal waterway. 2 BR, furnished, sleeps 6; 51st week. Boats, motors & dockage included. Oyster Bay Resort at Sebastian, FL., on Indian River. $3,500. Call (904) 854-5808.

FOR SALE: COMPUTER. Comptex VAX 3100 workstation. Less than 1 year old. 19" monitor, 8 meg RAM, 720 meg external disk; thick & thin ethernet, two scuzzy ports, keyboard, mouse. $9,250 OBO. Call 898-4846.

Working to Make Langley a Better Place to Work

SCAN Teams in Assessment Stage of Culture Study

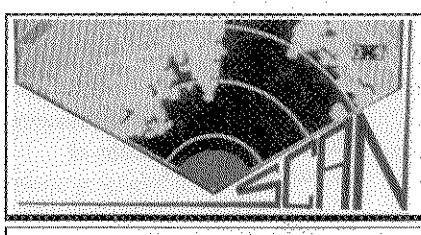
Tasked with examining how we do things at Langley with the goal of making LaRC an even better place to work, the SCAN teams are finalizing the results of their intensive five-month study. They will present these recommendations to Langley senior management August 20-22.

Empowered by the Center Director, the SCAN--Strategic Culture Assessment for the Nineties--teams are examining Langley's practices in three targeted areas--communications, career development and rewards and recognition.

Employee teams led by Del Croom, Cindy Lee and Rich Antcliff have talked to over 250 employees in the Think Tank groups alone. Think Tanks are small focus groups gathered to brainstorm what is positive and what can be improved regarding a particular issue. These Think Tanks have spanned the Langley workforce--to include clericals, research secretaries, administrative professionals, aerospace technologists (ASTs), technicians, first line supervisors for all skill groups as well as groups of cross-skill participants. In addition, SCAN teams have interviewed over 20 division chiefs, most of Langley's senior staff and field center experts from across the Center.

The SCAN teams have interacted with volunteer advocates from senior staff. This request was posed by team leaders at the May report session under the justification that those able to implement the recommendations resulting from this study be aware of the intensity of the concerns brought forward. Jerry Creedon, director for flight systems, Ray Hook, director for space, and Charlie Blankenship, director for structures, accepted the invitation to become more heavily involved in the three teams assessing the study.

The data gathered was thoroughly analyzed during a two-day off-Center workshop in June. At this time, many of the recommendations that will be presented to senior staff in August were formulated. Following senior staff response to the SCAN teams in September, feedback to employees is slated for October in the form of employee forums. A final report via the **Researcher News** is scheduled for November and a written SCAN report will be available in late November.



Culture Study Announcement of Recommendations

	Aug.	Sept.	Oct.	Nov.
Report to Senior Staff	X			
Senior Staff feedback to SCAN		X		
SCAN feedback to employees			X	
Researcher News summary				X
Written document available				X

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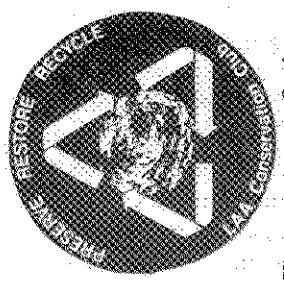
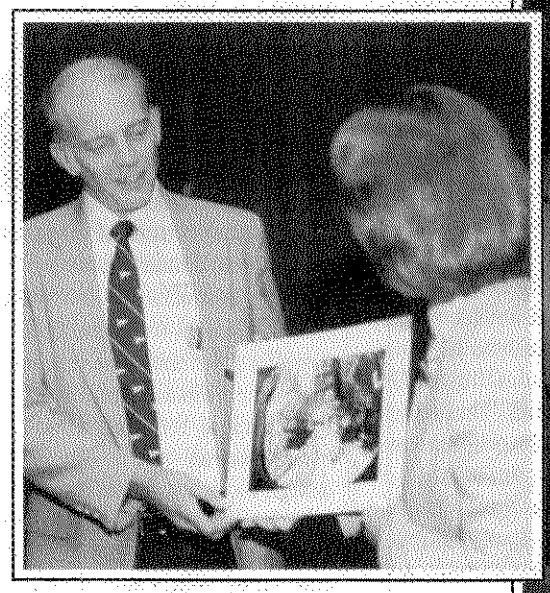


Be part of the solution: Recycle

Researcher News

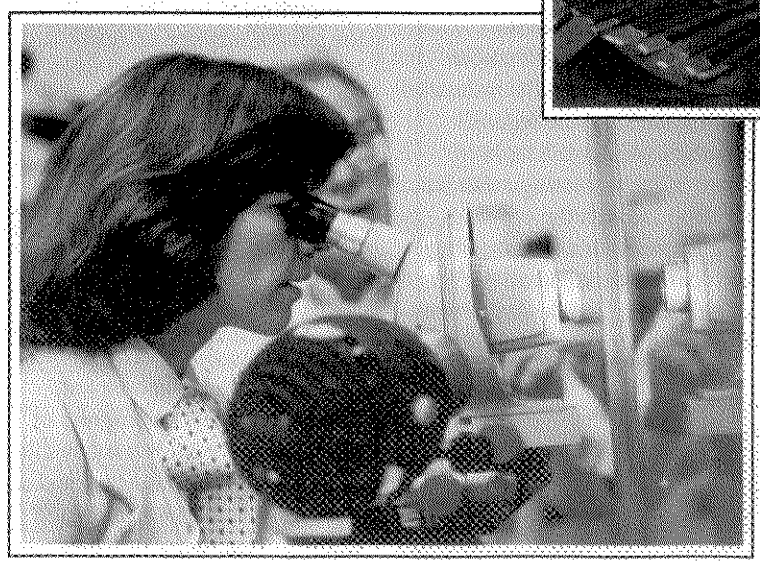
Astronaut Bonnie Dunbar Visits Langley

-photos by Carol Petrachenko



Following her colloquium presentation, STS-32 astronaut Dunbar presented to Langley an autographed photo commemorating the LDEF retrieval. The memento was accepted by Director for Structures Charles P. Blankenship.

During her visit, Dunbar visited the labs of LDEF principal investigators Wayne Slemp (above) and Don Humes. Slemp and Dunbar view the effects of space on composite materials after nearly six years of exposure.



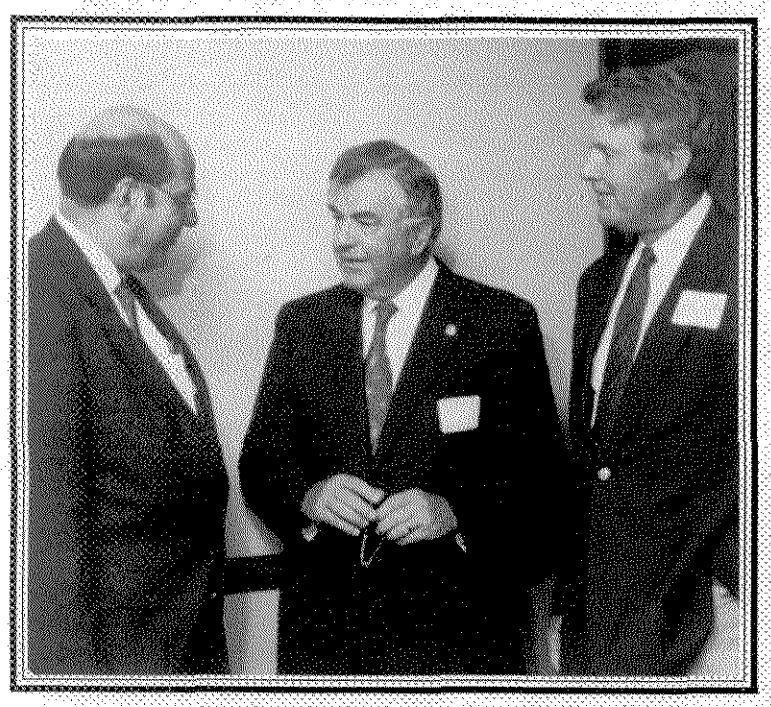
In Hume's laboratory, Dunbar views through a microscope craters caused by the impact of cosmic dust and space debris.

NASA
National Aeronautics and Space Administration
Langley Research Center

Langley Researcher News

Volume 4, Issue 16 August 10, 1990

Bi-weekly Employee and Contractor Publication



-photo by Carol Petrachenko

NASA Deputy Administrator J.R. Thompson (left) confers with Congressman Herbert H. Bateman (center) and Langley Director Richard H. Petersen. Thompson delivered the opening remarks at "New Tech '90," a symposium sponsored by the Virginia congressman.

Deputy Administrator Cites LaRC as Portal to Future in Aeronautics

-by Craig Murden

NASA's Deputy Administrator J. R. Thompson invited an audience of Hampton Roads business and industry leaders to look to the Langley Research Center for future aeronautical innovations. He also encouraged them to tap Langley for insights into opportunities for commercial research and development. Thompson was the featured speaker at the "New Tech 90" symposium sponsored by Congressman Herbert H. Bateman July 23 at the Ramada Inn, Newport News.

Sharing the podium later in the day was Langley's Dr. Jack Fishman, a senior research scientist in the Atmospheric Sciences Division and author of the new book *Global Alert*. Fishman's talk focused on how man and nature can affect our climate. He also probed the diverse issues surrounding global warming.

The day-long gathering was the seventh in a series of symposia the Congressman has hosted on science and technology. The morning program, which Thompson opened, featured the federal government's role in the country's technological future, while the afternoon thrust was on the environment and the role new technologies will play in understanding the planet.

Thompson's remarks, titled "The Future of America in Space," also highlighted NASA's programs involving the National Aero-Space Plane, Space Station Freedom and ventures back to the Moon and onward to Mars. He also pointed to education as one of the most prominent aspects of NASA programs saying that they serve as a stimulus for learning at all levels, from elementary schools to universities. His discussion of the future in aeronautics recognized continuation of excellent government and industry cooperation and pointed to coming strides in robotics, controls and propulsion. In commenting about international cooperation in space, he said there is potential but the new relationships must be stabilized before major, long-term ventures are undertaken.

Following Thompson, David Edgerly, director of the Office of Technology Commercialization at the Commerce Department's new Institute of Standards and Technology, spoke on government-industry partnerships. Genevieve Knezo, a specialist in science and technology at the Congressional Research Service, concluded the morning session with a discussion of government support for research and development in the face of decreasing defense budgets and increasing global competition.

Following Fishman in the afternoon and concluding the symposium was Dr. Dixon Butler, associate director for Modeling, Data Analysis and Informations Systems at NASA Headquarters. Butler elaborated on the Earth Observing System (EOS), a major NASA program to examine both natural and human-induced global change.

Langley Colloquium

CEBAF Scientist to Give Update on Nuclear Physics Lab

A $265 million dollar facility, now under construction in Newport News, will give scientists the best means yet to study the behavior of the smallest known particles of matter. The mission of CEBAF, the Continuous Electron Beam Accelerator Facility, is one of pure science--to decipher the mysteries of matter.

Professor John Dirk Walecka, scientific director at CEBAF, will discuss this top priority new construction project for the field of nuclear physics at a Langley colloquium Monday, August 13, at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222.

CEBAF, scheduled to begin operation in 1994, centers its research around a continuous wave, high intensity, high energy electron accelerator. The last concrete section of the seven-eighths mile, racetrack-shaped accelerator tunnel enclosure was completed June 8. Within the parallel linear accelerators and the recirculation beam lines that connect them, a beam of electrons will race at nearly the speed of light and accelerate to four billion electron volts enroute to target materials --protons and neutrons that hold clues about the nature of sub-atomic matter.

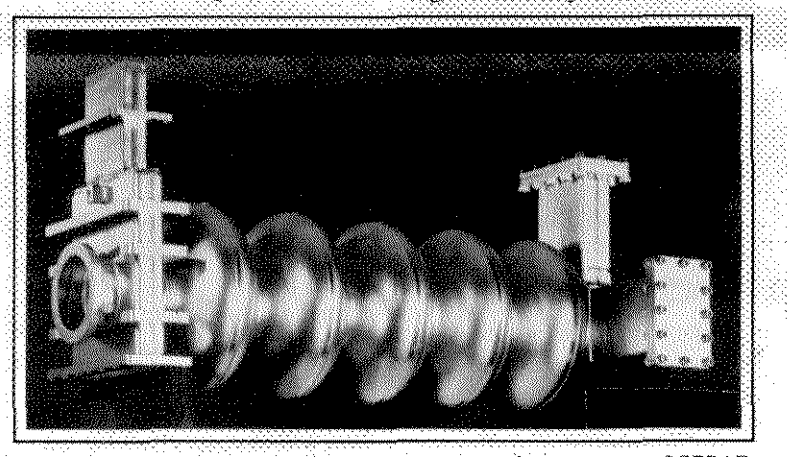
Protons and neutrons, which make up the nucleus of the atom, contain particles called quarks. CEBAF's specially-tailored electron beam will collide with the quarks; the interaction will produce a deflected electron and one or more nuclear fragments that will provide data about the nucleus.

At the heart of CEBAF are 338 superconducting accelerator cavities immersed in a bath of liquid helium cooled to 456 degrees below zero. This system eliminates heat buildup and allows the beam to be continuous. The electrons pass through the target in a steady stream.

allowing for greater precision in observing their behavior. CEBAF's continuous beam, guided with surgical accuracy, will allow data to be collected in weeks for experiments that would take decades to complete with existing equipment.

Walecka will delve into the scientific motivation for CEBAF, describe the accelerator project and review the scientific planning for the nuclear physics facility.

Prior to joining the staff at CEBAF in the summer of 1986, Walecka was chairman of the physics department at Stanford University, where he had been professor of physics since 1966 and where he is currently Professor Emeritus. He received his doctorate in physics from Massachusetts Institute of Technology in 1958. He has been a National Science Foundation Fellow, a Sloan Foundation Fellow, Nordita Guest Professor and he was the first Argonne Fellow. He is currently the Governor's Distinguished CEBAF Professor at Large in the Commonwealth of Virginia.



-photo courtesy of CEBAF

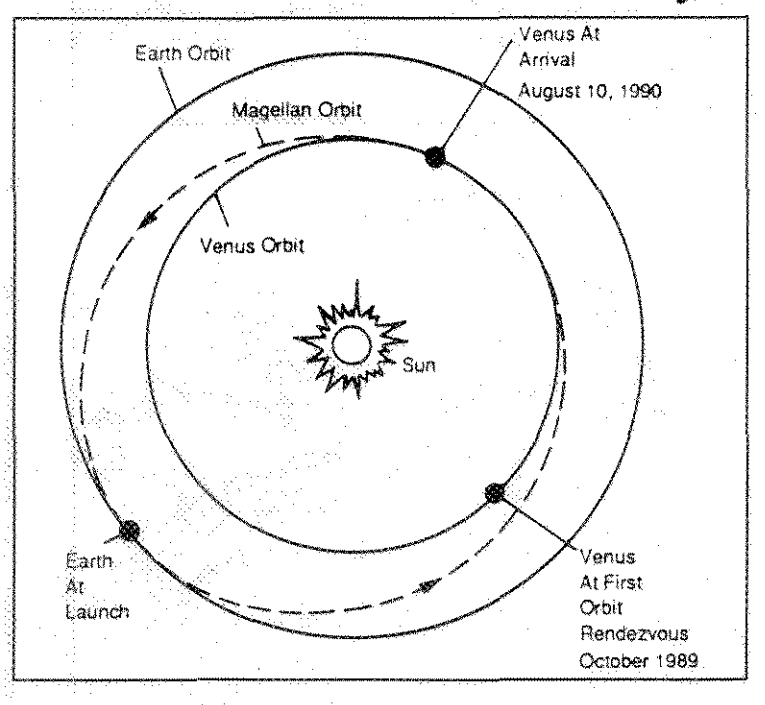
CEBAF's five-cell superconducting accelerating cavities, crafted from the metallic element niobium, were developed at Cornell University. The accelerator's several hundred cavities are superconductive at an operating temperature of minus 456 degrees Fahrenheit.

Magellan Spacecraft to Arrive at Venus Today

The Magellan spacecraft is scheduled to reach Venus today after a 15-1/2 month voyage. Deployed by the Space Shuttle Atlantis May 4, 1989, Magellan's primary objective is to map 70 to 90 percent of Venus, with 10 times better resolution than before.

Of all the planets in the solar system, Venus is the most like our own Earth in size, mass and distance from the Sun. Yet, we have only a sketchy, general knowledge of the planet's surface, due to the dense, constant cloud cover.

Astronomical imaging is traditionally done with optical instruments. There have been spectacular results using optical scanning instruments on spacecraft such as Voyager. The traditional approach is useless at Venus, however, where thick clouds obscure the surface.



The longer wavelengths of radar are needed for the Magellan mission for successful imaging and a new approach, specifically a synthetic aperture radar (SAR), is needed to acquire fine resolution images. SAR is sometimes called imaging or side-looking radar because it looks at its target at an

Continued on page 2.

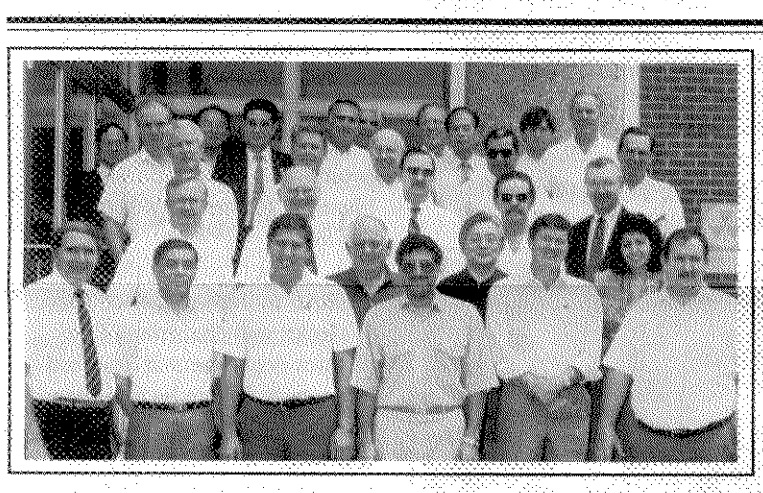
News Briefs

HEADQUARTERS, Washington, D.C. — An agreement was signed in Moscow Wednesday, July 25, to fly NASA's Total Ozone Mapping Spectrometer (TOMS) on a Soviet Meteor-3 spacecraft in 1991. The flight of the TOMS instrument on the Meteor-3 will provide critical environmental data on the yearly variability of the ozone hole over Antarctica. Global ozone measurements are a key element of the Mission to Planet Earth program to better understand environmental changes on Earth and the nature of global change. TOMS measurements will also be an important complement to the Upper Atmospheric Research Satellite, planned for launch in 1991 to make extensive observations of the physics and chemistry of the upper atmosphere.

AMES RESEARCH CENTER, Mountain View, Calif. --- New research indicates that Venus may have lightning similar to that on Earth. Previous studies had indicated lightning on Venus might be related to volcanic activity on the surface of the planet. Dr. Christopher Russell, magnetic fields investigator for the Pioneer Venus spacecraft and geophysics professor at UCLA, reports new studies now indicate the Venus lightning occurs in the afternoon, just as it does on Earth, and probably is related to cloud activity, not volcanic activity on the surface. Venus is 26 million miles closer to the sun than the Earth and completely covered with clouds.

HEADQUARTERS, Washington, D.C. --- NASA and Japan's Ministry of State for Science and Technology agreed to new areas of space cooperation during a Senior Standing Liaison Group (SSLG) meeting held in Toyko recently. New projects include observation of the ozone layer, space environment monitoring, space station solar terrestrial physics and space microgravity experiments. In addition, ongoing cooperation between the two countries on the construction and utilization of Space Station Freedom was emphasized.

AMES RESEARCH CENTER, Mountain View, Calif. --- A new moon orbiting planet Saturn has been discovered by Dr. Mark Showalter, a researcher at NASA Ames. Showalter found the small, bright object while analyzing images taken by the Voyager 2 spacecraft. When the discovery is certified by the International Astronomical Union, it will bring to 18 the number of Saturnian moons. The new moon has a diameter of only 12 miles and is temporarily designated 1981S13. It orbits in the major gap, known as Encke's gap, in Saturn's outermost major ring, the "A" ring.



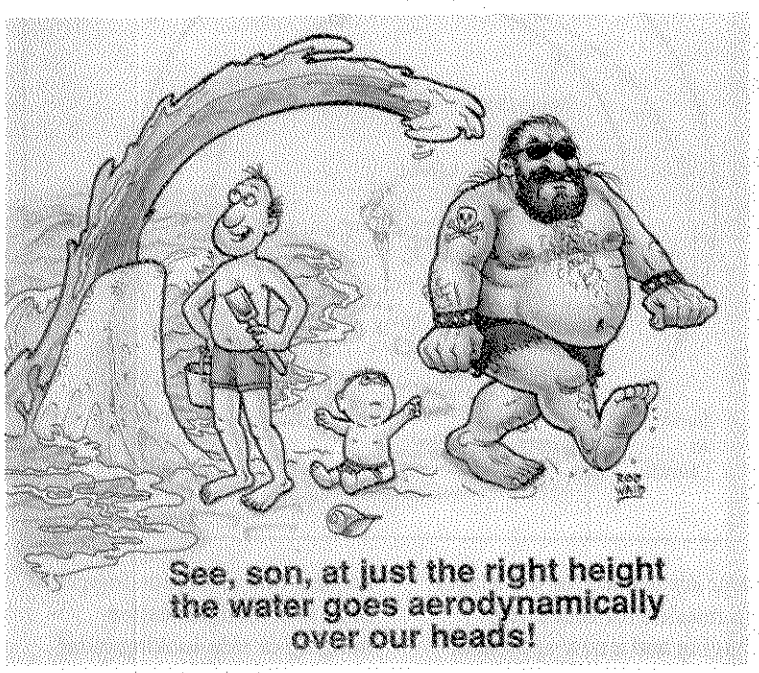
Flight Safety Group Meets at Langley

Langley Chief Engineer Joe Stickle hosted a meeting of the International Advisory Committee of the Flight Safety Foundation July 19-20. LaRC Director Richard H. Petersen welcomed the 40-member group concerned with the safety aspects of operating commercial transport aircraft and passenger service scheduling worldwide.

The Flight Safety Foundation (FSF) is an educational and research organization chartered to study flight safety, to disseminate safety information and identify safety problems. Foundation President J. H. Enders refers to the FSF as a "facilitator of communication, a window into the working areas of member organizations."

The program included overviews of Langley aeronautical research as well as safety reporting system research and human factors work in progress at NASA Ames Research Center.

Lankley



Magellan at Venus

Continued from page 1.

angle to the side of the flight path. It is a technique that uses many radar echoes gathered over an extended interval to sharpen, or increase, the resolution. Magellan's SAR will create high-resolution images by using computer processing on Earth to simulate a large antenna on the spacecraft.

Magellan's trajectory to Venus requires the spacecraft to go one and one-half times around the Sun before it goes into orbit around Venus.

Following insertion into Venus orbit, approximately 18 days will be spent checking out the spacecraft and its imaging radar. The prime mapping mission then will begin, lasting 243 Earth days or one Venus day.

Magellan is the first planetary probe to be launched from a Space Shuttle and the first planetary spacecraft to be launched in nearly 11 years.

Be Considerate

Parking in spaces designated for the handicapped is reserved for those with state-issued permits or license plates. Your cooperation and consideration are greatly appreciated.

Current News Releases

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

90-100.....Shuttle Drag Chute Test to Begin
90-101.....Pioneer Studies Lightning on Venus
90-102.....U.S. and Canadian Scientists Cooperate in Atmospheric Study
90-103.....New Moon Discovered Orbiting Planet Saturn
90-104.....Statement by NASA Deputy Administrator on Launch of CRRES/Atlas-1
90-105.....U.S. and U.S.S.R. Agree on Ozone Monitoring from Space
90-106.....NASA and Japan Agree on New Areas of Space Cooperation

Editorials

Letter to the Editor:

Several employees voiced their concern to Peter Edgette, head of the Occupational Health Services Office, over the undue wait prior to donating blood at the last bloodmobile. Edgette contacted Dr. Andrew Heaton, Tidewater Chapter of the American Red Cross. Below is Heaton's reply to Langley employees, contractors and retirees:

American Red Cross

I appreciate the use of this publication to extend my apologies to the people who donated blood to the American Red Cross at NASA on July 25, 1990. Your wait (to donate blood at the bloodmobile) was overly long, probably due in part to the use of a new beltline configuration.

This new configuration has worked well for the donors in many other locations and we sincerely regret that it did not work well for you. If the old way works best, then the old way it is. We will return to our original beltline pattern at our next bloodmobile.

The many units of blood you have donated over the years have benefitted innumerable patients throughout Virginia and Eastern North Carolina, and the American Red Cross and those patients are grateful. We thank you for your support and hope that you will give us another opportunity come September.

Sincerely,

Andrew Heaton

Andrew Heaton, M.D.
Chief Operating Officer
Tidewater Region

Employees Support Bloodmobile

Langley employees, contractors and retirees donated 308 pints of blood at the American Red Cross bloodmobile held July 27. Achieving gallon status were:

16 gallons — Richard Holt;
13 gallons — Victor Delnore;
10 gallons — Harvey Murray Jr., C. Donald Babb, George Carson, William G. Johnson and Eugene Hall;
9 gallons — Sharon Crockett;
8 gallons — James M. Shipp and Wayne Silver;
7 gallons — Michael M. Bryan and Samuel A. McPherson III;
6 gallons — Jerry W. Wright, Richard S. Young and Joseph B. Jackson;
5 gallons — Barry E. Brummer;
3 gallons — Dennis Caldwell, William Lupton and Russell Tatum;
2 gallons — Haywood Glapell, Kenneth Deyerle, James A. Phillip and Charles J. Luckes;
1 gallon — James T. Verry, Terry Flynn and Richard Wheeler.

Donating blood for the first time were Ronald Stevens, Leslie Ferguson, William Corlett, Leonard Sledge, Paul Daspit, Richard Tangenan, Paul Tartabini, Arnold Cody, Christopher Gallop, Darrel Beckuer, Gail Litter, Elizabeth Plentovick, Ken Tedjojuwono, Joseph C. Ritchie Jr. and Jeanette Tedjojuwono.

NASA coordinator for the bloodmobile was Annette L. Forrest; Marilyn Asby was the Red Cross coordinator.

News Researcher

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

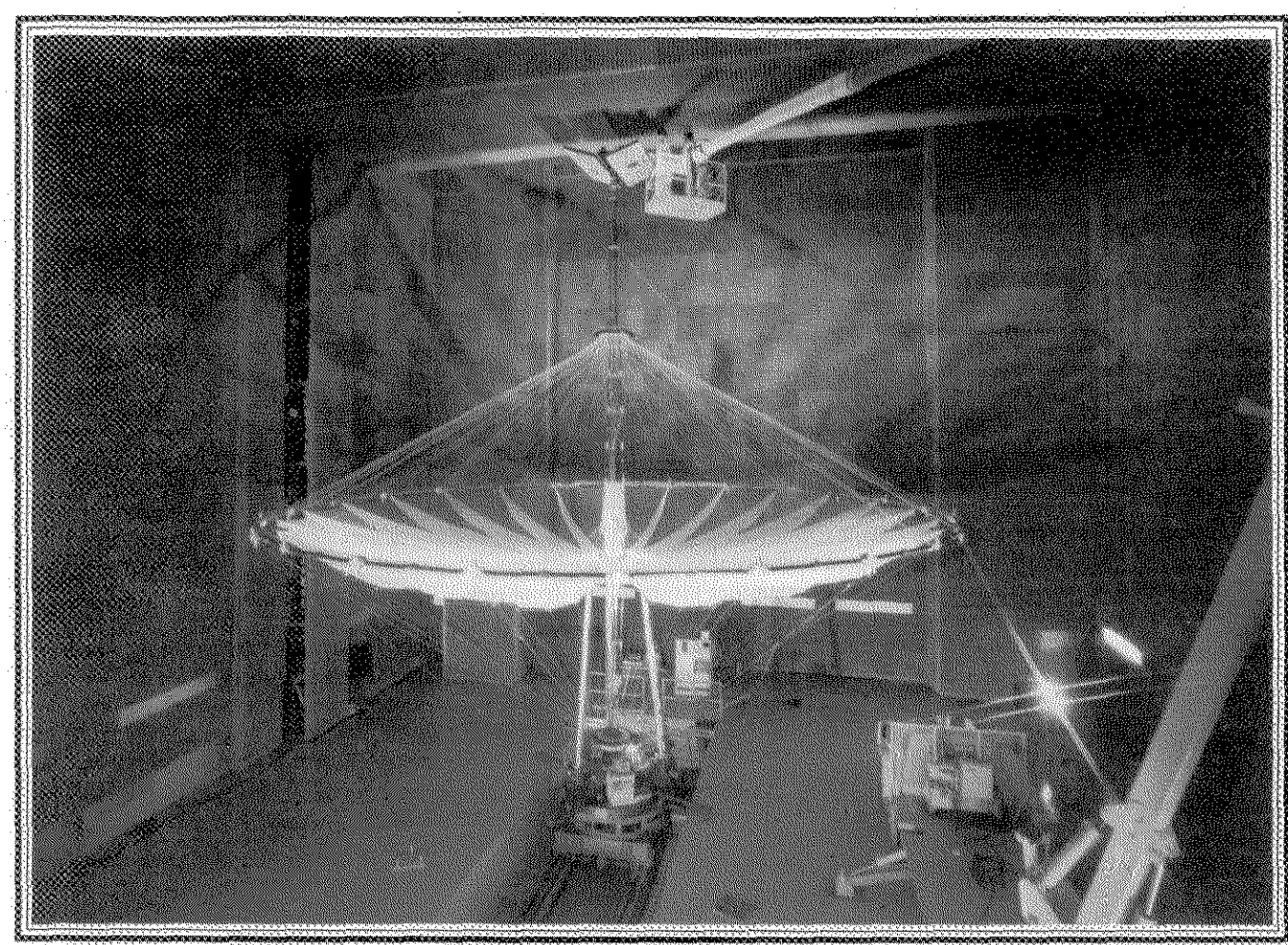
Managing Editor ..... Jean Drummond Clough

Editor ..... Marny S. Skora

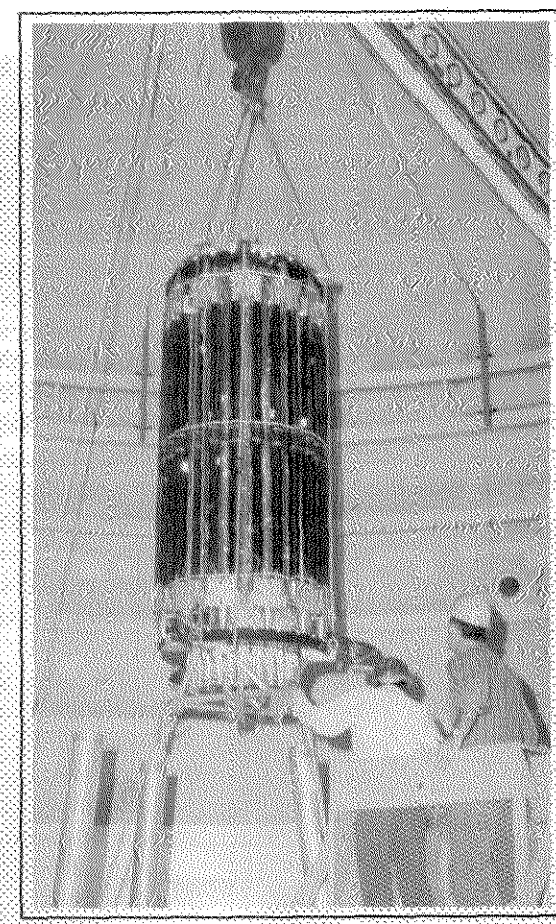
Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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 Langley-developed Hoop-Column Antenna is shown in its fully deployed, 50-foot diameter configuration.



Equally-impressive for its engineering innovation, the large anntenna folds into a phone-booth-size package.

LaRC Engineers Develop Self-Correcting Antenna

-by Craig Murden

Technology for a large, deployable antenna capable of correcting itself in space has been demonstrated in tests culminating nearly ten years of concentrated research by Langley guidance and control engineers. The Shuttle-compatible antenna's correction system is based on a set of computer-controlled actuators which correct distortions in the reflective surface caused by deployment and effects of the space environment.

The automated control system makes adjustments of less than one-quarter inch to reduce distortions in the 50-foot diameter surface from 0.200 inch down to 0.060 inch. Further, test results show that this operation can be completed in one second or less as compared to the two to four hours estimated for astronaut Extra Vehicular Activity, according to Thomas G. Campbell, head of the Antenna and Microwave Research Branch.

The antenna is shaped like a large umbrella built on a telescoping central column with the curved, parasol portion formed of gold-plated mesh stretched across the diameter of a large circular hoop. It is on the mesh reflecting surface that distortions will be caused during deployment, by control jet actuators or the large temperature gradients in the antenna's orbit. The self-correction system was designed to compensate for errors from those sources.

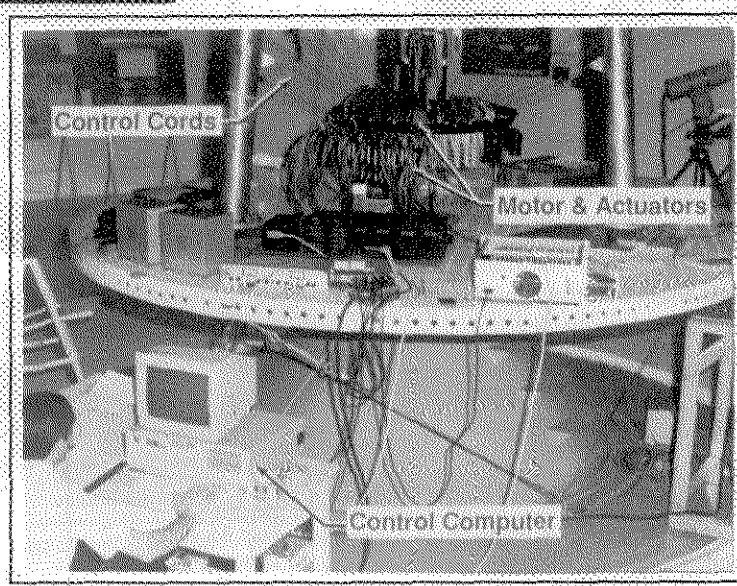
This computer-controlled, motor-driven surface adjustment system was designed by Elvin H. Ahl and James Miller of the Systems Engineering Division. It provides precision step adjustment for each of the correcting control cords, instruments to measure the load in each control cord and a computer system and driver to implement required control cord changes. Basically, sensors measure the surface distortion and relay this information to an on-board computer. The computer then calculates the amount of adjustment required to obtain the smoothest antenna surface and commands the motors to make control cord adjustments to a precision of one/thousanth of an inch (1 mil), says Ahl. In the most recent tests, initial deployment of the antenna resulted in a highly distorted surface. These distortions were severe enough to render the antenna useless for several applications. However, after two iterations of the computer-controlled adjustment system, the surface was very close to the limit of smoothness.

The technology associated with large scale antenna structures was sponsored by the Guidance and Control Division of the Flight Systems Directorate while the Systems Engineering Division of the Systems Engineering and Operations Directorate provided designs for the mechanical systems. This effort is part of a comprehensive program in controls-structures-electromagnetics interaction which is managed by Lyle C. Schroeder of the Antenna and Microwave Research Branch.

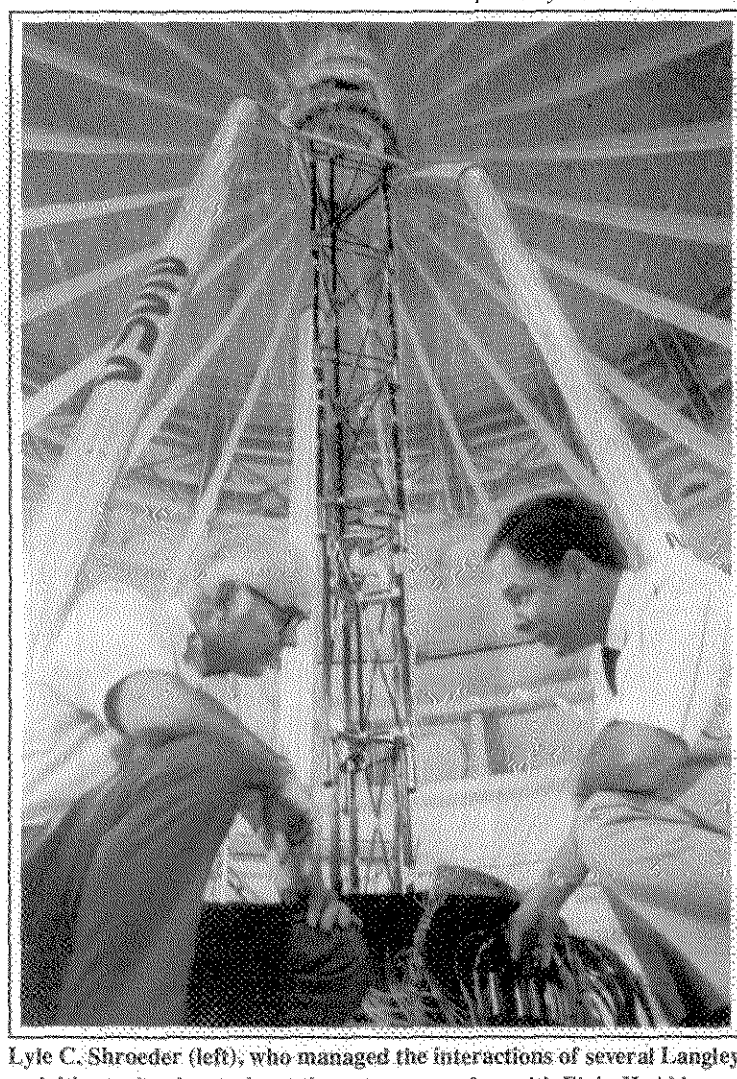
Although this is the largest deployable antenna in existence in NASA, it is a scale model of what could become a Shuttle-borne antenna over 300 feet in diameter. In previous tests, the antenna's good radiation performance was demonstrated over a broad microwave frequency range. Other features include the control of antenna vibrations, deployment repeatability and the application of electronic compensation techniques using multiple antenna feeds to provide further improvement in the antenna performance.

There are at least three major application areas for the antenna, states Campbell. An antenna of this design could provide continous multichannel communications over the entire continental United States. Second, the area illuminated by an antenna aboard a spacecraft and another one on the ground (the so-called Very-Long Baseline Interferometer) could serve the needs of astronomical observations from Earth. Finally, an antenna supporting a remote sensing radiometer in geosynchronous or low-Earth orbit could provide a variety of meteorological services, such as measuring rainfall, atmospheric moisture, soil moisture, ocean winds and temperature.

Campbell said that with completion of the surface control tests, the project has reached a major milestone---a point where the technology becomes available to commercial and governmental ventures for full-scale applications. To support that process, NASA intends to keep the antenna in a stand-by mode so that it can be easily available for study of additional applications.



Components of the antenna's control and adjustment mechanisms are shown in this test configuration. *-photo by Carol Petrachenko*



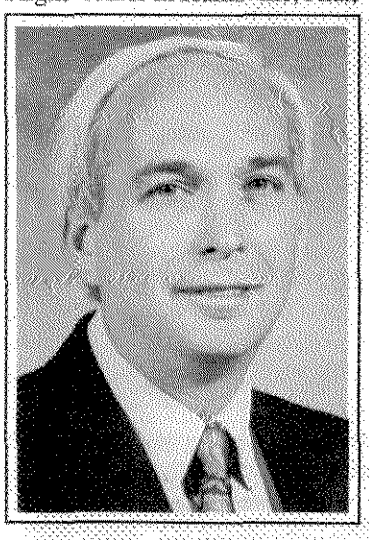
Lyle C. Shroeder (left), who managed the interactions of several Langley activities to develop and test the antenna, confers with Elvin H. Ahl, a designer of the computer-controlled surface adjustment system.

At the VC during August

Marshall Scientist to Speak on GRO

An observatory that may unlock secrets of the universe is scheduled for launch by the Space Shuttle Atlantis later this year. The Gamma-Ray Observatory (GRO) will investigate gamma radiation and its violent sources, such as quasars, pulsars and black holes.

Dr. Gerald Fishman, a principal investigator for GRO from the NASA Marshall Space Flight Center in Huntsville, Ala.,



will present "Probing the Universe with the Gamma-Ray Observatory" on Thursday, August 23, at 7:30 p.m in the Visitor Center theater. This free presentation is cosponsored by the Visitor Center and the Hampton Roads Branch of the American Institute of Aeronautics and Astronautics.

Fishman works as an astrophysicist in the Space Science Laboratory at NASA Marshall. During his presentation, he will discuss gamma radiation and its sources, describe the observatory and its instruments and give an update on the Space Shuttle mission.

According to Fishman, GRO is a giant space observatory designed to identify sources and processes that give rise to extremely high energy. Through gamma-ray observations, scientists may witness the deaths of stars and the birth of elements and gain more clues to mysterious quasars, pulsars and black holes.

The Space Shuttle Atlantis will place the 17-ton observatory into orbit. GRO, the heaviest payload ever for a Space Shuttle, has a minimum life of two years and can be extended to six years or longer. During the first year of operation, it will make a survey of the gamma-ray universe. In later years, GRO will return detailed views of intriguing objects identified in the survey.

Fishman, brother of Dr. Jack Fishman of Langley's Atmospheric Sciences Division, is currently the principal investigator of the Burst and Transient Source Experiment (BASTE) on GRO. He also serves as experiment scientist for the induced radio-activity experiment of the Long Duration Exposure Facility.

The Ball is in Your Court *-by John Wilson*

In the spring of 1990, a group of Peninsula tennis players in conjunction with the Peninsula Tennis Patrons Association and the Mid-Atlantic Tennis Association started a Peninsula Men's Senior 50's League. The new league was sponsored by Wheat First Securities and is composed of five teams. Each team played the others twice in a three team doubles match format.

After two rounds of play, the standings are:

1 Fort Monroe, 6-2
2 Village Green, 5-3
3 NASA, 4-4
3 Hilton, 4-4
5 Riverside Wellness and Fitness Center, 1-7

A second session is planned starting in mid-August. For information on playing or starting a team, call Charles Bryant, league commissioner, ext. 44674, or John Wilson, NASA team captain, ext. 41400. If sufficient interest is shown, a ladies' league may be offered.

Wheat First Securities Peninsula Senior 50's League--NASA Team. (First row, L to R) Dick Pincus, Bill Shinn, Charles Pruitt, Maynard Sandford; (second row) John Wilson, captain; David Carter, Woody Lovelace, Charles Bryant and George Lawrence.

SCAN TEAMS SORT OUT LANGLEY CULTURE. Following months of data gathering, team participants attended a workshop devoted to assessing information gathered from Langley's culture survey as well as the team's initiatives. SCAN team committee members are (front row, L to R) George Finelli, Del Croom, Gin Marks, Marilyn Ogburn, Diane Stoakley, Paul Bagby, Jim Batterson, Louise Hamilton, consultant; (middle row) Sharon Fairheart, Julie Williams-Byrd, Kim Bey, Clarence Stanfield, Cindy Lee, Diane Wieting, Donna Forbes, Rich Antcliff; (back row) Tom Frasher, Tim Marshall, Bob Buchan, Guy Kemmerly, Earl Atwood and Rich Silcox. Results and recommendations will be presented to Langley senior management later this month.

Key Positions Announced

The following individuals have been selected to fill key positions at Langley Research Center:

Willis A. Shearin Jr., supervisory production controller, Contractual Resources Section, Resources and Contracts Branch, Fabrication Division, under CPP 90-2.

Wayne C. Williams Jr., supervisory electrical technician, Microelectronics and Technical Support Section, Electronics Technology Branch, Fabrication Division, under CPP 90-3.

Thomas J. Lash, supervisory engineering technician, Systems Development Support Section, Systems Development Branch, Systems Engineering Division, under CPP 90-6.

Jack E. Pennington, supervisory aeronautical engineer, AST, Navigation, Guidance and Control Systems, Automated Technology Branch, Information Systems Division, under CPP 90-7.

Barry N. Hogge, supervisory engineering technician, Tunnel Support Section B, Laboratories Operations Branch, Operations Support Division, under CPP 90-9.

Boyce E. Lavender, supervisory engineering technician, Tunnel Support Section D, Tunnels Operations Branch, Operations Support Division, under CPP 90-10.

Donald B. Shortt, supervisory electronics engineering technician, Laboratory and Plant Electrical Section, Electrical Support Branch, Operations Support Division, under CPP 90-11.

William L. Sellars III, supervisory aeronautical engineer, AST, Fluid and Flight Mechanics Program Management, Experimental Methods Branch, Fluid Mechanics Division, under CPP 90-13.

Stephen K. Robinson, supervisory aeronautical engineer, AST, Fluid and Flight Mechanics Program Management, Experimental Flow Physics Branch, Fluid Mechanics Division, under CPP 90-14.

James G. Batterson, supervisory aeronautical engineer, AST, Navigation, Guidance and Control Systems, Spacecraft Controls Branch, Guidance and Control Division, under CPP90-16.

William C. Tennis, supervisory engineering technician, Fluid Systems Section, Mechanical Support and Utilities Operations Branch, Operations Support Division, under CPP 90-18.

Kurt W. Neitzke, AST, Experimental Facilities Techniques (Mechanical Systems), Experimental Facilities and Techniques Section, Aerothermal Loads Branch, Structural Mechanics Division, under CPP 90-19.

Emily J. Evans, secretary (typing), Space Station Freedom Office, under CPP 90-17.

Donald C. McCracken, program analyst (temp.), Scout Project Office, under CPP 90-15.

Golf Association Announces Winners

Results of Ford's Colony Four-Man Best Ball Tournament are:

1st Flight

1st place	D. Stroupe, D. Whipple, W. Oakley, D. Beasley	56
2nd place	R. Zacharias, R. H. Huffman, J. Deaver, R. Russell	58

2nd Flight

1st place	J. Kibler, B. Seals, B. Weaver, J. Usry	56
2nd place	M. Fitzgerald, J. Fitzgerald, T. Saunder, C. Poupard	56

Special congratulations to Wayne Oakley who had a low gross score of 72.

Get Away From It All!

Engineers Club of the Virginia Peninsula have arranged a 50th anniversary tour for members, former members and guests. Visit Orlando, Florida/Kennedy Space Center/ Epcot and Disney World August 27-September 2. Complete package is $675 per person (double occupancy) and includes accommodations, some meals, varied entertainment, some transportation. Call (804) 877-2939 for details.

--or--

Thanksgiving in Hawaii!! Eight days/ seven nights departing Norfolk November 17. Everything included except meals. Cost is $920 per person (double occupancy). Limited space. Call 890-0959 after 5 p.m. for additional information.

Last Call for PRs

This is the last call for expiring fiscal year funds or for requests to continue services beyond September 30, 1990. Please submit requests by August 15 to obligate funds by fiscal year end. Specific questions should be addressed to Sandi Ray, ext. 42430.

Notes of Thanks

Robert V. Garletts writes: "I wish to thank everyone in the Structures and Materials Lab for the very fine social held in my honor. I greatly appreciate the gifts presented to me but, even more, the caring and friendship shown over the years will never be forgotten."

Ira H. A. Abbott writes: "My wife and I wish to thank all who participated and contributed to making my retirement party a most memorable and outstanding event. Your friendship, participation and generosity were truly overwhelming and will long be remembered."

People & Places

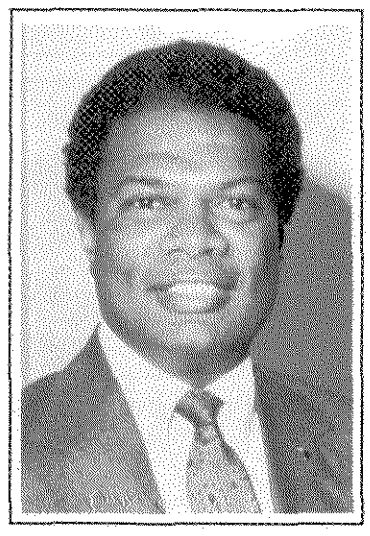
Langley Newsmakers

Livas Named NCMA Fellow

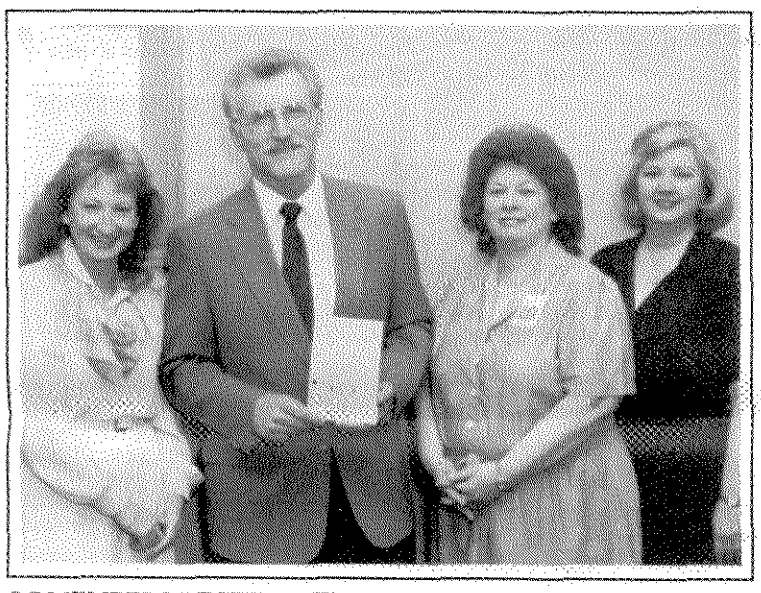
Henry L. Livas Jr., supervisory engineering contract specialist, has been elevated to the status of Fellow by the National Contract Management Association (NCMA). "Fellow status is awarded to those who have made significant contributions to the field of contract management and to the association," said James W. Goggins, NCMA executive director.

NCMA is composed of more than 23,000 members engaged in the field of public and commercial contracting through companies, government agencies or related fields of endeavor.

Livas began his NASA career in January 1990.



He came to Langley from the Atlantic Division of the Naval Facilities Engineering Command, Norfolk.



QC MEMBERS RECEIVE AWARDS. Sullivan Donadio, assistant chief of the Fabrication Division, presented achievement awards to the "Fabulous Few" Quality Circle members for their efforts in the development of a *Mini Minder* publication that provides a quick method of locating information related to official regulations. Pictured with Donadio are (L to R) Stephanie Stockum, Carol Williams and Nadine McHatton.

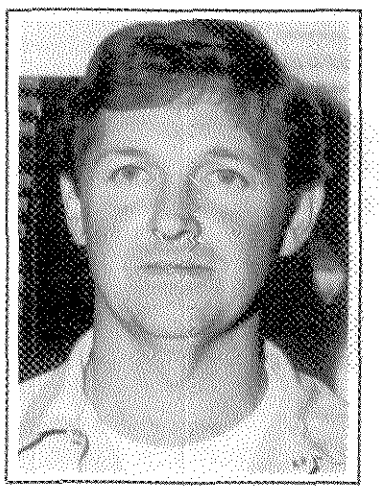
Contractor News

EG&G Names Suggestion Winners

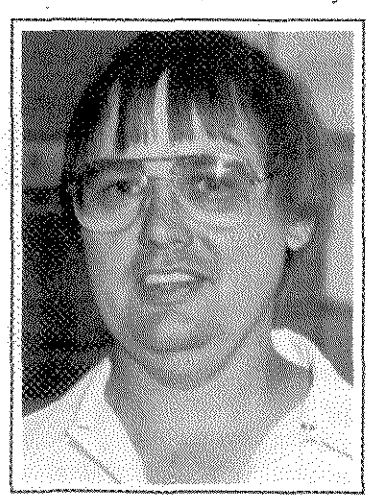
EG&G Florida, a support services contractor to NASA Langley, has implemented a suggestion award program to increase and emphasize efficiency on the job. The first two award winners are Ronnie L. Diggs, maintenance pipefitter, and Lucky Thomas, maintenance painter.

Thomas suggested that pre-mixed, off-white paint be included in stock rather than hand mixing off-white paint each time it is called for on a job. This savings in time and tinting materials resulted in a savings to NASA of over $2,200 annually.

Diggs suggested flanges be welded to the Joy compressor which provides air to the wind tunnels on NASA's East Side. This addition enables pipefitters to remove piping by sections for inspection and repair, eliminating the use of a crane and rigging personnel. This suggestion has resulted in a savings to NASA of over $2,300 annually.



Ronnie L. Diggs



Lucky Thomas

NASA Engineer Attains High Goal

-by Kristina Murden

1990 was the year; the year for Erik Vedeler to reach the 20,000 foot summit of Alaska's Mount McKinley. On June 29, after seven years of planning and 24 days of climbing, Vedeler and five others "vacationed" atop North America's highest mountain.

A climber since 1975, Vedeler had always kept McKinley in the back of his mind. After conquering Northwestern mountains Rainier, Shasta and Hood, and climbing in Ecuador, Mexico, New Mexico and Colorado, he had dreams of doing something bigger and better. This summer he did just that.

Vedeler is an aerospace technologist in the Antenna and Microwave Branch. As part of the Electromagnetic Measurement group, he is working with the New Experimental Test Range, an electromagnetic test facility that uses an anechoic chamber to test electromagnetic scattering and antennas.

Langley's Erik Vedeler is, perhaps, the first climber to take astronaut ice cream to the peak of Mt. McKinley. This summer, Vedeler accomplished his goal of climbing North America's highest mountain.

"It's hard to explain to others why I would want to endure the cold and call it a vacation," said Vedeler. "It is a personal triumph. I think it might be similar to walking on the moon—there were no plants or animals, and we were up so high, with nothing but ice and rock, for 24 days."

McKinley is one of the most impressive mountains in the world, or at least the Western Hemisphere, because of its vertical rise, said Vedeler. "However, we didn't do any vertical rock climbing like they do in the movies." The team spent six to eight hours a day climbing, carrying 90 pounds of equipment on their backs. In addition, they spent three to four hours preparing meals at camps set up in crevasses. This left little leisure time to just soak in the scenery, he added.

In planning for this expedition they had to consider the dangers. Since the bulk of the uncommon route they had chosen to travel was part of a national park, no pack animals or air drops were allowed. They had their food sent via dog sled during the winter to a designated destination, and were later lucky enough to find it.

Vedeler compared the mountain atmosphere to being in outer space. "Although I have never been in space, it must be similar because the air is so thin. Radiated heat from the sun was amazing. The sunny areas on the mountain were roasting hot and everything in the shade was very cold. You'd have to experience it. Also, the only sounds we heard were the wind, an occasional airplane or an avalanche."

Fellow climbers were Vedeler's aunt, uncle and three outdoorsmen whom he had climbed with before. "Six was an ideal number since we were able to divide into two groups and separate. The groups of three were tied together and then spread out to alleviate the risk of both groups encountering the same dangerous situation."

Vedeler and his uncle, whom he considers a world class climber, had both planned to tackle the same northern non-standard route, which was the original route of first ascent probably around 1913. "This particular route is very remote and very arduous, but the steepest places are at no more than a 45 degree angle."

During their ascent, Vedeler and his aunt and uncle decided to traverse, or go over the top and descend down the other side. This way they would reach the summit, go back down to camp, then up again with all their equipment and descend the other side, on the standard route. This involved the added dangers of running out of food and taking a chance that there would not be a plane at the glacier at the bottom to bring them to safety, since they were not expected. They arrived at the bottom July 2. The other three returned via the non-standard route about four days later.

"I'm really glad that I traversed because I got to see both sides of the mountain, which was a very unique experience," said Vedeler. "Coming in from the North, we were completely isolated from people, except for an occasional CB radio transmission to an airplane. Coming down we encountered many fellow climbers. In fact, 90 percent of climbs are on the West Buttress, our route of descent."

The six climbers did not encounter any major storms during their 24 day venture. "We had a real good stretch of weather with one eight-inch snowfall and no appreciable wind." The coldest temperature recorded during their trip was 10 below zero and the highest 65 degrees. "It was not very cold for this time of year at these altitudes," said Vedeler. "We were prepared to encounter the more common 40 below temperatures."

"I would do McKinley again," said Vedeler. "Next time I would not do such an arduous trip, though. It was just too long. I got so worn out and my health began to deteriorate. Next time I will take a shorter, but more technical route." Plans are in the works to go back to Alaska for a climb of Mount Foraker, North America's sixth highest peak.

"In the last decade there has been a dramatic increase in the amount of climbers on McKinley," said Vedeler. During the summer there may be 100-200 people attempting the climb. "It was such an amazing thing to come back and see living things. After we reached about 6,000 feet, there was nothing living up there at all."

Happenings

SPECIAL LAA SOCIAL will be held Friday, August 17, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment provided by Foxfire, the Party Band. $1 cover charge. See you there.

CONSERVATION CLUB will meet Tuesday, August 21, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call Ram, ext. 41524 for more information.

NASA TOASTMASTERS will meet Wednesday, August 22, at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are welcome. For information, call Christine Darden, ext. 45258.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. For details, call Steve Dahmen, ext. 44519.

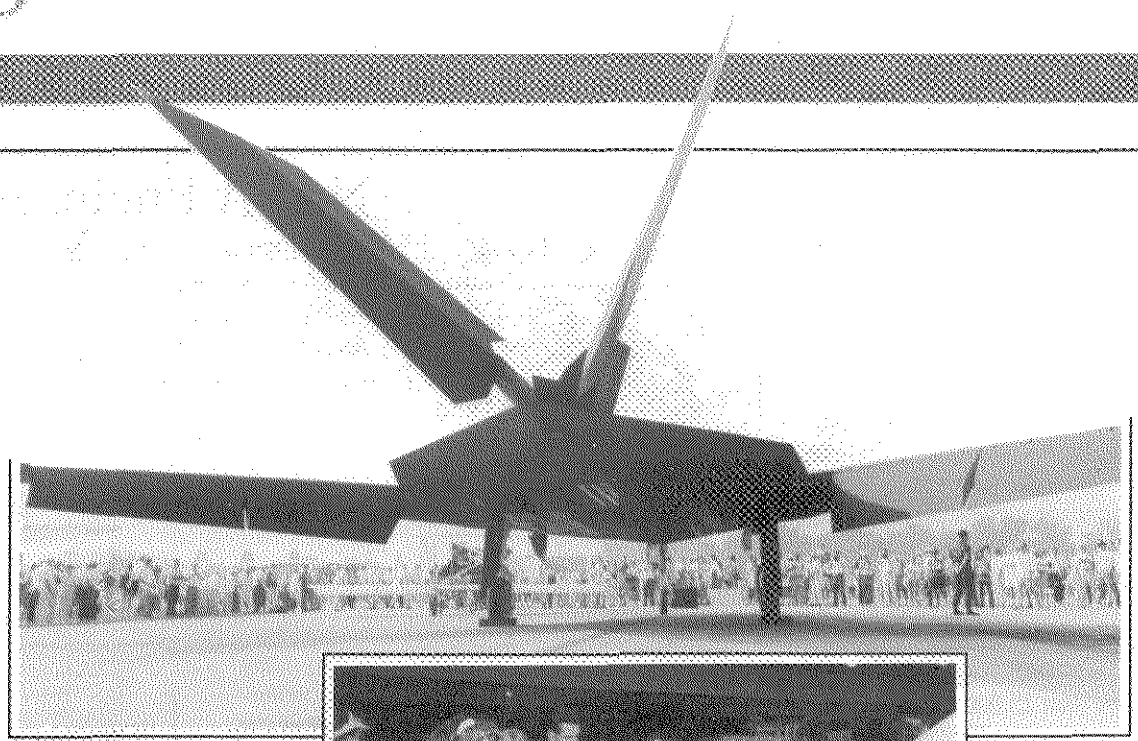
LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. Classes meet in the cafeteria, Building 1213, during August. Cost is $12 per month.

NASA TENPIN BOWLING League will meet August 17 at 1 p.m. in the Langley Room of the H.J.E. Reid Conference Center for an organizational meeting for the 1990-91 winter league. All team captains and league officers are encouraged to attend. Any individual or team interested in joining the league contact Andrea Lewis, ext. 46369.

GOLF TOURNAMENT sponsored by VA Tech Alumni will be held August 25-26 at Hampton Municipal Golf Course. Cost is $65 per two person team which includes all greens fees. Prizes awarded. Proceeds to benefit scholarship fund. Contact Frank Cowling Jr. at 722-7637.

SCALE MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society is holding the Region II model contest September 21-22. No need to be IPMS member. For information, contact IPMS Tidewater, P.O. Box 1651, Newport News, Va. 23601.

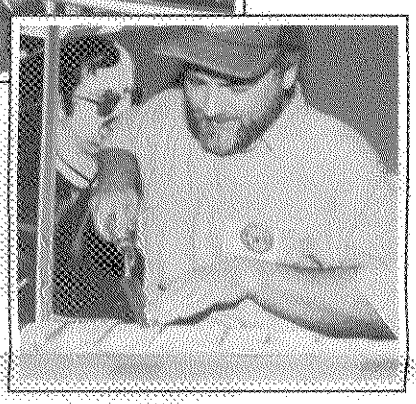
FOR RENT: ROOM. Furnished room in waterfront home 3 miles from NASA. Kitchen and washer/dryer privileges. $60 per week. Call 722-2440 after 4 p.m.



The silhouetted Stealth shadows the crowds gathered at Oshkosh.

Ron Barnes, a NASA craftsman, uses a wood chisel to form the fuselage of a model airplane.

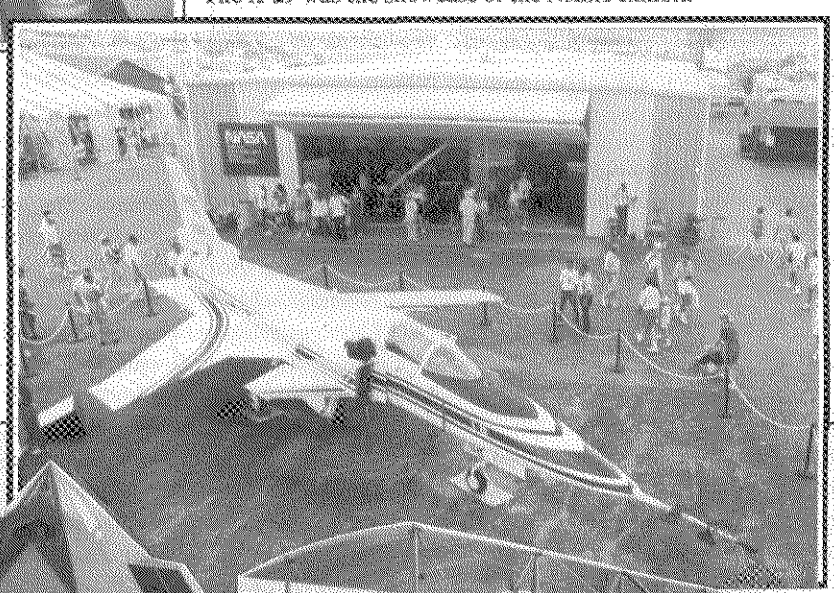
Janice Mc Collum demonstrates space station construction concepts.

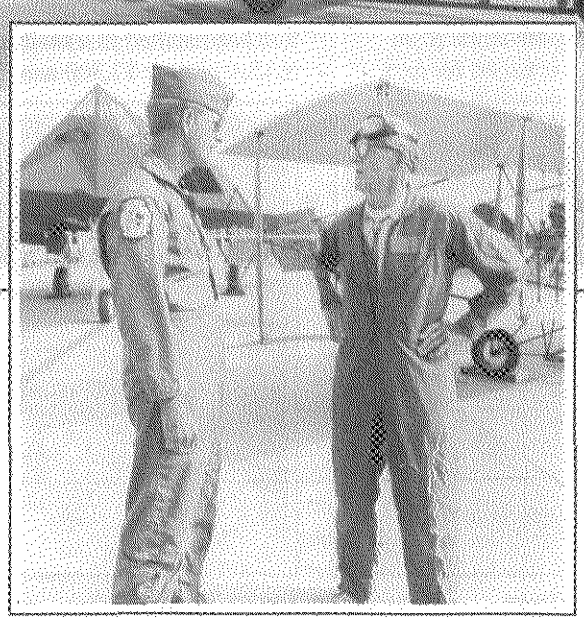


Harry Verstynen explains capabilities of the NASP.

People, Planes Converge at Oshkosh '90

The X-29 was the showcase of the NASA exhibit.





Old and new appeared side by side at Whitman Field, the site of Oshkosh '90. The Experimental Aircraft Association's Annual Fly-In featured the Stealth Fighter and a Curtiss Pusher.

Those who love planes traded stories--both recent and of years past. Stealth Fighter pilot Jerry Howalt meets Curtiss co-owner Dale Crites at Oshkosh.

-photos by Carol Petrachenko and Keith Henry

Researcher News

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Researcher News

Volume 4, Issue 17 August 24, 1990

Bi-weekly Employee and Contractor Publication

Personnel Division Undergoes Reorganization; Now Human Resources Division

Langley's Personnel Division has been renamed and management changes are announced. Dr. Belinda H. Adams has been appointed chief of the new Human Resources Management Division (HRMD). Also under the HRMD reorganization, John J. Cox has been named associate chief and Alice C. Massey has been selected assistant chief.

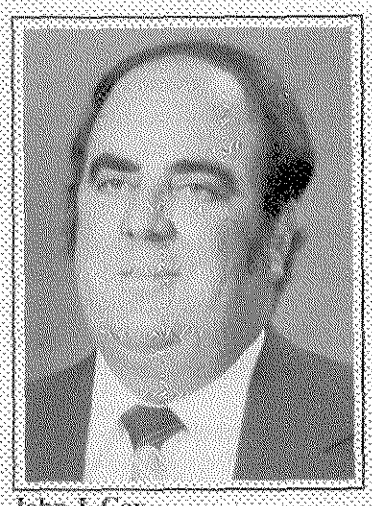
Adams replaces Irwin J. Schauer, who has been named special assistant in charge of Productivity. In his new position, he will report to the director for Management Operations. Much of Schauer's effort will be in direct support of Associate Director Sidney F. Pauls, who is the senior management official responsible for Langley's productivity.

As chief of the HRMD, Adams is responsible for developing and managing comprehensive personnel programs, including recruitment, promotions, classification, employee benefits, employee and labor relations, employee development and occupational health. She is a principal adviser to Langley management concerning personnel matters, ensuring regulatory compliance with both NASA Headquarters and the Office of Personnel Management (OPM).

Adams joined the Langley staff as an aerospace technologist in the Analysis and Computation Division in July 1963. Prior to the personnel assignment, she was chief of the Programs and Resources Division. She assumes her new responsibility upon her return to Langley following a year at the Massachusetts Institute of Technology as a Sloan Fellow and a brief assignment at NASA Headquarters, Washington, D.C.

At MIT, Adams was elected governor of the 1989-90 Sloan class. She is the first U.S. government employee to be selected class governor in the history of the Sloan program. Adams is now completing a two-month assignment at NASA Headquarters where she is supporting an Agency work force study under the direction of NASA's Associate Deputy Administrator Samuel W. Keller.

Dr. Belinda H. Adams

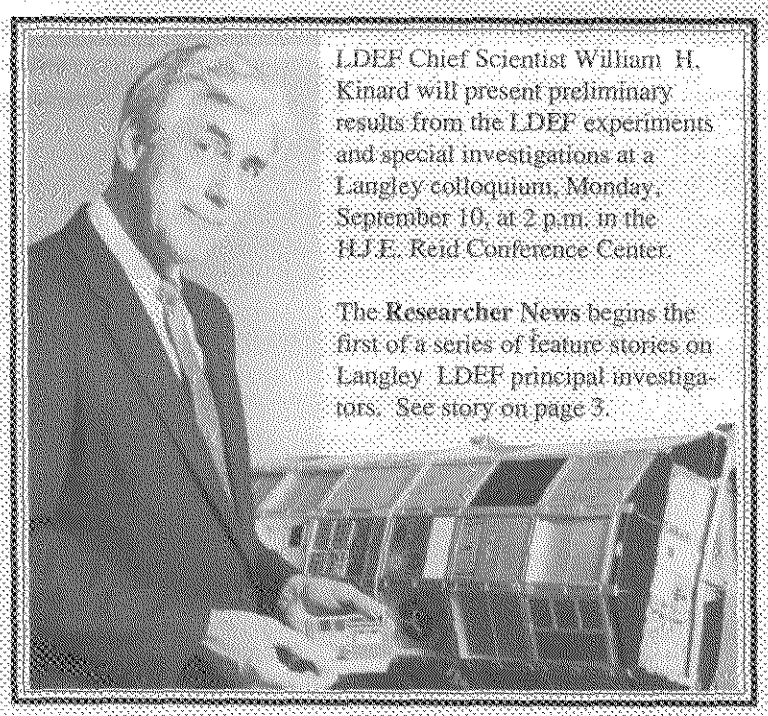


John J. Cox

Alice C. Massey

In the new position of associate division chief, John Cox will be responsible for policy matters, procedures and regulations. He will advise the chief on regulatory compliance with NASA Headquarters and OPM issuances. He was formerly head of the Employee Development and Services Branch. Cox began his NASA career in 1962 as a personnel staffing specialist. Prior to joining NASA, he was a budget analyst for the U.S. Naval Supply Center in Norfolk.

As assistant chief, Alice Massey will be in charge of internal personnel operations. She will handle many of the day-to-day operational activities within the division, such as those affecting processes and procedures as well as organizational issues. She was formerly head of the Research and Program Management Branch, Programs and Resources Division. Massey began her NASA career in 1973 as Langley's Federal Women's program coordinator.



LDEF Chief Scientist William H. Kinard will present preliminary results from the LDEF experiments and special investigations at a Langley colloquium, Monday, September 10, at 2 p.m. in the H.J.E. Reid Conference Center.

The **Researcher News** begins the first of a series of feature stories on Langley LDEF principal investigators. See story on page 3.

Goal Set at $255,000

Langley Launches 1990 CFC Campaign

-by Jean Clough

"Make the World A Better Place." How many times have you heard that statement? How many of you have donated your time and/or money to that worthy cause?

Next month, you will have a chance to contribute to this effort when you make your pledges to the Combined Federal Campaign (CFC). Right here at home, the Langley family can make the Peninsula a better place to live and to raise our families.

Langley Director Richard H. Petersen has launched this year's campaign by appointing a campaign committee headed by Dr. Darrel R. Tenney Jr., chief of the Materials Division, to help the Center meets its challenging goal of $255,000.

Langley will conduct a one-day centerwide solicitation Tuesday, September 25, preceded by a kickoff meeting for division chairpersons, key solicitors and new employees Friday, September 21, from 1:30 to 2:30 p.m. in the H.J.E. Reid Conference Center.

This is the one time during the year that government employees are asked to consider the needs of others by contributing to many worthy health, welfare and community service organizations. The CFC is not a charity drive. It is an opportunity for the Langley family to help improve the way of life on the Peninsula, thereby making the world a better place.

Langley has always exceeded the goal set by the director and the campaign committee. Let us continue that tradition and support the campaign when your "key person" contacts you on September 25.

Remember, the money you give this year may some day help a member of your own family. Please give generously and help *make the world a better place.*

-photo by Carol Petrachenko

CFC COMMITTEE SELECTED. Langley's Combined Federal Campaign committee for 1990-91 has been named by Director Richard H. Petersen. Committee members are (L to R) Roscoe C. Edge, Human Resources Management Division, NASA-Union Liaison; Cassandra G. Favor, Financial Management Division, Financial Chairman; Shirley B. Crockett, Materials Division, Secretary; Dr. Darrel R. Tenney, Materials Division, Chairman; Bruce A. Conway, Instrument Research Division, Vice Chairman; Jean W. Clough, Office of External Affairs, Publicity Chairman; and Thomas L. Vranas, Fabrication Division, Pattern Makers Union. Not pictured are Ben J. Schlichenmayer, Operations Support Division, American Federation of Government Employees Union; and A. Gary Price, OEA, Langley's representative to the Peninsula CFC.

Finelli Attends Maxwell Program

George B. Finelli, computer engineer in the System Validation Methods Branch, has been selected to attend the Maxwell Midcareer Program in Public Administration at Syracuse University. Selected by NASA Headquarters following an intercenter competition, Finelli 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.

Finelli began his NASA career in the Flight Systems Directorate in April 1980. He is a graduate of the State University of New York at Buffalo with a bachelor's degree in computer science. He earned a master's degree in statistics from the Virginia Polytechnic Institute and State University, Blacksburg.

"The Syracuse-Maxwell Program will allow me the opportunity to strengthen my managerial skills through course work as well as through interaction with other government managers, graduate students and faculty," said Finelli. "The Maxwell experience will enhance my ability to contribute significantly to Langley and to NASA."

News Briefs

HEADQUARTERS, Washington, D.C. --- NASA Administrator Richard H. Truly has named Margaret G. Finarelli as acting associate administrator for external relations. Finarelli has served as deputy associate administrator for external relations since December 1988. Kenneth S. Pedersen, associate administrator for external relations since November 1988, will be on a one-year teaching assignment as a visiting professor at Georgetown University, Washington, D.C., effective August 6.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- In an effort to boost interest in science and math in the state of West Virginia, NASA has received a donation of $125,000 from C&P Telephone Company of West Virginia, Bell Atlantic Charitable Foundation, Charleston, W.V., and the West Virginia Department of Education to help fund the development and operation of NASA's project LASER mobile teacher resource center. LASER (Learning About Science, Engineering and Research) is a tractor-trailer-mounted mobile teacher resource center which provides elementary and secondary school lesson materials to teachers who do not have access to the stationary teacher resource centers at NASA's field centers.

HEADQUARTERS, Washington, D.C. --- NASA has announced the selection of four candidates for two payload specialist positions for Space Shuttle mission STS-53 scheduled to carry the U.S. Microgravity Laboratory-1 (USML-1) in March 1992. Selected for mission training were Lawrence J. DeLucas, O.D., Ph.D.; Joseph Prahl, Ph.D.; Albert Sacco Jr., Ph.D. and Eugene H. Trinh, Ph.D. Two of the candidates will be selected for flight in March 1991, and the others will serve as alternates.

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- After only preliminary analysis, NASA's Hubble Space Telescope (HST) has provided the first detailed views of how massive stars are formed in galaxies unlike our own. Early observations, in support of an engineering test of 30 Doradus, the most prolific stellar nursery within the Large Magellanic Cloud, revealed new information about our neighboring galaxy. Hundreds of stars are believed to exist in this region, which is smaller than from here to the nearest star, about four light years away. Early computer analyses of this same image suggest that HST may be resolving many more stars.

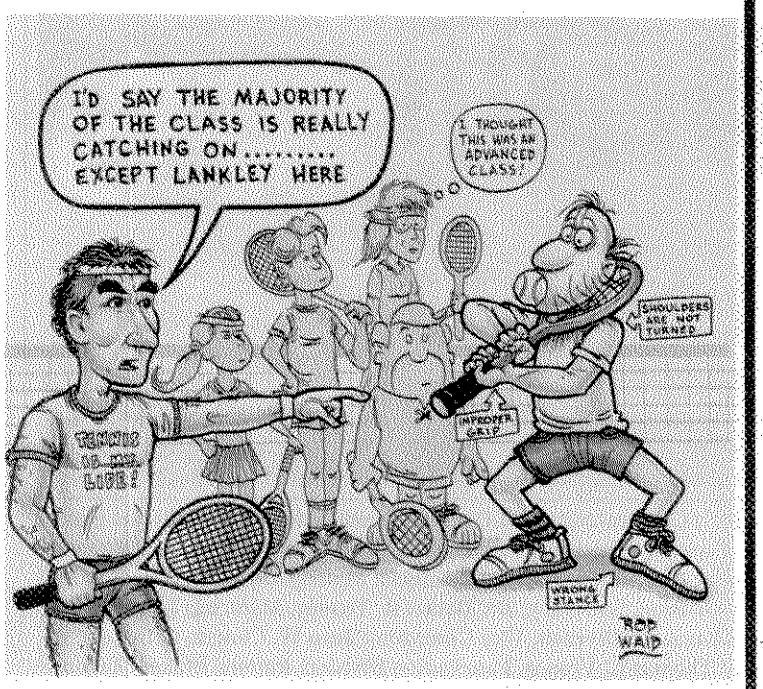
HEADQUARTERS, Washington, D.C. --- NASA has announced the 1990 Solid Propulsion Integrity Program (SPIP) awards for outstanding contributions toward improving the nation's engineering capability for solid rocket motors. The awardees are: Hercules Aerospace Corporation, Magna, Utah; PDA Engineering, Costa Mesa, Calif.; Southern Research Institute, Birmingham, Ala.; and United Technologies Chemical Systems Division, San Jose, Calif. These awards recognize SPIP contractors, subcontractors or individuals who have made significant accomplishments toward achieving the program's objectives.

Senior Management Research Review

The Senior Management Research Review will be held Monday, August 27, 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	Studies in Direct Simulation of High-Speed Mixing Layers With and Without Chemical Heat Release	Mark Carpenter (Aeronautics/FLDMD)
9:45	A Globally Convergent Algorithm for Solving Systems of Nonlinear Equations	Daniel Moerder (Flight Systems/GCD)
10:00	ATMOS Experiment--Langley Results from Spacelab 3	Curtis Rinsland (Space/ASD)
10:15	Space Station Freedom-Phase II Implementation Plan Development	Barry Meredith (Space/SSFO)
10:30	Commonality in Failure Behavior Identified for Metal and Composite Aircraft Structures Under Crash Loads	Huey Carden (Structures/SDYD)
10:45	Comparison of Theory and Experiment of Bulk Liners in a Fan Duct	Willie Watson (Structures/ACOD)

Lankley



Take Note:

If you will complete the requirements for your graduate degree program during Fiscal Year 1990 and **have not** notified the Training and Education Section, please call George Allison, ext. 42594.

Current News Releases

To obtain a copy of any of the NASA News Releases summarized above in *News Briefs*, contact Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by headline and release number.

90-107.....Finarelli Named Acting Head of External Relations
90-108.....NASA Selects Microgravity Mission Payload Specialists
90-109.....NASA Announces 1990 SPIP Awards
90-110.....NASA, C&P and State of West Virginia Support Project Laser
90-111.....HST Takes Family Portrait of Stars Outside Milky Way

Key Positions Announced

The following individuals have been selected to fill key positions at Langley Research Center:

John G. Wells Jr., AST, Atmospheric Chemistry and Dynamics, Theoretical Studies Branch, Atmospheric Sciences Division, under CPP 90-12.

Norma F. Davis, secretary (typing), Office of the Chief, Systems Engineering Division, under CPP 90-8.

Joseph M. Faulkner, quality assurance specialist, Quality Assurance and Inspection Office, Fabrication Division, under CPP 90-5.

Willard R. Weaver, AST, Technical Management, Office of the Director for Space, under CPP 89-108.

Pamela L. Howard, secretary (steno), Office of the Chief, Facilities Engineering Division, under CPP 89-96.

William M. Rollins Jr., head, Composites and Models Development Section, Models and Materials Technology Branch, Fabrication Division, under CPP 90-21.

Glenn A. Brehm, supervisory engineering technician, Technical Support Section D, Tunnels Operations Branch, Operations Support Division, under CPP 90-37.

Robert A. Baals, supervisory engineering technician, Technical Support Section A, Laboratories Operations Branch, Operations Support Division, under CPP 90-34.

Robert F. Bryant Jr., supervisory engineering technician, Technical Support Section C, Tunnels Operations Branch, Operations Support Division, under CPP 90-33.

James E. Bell, supervisory electronics technician, Electronics Fabrication Development Section, Electronics Technology Branch, Fabrication Division, under CPP 90-32.

Howard W. Wilson Jr., supervisory engineering technician, Composites and Models Development Section, Models and Materials Technology Branch, Fabrication Division, under CPP 90-39.

Michael Gilbert, head, Spacecraft Dynamics Branch, Structural Dynamics Division, under CPP 90-40.

Thomas Shull, head, Electronics Branch, Flight Electronics Division, under CPP 90-31.

Pamela Rinsland, assistant head, Electronics Branch, Flight Electronics Division, under CPP 90-30.

William Fernald, head, Systems Development Branch, Systems Engineering Division, under CPP 90-47.

Plesent Goode, assistant head, Automation Technology Branch, Information Systems Division, under CPP 90-49.

Dewey Smith, AST, Project Management (temp.), Systems Engineering Division, under CPP 90-50.

William Alexander, lead engineering technician, Operations Support Division, under CPP 90-51.

Irby Jones, aerospace engineer, Systems Engineering Division, under CPP 90-55.

Earl Conkling, lead engineering technician, Operations Support Division, under CPP 90-56.

Valintina Johnson, resources control assistant (typing), Fabrication Division, under CPP 90-62.

Patrick Seabolt, supervisory engineering technician, Operations Support Division, under CPP 90-63.

Maria Elliott, secretary (steno), Business Data Systems Division, under CPP 90-65.

Thomas Barclay, supervisory engineering technician, Fabrication Division, under CPP 90-67.

Robert Sherrill, head, Spacecraft Systems Section, Systems Engineering Division, under CPP 90-68.

Melvin Lucy, head (temp.), Mechanical Systems Section, Systems Engineering Division, under CPP 90-71.

Judy Evans, head, Financial Services Branch, Financial Management Division, under CPP 90-64.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

LDEF's Thermal Experience in Space Confirms Pre-flight Predictions

-by Craig Murden

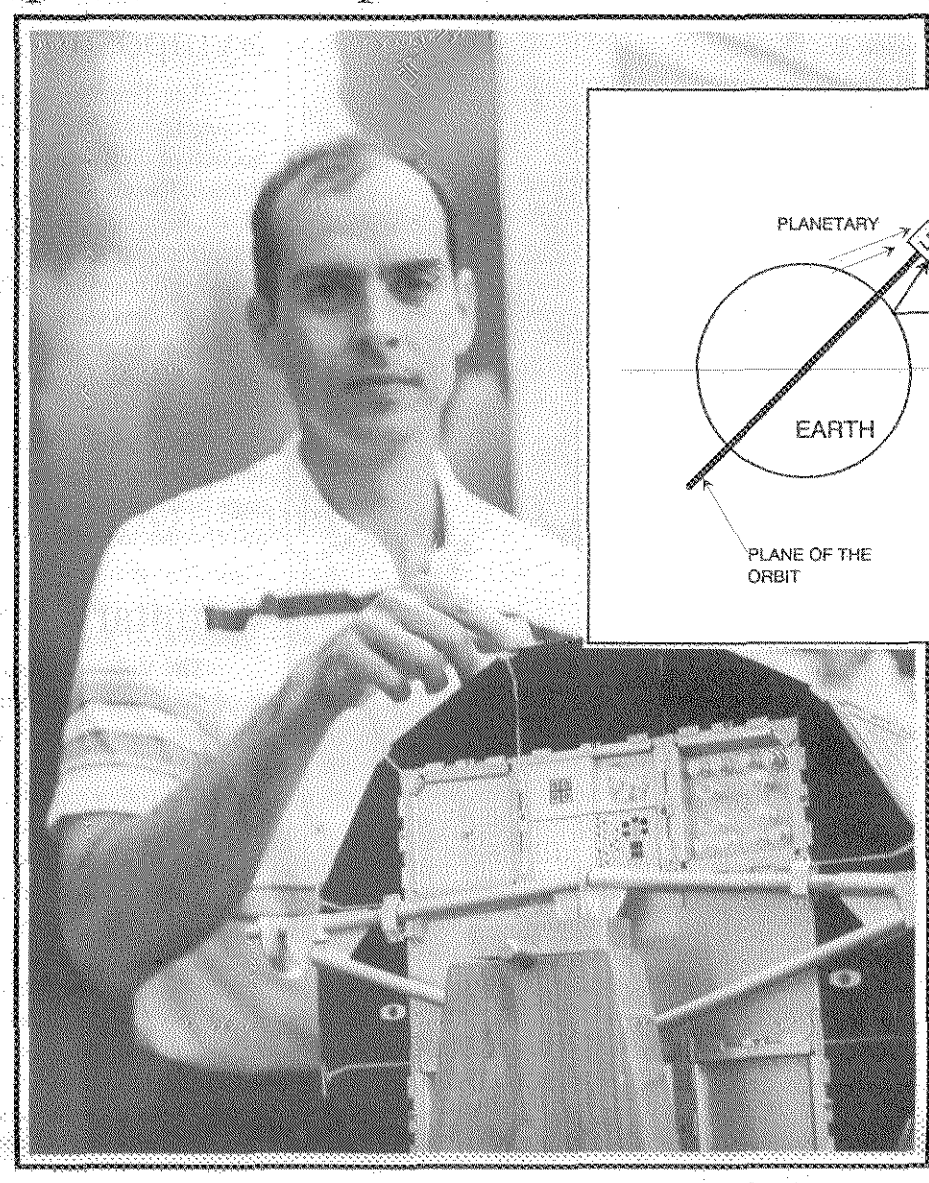
Temperatures encountered by the Long Duration Exposure Facility (LDEF) on its extended space sojourn have been confirmed to be within the limits predicted by pre-flight calculations nearly six years earlier. These are the findings of Langley's William M. Berrios, principal investigator. A major element in the overall LDEF evaluation process, these findings are fundamental to interpreting the effects of space on a large number of the vehicle's 57 experiments. In turn, many of the experiments will find direct application to NASA's future ventures in space.

The importance of this corroboration is that pre-flight predictions of thermal conditions were a key ingredient in formulating and constructing the experiments. Now, as investigators review them, they must know if the actual thermal exposure was as expected. Only then can they put together a complete picture of how their experiments reacted to the rigors of space, said Berrios. The confirmation process required exhaustive comparative analysis between data from sensors aboard the spacecraft and information derived from a thermal computer model developed by Berrios.

The on-board Thermal Measurements System (THERM) involved a series of temperature sensors installed at various locations on the LDEF internal structure. The package included six thermocouples, two thermistor reference measurements and an electronic system. They were deployed to capture temperatures of the center structure, the average interior readings and maximum structural temperatures. Representative boundary conditions for experiments on both the space end and Earth-facing orientation of LDEF were also recorded. Routine scans of data were usually taken 12 times daily. The THERM data was able to provide both long-term and transient temperatures with accuracy within plus or minus 5 degrees over a range from minus 30 degrees to 170 degrees (F).

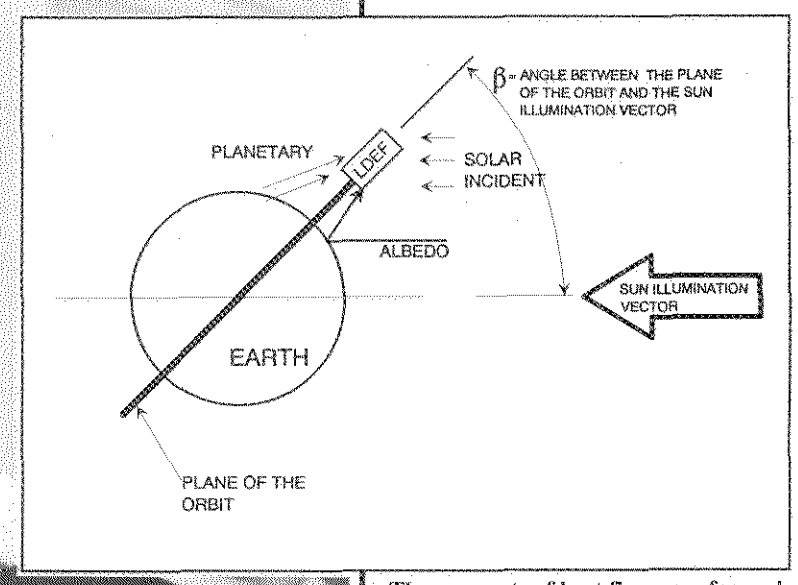
This comprehensive mode of measurement covered the expected mission duration of one year. Since the mission lasted almost six years, temperature data for the remaining period was not available and would have represented a major unknown to researchers evaluating long-term temperature effects on their experiments.

The computer model Berrios developed used data compiled from actual observations during the entire LDEF mission. That environment included heat fluxes which are comprised of direct incident solar radiation, solar radiation reflected from the Earth to LDEF (albedo) and planetary radiation. Due to the everchanging position of the LDEF relative to the Sun, the solar and albedo incident radiation were constantly changing while the planetary radiation was considered to be constant. These heat fluxes were calculated for a series of beta angles (the angle between the Sun vector and the plane of the orbit) that were experienced several times during the LDEF mission.



-photo by Carol Petrachenko

William Berrios indicates the location of his experiment on a scale model of the LDEF.



Three aspects of heat flux were focused on LDEF in space. Berrios' computer model used these influences to form a complete thermal history over the spacecraft's six-year voyage.

Confirmation of agreement between the temperatures recorded by the few thermocouples on LDEF and what the thermal model predicted those measurements would be, allows for more accurate calculation of flight temperatures for all locations within the spacecraft. This complete description of the LDEF thermal environment as experienced by all experiments is what Berrios points to as the greatest benefit to LDEF principal investigators. "In other words," he said, "we have been able to reliably reconstruct the complete thermal history of the LDEF mission so that the investigators will have the tools to make finite decisions about how heat or its absence affected their experiments."

A key Langley participant in early LDEF thermal activity was Robert F. Greene Jr., who was the original principal investigator on THERM and the head LDEF thermal analyst. Berrios and Greene worked together on LDEF deployment and analysis until Greene's death in 1985.

The Langley effort was supported by a Goddard Space Flight Center experiment also aboard LDEF. The Low-Temperature Heat Pipe Experiment Package was designed to evaluate heat pipe performance in a zero-gravity environment and included data collection and recording equipment to capture that information. That same recording capability was also extended to the thermal measurement nodes and was the primary data capturing capability for the whole Langley effort. The cooperation of Goddard's principal investigators, Roy McIntosh Jr. and Stanford Ollendorf, assured the success of this shared data collection effort, said Berrios.

Berrios is a mechanical engineer in the Space Systems Engineering Branch of the Systems Engineering Division where he is responsible for the structural and thermal design of both flight and ground-based systems and subsystems. He is also charged with finding solutions for spacecraft structural and thermal problems and for directing other engineers and designers in developing the detailed designs for structural and mechanical elements.

He currently provides engineering support for the LDEF where he is the senior thermal analyst responsible for all thermal activity. Prior to the LDEF retrieval, he was the technical project engineer for the Stanford University-NASA Laser In-Space Technology Experiment (SUNLITE). He also contributed to the LITE and LASE projects and served as a thermal consultant for Langley's 15-meter Hoop Column Antenna development.

A native of Ponce, Puerto Rico, Berrios graduated from the University of Puerto Rico in 1979 with a B. S. degree in mechanical engineering. He came to Langley to begin his NASA career in 1980.

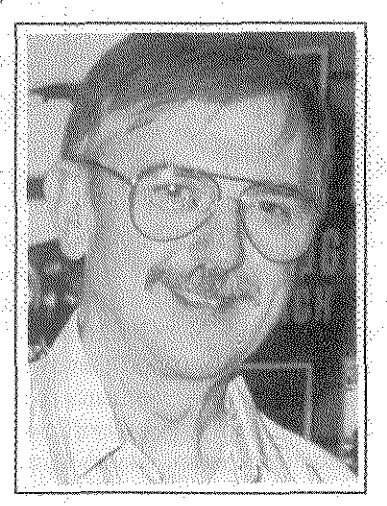
"In grateful recognition and appreciation of faithful service . . ."

Langley Director Richard H. Petersen recently presented pins and certificates honoring 45 years of NASA and the U.S. government service to Charles A. Baldwin, Systems Engineering Division; Sherman A. Clevenson, Acoustics Division; and William B. Igoe, Applied Aerodynamics Division.

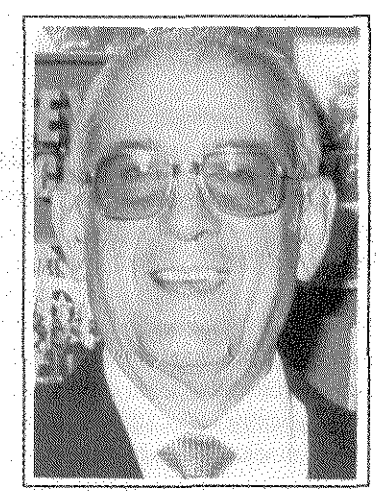
In addition, Petersen presented a 40-year service award to Fred Ferrari Jr., Fabrication Division.

Charles A. Baldwin

Sherman A. Clevenson

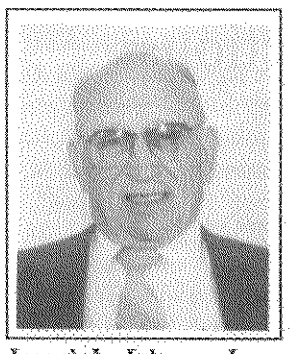


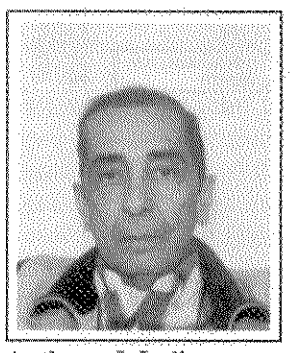
William B. Igoe

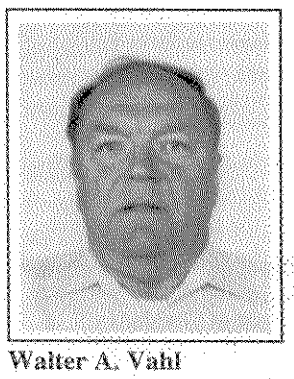


Fred Ferrari Jr.

Recent Retirees


Joseph L. Johnson Jr.


Anthony J. Italiano


Walter A. Vahl

Joseph L. Johnson Jr., Flight Applications Division, retired April 30.

Donald G. Cuddihy, Analysis and Computation Division, retired May 2.

Anthony J. Italiano, Flight Electronics Division, and **Dale Gordon Holden**, Information Systems Division, retired May 3.

Walter A. Vahl, Advanced Vehicles Division, and **Nancy C. Rodgers**, Office of the Director for Electronics, retired May 31.

Victor E. Wilson, Fabrication Division, **Jesse D. Timmons**, Office of the Director for Systems Engineering and Operations, and **Richard L. Kurtz**, Systems Engineering Division, retired June 1.

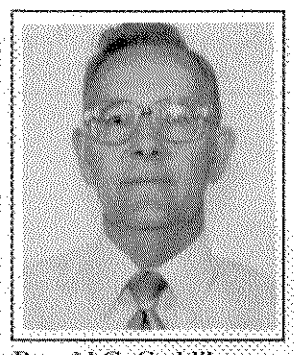
Stephen P. Horvath Jr., Fabrication Division, and **Hugh B. Milteer**, Flight Electronics Division, retired June 15.

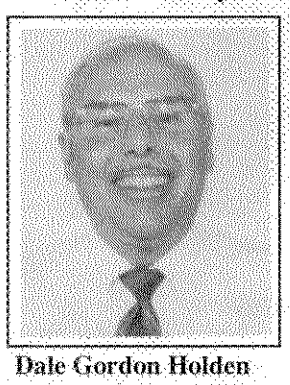
Daniel J. Crawford, Analysis and Computation Division, and **Ira H. A. Abbott** and **James S. Post Jr.**, Operations Support Division, retired June 29.

Joan I. Pitts, Analysis and Computation Division, retired July 27.

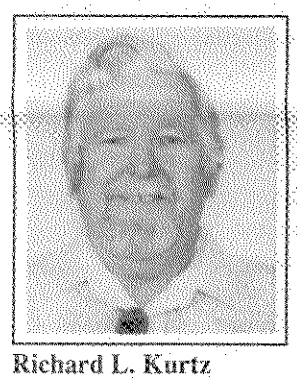
Jane S. Hess, Research Information and Applications Division, retired July 31.

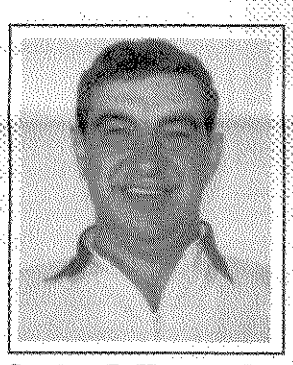
Salvatore S. Gionfrida and **George C. Grady**, Operations Support Division, and **Virginia M. Kanoy**, Space Systems Division, retired August 3.

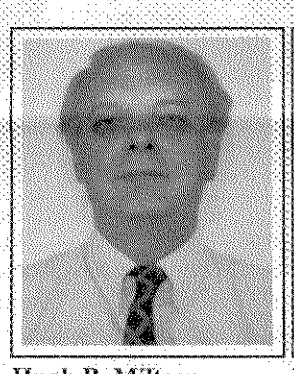

Donald G. Cuddihy

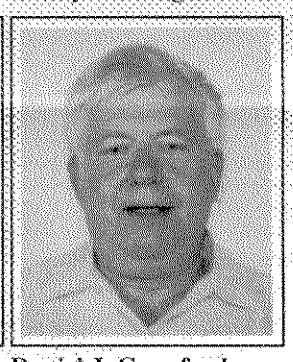

Dale Gordon Holden

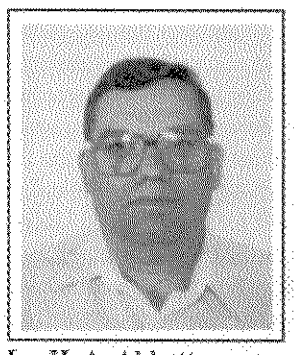
Nancy C. Rodgers

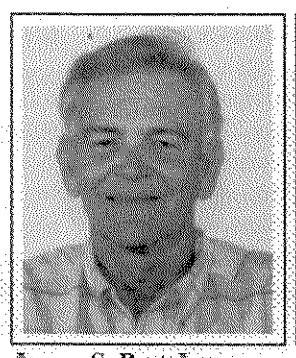

Richard L. Kurtz


Stephen P. Horvath Jr.

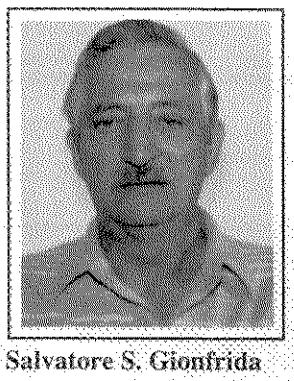

Hugh B. Milteer


Daniel J. Crawford


Ira H. A. Abbott


James S. Post Jr.

Jane S. Hess


Salvatore S. Gionfrida

Virginia M. Kanoy

Volleyball Season Begins

The fall volleyball season will start September 11. Three leagues will be formed: B-League (advanced) and D-League (beginners) will play on Tuesday nights; C-League (intermediate) will play on Thursday nights. The first match each evening will be played at 6:15 p.m. and the last at 9:15 p.m.

Player eligibility is restricted to NASA and contractor personnel and their spouses only. Team composition must consist of at least two female players on the court. In addition, no more than two higher league players may play in a lower league team. Players in higher leagues may **only** play in the next lower league. Each team captain will be responsible for the team's eligibility and composition.

The entry fee is $80 per team. This fee is used to pay the officials and to purchase new equipment. The fee, made payable to the Langley Activities Association (LAA), must accompany the registration form. Registration forms may be obtained by contacting one of the following Volleyball Club officers: Tricia Romanowski, president, ext. 47020, or Frank Quinto, vice-president, ext. 45068.

Tidbits from Training

One-Step Conference, Seminar or Symposium Fee Registration

The Training Section, in conjunction with the Travel Section of the Financial Services Branch, has developed a form which, once completed by the organizational secretary, will provide all necessary information to process conference, seminar or symposium fee registrations in the most expedient manner.

The organizational secretary will complete the one-page form and send it with the travel order to the Training Section, Mail Stop 309, Attention: Millie Boone or Tony Maturo. After evaluating the information, Boone or Maturo will send the package directly to the Travel Section or return it to the sender for additional information.

This one-stop process will conserve administrative time and clarify expenditures on the traveler's voucher. These forms are available in the Training Office. As of October 1, 1990, they will be a standard form.

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.

The following employees are approved leave recipients:

- David S. Aliff
- Robert M. Connell Jr.
- Janice R. Grow
- Joy W. Italiano
- Kenneth M. Jones
- Noel A. Talcott 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, Employee Relations Section, ext. 42610.

Notes of Thanks

Noel A. Talcott Jr. writes: "Nancy and I want to thank the 38 donors who gave blood July 25 in our daughter Natalie's name. We really appreciate your gift and want to let you know that Natalie is doing fine and her bone marrow transplant is scheduled for Monday July 30. I also want to thank those of you who have donated leave so that I may be with Natalie and Nancy in Minneapolis. We are all looking forward to coming home soon."

Wayne Barfoot writes: "My Dad and I would like to thank all our friends who gave blood on his behalf at the past two bloodmobiles."

Robert M. Connell Jr. writes: "As I come to the end of a long road, I wish to thank those who have helped make my excellent prognosis possible. It's difficult to express the deep gratitude I feel for your love, prayers and good wishes. Please accept my sincere thanks for the 17 units of bood donated in my name as well as the annual leave donated to me. I am blessed to have friends like you."

Walt Hoggard writes: "I wish to express my sincere appreciation and gratitude for the many expressions of concern and regard which I received during my recent hospitalization. The kindnesses were most encouraging."

Reminder to Employees

Employees are reminded that they are not to create forms on computers or desk top publishing systems without first coordinating and obtaining approval from the Center's Forms Management Officer, Margaret Hall, Directives and Forms Management Office, Management Support Division, ext. 43438.

The Center's policy as stated in Langley Management Instruction 1420.1, "Forms Management Program," is to control creation and duplication of forms to ensure efficiency and cost containment.

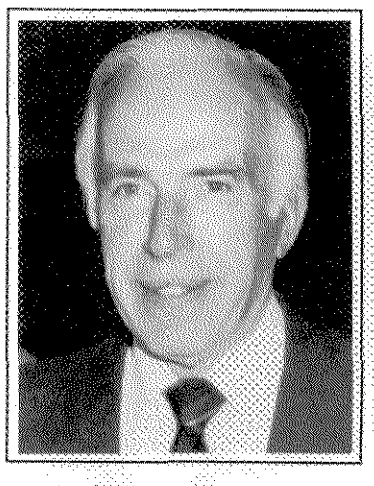
Flag Football Organizes

The NASA Flag Football League will have an organizational meeting Thursday, August 30, at 4:45 p.m., in the H.J.E. Reid Conference Center, for prospective team captains and other interested persons. Topics will include rules, officiating and scheduling. Those interested in playing or officiating, call Roger Lepsch, ext. 44520.

Summer Race Announced

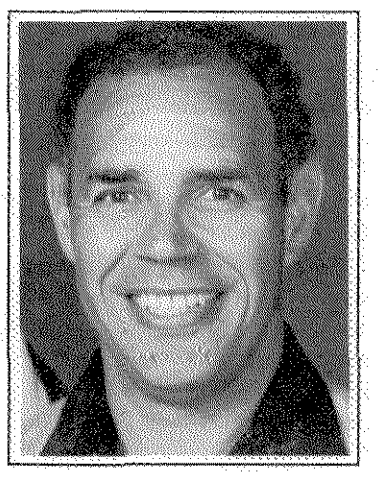
The Runners Club will hold the Summer 5-Mile Race on Saturday, August 25, starting at 9 a.m. on Doolittle Road. The race is open to NASA and contractor employees and family members. For more information, call Richard Shearer, ext. 47036.

People & Places

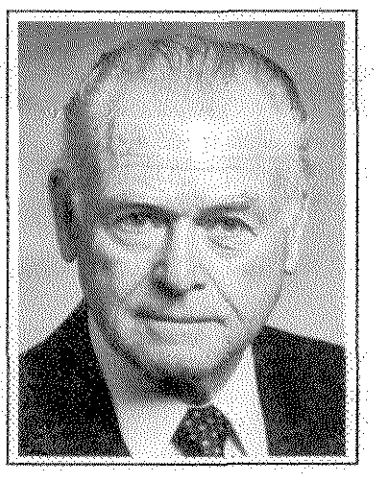


Edgar M. Cortright

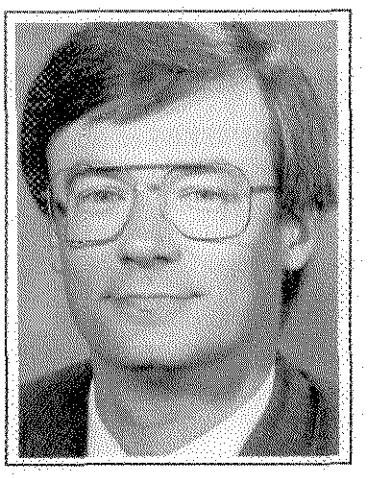
Sidney F. Pauls



Frederick D. Gregory



Charles J. Donlan



James R. Hansen

Petersen Appoints Five to Museum Board; VASC to Tell Langley Story

Langley Director Richard H. Petersen has named five members to the Board of Directors of the Virginia Air and Space Center (VASC), scheduled to open on the Hampton waterfront in 1992. Appointed were Dr. Edgar M. Cortright, Sidney F. Pauls, Astronaut Frederick D. Gregory, Charles J. Donlan and Dr. James R. Hansen.

The board of directors sets policy for the Center, a private non-profit organization presently under construction on Settlers Landing Road and South King Street.

Hansen, appointed for a one-year term, was elected vice-president of the board at the first meeting held July 18. Hansen is alumni associate professor of history at Auburn University, Auburn, Alabama, and Langley's historian. "The Virginia Air and Space Center is going to be a spectacular place--the closest thing to the Smithsonian's National Air and Space Museum," said Hansen. "One of the responsibilities of the NASA appointees will be to ensure that NASA Langley's story is told as convincingly and as authentically as it has been told for the last twenty years in our own Visitor Center. We will do our best to make that happen."

Hansen, author of *Engineer in Charge: A History of the Langley Aeronautical Laboratory, 1917-1958*, is currently working on the second book in the proposed three-volume series.

Donlan, also appointed for a one-year term, is an aerospace consultant and former Langley associate director. During his 38 years of service to NACA/NASA, he was deputy chief of Project Mercury, associate administrator for Manned Space Flight and acting director for the Space Shuttle Program.

Appointed for a two-year term, Fred Gregory served as a research test pilot at Langley until selected for the Astronaut Program in January 1978. He has logged more than 6,500 hours flying time in over 50 types of aircraft, including 550 combat missions in Vietnam. A veteran of three Space Shuttle missions, Gregory has been named commander for Shuttle flight STS-44, a dedicated Department of Defense mission set for March 1991.

Langley Associate Director Sid Pauls has been appointed to the board for a three-year term. He began his Langley career in 1963 working on space-related projects. He has served as chief of Langley's Business Data Systems Division, the Programs and Resources Division and the Personnel Division.

Former Langley Research Center Director Dr. Edgar M. Cortright has been appointed for a four-year term. Cortright led Langley from 1968 to 1975 and then retired to enter private industry after 30 years of government service. He has served as technical director for Owens Illinois Corporation and president of the Lockheed California Company. Cortright brings to his position on the board the experience of installing the Langley Visitor Center, which will become a part of the Virginia Air and Space Center.

Health Corner

Travelers' Health-Care Hotline

LaRC travelers now have access to a Global Travelers' Hotline.

The Center for Disease Control has initiated a 24-hour automated telephone system to provide information and recommendations to health professionals and international travelers. Included is information on such topics as immunizations, malaria, travelers' diarrhea, water precautions and local disease outbreaks. The service is available by calling (404) 332-4559.

Can Your Children See Well?

The wonders of the world are often seen through the eyes of a child. Yet, without good vision, a child's ability to learn about the world is lessened. Nationally, vision problems affect one in 20 preschoolers and one in four school-age children. In Virginia alone, it is estimated that 10,000 children may have vision problems.

"Just because your child doesn't complain about his eyesight, you can't assume that there are no vision problems. Most children believe that the way they see is the way everyone sees--even if vision is blurred, double or through only one eye," said Frank Carlomagno, executive director of the National Society to Prevent Blindness, Virginia Affiliate.

Some vision problems can be suspected from a child's behavior and the appearnace of the eyes. But the best way to find out if your child's vision is normal is through regular eye exams beginning at age three. Early treatment of children's vision problems is important because it can provide children with added potential to develop normal learning ability, personality and adjustment in school. Because some eye conditions, if untreated, may worsen and become more difficult to correct later, be aware of some signs that can alert you to possible eye trouble in your child.

Be aware! The following conditions may signal poor vision in your child:

- o Rubs eyes excessively.
- o Shuts or covers one eye, tilts head or thrusts head forward.
- o Has difficulty in reading or in other work requiring close use of the eyes.
- o Blinks more than ususal or is irritable when doing close work.
- o Is unable to see distant things clearly.
- o Squints eyelids together or frowns.

Upcoming Conference

The Third Combined Manufacturers' and Technologists' Airborne Wind Shear Review Meeting will be held October 16-18 at the Radisson Hotel Hampton. For further information or to receive registration materials, contact Carol Lightner, conference manager, The Bionetics Meeting Support Division, (804) 722-0330 or (800) 868-0330.

-photo by Fred Jones

SONIC BOOM RESEARCH RESUMES AT LANGLEY. As part of the environmental acceptability for the new High-Speed Research Program, Langley is again engaged in research into the physics on sonic boom signature shapes. Examining the potential test setup in the Four-Foot Unitary Plan Wind Tunnel are Sonic Boom Group members Kathy Needleman, Dr. Christine M. Darden, team leader, and Robert J. Mack.

Happenings

NO LAA SOCIAL will be held Friday, August 31, due to the Labor Day holiday.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12.30 p.m. in Building 1232, Room 236. For details, call Steve Dahmen, ext. 44519.

LOW-IMPACRT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. Classes meet in the NASA gym. Cost is $12 per month. First class is free.

SCALE MODEL CONTEST. The Tidewater Chapter of the International Plastic Modelers Society is holding the Region II model contest September 21-22. No need to be IPMS member. For information, contact IPMS Tidewater, P.O. Box 1651, Newport News, Va. 23601.

LaRC RETIRED WOMEN and those formerly employed at Langley are invited to a Dutch-treat luncheon at 1 p.m., Thursday, September 6, at Western Sizzlin' restaurant, Cunningham Drive, Hampton. For reservations, call Irene Collins, 898-8188, Edna Davidson, 898-3868, or Eloise McGehee, 838-4146, by Tuesday, September 4.

GOLF TOURNAMENT sponsored by VA Tech Alumni will be held August 25-26 at Hampton Municipal Golf Course. Cost is $65 per two-person team which includes all greens fees. Prizes awarded.

WANTED: BIKE RIDERS. At least three more experienced motorcycle riders to enable the Motorcycle Safety Foundation's one-day Experienced Rider Course at Thomas Nelson Community College. Class will be held on a Saturday between now and November; consensus will determine date. Cost is $25. Contact Jim Youngblood at 588-8617.

FOUND: WATCH, TOWEL found on tennis court at Building 1222 on July 25. Call Security Office, 864-3416.

Retirement Party

John F. (Jack) Royall will be honored at a retirement dinner September 21 at the H.J.E. Reid Conference Center, Building 1222. Cash bar opens at 6 p.m.; dinner is at 7. Cost is $13 per person and includes gift. Please respond to Anne Reed, ext. 42417, or Beverly Burse, ext. 42420, by September 10.

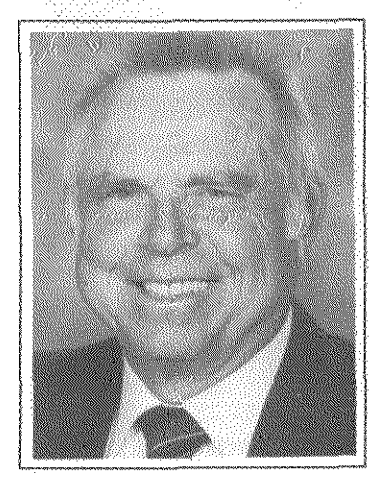
Former Assistant Director to Speak at Visitor Center

NASA has maintained a strong commitment to research and technology to keep the United States a world leader in the aerospace industry. Dr. George Brooks, a former NASA Langley assistant director, has contributed 40 years of research and research management to assure the Center's integral role in this advanced industry. At noon on August 29 in the Visitor Center theater, Brooks will present "Langley's Research and Development Environment."

This free presentation is cosponsored by the Visitor Center and the Hampton Roads student branch of the American Institute of Aeronautics and Astronautics.

Brooks will review the research and development environment of the 1950s, one of Langley's greatest periods of growth. He will further discuss that period's approach to research, the communication between researcher and support facility personnel and the impact of Langley researchers on the national scene.

To end his presentation, Brooks will describe his personal research in the area of advanced rotorcraft dynamics. Rotorcraft are aircraft that combine the vertical take-off and landing capability of a conventional helicopter with the high speed of a fixed-wing aircraft.



Brooks began his career in 1949 as an aeronautical engineer. From 1968 to 1974, he was Langley Research Center's assistant director and director for structures.

Langley Honors LDEF Family

LDEF Management Changes Hands

-by Jean Drummond Clough

An unusual family reunion was held Wednesday, August 8 -- a reunion quite different from most. This reunion was a Long Duration Exposure Facility (LDEF) family reunion.

Nearly 300 Langley employees, retirees and contractors gathered in the H.J.E. Reid Conference Center to honor a team who has worked almost three decades to raise LDEF from conception to full maturity.

"The conception, growth and development of LDEF are similar to that of an individual within a family," LDEF manager E. Burton Lightner said during a reception hosted by the Langley Research Center and the Langley Activities Association. The reception was given for all present and former employees who have been a part of the LDEF team at some time over the life of the project.

Lightner gave his analogy: "LDEF---conceived in the 60's; then nurtured until the birth of a project plan in 1974; in its childhood during the design, development and fabrication phases; encountered the ups and downs of adolescence with changes, rescheduling and putting it all together; and finally, graduated, or rather launched, in 1984.

"Following launch, LDEF entered into the real learning phase, accumulating information and knowledge, as a college student with the expectation of a bachelor's degree. But LDEF was extended, gaining a master's degree, and even a doctorate or two, before going out into the world or, as with LDEF, coming back, with the retrieval early this year.

"Now the LDEF, with its cargo of experiments loaded with scientific information, is ready for data analysis."

The data analysis phase of the LDEF project will be conducted by the Structures Directorate. The highlight of the evening was the transfer of LDEF management from the Electronics Directorate to Structures.

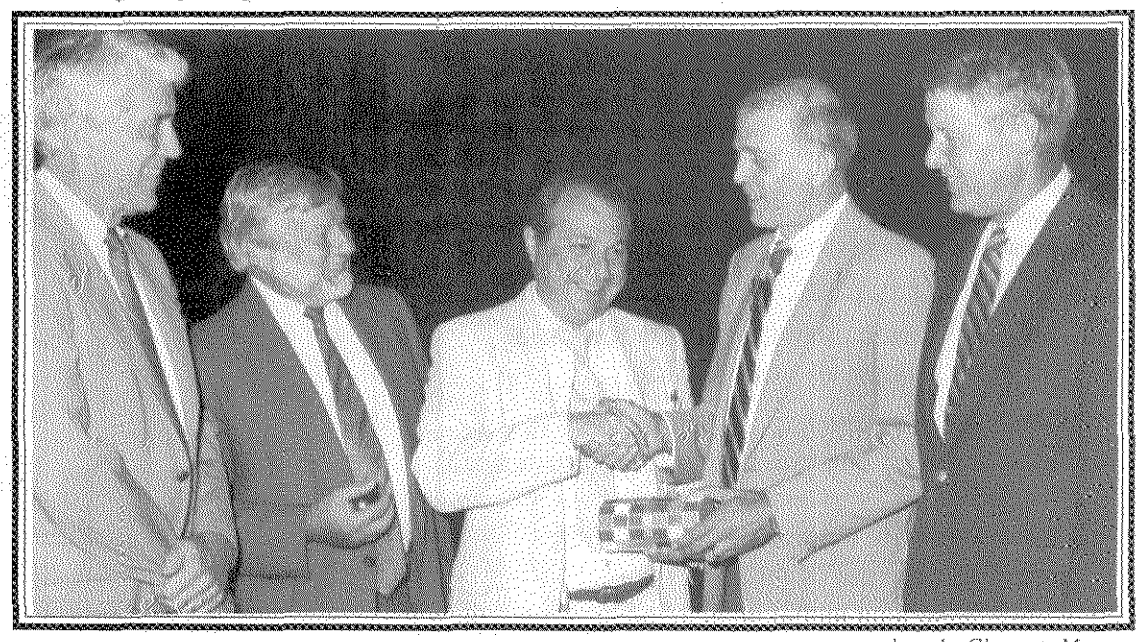
Charles Blankenship, director for structures, accepted a small LDEF model from Frank Allario, director for electronics, saying, "It is a challenge and privilege to take on the LDEF program. We are left with a legacy that we were not aware of, a legacy all of you have left-- over 100 filing cabinets of LDEF information."

The filing cabinets are full -- full of over 4,000 photographs taken during retrieval and post-retrieval processing and a voluminous amount of investigative material from a spacecraft that traveled 742 million miles during its nearly six years in Earth orbit.

As the program moves from the project management phase to the data analysis phase, over 200 experimenters and members of the LDEF family begin hands-on deciphering of a wealth of scientific information.

LDEF has grown to "full maturity," and the LDEF team has truly lived up to the tradition expected in NASA. LDEF is indeed a credit to the Langley Research Center, thanks to the LDEF family.

"Families tend to be proud of their own, and the LDEF family should be no exception," Lightner added. "LDEF has had, and will continue to have, international visibility and recognition as an outstanding project. Today, we celebrate a job well done."



-photo by Clements Mayes

CHANGING OF THE GUARD. Director for Electronics Frank Allario (center) passes a model of the Long Duration Exposure Facility and the management of LDEF to Director for Structures Charles P. Blankenship (second from right). Showing approval of the management shift are (L to R) LDEF Chief Scientist William Kinard, Project Manager E. Burton Lightner and Center Director Richard H. Petersen.

Researcher News

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

Official Business
Penalty for Private Use $300

NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

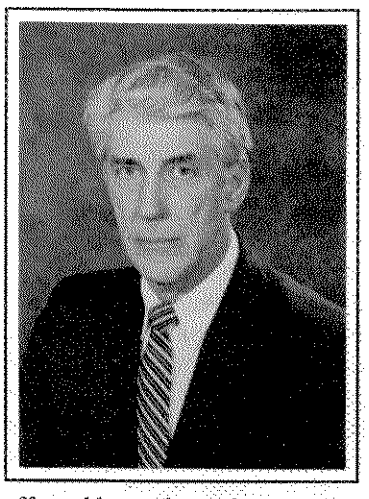
Volume 4, Issue 20 September 7, 1990
Bi-weekly Employee and Contractor Publication

Langley Colloquium

Kinard to Address LDEF Science

The Long Duration Exposure Facility (LDEF), containing 57 science and technology experiments, was retrieved this past January by the Space Shuttle Columbia after spending almost 6 years in Earth orbit.

During a Langley colloquium Monday, September 10, Dr. William H. Kinard, LDEF chief scientist, will give an overview of the science learned from the LDEF retrieval and examples of how this new knowledge will benefit follow-on spacecraft, such as Space Station Freedom. Kinard's talk will be given to Langley employees, retirees and contractors in the H.J.E. Reid Conference Center, Building 1222, at 2 p.m.



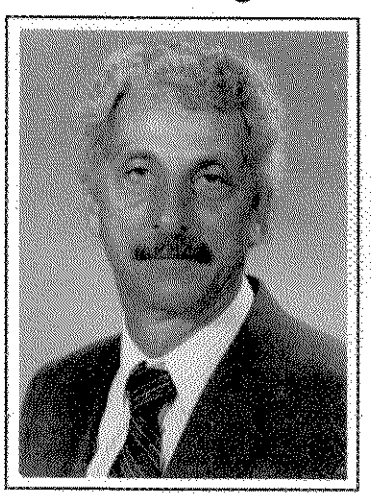
The LDEF experiments involved approximately 10,000 material and system test specimens which were selected to measure either specific space environments or the effects of exposure in the space environments. Kinard said that the preliminary looks at these test specimens have revealed invaluable information on radiation, meteoroids, man-made debris, contamination, vacuum, atomic oxygen impingement and ultraviolet radiation. In addition, examinations of the facility and experiment support hardware, such as batteries, data processing and storage systems, structural and mechanical systems, and thermal control systems, have also revealed valuable information on how such systems are effected by prolonged expsoures in space.

Kinard managed the initial design and development of the LDEF and was responsible for developing and integrating the scientific and technical experiments that were incorporated into the facility. Today, he manages the LDEF data analysis activities which involve over 200 scientists in the United States and nine foreign countries.

A native of South Carolina, Kinard received a bachelor of science degree in mechanical engineering from Clemson University in 1954. He received an honorary doctorate from Clemson University in December 1984, recognized for his "eminent achievements in basic scientific research related to the exploration of the solar system, and the great credit he has brought to his alma mater throughout his long career in the service of NASA and his country."

Muraca Chosen for Harvard Program

Dr. Ralph J. Muraca, chief of the Systems Engineering Division, has been chosen to attend the Fall 1990 Senior Executive Fellows Program. Muraca will enter an eight-week study session in the John F. Kennedy School of Government at Harvard University, Cambridge, Mass.



The Senior Executive Fellows Program is an intensive executive education program designed for exceptionally promising managers in the public sector. The program addresses the needs of rising managers of demonstrated accomplishment who are now setting strategy, evaluating program choices and managing relationships with the external political environment.

"The Senior Executive Fellows Program will provide me with a better understanding of the environment which shapes policy as well as broaden my knowledge of the principals and practices of management in large and complex organizations." said Muraca.

Muraca began his NASA career in 1962 as an aerospace engineer. In 1981, he was named assistant chief of the Systems Engineering Division. From 1984 to 1985 he was deputy manager for the Space Station Office He assumed his present position in August 1985.

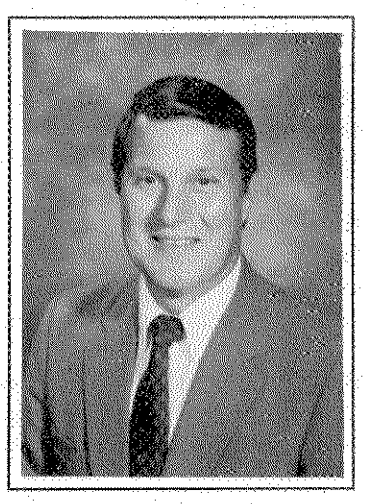
Chariman's Message

Langley Hopes to "Make the World a Better Place"

This year's theme for our Combined Federal Campaign (CFC) is "Make the World a Better Place." Each of us can do our part to improve the quality of life for those less fortunate living in our community by giving to the CFC. We all know that actions speak louder than words and in the final analysis, we are all known more for what we do than for what we say. If we respond to the needs of others we will be known as caring persons and we will experience the joy and satisfaction of knowing that we helped someone who genuinely needed our help. When you give to CFC you can be assured that through the many worthwhile community and national organizations supported by CFC you're helping needy people.

We will have a kick-off meeting in the H.J.E. Reid Conference Center from 1:30 p.m. - 2:30 p.m. on Friday, September 21. All NASA employees are invited.

Our one-day solicitation will be Tuesday, September 25. This year's goal of $255,000 is a $10,000 increase over last year's goal. We have always made our goal. We have a proud tradition of being a leader on the Peninsula in the CFC campaign. For the past several years we have had the highest percentage of participation and the highest per capita contribution of any agency in the Peninsula CFC campaign. NASA employees are known for their generous giving to CFC and for being interested in improving their communities. Be known for your good deeds and help to "Make the World a Better Place" through your contributions to CFC.



Chairman- Dr. Darrel Tenney

Flight Tests Prove Concept for Fuel Economy

by H. Keith Henry

The aerodynamic efficiency of future aircraft may improve sharply due to better-than-expected findings from a joint government-industry flight test program concluded last month. Such improved flight efficiency would result in reduced fuel consumption and lower operational costs for the U.S. airline industry, according to officials from NASA, Boeing and the Air Force.

Boeing modified a 22-foot section of a Boeing-757's wing outboard of the left engine and performed all the flight tests. Laminar air flow was achieved over as much as 65 percent of the upper surface of the modified wing section, measured from the leading edge to the trailing edge of the wing. And laminar flow was achieved the first time the suction system was used and on all subsequent flights during the five-month test period.

If the entire span of both wings was modified, a reduction in total airplane drag of up to 10 percent or more, depending on the application, could be realized. Each percent of drag eliminated by the U.S. transport fleet represents an estimated savings in fuel costs to the U.S. airline industry of $100 million annually.

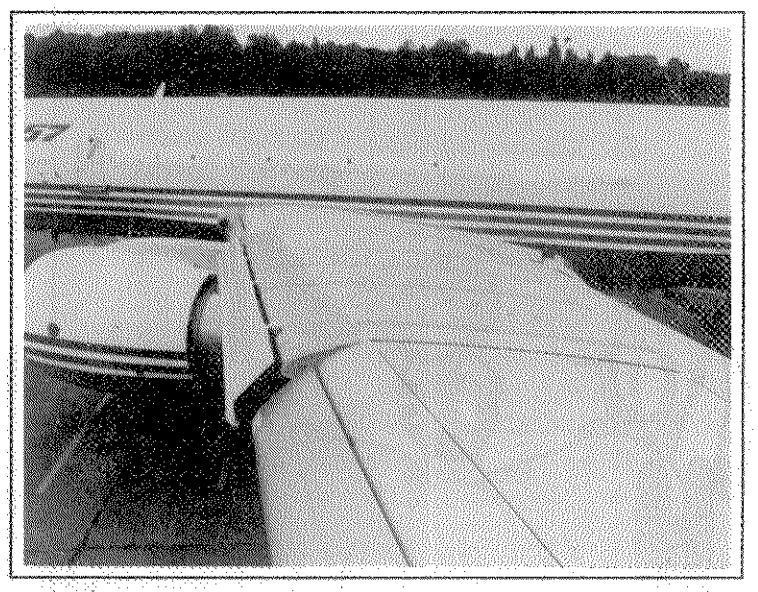
Langley's Dal Maddalon and Richard Wagner hailed the flight tests as one of the most significant events in the history of boundary-layer control. "We've known for years that laminar flow could be obtained under ideal conditions," Boeing Program Manager A. L. "Del" Nagel explained. "The real problem has been the difficulty of manufacturing a sufficiently smooth permeable wing structure at reasonable cost. Now we've shown that we can do that."

The research was aimed at preventing much of the turbulence that occurs naturally in the thin boundary layer of air at the surface of an aircraft's wing. Turbulence over the wing increases skin-friction drag, requiring the aircraft to use more fuel. In contrast, a smooth or "laminar" air flow significantly improves aerodynamic efficiency by reducing drag, which results in lower fuel consumption. The program is the first to demonstrate "hybrid laminar flow control" (HLFC) in flight.

Early investigations in the 1930's and 1940's showed that careful shaping of wings could achieve some laminar flow. But this "natural" laminar flow works only under restricted conditions. A more powerful technique, called laminar flow control, pulls a small amount of the boundary layer air through a porous or slotted wing skin by means of a suction system.

Reduction is anticipated on new aicraft with hybrid laminar flow incorporated in their initial designs. Government and industry researchers believe that HLFC technology could be introduced in new aircraft designs during this decade.

The program was jointly funded by Langley, Boeing Commercial Airplane Group-Seattle, and the U.S. Air Force Wright Research and Development Center, Wright-Patterson AFB,Ohio.



Boeing modified a 22-foot wing section on this 757 for the flight tests. Approximately 19 million holes were drilled for sucking small amounts of air off the wing surface, and a special leading edge flap was fitted for deflecting insects and dirt that might clog the system.

News Briefs

HEADQUARTERS, Washington, D.C. -- NASA Administrator Richard H. Truly announced the establishment of a Space Commerce Steering Group, composed of senior NASA officials, who provide a high-level overview of commercial applications of space technology. The steering group will be chaired by NASA Deputy Administrator James R. Thompson Jr., with Assistant Deputy Administrator John E. O'Brien serving as vice-chairman. In addition to the assistant administrator for commercial programs, members include the associate administrators for space flight; space science and applications; aeronautics, exploration and technology; space operations; and external relations; the assistant administrator for procurement, as well as the comptroller and the consul general.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala -- A government-industry board has completed a key milestone with its decision defining the type of rocket engine which will be designed and built to power the NASA/U.S. Air Force Advanced Launch System (ALS). The two candidates were the gas generator power cycle, similar to the J-2 engine employed on the second and third stages of the Saturn moon rockets, and the closed expander power cycle, similar to the RL-10 engine used in the Saturn I and the Centaur upper stage. The decision went to the gas generator cycle.

HEADQUARTERS, Washington, D.C. -- NASA announced that response has been strong to its request for ideas on how to return to the Moon permanently and begin human exploration of Mars. The ideas were solicited under NASA's Space Exploration Initiative (SEI) Outreach Program announced by NASA Administrator Richard H. Truly on May 31.

HEADQUARTERS, Washington, D.C. -- Joseph B. Mahon, deputy associated administrator for space flight (flight systems) has announced his retirement effective September 1, 1990, after nearly 30 years with NASA and a total off 44 years of government service

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. -- NASA's Hubble Space Telescope, a cooperative program with the European Space Agency, has provided a dramatic new look at the remnants of one of the most spectacular and unexpected astronomical events of this century, the great supernova of 1987. Observations made with the European Space Agency's faint object camera shows an intriguing view of the supernova and its surrounding shell of stellar material.

Senior Management Research Review

The Senior Management Research Review will be held Monday, September 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	Thermochemical Nonequilibrium Issues for Earth Reentry of Mars Mission Vehicles	Robert Mitcheltree (Space/SSD)
9:45	ANOPP Jet Noise Predictions for HSCT Reduced Thrust Take-Off Study	Robert Golub (Structures/ACoD)
10:00	High Precision Composite Reflectors for Spacecraft	Timothy Towell (Structures/MD)
10:15	Personnel Launch System Approach and Landing Simulation Study	Bruce Jackson (Flight Systems/GCD)
10:30	Definition of a High Performance Scramjet Accelerator Engine Concept	John Weidner (Aeronautics/FLDMD)
10:45	Inexpensive, Low Power, On-Board, Laser Diode Light Sheet Flow Visualization System for Wind Tunnel Models	Peter Jacobs (Aeronautics/AAD)

Hubble Peers into Distant Galaxy

The Hubble Space Telescope, a cooperative program with the European Space Agency, has provided a remarkably new detailed view of the core of a galaxy which lies 40 million light-years away, more than half way to the great Virgo cluster of galaxies. These results promise that astronomers will be able to use the Hubble to probe the mysterious centers of galaxies, in a search for massive black holes.

The image, taken with the wide field and planetary camera, reveals that stars are much more tightly concentrated at the center of the galaxy than was previously expected. Since the galaxy, cataloged as NGC 7457, is assumed to be a "typical" galaxy, these preliminary findings suggest that the nuclei of normal galaxies may be more densely packed with stars than previously thought.

The centers of galaxies are extremely interesting to astronomers because the centers are at the heart of the violent processes that give rise to cosmic jets, quasars, Seyfert galaxies and other mysterious energetic behavior.

The resulting images show that an exceptionally bright and compact core is embedded in the diffuse background of the rest of the galaxy. Based on this new image, the stars in the nucleus of NGC 7457 are crowded together at least 30,000 times more densely that those stars seen within our own galactic neighborhood. This extraordinarily high stellar density exceeds earlier estimates from ground-based observation of NGC 7457 by a factor of 400.

It is far from clear whether or not a massive black hole is at the center of NGC 7457, since the images alone do not provide the answer. But this new data suggest that NGC 7457 is an excellent place to use the Hubble's spectrographs to measure how much mass is concentrated at the center of the galaxy.

Upcoming Fall Conference

The Spacecraft Controls Branch, Guidance and Control Division will hold an Aerospace Applications of Magnetic Suspension Technology Workshop on September 25-27 at Langley.

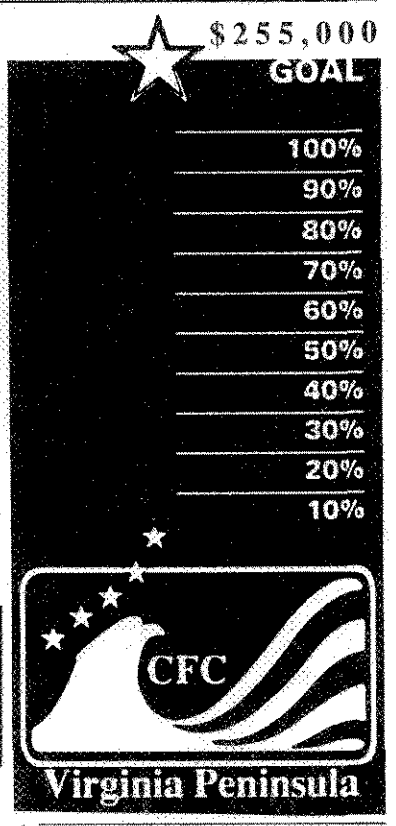
The workshop will examine the state of the technology and review recent developments in areas of superconducting magnet technology. For further information call Nelson J. Groom, Mail Stop 161, ext. 46613.

CFC Kick-off

Dont' forget that Friday, September 21, from 1:30 to 2:30 p.m. is Langley's Combined Federal Campaign (CFC) Kick-Off at the H.J.E. Reid Conference Center. All NASA employees are invited.

Tuesday, September 25 is Langley's one-day solicitation. Remember, you're able to designate your money to the charity of your choice and make your contribution through payroll deductions.

"Make the World a Better Place"



Lankley

STS-41 Car Passes

Due to possible budget constraints,vehicle passes for STS-41 (Ulysses), scheduled for early October , will not be issued.

National Hispanic Heritage Week

The week of September 16 has been proclaimed as National Hispanic Heritage week by President Bush. During the week-long observance, Langley will pay tribute to Hispanics by serving special foods in the cafeteria and by distributing literature highlighting the achievements of Hispanics. Interested employees may obtain these materials by contacting the Equal Opportunity Office, ext. 43290.

Current News Releases

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

90-112.....NASA Establishes Space Commerce Steering Group
90-113.....Advanced Launch System Rocket Engine Defined
90-114.....Response to SEI Outreach Program Strong
90-115.....Flight Tests Prove Concept for Jetliner Fuel Economy
90-116.....Space Flight's Mahon to Retire
90-117.....Hubble Resolves Gaseous Ring Around Supernova

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Optical System Components Score Well in Six-Year LDEF Exam

by Craig Murden

Optical materials that could become the lenses for space cameras and sensors have come through their extended challenge in space aboard Langley's Long Duration Exposure Facility (LDEF) with high marks for durability and encouraging potential for future applications. Principal Investigator Gale A. Harvey's comparative analysis of the optical properties of lens and window materials which flew and those that stayed home as controls show that the experiment was well designed to withstand the hazards of space.

Those hazards to space-based observation instruments can involve high energy particle or photon radiation damage, the effects of effluent gases, abrasion or cratering of surfaces caused by meteoroids and cosmic dust and damage from mechanical vibration or repetitive thermal shock. The sophisticated laboratory analysis techniques available to assess these effects include microscopy, Fourier Transform infrared spectroscopy and vacuum ultraviolet spectroscopy.

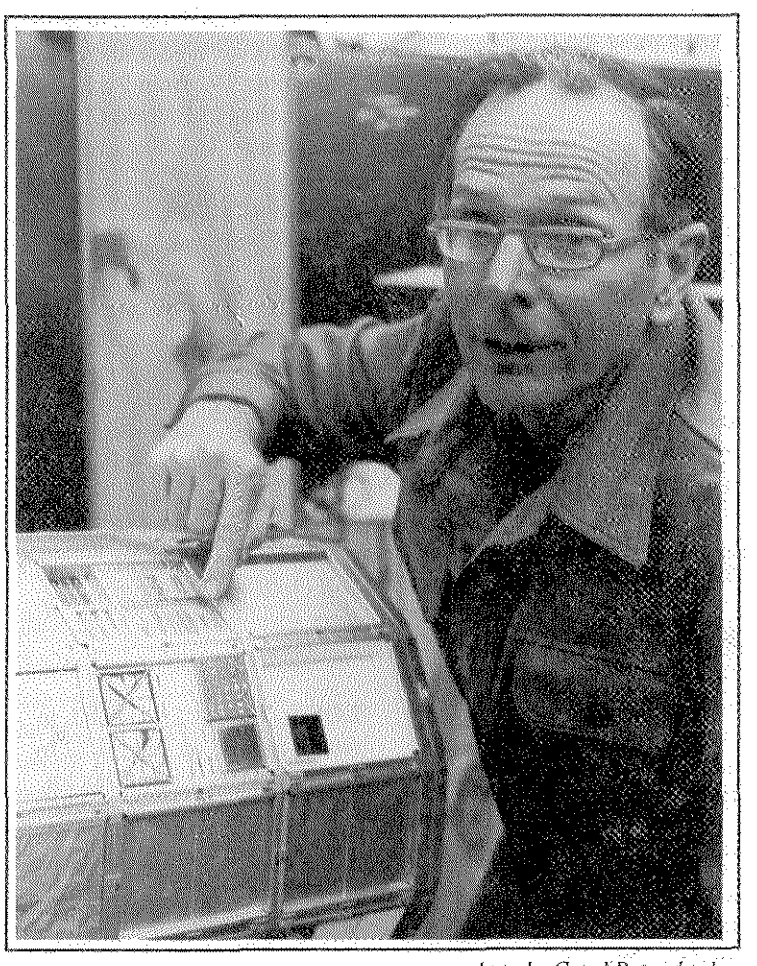
"When you consider the possible hazards peculiar to space, it's amazing how much friendlier our post-flight testing proved that environment to be," Harvey said. "We expected up to half of the items to prove unsuitable for use, especially since they were unshielded. Only the magnesium chloride material showed surface deterioration," he added.

Harvey's experiment included a variety of candidate materials ranging from synthetic saffire, fused silica and calcium chloride to magnesium chloride, lithium chloride and germanium. Aboard LDEF, they were in a passive mode with no electrical power and no cooling. (The components normally operate at cryogenic temperatures.) In this fashion the experiment served to establish a baseline for the effects of degradation at ambient temperature. Thus, in future testing at cryogenic levels, comparisions to the ambient regime will separate degradation effects that are specifically related to temperature.

Harvey is a research scientist in the Chemistry and Dynamics Branch of the Atmospheric Sciences Division. His specialties are slitless spectroscopy, infrared spectroscopy, and cleanliness and contamination measurement. He began his NASA career at Langley in 1962 with work on the Trailblazer Project and has participated in a succession of important Center initiatives including faint meteor spectra patrol, CO_2 laser, the LIDAR Program and the HALOE Project.

In addition to his work with LDEF optical system components, he is conducting extensive analysis of the effects of space on the organic film (paint) which was applied to large portions of LDEF's interior surfaces.

A native of New York City, he received a bachelor of science degree in physics from New Mexico State University in 1962 and a master of science in physics from Virginia Polytechnic Institute and State University in 1967. Harvey resides in Hampton.



-photo by Carol Petrachenko

Gale A Harvey, Langley's principal investigator for optical materials which are destined for space cameras and sensors, shows the placement of his experiments on LDEF.

LDEF-Borne Pollution Detectors get Close-up Post Flight Scrutiny

by Craig Murden

Three types of infrared radiation detectors, flown on LDEF to assess their suitability for future pollution monitoring and global mapping, are getting detailed report cards from Principal Investigator Dr. James B. Robertson, a senior research scientist in Langley's Flight Management Division.

The detectors are the pyroelectric type which are candidates for NASA's future thermal infrared detector requirements in space. This technology differs from other infrared detectors which require large, complex and expensive cooling systems when operating in the heat detection ranges required. The pyroelectric detectors operate at room temperature and respond to changes in incoming radiation. Absorption of this radiation alters the temperature of the detectors causing a change in the surface electrical charge which is then measured and conveyed by accompanying electrical circuitry.

The three types tested are distinguished by the absorbing material they possess. The first uses Strontium barium niobate, a ceramic-like substance; the second is lithium tantalate, also ceramic in nature; and the third uses an organic material called tri-glycene sulfide.

Robertson's pre-flight approach was to carefully measure the performance of each of the 20 detectors which would go aboard LDEF and to keep like-units in the lab as controls. Since the in situ environment for this experiment was passive, i.e., no measurement or recording circuitry connected to the detectors in the spacecraft, remeasurement of the 20 detectors flown was necessary to determine the effects of six years in space.

This was handled in Robertson's laboratory by mounting each detector in front of a "black body" infrared source whose radiation was passed through a hole of specific size, chopped by a rotating blade and allowed to fall on the detector. In this manner, the exact amount of pre-flight radiation was applied and the results measured to show if LDEF exposure had reduced the detector's performance.

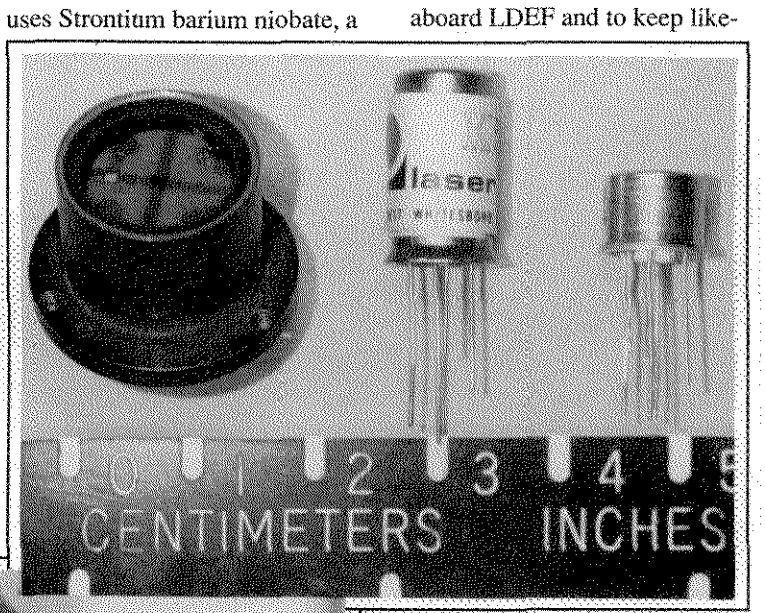
"The prognosis for performance in future space applications," says Robertson, "is that the Strontium detectors (ceramic), would have done the best job of enduring in space with little loss in performance." While the lithium detectors are still under evaluation, the tri-glycene versions (organic) didn't fare well and probably wouldn't have survived the environment encountered by LDEF," he added.

The scientific basis for these results is the focus of Robertson's continuing evaluation as he and associate investigator, Dr. Ivan O. Clark of Langley's Information Systems Division, work to finalize recommendations which can eventually be used in the selection of the infrared radiation detectors NASA will use in future space ventures.

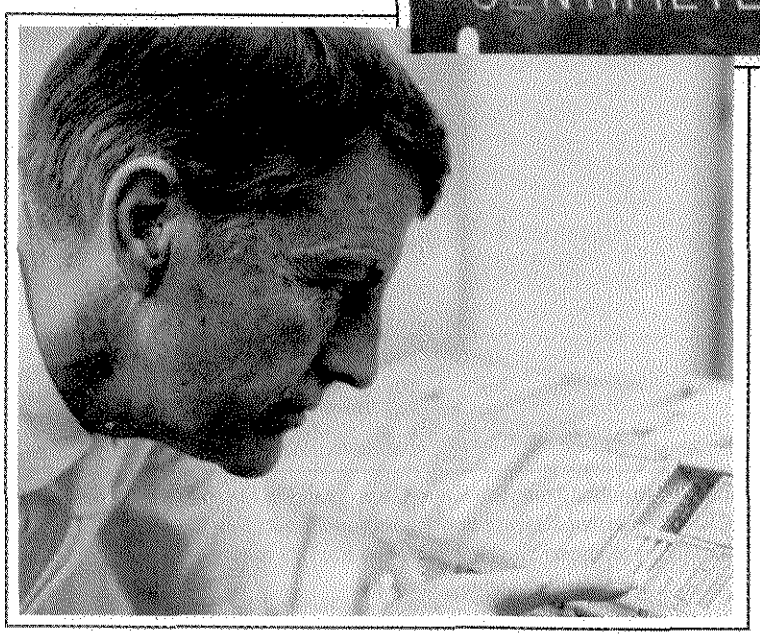
Robertson began his NASA career when he came to Langley in 1962 to join the Applied Materials and Physics Division. In 1967 he moved to the Flight Electronics Division and in 1982 was assigned to the Flight Management Division. Past research areas have included physics of meteors, impurities in semiconductors and infrared detectors. In addition to LDEF responsibilities, he is Langley's technical program manager for advanced flat-panel aircraft displays. He is also the NASA representative on the Tri-Service Airborne Display Working Group. Robertson is the author of 39 technical papers and holds five patents. He is a member of the Society for Information Display.

A native of Columbia, South Carolina, he earned a bachelor of science degree in chemistry from The Citadel in 1956, a masters in physics from Clemson University in 1962 and in 1966 took his doctorate from the Virginia Polytechnic Institute and State University. Robertson resides in Grafton.

The following are the second and third feature stories in the ***Researcher News*** *LDEF series.*



Above are three pyroelectric-type infrared detectors which were evaluated aboard LDEF. The Strontium ceramic-type unit on the right showed the most promise for endurance in space while the tri-glycene (organic) detector on the left would not have survived. Analysis is not yet complete on the detector in the middle which uses ceramic material.



Dr. James B. Robertson zeros in on the location of the infrared detectors which flew on LDEF under his stewardship as principal investigator.

Happenings

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

TOASTMASTERS will meet Wednesday, September 12, at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222. Guests are welcome. For information, call Christine Darden, ext. 45258.

HIGH-TECH FUN. Anyone interested in designing and building a "recumbent" bicycle, one ridden in a reclined position.Contact Lawrence Taylor, 851-2258.

YELLOW & WHITE CAT. Beautiful long-haired cat looking for a good home. Free, very friendly, declawed. For more information, call 851-1506 after 5 p.m.

CONSERVATION CLUB will meet Tuesday, September 18, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, September 19, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center, Building 1222.

AIRCRAFT OPERATIONS PICNIC will be held Saturday, September 15, from 11 a.m. to 6 p.m. at the Bethel Reservoir Picnic Area--Pavilion #2. Cost for adults is $6 and $2 for children. Payment is due by September 7. For information, call ext. 43875 or 43900.

FOR SALE: GOLF CLUBS. One complete set of left-handed golf clubs with Wilson bag. Very good condition. $150. Call 838-6000.

LOST: FRONT WHEEL to racing bicycle on August 22 by Building 1199, far parking lot. Call Kendall Freeman at ext. 46670.

FOR SALE: CROSS BARS. Two 48-inch cross bars for Yakima car-top bike rack. Each $12; both $20. Call J. Younblood at 1-588-8617.

LAA Elections: Two executive board positions are open for nominations. Nominating forms or position duties will be available September 10 in the LAA office. Send completed forms to LAA, Mail Stop 496.

Retirement Party

Ronald N. Jensen will be honored at a retirement party Thursday, September 20, in the private dining room of the cafeteria. Hors d'oeuvres and cash bar will begin at 4:30 p.m. Cost is $8 per person and includes gift. Please respond to Gloria Ragsdale, Mail Stop 441, ext. 46915, or Thomas G. Popernack, Mail Stop 443, ext. 46922, by September 13.

Note of Thanks

Jerome Fife writes: I would like to take this opportunity to express my sincere thanks to my friends and associates for their generosity during my recent illness. My family and I were very touched by the gifts and donations.

Attention

Would the person who borrowed a Brower Optical Chopper, serial no. 443, Model 312C, ECN No. 0531991, please contact Culotta/Clark at ext. 41488.

Children to Solve Case of the Mysterious Flying Machine

The primitive Wright Brothers' Flyer, the forward-swept wing of the X-29 and the sleek-looking concept of the National Aero-Space Plane, are clues to the mystery of the Visitor Center fall children's program. "The Case of the Mysterious Flying Machine" will let children solve a mystery puzzle while learning about different types of aircraft.

The hands-on program will allow children to demonstrate the principles of flight, experiment with paper airplanes and solve a mystery by identifying certain aircraft. After the program, the children are invited to stay and watch the video "Aeronautical Oddities." This 16-minute video gives a humorous look at the successes and failures with early airplane designs.

Children ages 8- to 10-years-old are invited to attend the Saturday program, which will be offered on September 15 and 29, October 20 and 27, and November 17 and 24. The 45-minute presentation begins at 10 a.m.

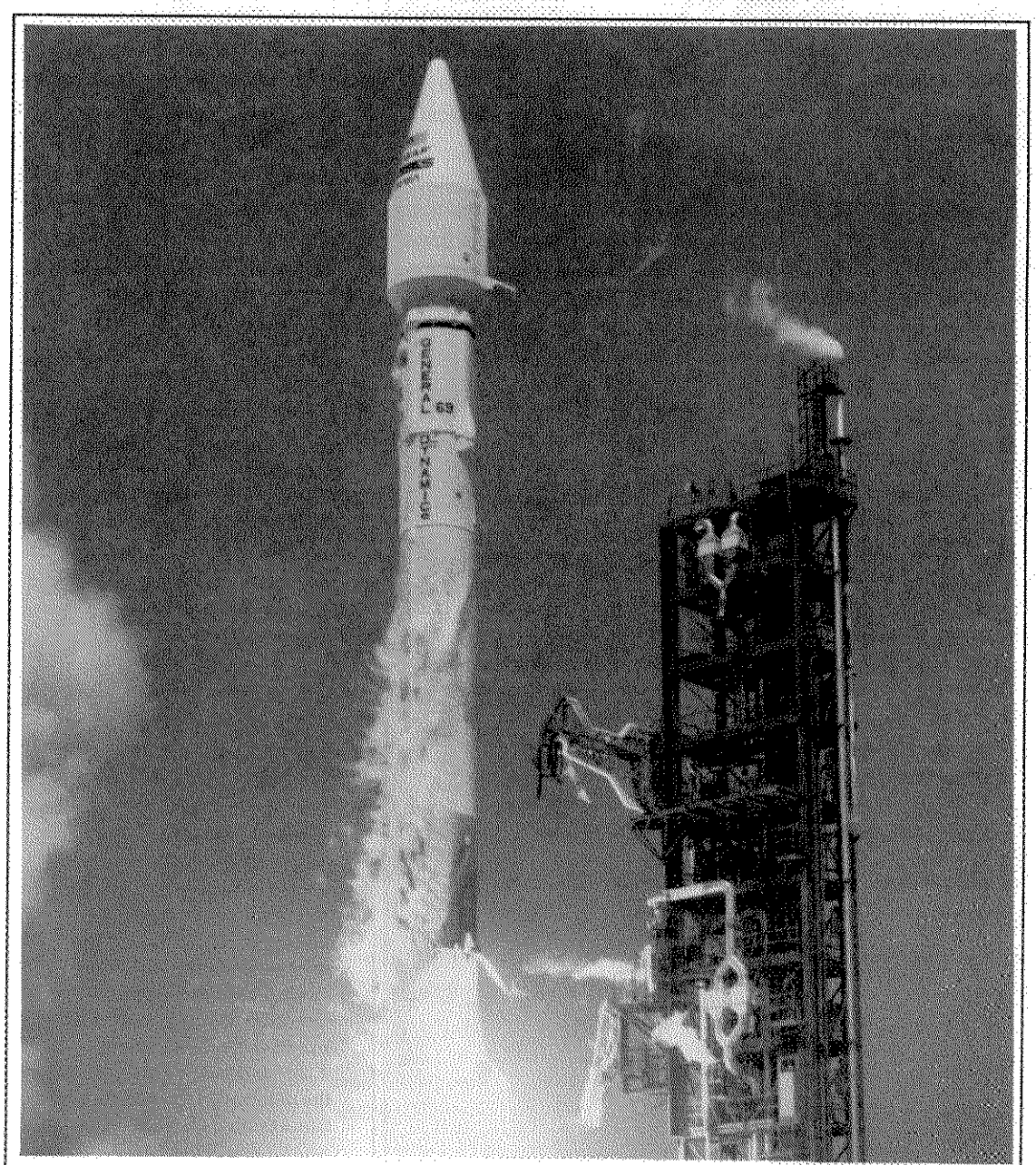
The program is free but, due to limited seating, advanced reservations are required. Call the Visitor Center at ext. 46000.

In Memoriam

Sympathies are extended to the following families:

John P. Richardson who died July 10, 1990, in Hampton, Virginia. Richardson retired from NASA in 1966 after 19 years of service.

Harry N. Henry who died June 11, 1990, in Abilene, Texas. Henry began his career with NACA in 1940 and retired from the Design and Construction Engineering Division at NASA in 1973.



The Atlas Centaur rocket (AC-69) was recently launched from the Cape Canaveral Air Force Station complex 36B carrying into orbit the spacecraft CRRES (Combined Release and Radiation Effects Satellite). CRRES is a joint NASA/Air Force mission to study the effects of chemical releases on the Earth's ionosphere and magnetosphere.

Researcher News

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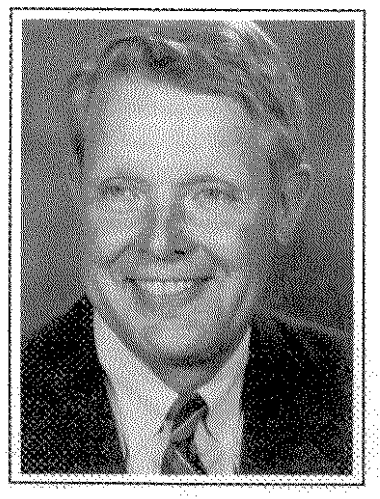
Langley News Researcher

Volume 4, Issue 19 September 21, 1990
Bi-weekly Employee and Contractor Publication

CFC Message from the Director

Langley Employees Strive to "Make the World a Better Place"



Langley Research Center is known worldwide as a leader in aerospace technology. The research that goes on here everyday makes our world a better place.

But the commitment to a better tomorrow does not stop at the gate. Langley employees care tremendously about others: co-workers, friends, neighbors and even those they have never met. Our people are actively involved in their communities and many volunteer activities. They are also attuned to worldwide concerns. It's no surprise, then, that LaRC has always been a leader on the Peninsula in responding to the Combined Federal Campaign (CFC).

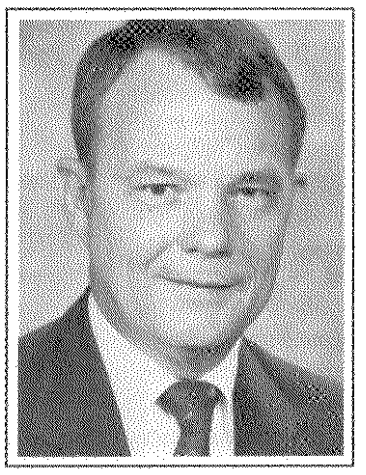
This year's CFC theme challenges federal workers to "make the world a better place." Our own Terry Morris, an electrical engineer in the Information Systems Division, is featured in a video distributed nationwide outlining the thrust of the campaign. Terry's dramatic story is told on page 5. He has benefitted from CFC-funded agencies and is now committed to make the world a better place for others.

Langley CFC chairman Darrel Tenney and his committee have set a goal of $255,000 for this year's campaign. I ask you to support Darrel; do what you can when your key person contacts you on September 25. This is your opportunity to make the world a better place for people on the Peninsula, in Virginia, in the United States and all over the world who need our help. Your one gift will help them all year long.

Richard H. Petersen
Director

CFC Message from the Co-Chairman

CFC Warrants a Personal Commitment



When we hear the words "Combined Federal Campaign" or "United Way," we typically think of organizations which serve people in our community. For the CFC, this "community" includes our nation and the world, through the health, environmental, national and international service agencies that are represented along with our local United Ways.

We readily recognize these organizations because of the good work they do helping our youth, providing low-cost sources of food for those in need, conducting research to fight multiple sclerosis or AIDS, or offering medical care to under-developed areas of the world. What we probably haven't thought of is the commitment made by the many thousands of volunteer and paid staff who make these programs work.

Unless we personally know someone who is involved with one of the CFC-funded agencies, we might have trouble identifying with the typically low salaries of paid staff and the bare-bones budgets for supplies and materials with which they must work. We can remember, though, the tight times we experienced (or may be experiencing) when we first started working and/or got married. The pay seemed low and there never seemed enough money to do everything we wanted to do after taking care of the bare necessities. But we made a commitment to work harder and advance in our vocation so that we and our families could improve our quality of life. I believe the commitment of the many folks associated with the Combined Federal Campaign and its benefitting organizations is similar to the commitment we are making to improve our daily lives.

If we can identify in any way with this type of commitment, it seems natural that we might want to help share the burden of the volunteer and professional staff involved in improving the quality of life for so many in our "community." We can do this through our own personal commitment to the Langley Research Center CFC campaign. Our one day solicitation takes place September 25.

Stop and think for a moment about the magnitude of your commitment. It might be helpful to relate it to the giving of your time to one or more of the many worthwhile causes represented during the year. For example, if you currently earn $16,000 a year, that works out to about $8 per hour. A pledge to the CFC of $4 per pay period (which can be designated to the agency or organization of your choice) represents a half-hour every two weeks of your time. How personal your commitment now becomes if you think of it in these terms--"from 7:30 to 8 a.m. every other Monday I am working for the Boys' Club." If you earn $32,000 a year, that's $16 an hour, and an $8 per pay period pledge might be personalized as "from 3:30 to 4 p.m. every other Friday I am working for the Girl Scouts."

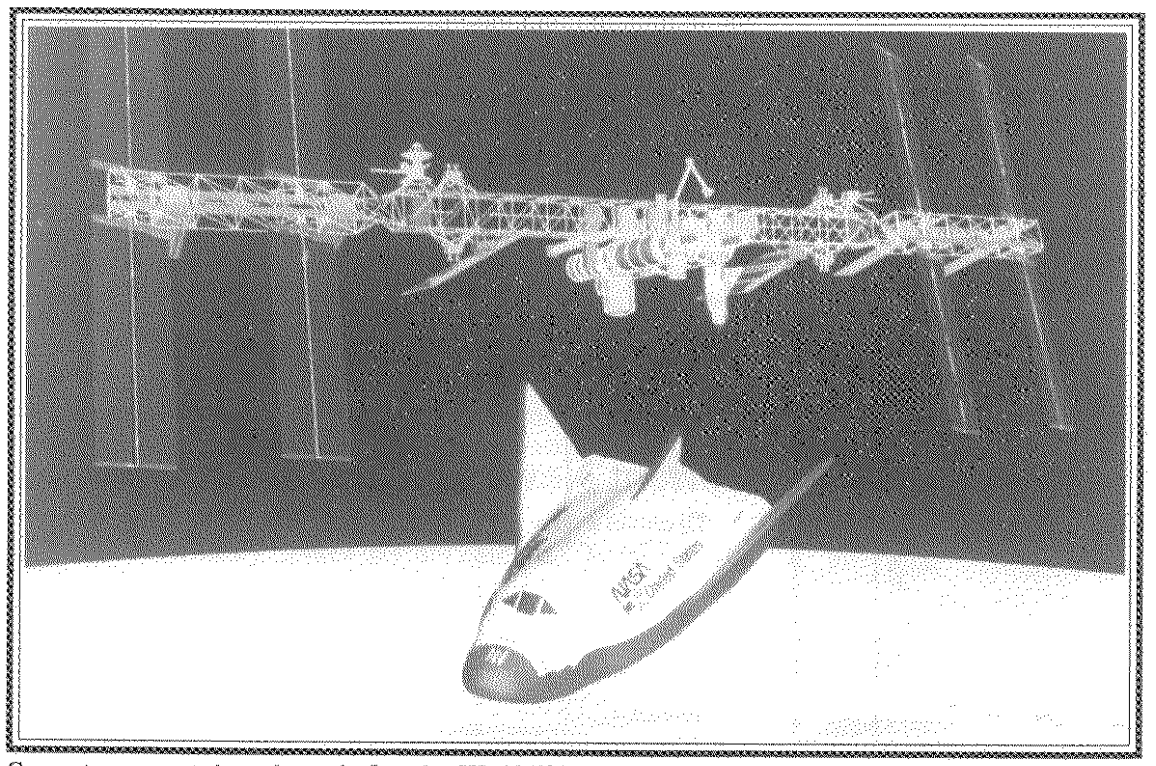
The many people who work for CFC-funded agencies continually make a commitment to their work. The key persons who will be soliciting from Langley employees on September 25 are making their extra commitment to the campaign.

I urge all my fellow workers at Langley to join me and the campaign staff in making a personal commitment through your generous support of the Center's goal of $255,000. With this commitment, we can truly "make the world a better place."

Bruce A. Conway
Campaign Co- Chairman

NASA Studies Space Taxi System to Complement Shuttle

-by Jean Drummond Clough



Computer-generated art shows the Langley HL-20 lifting body on a return trip from Space Station Freedom.

A lifting body vehicle, which one day may be used to shuttle humans and cargo to the Space Station Freedom, is under study by researchers at NASA Langley.

Called the HL-20, the vehicle is a concept being considered as a Personnel Launch System (PLS). The PLS is a small space taxi system designed to transport people and small amounts of cargo to and from low-Earth orbit. A PLS is envisoned as a complement to the larger Space Shuttle.

To aid NASA in the study, North Carolina State University (NCSU), Raleigh, and North Carolina Agricultural and Technical University (NC A&T), Greensboro, have constructed a full-scale research model of the HL-20 and a supporting cradle. The model, which is 29.5 feet long and 23.5 feet across the wingspan, will be used at Langley and at Johnson Space Center to study crew seating arrangements, habitability, equipment layout, crew ingress and egress, and maintenance and handling operations. The cradle is a steel truss structure 23 feet long, eight feet wide and three feet deep. The primary purpose of the cradle is to support the HL-20 fully loaded and to raise it from a horizontal to a vertical position. It will also serve as a support for the HL-20 when it is transported by truck.

Funded by a $136,000 NASA grant, the fiberglass model was built by 55 students with assistance from six faculty and staff members from the Mars Mission Research Center at NCSU and NC A&T.

The HL-20 is one of two concepts being designed as part of a NASA-wide study sponsored by the Office of Aeronautics, Exploration and Technology and the Office of Space Flight, NASA Headquarters. The Johnson center is considering a biconic-shaped capsule with a parachute landing system; whereas, Langley's design is a lifting body that can make a conventional runway landing on return to orbit.

Although the PLS has not been approved for development, it is being considered as a future addition to the manned launch capability of the United States. The system would assure rapid manned access to space in the event a Space Shuttle was unavailable and minimize life-cycle costs through system and subsystem simplicity. Unlike the Space Shuttle, the PLS would have as a design objective a launch abort capability to safely recover the crew during ascent.

News Briefs

GODDARD SPACE FLIGHT CENTER, Greenbelt, Md. --- NASA's Hubble Space Telescope (HST), a cooperative program with the European Space Agency, has provided a remarkably new, detailed view of the core of a galaxy which lies 40 million light years away, more than half way to the great Virgo cluster of galaxies. These results promise that astronomers will be able to use Hubble to probe the mysterious centers of galaxies in a search for massive black holes. The image, taken with the wide field and planetary camera on August 17, reveals that stars are much more tightly concentrated at the center of the galaxy than was previously expected. HST scientists are greatly encouraged by this new observation and emphasize that it demonstrates intriguing science can be routinely accomplished with the spaceborne observatory.

JOHNSON SPACE CENTER, Houston, Texas --- Astronaut Michael J. McCulley, Captain, USN, is retiring from the Navy and leaving NASA in early October after the STS-41 Ulysses launch. McCulley has accepted the position of vice president and deputy director, KSC-Launch Site, with Lockheed Space Operations Company. In this position, he will be heavily involved in the day-to-day processing of Space Shuttle vehicles. McCulley was selected for the astronaut program in May 1984.

MARSHALL SPACE FLIGHT CENTER, Huntsville, Ala. --- A NASA/U.S. Air Force satellite initiated two chemical release experiments September 10 and 12 to aid scientists studying the processes by which fast-moving neutral gases become ionized. The two chemical releases, part of the Combined Release and Radiation Effects Satellite (CRRES) program, occurred at dusk over the South Pacific and above the atmosphere at altitudes between 300 and 360 miles. CRRES is a joint NASA/ U.S. Air Force mission to study the Earth's ionosphere and magnetosphere and to monitor the effects of the space radiation environment on sophisticated electronics.

HEADQUARTERS, Washington, D.C. --- Captain Bruce McCandless II, a NASA astronaut since April 1966 and mission specialist on two Space Shuttle flights, retired from NASA and the Navy on August 31. During his first space flight, STS 41-B in February 1984, McCandless made the first, untethered, free flight in the Manned Maneuvering Unit (MMU) which he developed with Charles E. "Ed" Whitsett of the Automation and Robotics Division, Johnson Space Center, Houston. McCandless' second flight, STS-31 in April 1990, deployed the Hubble Space Telescope.

STS-35/ASTRO-1 to Include Space Classroom

On the fifth day of the ten-day ASTRO-1 mission, the first space classroom, called "Assignment the Stars," will be taught by members of the science crew. The continental United States will receive NASA Select Television 24 hours a day throughout the mission, via SATCOM F2R on Transponder 13. As of press time, launch of STS-35 is scheduled for September 18 at 1:28 a.m. EDT.

Mason and Hanger Services Selected for Negotiations

NASA Langley has selected Mason and Hanger Services Inc., Hampton, for negotiation of a contract to support Langley's Consolidated Logistics, Administrative, Security and Scientific Information Contract (CLASSIC) services. The five-year, cost-plus-award-fee contract, estimated at $97.9 million, will be effective September 28.

Mason and Hanger will perform the majority of the work at Langley. The firm will provide a comprehensive logistics program covering all aspects of supply, transportation and equipment management; general and specialized administrative services such as mail and correspondence records management; clerical support services; and micrographics and engineering drawing files support.

Within the scope of the contract, the company will support Langley's security program including physical, personnel and information services, badge/pass and locksmith services and Langley-sponsored or hosted projects and programs. In addition, the contractor will support the scientific and technical information program with technical editing and documentation; laboratory photography; reproduction; offset duplication, finishing operations and distribution services; graphics support; and selected library services.

Lankley

In Memoriam

Sympathy is extended to the family of **Chester Oss**, who died May 2 in Newport News. Oss, an electrical engineering technician retired in 1977 after 35 years of government service.

Current News Releases

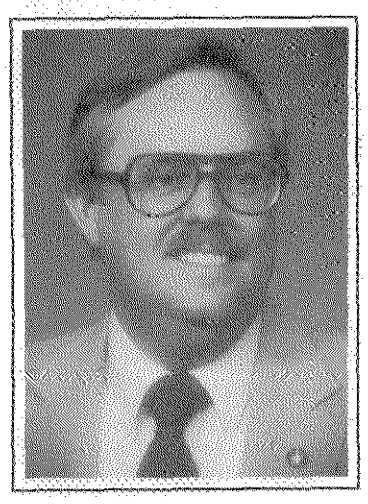
To obtain a copy of any of these NASA News Releases, contact Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by headline and release number.

90-118.....Hubble Space Telescope Peers into Core of Distant Galaxy
90-119.....Astronaut McCulley to Retire From the Navy and Leave NASA
90-120.....NASA to Test Gas Ionization Theory over South Pacific
90-121.....Astronaut McCandless Retires from NASA, Navy

90-122.....STS-41 Ulysses Deployment Press Kit

Langley Newsmakers

Houck Presented AIAA Award

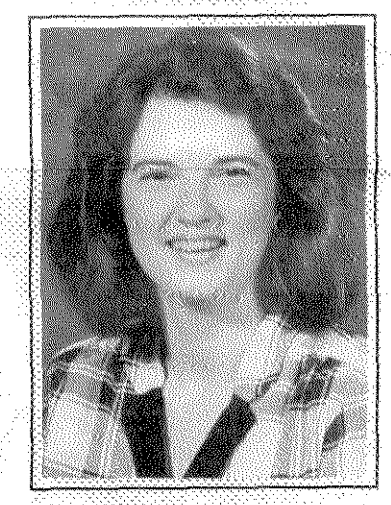


Jacob A. Houck, senior research engineer in the Analysis and Simulation Branch, has been recognized by the American Institute of Aeronautics and Astronautics. Houck was presented the DeFlorez Training Award for Flight Simulation September 18 at the AIAA Flight Simulation Technologies Conference held in Dayton, Ohio.

The award is named in honor of the late Admiral DeFlorez, who advanced the use of simulators in the training of pilots. Houck was cited for "outstanding contributions to the field of flight simulation as the designer and implementor of important NASA rotorcraft, air traffic control and air transportation simulator facilities used for research and training at NASA Langley."

Houck is group leader for special projects and is responsible for the development and operation of the Mission Oriented Terminal Area Simulation Facility as well as operation of the Transport Systems Research Vehicle Simulator. He began his NASA career in 1966 as a student trainee in the Center's engineering cooperative education program.

Stoakley Attends Penn State Program



Diane Stoakley, a chemical engineer in the Polymeric Materials Branch, has been selected to attend Penn State's Management Program for Women. The week-long program will be held at Pennsylvania State University, University Park, September 23 to 28.

The program addresses issues in effective management, with emphasis on the strengths that women bring to managerial positions that are of benefit to their organizations. Topics to be covered include financial planning and analysis, decision making, negotiation strategies and leadership. Discussions will be led by members of Penn State's faculty, as well as business representatives and faculty from other universities.

Stoakley believes the Penn State program offers a unique opportunity to improve her skills in several areas of management, and welcomes the specific training. "I expect the interaction with other women with similar responsibilities to prove very valuable," she adds.

A specialist in experimental development and analytical evaluation of polymeric materials for aerospace applications, Stoakley has developed a process for improving the processability of polyimides. She is nationally recognized in the area of high-performance, high-temperature polymers for advanced aircraft applications, and currently conducts research and assists in program planning and technical supervision in the Advanced Aircraft Project.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

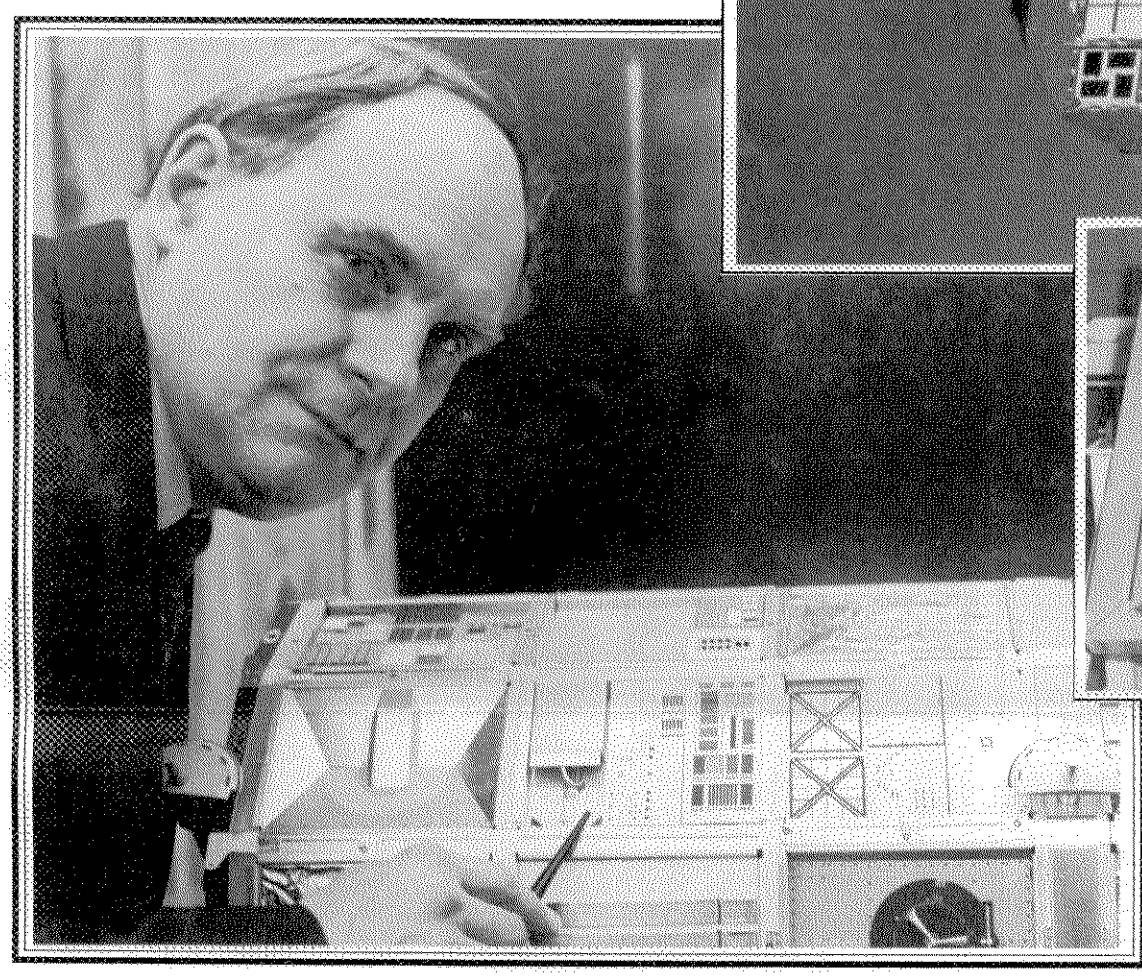
Editor ..... Marny S. Skora

Photojournalist ..... Carol Petrachenko

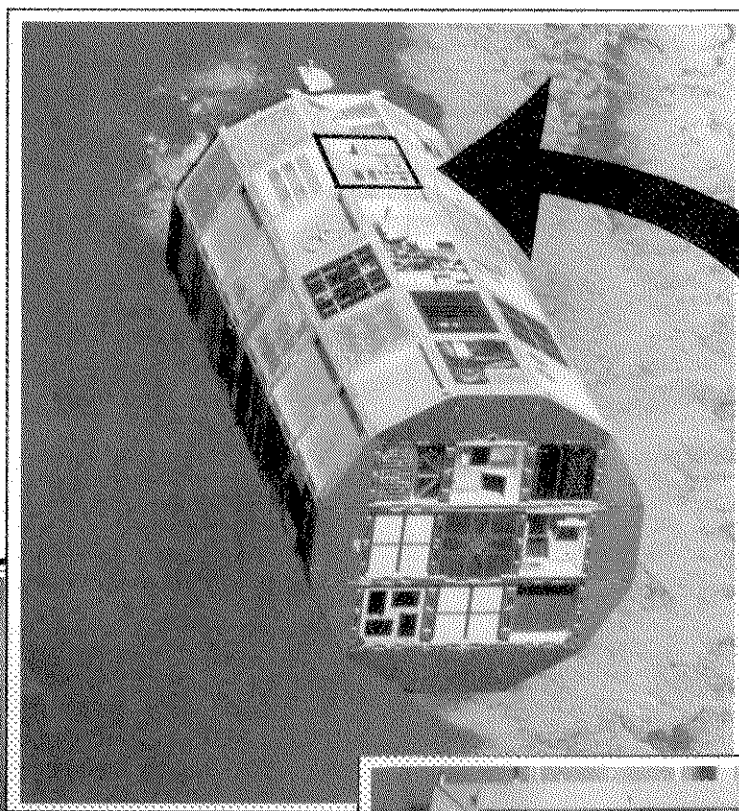
Photographic Support ..... Photo Lab

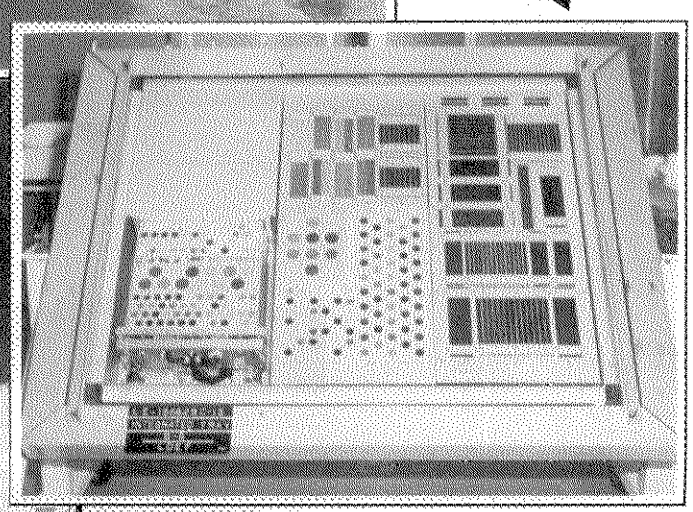
The privilege of advertising in this publication is restricted to the employees and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

*The following is the fourth story in the **Researcher News** LDEF series featuring Langley principle investigators.*



Using a 1/10 scale model of the Long Duration Exposure Facility, Wayne Slemp points out the location of his experiment which investigated the effects of space exposure on composite materials and coatings.





This close up view of Slemp's experiment tray shows the variety of composite materials and coatings tested. Follow the arrow upward to see the location of the tray on the LDEF spacecraft as it floated freely in space.

Major Insight into Future Spacecraft Construction Revealed by LDEF

-by Craig Murden

The combined evaluation of two Langley experiments flown aboard the Long Duration Exposure Facility (LDEF) has revealed shortcomings and strengths that will directly influence how spacecraft of the future are built.

Wayne Slemp, principal investigator for both a composite materials and a coatings experiment, has determined that most of his materials being tested on LDEF as candidates for external spacecraft structural members suffered substantial degradation of their tensile strength during the six-year exposure. However, Slemp hastens to point out that the coatings being tested for their ability to protect these same materials did very well in space and should prevent such effects when applied before assembly. Slemp is, therefore, in a unique position to have actual flight test data on coatings which can be used to protect structural composites from degradation.

The degradation occurred to the materials on the front side of the Langley spacecraft where they were subjected to assaults from atomic oxygen. Two classes of graphite-reinforced composite materials were tested. The polymeric matrix composites (epoxy and polysulfone) suffered loss of strength due to atomic oxygen attack and a magnesium matrix composite was also substantially degraded by atomic oxygen. Only an aluminum matrix material resisted erosion. Test procedures involve comparing the performance of exposed materials to control counterparts that did not fly.

In contrast to the materials, the coatings came through with flying colors. Those aboard LDEF were second-surface mirrors, black paints, white paints, anodized finish and sputtered finish. The most gratifying result, says Slemp, was the mirrored quartz-silver optical solar reflector which experienced no changes in optical or physical properties and, interestingly, was used for the first time on the Langley-built Lunar Orbiter vehicle in 1968. The only surprise was the less than expected resistance of the zinc oxide-silicone white paint S-13GLO. The mode of testing for these coatings required comparisons of before and after optical properties, changes in mass (weight) and erosion rates from atomic oxygen.

Normally, said Slemp, we would have liked to have been able to also assess the effects of ultraviolet radiation. However, in this case, the atomic oxygen bombardment bleached out any degrading effects from that radiation. This does not pose a problem because this bleaching will happen to any spacecraft surface exposed to atomic oxygen and what actually happened confirmed laboratory suspicions.

Another interesting test result involved a canister of the same sample coatings which opened upon reaching orbit but closed by design after 10 months of exposure in the 12-month projected mission. This procedure was intended to isolate the samples from contamination during launch so that they could serve as a monitor when compared to those which were unprotected during that early phase of flight. "Of course, as it turned out when the mission lasted almost six years, what we got was an in-flight comparison of 10 months of exposure against those with six years exposure which was a far more meaningful test result," he said.

Slemp voiced what he views as an inescapable conclusion from his material-coating experiments analysis: "We cannot fly polymeric composites on the outside of most spacecraft without protective coatings." Fortunately, the combined results of the two experiments will now allow Slemp to be specific in his recommendations for long duration space vehicle construction. His input to the data handbook that is to come out of the LDEF experience will suggest which composite materials to use and which coatings are the most protectively compatible with each.

Slemp is a senior materials research scientist in the Applied Materials Branch of the Materials Division. In addition to his LDEF work, he has served as the principal investigator or co-investigator on six flight experiments for evaluating the performance of spacecraft structural materials and spacecraft coatings. He has also provided technical support for NASA flight programs including the Lunar Orbiter, Apollo, Viking Lander, Skylab, Shuttle Orbiter and is currently evaluating materials and coatings for Space Station Freedom. Additionally, he developed the reflecting silver/Teflon coating for the Shuttle's crew systems radiator.

He is a native of Big Stone Gap, Virginia, where he graduated from high school. He received a bachelor of science degree in 1958 from Emory and Henry College with a double major in physics and mathematics and began his NASA career at Langley that same year as an aerospace technologist. Slemp has won two Best Technical Paper awards, authored over 20 technical papers, made 25 technical presentations and holds two patents. He and his wife Shelby reside in Newport News, Virginia.

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Langley Research Center will ho
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describing their programs will be
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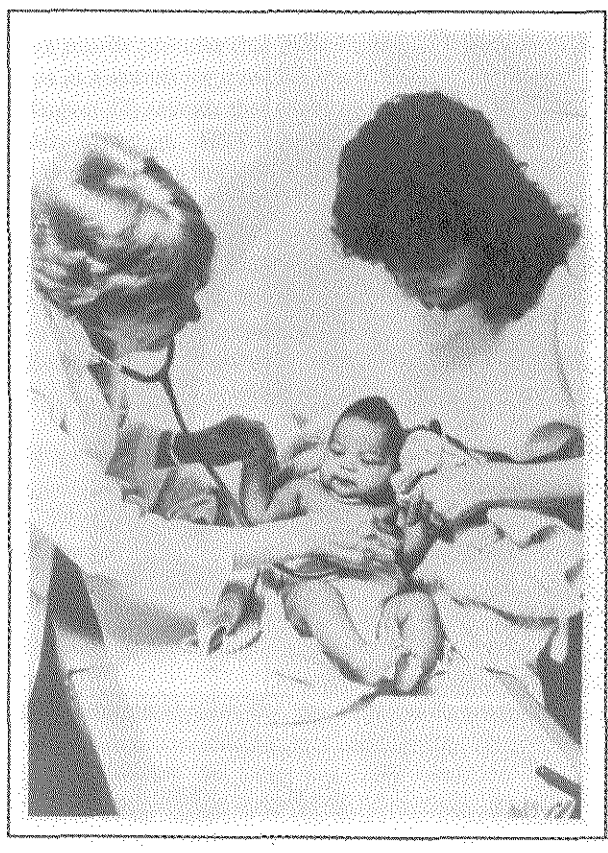


NVHA

MAKE A GOOD HEALTH CONNECTION.
The 65 members of the National Voluntary Health Agencies (NVHA) of Virginia 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 is working to ensure that everyone enjoys the highest quality of life--from the time they are our precious little ones through the golden years when they are our treasured ones.

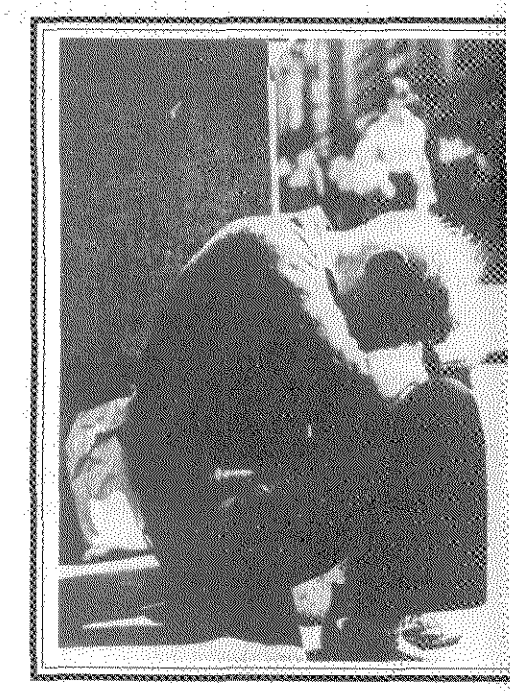
NVHA relies on CFC funds to supplement its operating budget. CFC offers you an opportunity to make the world a better place.

United Way
OF THE
VIRGINIA PENINSULA

YOU'RE NEVER TOO OLD TO HAVE FUN.
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. And the United Way relies on you. By giving to the Combined Federal Campaign, you are reaching out to someone who needs you.

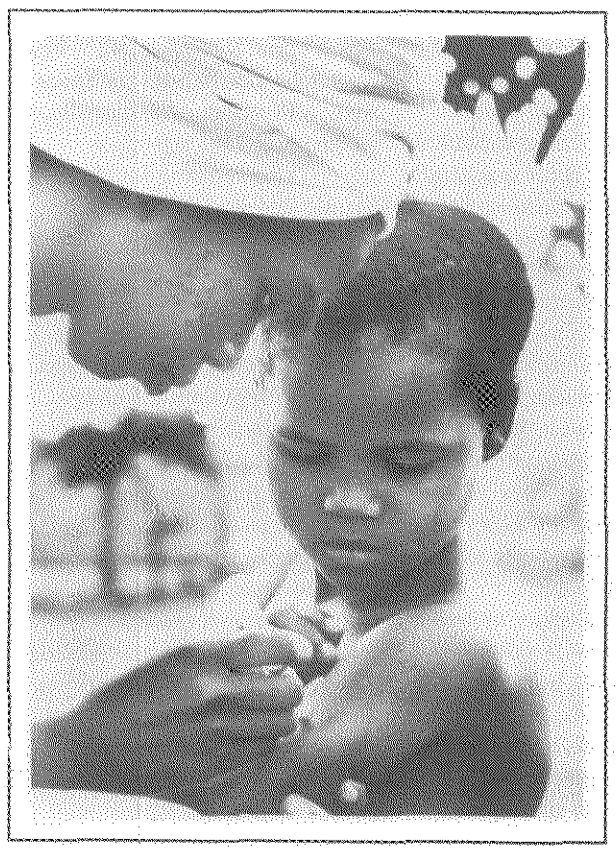
Your one gift to the CFC helps the United Way--and other local, national and international agencies--help people. People helping people will make the world a better place.



WITHOUT YOUR HELP, SOME PEOPL
Independent Charities of America (ICA) rep
the hungry, shelter the homeless, provide for
rights and safety of those who do not have th

ICA was founded by federal employees and is partially funded by Combined Federal Campaign contributions. Your gift to the CFC can help ICA and other organizations who reach out to help those in need.

Your gift can make their world a better place.



ISA

THIS WILL FEEL LIKE A LITTLE PINCH.
Fact--one in every five children dies in childbirth in impoverished nations overseas.
Solution--International Service Agencies (ISA) trains nurses, doctors and village health workers. Millions are immunized every year against polio, diptheria, measles and other diseases.

ISA is a nonprofit federation of 37 American charitable agencies which, last year, assisted nearly 150 million needy people in 100 countries throughout Latin America, Africa, Asia and the Far East.

ISA agencies depend on the support of the Combined Federal Campaign to help them help those in need. Among other things, ISA agencies are among the first to bring life-saving emergency aid to the victims of disasters, providing critically needed food, medicine, water and shelter.

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A BETTER PLACE

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the recipients of your gifts and
ble. Take a moment to study the
nsideration and your support.

United Way
of Greater Williamsburg

TOGETHER WE CAN MAKE IT HAPPEN.
Big Brothers/Big Sisters, providing one-to-one friendships to children of single-parent households, is just one of 24 social service agencies in the greater Williamsburg area supported by the United Way.

Contributions to the United Way of Greater Williamsburg help area residents because funds raised in the area remain in the area. And the vast network of United Way volunteers helps to keep fund raising costs low--nearly all of each donation helps people.

The United Way of Williamsburg relies on CFC funds to supplement its operating budget. Help the United Way make good things happen.

ENVIRONMENTAL
FEDERATION OF
AMERICA

NOT ALL ENDANGERED SPECIES HAVE WINGS OR PAWS.
Over 100 U.S. cities cannot meet federal clean air standards. Your gift to the agencies of the Environmental Federation of America will support urban tree planting programs which help clean our air, reduce noise pollution and add a splash of green to the city.

America has a choice. We must *choose* to have a clean, healthy environment.

As a coalition of 18 national environmental charities, the Environmental Federation of America offers people the chance to help save America for ourselves and the children who follow us. Your gift to the CFC can help make the choice for a healthy, beautiful America. Do your part to make our world a better place.

L BE ALL ALONE.
8 charitable agencies working to feed
bled. ICA works to protect the human
ces to fight for themselves.

ICA Independent Charities of America
Share The American Way

N|USA
National|United Service Agencies

PROVIDING FOR A BETTER WAY OF LIFE.
The National United Service Agencies are national voluntary organizations that provide specialized help to assist citizens in achieving 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--and agencies all over the world--all year long.

Alumni Initiate 'Project Thank You'

The Langley Alumni Association, under the leadership of former Director for Structures George Brooks, is spearheading a drive to collect items for American troops now stationed in the Middle East.

"We are gearing up for what the Alumni calls 'Project Thank You,' a show of support for our forces now stationed in Saudi Arabia," said Brooks. "We retired folks want to do what we can to provide 'extras' to lighten the load of those tasked with our defense. We are calling on Center employees to support our initiative."

The initial goal of the Alumni Association is to prepare 1,000 shoe-box-size packages to be mailed overseas. Restrictions on what these good-will boxes can contain are quite stringent. In an effort to respect the cultural standards of the area, no dairy or pork products may be included, no religious or holiday-oriented items may be sent, no photographs, calendars or printed materials revealing human anatomy are permissible. Also, due to the area's extreme heat, no pressurized containers, heat sensitive products (chocolate, oil, vaseline, chap stick, gum) or perishable items may be sent. Tobacco products are also prohibited.

The categories of what is acceptable and what would be appreciated by a far-from-home military person are endless and limited only by your creativity. Langley Alumni are, therefore, soliciting personal care items such as toothpaste and tooth brushes, razors, tube shaving cream, stick deodorant, foot powder and shampoo. Snacks such as pre-wrapped cracker sandwiches, nuts and store-bought cookies are very good for raising morale as well as satisfying an in-between-meal craving. Writing materials—stationery, envelopes and pens—and games—playing cards, cross-word puzzles, checkers, dominoes—are great for passing endless hours and keeping one's mind off the intense heat.

The Alumni Association will collect items through October 22. Donations of any of the above items will be accepted and packaged for delivery by alumni volunteers. Collection boxes are available in the cafeteria. Donations of money will also be accepted and may be preferable since alumni members can purchase many of the supplies at or below wholesale prices. Checks may be made payable to the Langley Alumni Association Treasurer and sent to Mail Stop 496.

Questions regarding Project Thank You may be addressed to George Brooks, project manager, 868-6013, or Ann Suit, Langley coordinator, ext. 43305.

Project Thank You

Gifts for service persons stationed in the Middle East sponsored by the Langley Alumni Association

Contributions or gifts such as those listed below are being collected for distribution to our armed forces stationed in Saudi Arabia. Checks may be made payable to the Langley Alumni Association Treasurer and mailed to Mail Stop 496. Items should be taken to the Langley cafeteria and will be packaged for shipment by alumni volunteers. Be as generous as you can.

Acceptable Items

Personal care items
- toothpaste
- tooth brushes
- shampoo
- tube shaving cream
- stick deodorant
- disposable razors
- foot powder

Stationery

Snacks
- cracker sandwiches
- nuts
- cookies

Games
- playing cards
- puzzles
- checkers
- dominoes

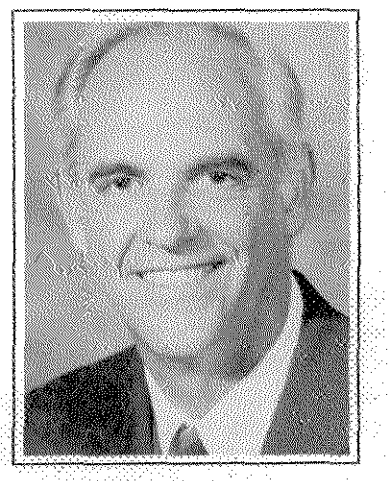
Unacceptable Items

Dairy or pork products
Religious/holiday items
Heat sensitive items
Pressurized containers
Tobacco products
Perishibles

Collection deadline: October 22

At the VC during September

Pegg to Give NASP Update



A plane takes off from an airport runway, reaches a speed of up to Mach 25 (17,500 mph) and flies directly into orbit. This aircraft technology is being developed at NASA Langley as part of the National Aero-Space Plane program (NASP). Robert Pegg, an aerospace technologist, will discuss "The Beginning of the Hypersonic Age: The National Aero-Space Plane" on Thursday, September 27, at 7:30 p.m. in the Visitor Center theater.

Pegg will give an update on the NASP program and discuss the technological challenges, the cost of the program and milestone dates. Langley is currently developing high temperature materials and structures, air-breathing propulsion systems and computational fluid dynamics required by the NASP.

The NASP program is managed jointly by the Department of Defense and NASA. Over the next three years, researchers will continue to acquire data, develop technology and evaluate engine and airframe designs before a decision is made to begin building the X-30, the experimental version of the NASP.

Sports News

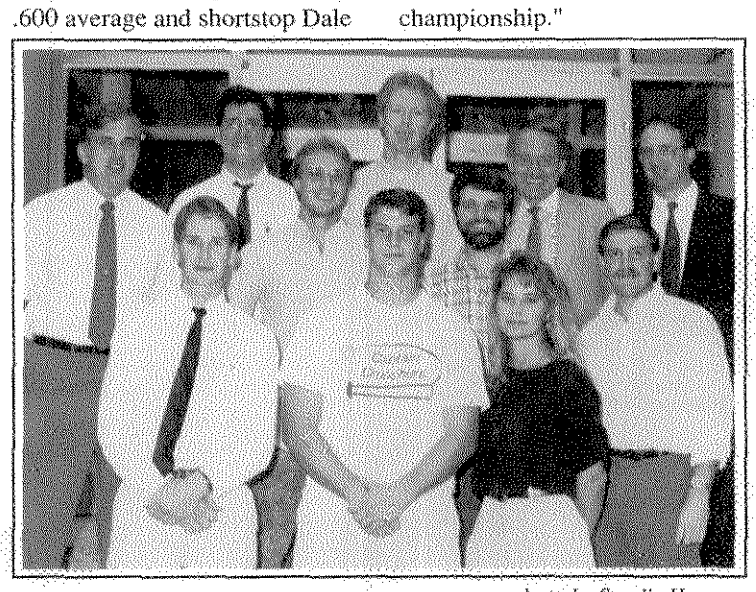
Crunchers Capture Championship

The Captain Crunchers squeaked past the Buzz Saw by a 6-4 score to win the 1990 D-League softball championship.

"It felt good to win this one after having lost to LSB in the championship game last year," said team coach Gordy Degear.

Comprised primarily of Management Operations and Structures Directorate players, the Captain Crunchers were led offensively by pitcher Jim Taylor's .642 batting average, Virginia Tech co-op Tom Weih's .600 average and shortstop Dale Davis' 12 home runs. Leading pitchers were Taylor with an 8-4 record and Gene Poole at 5-1. Defensive standouts included Davis, third baseman Richard Siebels, left fielder Ken Frink and center fielder Staten Spruill.

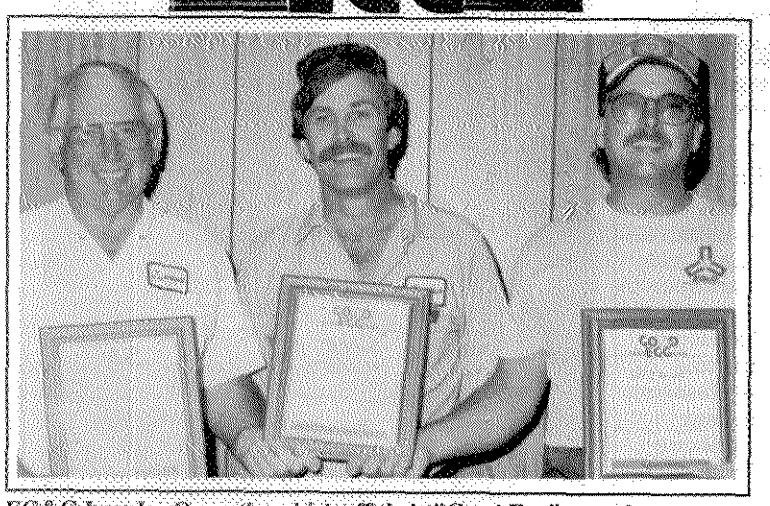
"Spruill made some catches this year that would have made Paul Blair proud," said Degear. "There was some great competition this year from teams such as the Buzz Saw, the Brewers, Simulation and LSB. Although we had a strong team, we were fortunate to win the championship."



-photo by Sandie Horsey

Captain Crunchers team members are (front row, L to R) Staten Spruill, Tom Weih, Tracy Spruill, (middle row) Tom Frasher, Dale Davis, Gene Poole, Gordy Degear, (top row) Richard Siebels, Ken Frink, Jim Taylor and Dave Jones. Missing are Allison Ballew, Lisa Burg, Mark Carpenter, Rosemary Carpenter, Mike DeLong, Jennifer Heeg, Jim Prohaska, Dave Rudy and Tim Warner.

GOOD EGG



EG&G Langley Operations kick off their "Good Egg" award program which recognizes superior job performance and pays a $25 cash award. Congratulations go to the first three recipients (L to R) Marshall Masengill, inspection department; and John Paul Jones and Roland Morrissette, both of the electrical department.

Retirement Parties

Willard E. Foss will be honored at a retirement luncheon at 11:30 a.m. Monday, September 24, in the H.J.E. Conference Center, Building 1222. Cost is $8 per person, gift included. Please respond to Velma R. Martin, Mail Stop 406, ext. 45223.

Bobby M. Earnest will be honored at a retirement social Wednesday, October 3, at 4:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. Cost is $8 per person, which includes gift. Gift only donations will be graciously accepted. Please make checks payable to Shirley R. Brown and mail to Brown or Peggy B. Rollins at Mail Stop 157D by September 26.

Runners Club Announces Race Results

The Runners Club summer 5 mile race, held August 25, was won by **Gale Harvey** in a time of 33:26 minutes. **Bob Ferguson** was a close second in 33:36 and **Jack Batina** finished third in 35:50.

NASA Intercenter Races will be held during October. The 10K races will be run October 1, 10 and 25; the 2 mile races will be run October 4, 9, 17 and 22. All races start at 5 p.m. on Doolittle Road, except the 2 mile race on October 9, which will be run 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 are welcome in all races. For more information, call Richard Shearer, ext. 47036.

People & Places

Celebrating National Hispanic Month

U.S. Secretary of Education to Speak at Fort Monroe

Dr. Lauro F. Cavazos, secretary of education, will speak at a luncheon Tuesday, September 25, at Fort Monroe in celebration of National Hispanic Heritage Month.

The 11:30 a.m. event will take place at the Fort Monroe Officers' Club. The public is invited.

A sixth-generation Texan, Cavazos earned his bachelor's and master's degrees in zoology at Texas Tech University and he holds a doctorate in physiology from Iowa State University. In addition, he has received honorary degrees from several universities and colleges.

Cavazos has served in various professional and administrative positions. He has taught at the Medical College of Virginia and at Tufts University School of Medicine in Boston, where he was also dean for five years. He returned to Texas Tech University in 1980 to become its tenth president, the first Hispanic and first graduate of the school to hold the office.

Cavazos has served both the field of medicine and the field of education. He has been a consultant to national and international health organizations, including the World Health Organization and a variety of inter-American health groups.

Reservations to attend the pay-as-you-go luncheon can be made by calling 727-3500.

Space Society Chapter Formed Here

A local chapter of the National Space Society (NSS) has recently been formed at Langley Research Center.

An organizational meeting of the Langley NSS chapter will be held at 5 p.m. Wednesday, October 10, at the Visitor Center to familiarize interested persons with the purpose and goals of NSS and to plan activities for the coming year.

The NSS is a 30,000-member national organization with chapters in most major metropolitan areas. The society was formed to promote interest in space exploration, research, development and habitation through the media of conferences, the press, library and museum exhibits and other literary and educational means. The NSS also strives to stimulate the advancement and development of applications of space and related technologies by bringing together people from government, industry and other walks of life for the free exchange of information.

Interested members of the Langley community and the community at large are invited to attend the October 10 organizational meeting. For further information about the meeting, the NSS or the Langley Chapter, contact Doug Stanley, ext. 44518.

Science-by-Mail Scientists Needed

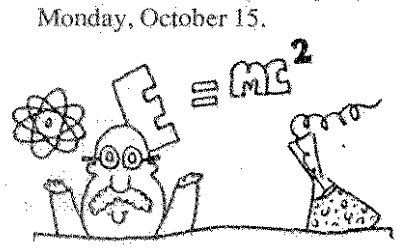
How does one get rid of the trash accumulated during a space voyage to Mars? Seal the trash bags and store them on the outside of the spaceship so that the heat of reentry burns them up? Use the trash as fertilizer to grow plants inside the spaceship? Or, maybe, fly by a black hole and drop it in? These are ideas generated by children as they wrote to their scientist pen pals in the Science-by-Mail program.

Science-by-Mail is an international science outreach program that teams children with scientists in creative, problem-solving exercises. The Science Museum of Virginia in Richmond serves as a regional chapter for the program. Scientists from all science fields, engineers and persons in other technology fields are needed for the program.

The program is geared for students in grades four through nine. Students can sign up as individuals, as groups of up to four, or as a family. Student teams receive three science challenge packets a year designed to foster an interest in science and elicit creative solutions.

Each Science-by-Mail volunteer scientist is paired with up to five groups of children. The volunteer scientist is sent background information, science project solutions and suggestions for evaluating the three science challenge packets. The amount of correspondence time required depends on the extent to which the scientist and teams become involved in the three projects.

Persons interested in participating as volunteer scientists or in registering children in the program may contact Shelley Canright, education and information specialist, Mail Stop 154, or call ext. 43313. Deadline for registering either as a volunteer scientist or student participant is Monday, October 15.



-photo by Carol Petrachenko

Terry Morris, electrical engineer in the Information Systems Division, operates the telerobotic manipulator, a prototype for a robotics system to be used on the space station to build or repair space structures.

Who benefits from CFC contributions?

Because Others Cared, His World is A Better Place

How is it that a 14-year-old boy—abused, neglected, then abandoned—could survive in an unknown environment, earn a scholarship to college and land a responsible position in America's space program? It is because someone cared—someone like you or me who remains convinced that our world can be a better place.

Terry Morris is an electrical engineer in the Information Systems Division. He is currently working on NASA's laboratory telerobotic manipulator (LTM) project, a prototype for a robotics system to be used on the space station to build or repair space structures.

The future for Terry Morris wasn't always so bright; in fact, at age 14, Morris was not convinced that he had a future at all. Abused and neglected for most of his childhood, Morris was abandoned by the side of the road nearly 500 miles from home. He never saw his family again.

"For six weeks I roamed the countryside, looking for places to sleep and things to eat," said Morris. "I was in a strange part of the country and knew no one; I had nowhere to turn."

Morris was picked up by the local police and taken to Alpha House, a foster care home for boys partially funded by Combined Federal Campaign (CFC) funds. "Alpha House gave me what I never had as a child. There was somebody there for me, someone to talk to, someone who cared about me," he said. "I mark my first day at Alpha House as the beginning of my life—my quality life. The world suddenly seemed a better place for me."

Under the guidance of Alpha House director Jerry Clayton and his staff, Morris blossomed personally and excelled intellectually. "Alpha House offered the discipline and the direction that had always been missing in my life," he reminisced. "I respond well to goals and they helped me set them for myself."

Through his high school counsellor, Morris was introduced to the NASA co-op program. On May 31, 1985, he graduated at the top of his high school class in Tupelo, Miss. He had earned a full college scholarship and, five days later, had started the first of six co-op experiences at NASA's Langley Research Center.

"My personal life has been fraught with constant challenges. I had to leave Alpha House at age 17 and was bounced from one foster home to the next," said Morris. "I was faced with adjusting to family life and cultural idiosyncrasies having had little positive experience with either. My only constant outlet was education. Knowledge, to me, was power and I worked hard at my education to attain that power."

A 1990 graduate of Mississippi State University in Starkville, Morris is now a full-time Peninsula resident and a staunch proponent of the CFC, the once-a-year opportunity for federal workers to help others in need. "I could lose everything and still succeed," concluded Morris, "because I now know people care. This caring can work miracles—it did for me! It can make our world a better place."

CFC
Virginia Peninsula

Happenings

SPECIAL LAA SOCIAL will be held Friday, September 28, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment by Gator Allmond and Spice of Life. $1 cover charge.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 to 12:30 in Building 1232, Room 236. For additional information, call Steve Dahmen, ext. 44519.

NASA TOASTMASTERS meet the second and fourth Wednesdays of each month. The next meeting is September 26 at 11:30 a.m. in the H.J.E. Reid Conference Center, Building 1222.

LOW IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA gym. Cost is $12 per month. First class is free.

TURKEY SHOOT, sponsored by the Langley Activities Association, will be held from 9 a.m. till dusk Saturday, November 3, on the Activities Center grounds. Food, fun and "turkeys!" Raffle tickets to win turkeys are $.25 and are available from members of all LAA-sponsored clubs.

NAT'L SPACE SOCIETY, Langley chapter, will hold an organizational meeting at 5 p.m. October 10 at the Visitor Center. Purpose and goals of the society as well as plans for the coming year will be discussed. See news item on page 7 for additional information.

FUZZY THE CLOWN will do children's birthday parties. Let Fuzzy entertain and play games with the young guests while you take pictures. $25. For information, call 851-2255.

MODEL TRAIN SHOW and SALE will be held at the Virginia Beach Civic Center, September 29-30, during Neptune Festival. Times are 11 a.m. to 6 p.m. Saturday; noon to 6 p.m. Sunday. Cost is $2 for adults; children under 12 free with adult. For information, contact Norm Garner, 484-0772, or Skip Metcalf, 421-7964.

SHOPPING TRIP to English Towne, N.J., October 6. Depart Hampton at 1 a.m., return 10 p.m. Cost is $25/round trip. Call Dee at 887-8481 for details.

FOR SALE: AUTOMOBILE. 1976 Datsun B210 for parts. Call 838-6000.

Richmond Red Cross Official to Speak

NASA Langley to Hold CFC Kickoff

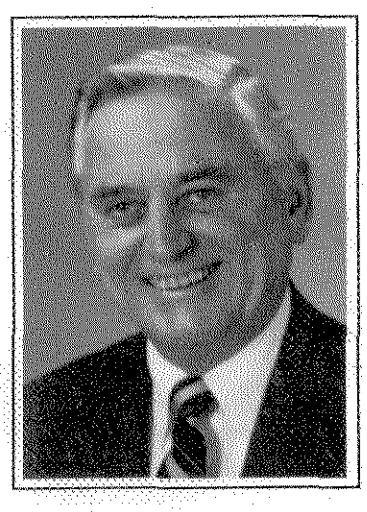
Langley Research Center will begin the 1990-91 Combined Federal Campaign (CFC) with a special kickoff ceremony Friday, September 21.

Brigadier General William D. Curry Jr., USAF retired, will speak on this year's CFC theme "Make the World a Better Place" and the St. Croix/Hurricane Hugo disaster. The kickoff will be held for all employees at 1:30 p.m. in the H.J.E. Reid Conference Center, Building 1222. The national CFC film "A Better Place," featuring Langley's own Terry Morris, will be shown during the kickoff program.

Curry is chairman of the Disaster Services Committee and board member of the Virginia Capital Chapter, American Red Cross in Richmond, and is self-employed as a consultant. He was director of resources at Whittaker General Medical Corporation, general manager of Herwig Surgical Instrument Company, and division manager of Herwig/OEM Group during the period 1981 to 1987. Curry served in the U.S. Air Force from 1944 to 1980. He has flown the P-51 Mustang, B-47 Stratojet and F-4 Phantom fighter and was commander of an A-7 Corsair II wing. His assignments included the Strategic Air Command, Joint Chiefs of Staff and Air Staff, Chief of Staff for Logistics, Headquarters Tactical Air Command and commander of various fighter wings. His last assignment was with the Defense Logistics Agency as commander of the Defense General Supply Center in Richmond.

Curry has been very active in the United Way and CFC. He has served on the United Way boards in various cities in the United States, and in 1980, he was a member of the United Way campaign cabinet and chairman of the CFC in Richmond.

The CFC provides an opportunity once a year for civilian and military employees of the government to support and contribute to many worthy health, welfare and community service organizations. The funds provided to these agencies permit them to relieve suffering; provide care for the young, aged, homeless and hungry; bring hope to the depressed; and to improve the quality of life for everyone, not only on the Virginia Peninsula but around the world. It is the one campaign which helps people--our families, friends and neighbors--all year long.



The Langley Research Center is the third largest CFC contributor on the Peninsula. Langley Director Richard H. Petersen has confirmed a goal of $255,000 set for this year's campaign. The money Langley contributes will be distributed among the Peninsula United Way, Greater Williamsburg United Way, National Volunteer Health Agencies, National United Service Agencies, International Service Agencies, Independent Charities of America and Environmental Federation of America. Each of these organizations distributes its funds directly to subsidiary agencies and each agency is dedicated to helping people, not only in this area but worldwide.

-photo by Sandie Horsey

BUMPER POOL ANYONE? Youngsters at the Boys' Club of the Virginia Peninsula enjoy a game of bumper pool under the supervision of Langley staff members (L to R) Bruce Conway, chief, Instrument Research Division and CFC campaign vice chairman; Joseph Stickle, chief engineer, Willard Weaver, technical assistant to the director for space; and Darrel Tenney, chief, Materials Division and chairman, CFC. For 45 years, the Boys' Club has been dedicated to serving the cultural, educational and recreational needs of boys between the ages of six and 16. This summer, 250 boys spent approximately 12 hours a day at the Newport News facility, participating in supervised activities, such as games, computer training, reading, swimming, exercise and outdoor sports. The Boys' Club, which emphasizes fun, good character and responsible citizenship, enhances the quality of life for many boys on the Peninsula through the support it receives from the United Way of the Virginia Peninsula. The United Way provides approximately 74 percent of the operating costs of the the club. Your contribution to the Combined Federal Campaign helps the Boys' Club and countless other worthy organizations. Please give generously.

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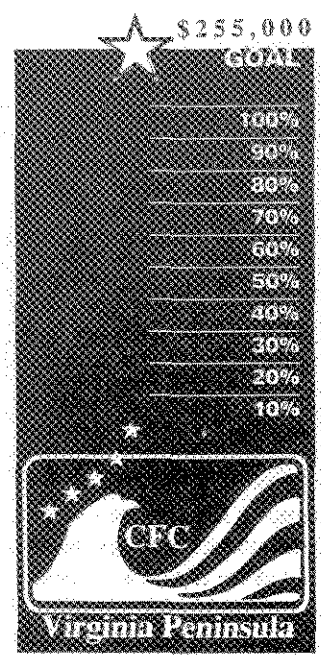


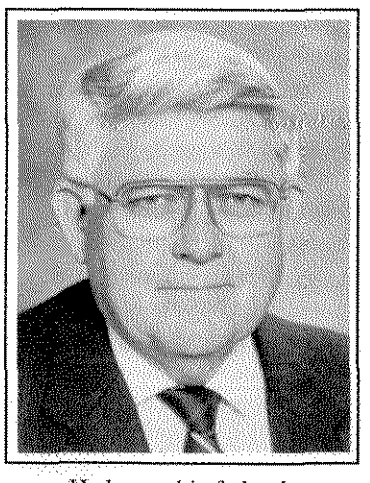
NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 20 October 5, 1990

Langley News Researcher

Bi-weekly Employee and Contractor Publication

Hook Receives Space Award



Langley Director for Space W. Ray Hook has been recognized by the American Institute of Aeronautics and Astronautics (AIAA) for achievements in spacecraft and launch vehicle technology. Hook was presented the 1990 Space Systems Award at the AIAA Space Programs and Technology Conference September 27 in Huntsville, Alabama.

Hook was cited for "outstanding leadership and contributions in the areas of Space Station and space transportation systems requirements and technology needs, which have had significant impact on the nation's Space Program."

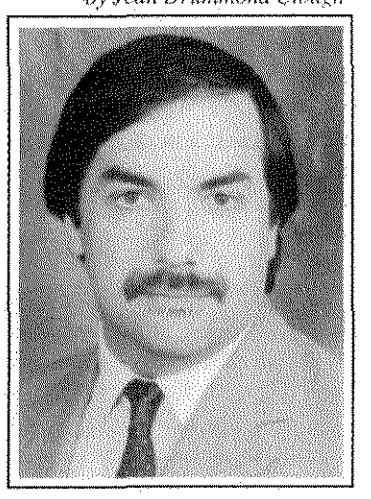
Since October 1988, Hook has overseen space research efforts at Langley. He is responsible for advanced space transportation, planetary entry, Space Station Freedom, large space antenna research and Langley's atmospheric sciences programs.

He began his federal career at Langley in 1955 as an aeronautical research intern. His experience has included an assignment at NASA Headquarters, Washington, D.C., as acting director for Space Shuttle technology payloads. He was also head of Langley's Shuttle Experiments Office as well as the Systems and Experiments Branch. Prior to assuming his present position, he was head of the Space Station Freedom Office.

Langley Colloquium and The Sigma Series

DuPont Scientist to Discuss 'Designer Genes'

-by Jean Drummond Clough



Humans have used genetics for hundreds of years to improve the quality of crops. However, the ability to analyze genes at the molecular level was only developed in the last decade. The combination of classical genetics and molecular biology gave rise to the novel discipline of molecular genetics. In agriculture, the challenge today is to produce food crops--through the use of "designer genes"--that are safe, abundant and cheap.

During two lectures in Hampton, Tuesday, October 23, Dr. Pablo Scolnik, plant science group research supervisor, DuPont Experimental Station, Wilmington, Del., will present "Designer Genes in Agriculture." In his lectures, Scolnik will discuss the application of modern molecular genetics to agriculture and the prospects for crop improvement using genetic engineering.

At 2 p.m., Scolnik will speak to Langley employees, retirees and contractors at a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 7:30 that evening, he will give the same lecture at the Holiday Inn, Coliseum Hotel and Conference Center, as part of The Sigma Series. Sponsored by the Virginia Air and Space Center, the Daily Press and NASA, the Sigma Series presents free public lectures on timely topics.

According to Scolnik, the world's population is expected to reach 8.5 billion by the year 2025. It is estimated that a minimum five-fold increase in global economic output is required just to maintain current standards of living. This increase must be achieved without further deterioration of the Earth's environment. Thus, agricultural researchers are looking at genetic engineering and molecular genetics as a means of improving crop production.

Scolnik has been with DuPont since 1987. Previously he was a staff scientist at Cold Spring Harbor Laboratory, a research associate professor at the University of Chicago and a research associate at St. Louis University and at the Buenos Aires National Institute of Microbiology.

LaRC Nets Two R&D 100 Awards

Langley Inventions Chosen Most Significant Technical Advances This Year

Two Langley inventions number among the 100 most significant technological advancements of the year. R&D 100 awards are presented annually by *Research and Development* magazine; they recognize a hundred outstanding products developed during the year to advance science and technology. Selections are made by a panel of scientists and engineers after studying new technology around the world.

Langley Research Center has earned 19 R&D 100 awards in its 23 years of competition. NASA ranks second on the list of R&D award recipients.

Composite Monitoring Device Heralded

-by Kristina Murden

A recently patented monitoring system will advance NASA's goal to exploit the full potential of composite materials.

The In-Situ Fiber Optic Polymer Reaction Monitor, developed by Foster-Miller Inc. and Langley Research Center, represents a quantum advance in the processing of polymer matrix composites like carbon fiber and high performance resins. Conceived at Langley, the new technology should find numerous research and commercial applications ranging from the manufacture of new aerospace materials to environmental and industrial arenas, said Dr. Philip Young, a principal developer of the system and senior polymer scientist in Langley's Polymeric Materials Branch.

-photo by Carol Petrachenko

Dr. Philip Young is the principal developer of the In-Situ Fiber Optic Polymer Reaction Monitor.

The analytical system is capable of directly measuring the chemistry of a variety of advanced composite materials through the use of fiber optics, the transmission of light through fiber. Fiber optics can sense infrared spectra, light lying outside the visible spectrum, which fingerprint the integrity of a composite.

This monitoring technique may alleviate problems associated with the manufacture of advanced carbon fiber composite materials by recognizing the need to redistribute temperature and pressure during the cure process. The monitoring of pure resin chemistry helps to yield optimum materials, since voids or imperfections that can be attributed to a decrease in performance can be compensated for during processing, said Young. Monitoring may take place in virtually any environment, during or after manufacture.

"The capability to directly observe, interpret and control the formation of composite matrix building blocks, the chemical bonds between atoms, is revolutionary. Significantly higher yields in the manufacture of complex composite parts for aircraft structural elements and substantial cost reductions could result," said Young. "This monitoring device may speed the general acceptance of composites, which are considered to be important materials of the future." This prospect drives Langley's interest in the technique.

Laser Velocimeter Device Chosen

-by Laura A. Pritchard

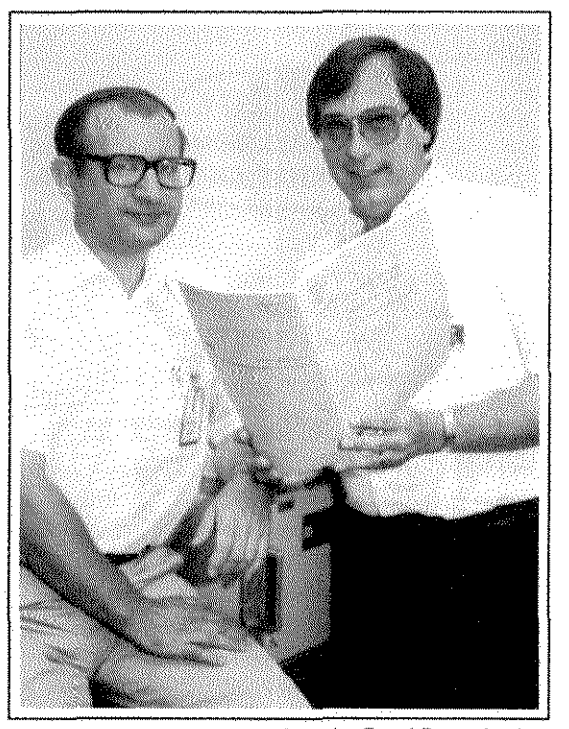
A method of processing data on the velocity of fluid flow has been recognized as one of the 100 most significant technical products this year.

James F. Meyers, an aerospace technologist, and James I. Clemmons Jr., a senior electronics technician, developed the technology that led to the fabrication of the Frequency Domain Processor (FDP 3100). The device can accurately measure air flow, blood flow, water flow and crystal growth, depending on the computer software used.

Meyers and Clemmons, of Langley's Gas Parameters Measurement Section, were assisted by John W. Stoughton, Sharad V. Kanetkar and Andreas E. Savakis, from Old Dominion University in Norfolk.

The FDP 3100, coupled with a laser based optical system, measures the velocity of air in wind tunnels, for example. However, air cannot be measured directly, so the velocity of very small particles in the air is measured. The FDP 3100 digitizes the signal created by the laser-based optical system hitting the very small particles to determine the velocity. The concept behind the FDP 3100 is not new, but the implementation and electronics supporting it are new.

The advantages of the FDP 3100 include its ability to use more points of data to receive more accurate results than previously existing products.



-photo by Carol Petrachenko

James I. Clemmons (left) and James F. Meyers developed the technology that led to the FDP 3100.

News Briefs

Pioneer 10 Marks New Epoch in Solar System Exploration. --- NASA's Pioneer 10 spacecraft, the first to leave the solar system, reached another milestone on Saturday, September 22. At 4:19 p.m. EDT, Pioneer 10 was 50 times farther from the sun than the sun is from planet Earth. Reaching the 50 astronomical unit (AU) distance "marks a new epoch in exploration of the outer solar system," according to Pioneer experimenter James Van Allen of the University of Iowa. Van Allen, discoverer of the radiation belts around the Earth which bear his name, said reaching the 50 AU distance "has been a goal of physicists for many decades." At this point, Pioneer 10 was 4,647,809,899 miles from Earth. Pioneer has already travelled farther than any human-made object.

NASA Awards Education Research Grants. --- NASA has awarded research grants to two universities to develop teacher training courses that will enable teachers to incorporate aerospace topics and concepts into their classrooms and to create new and imaginative practices in learning. The new education initiative, the Teacher Training Pre-Service Program, is a two-year pilot program. Bethune-Cookman College, Daytona Beach, Fla., and Rensselaer Polytechnic Institute, Troy, N.Y., were selected from responses to a solicitation of proposals. Each will receive a $75,000 grant and are expected to provide matching, non-Federal funds. The Rensselaer program will be developed and implemented jointly with Russell Sage College, Troy.

NASA Names Space Shuttle Hydrogen Leak Investigation Team. --- Robert L. Crippen, director, Space Shuttle, has formed a Hydrogen Leak Investigation Team to locate and solve the hydrogen leak problem on the orbiter Columbia which forced the postponement of the STS-35 mission. Crippen has named Robert Schwinghamer, deputy director for the Space Transportation Systems, Science and Engineering directorate at the Marshall Space Flight Center, Hunstville, Ala., to lead the team.

Hot Early Earth Evidence May Change Life Evolution Theories. --- Evidence for a hot early Earth has been growing in recent years, and these conclusions may require major changes in theories of how life began on Earth. NASA Ames scientists believe that during the first several hundred million years of the Earth's history, massive amounts of carbon monoxide and carbon dioxide were released into the primitive atmosphere through volcanic eruptions and the impact of meteorites and comets. Because carbon dioxide traps heat radiating from the Earth's surface, temperatures soared to 190 degrees Fahrenheit. These searing temperatures may have destroyed the large organic molecules that are the building blocks of life. In light of these conclusions, some scientists are looking at sites other than the Earth's surface for places where life could have originated.

Editor's Note: To obtain copies of the news releases summarized above, contact Jolyn Rivenbark, Mail Stop 146, ext. 43293. Request information by bold face headline given above.

Senior Management Research Review

The Senior Management Research Review will be held Monday, October 15, 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	LTM--A Dual-Arm Redundant Telerobotic System	Walter Hankins (Flight Systems/ISD)
9:45	Flight Tests Using Data Link for Air Traffic Control and Weather Information Exchange Show Wide Pilot Acceptance and Significant Communication Error Reductions	Charles Knox (Flight Systems/FLMD)
10:00	Control of Flexible Mini-Mast Demonstrated by CSI Investigators	Sharon Tanner (Structures/SDYD)
10:15	Development of High-Angle-of-Attack Nose-Down Pitch Control Requirements for Relaxed Static Stability Combat Aircraft	Marilyn Ogburn (Aeronautics/FAD)
10:30	Water Vapor and Cirrus Cloud Climatology from SAGE II	William Chu (Space/ASD)
10:45	Experimental Study to Enhance the Aerodynamic Characteristics of the HL-20 Personnel Launch System Concept	Bernard Spencer (Space/SSD)

Lankley

Happy Boss's Day--October 16

Tech Brief Awards Presented

The following Langley employees received NASA Tech Brief Awards. The awards were presented by Charles P. Blankenship, director for structures.

Robert H. Daugherty was cited for his publication "Measurement of Flow Rate and Trajectory of Tire-Generated Water Spray."

Pamela A. Davis, Sandy M. Stubbs and **John A . Tanner** for "Langley Aircraft Landing Facility."

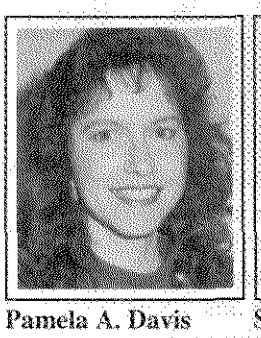
Ruth H. Pater for "Tough, High-Performance, Addition-Type Thermoplastic Polymers," "Addition-Type Thermoplastic Bismaleimide Reaction," and "A Tough and Microcracking-Resistant High-Temperature Polymer."

Moses G. Farmer for "Butterfly Screens to Protect Wind Tunnel Fan Blades."

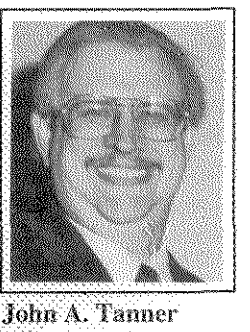
David E. Bowles for "FECAP--Finite Element Composite Analysis Program for a Micro-Computer."

Gary L. Farley (Army) for "Farley 3-D Braiding Machine."

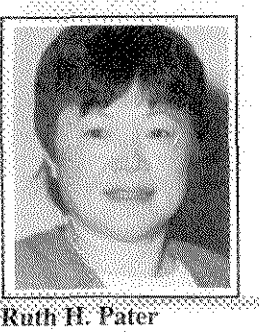
Robert A. Golub for "256 Ring."

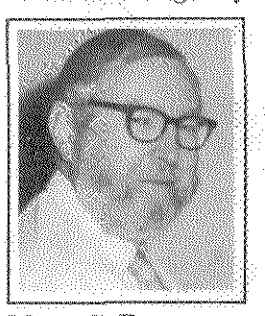

Pamela A. Davis

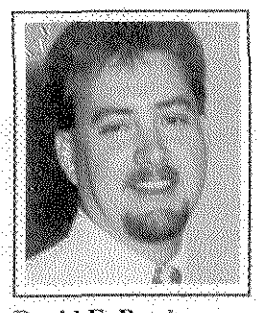
Sandy M. Stubbs


John A. Tanner

Robert H. Daugherty


Ruth H. Pater


Moses G. Farmer


David E. Bowles

Talcott Approved for Leave Transfer

Natalie Talcott, five-year-old daughter of Noel Talcott of the Advanced Aircraft Branch, has been diagnosed with a very rare condition called Sanfilippo Syndrome, type A. Treatment for this disease is based on bone marrow transplantation. Talcott has been accepted into NASA's Leave Transfer Program. Under this program, an individual may donate annual leave to Talcott so that he may remain at the University of Minnesota Hospital with his family during this crisis.

In addition, blood may be donated to the American Red Cross in Natalie's name. For information on the Talcott situation, contact Steve Kirkham or Doris Williams, ext. 45292.

DIAL-A-SHUTTLE 1-900-909-NASA

A service provided by the National Space Society, Washington, D.C., allows you to listen to the astronauts and hear mission updates 24 hours a day, from launch to landing. Cost is $2 for the first minute and $.45 for each additional minute. STS-41, scheduled to launch October 6, will deploy the Ulysses spacecraft on a five-year journey to the polar regions of the sun. See mission report, page 5.

Upcoming Conferences

High-Angle-of-Attack Technology Conference banquet will be held at 7 p.m. Wednesday, October 30, at the Holiday Inn, Coliseum Hotel and Conference Center. Guest speaker will be James A. Robb, commander, U.S. Navy Fighter Weapons School "TOPGUN." Cost is $25. Interested individuals should contact Carol Lightner at 722-0330, ext. 222, or Pat West, Mail Stop 246A, ext. 46399.

Technology for Lunar/Mars Aerobrakes Workshop will be held October 30-31 at the Mission Valley Inn, Raleigh, North Carolina. The workshop is sponsored by the Mars Mission Research Center, a NASA University Space Engineering Research Center at N.C. State University and N.C. A&T University. Topics include mission analysis and design, hypersonic aerodynamics, structures and controls, composite materials and fabrication. Cost is $50. Contact Fred DeJarnette at (919) 737-2365.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Meteoroid Strikes on LDEF Hold Clues to Cosmic Origin and Space Station Protection

Analysis of meteoroid impacts on Langley's Long Duration Exposure Facility (LDEF) promises important new perspective for two major space puzzles--how our universe was formed and how to protect long-term space vehicles. Both these challenging prospects are the province of Donald H. Humes, principal investigator for the space debris impact experiment, the largest in terms of exposed surface on LDEF. Humes is now in the midst of examining the approximately 25,000 meteoroid and space debris hits on the 48 separate aluminum plates designed to record the bombardment of the space missiles, some of which hit LDEF at speeds up to 60,000 miles per hour. Like other investigators, Humes now has a widely expanded horizon for his research owing to the nearly five extra years of LDEF's voyage.

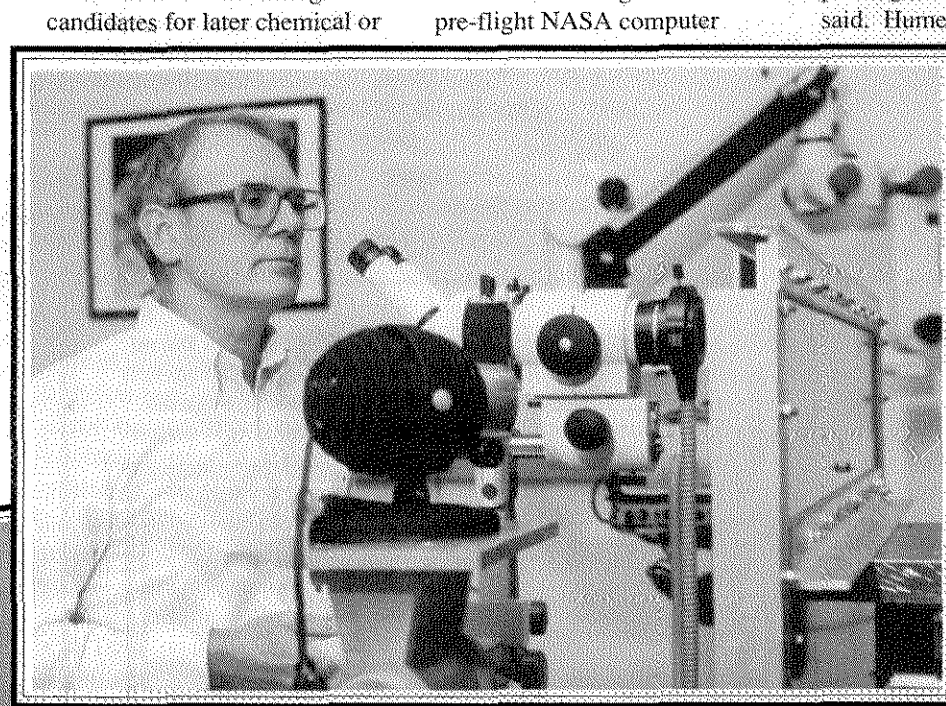
The research in this two-pronged science and engineering investigation, includes characteristics of the meteoroid impacts such as number, size, speed and direction. Humes explains that this data can identify the source of the meteoroids--the comets which inhabit deep space and emerge infrequently to dazzle us with their fiery tails. Thus, the knowledge already accumulated about these parent phenomena will be enhanced by the LDEF meteoroid data. Added to that information will be the eventual chemical analysis of residual material from the impact craters on the LDEF plates. In this process an electron or ion beam is focused on the material in a vacuum environment. When the beam strikes, electrons or x-rays are emitted whose energy spectrum is an identifying fingerprint of the material. These data, together with other inputs, will give astronomers much more to consider in their quest to confirm theories of cosmic origin including the origin of life.

At the same time, engineers working on the design of projects like the Space Station are vitally interested in this data because it will influence decisions about construction materials and the variation in shielding needed around such spacecraft. Of particular interest to the engineers is the presence of man-made debris. This space junk can be distinguished from meteoroids because, unlike meteoroids which are on the way down toward Earth, the junk is in orbit and, therefore, hits LDEF almost exclusively on the sides. Similarly, because of its orbit, it would seldom strike the back of LDEF. While this material will eventually burn-up as it reenters the atmosphere, it poses a major threat to space vehicles and must be part of engineering considerations, Humes notes.

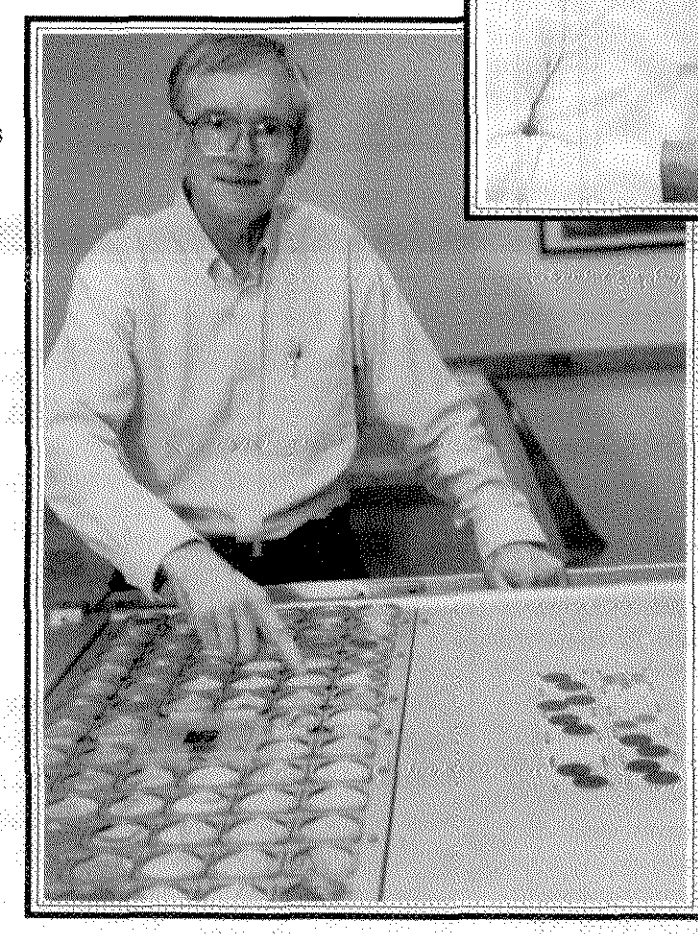
The initial mode of identity and categorization of the strikes involves mounting each plate on a traverse table and examining the craters through a stereo microscope. Individual sizes and locations are then recorded as is the presence of residual material which might be candidates for later chemical or isotopic analysis. Humes explains that he has documented about 2,800 of the craters so far. The size of the meteoroids that struck LDEF ranged from about 1/ 1000 of an inch in diameter to 1/32 of an inch in diameter. The deepest penetration into the aluminum plates was 1/16 of an inch--deep enough to raise a bump on the back of the 3/16 inch thick plate.

He points to the differences he is finding between a pre-flight NASA computer model constructed from other space flights, radar measurement and photograghy. He says the model appears to be generally accurate as to the number of impacts and sizes but did not predict the kinds of trajectories the meteoroids actually travelled. "We have an accurate velocity distribution in the NASA model of the meteoroid environment but the distribution of craters around LDEF is proving the model wrong, " he said. Humes will explain his early findings at the LDEF symposium to be hosted by Langley when nearly 1,000 worldwide scientists and engineers will present preliminary results of the spacecraft's 57 experiments.

Humes is a research engineer in the High Energy Science Branch of the Space Systems Division. In addition to his LDEF principal investigator role, he has had dual responsibilities in the areas of solar-pumped laser and meteoroid research. He was charged with development of a flow laser including its system design, assembly and experimental operation. In meteoroid research, he is Langley's lead individual in the fields of hypervelocity impact damage and he is a consultant to major space projects in evaluating possible meteoroid impact damage. This work has involved such offices as Lunar Orbiter, Skylab, Viking, Voyager, Galileo, Pioneer and the Shuttle.



Above, Donald H. Humes, principal investigator for the LDEF space debris impact experiment, adjusts the stereo microscope he uses to analyze the craters made by meteoroids when they hit aluminum plates mounted on the Langley spacecraft. About 25,000 meteoroids or pieces of space debris impacted LDEF, some at speeds up to 60,000 miles per hour.



Philip C. Kassel Jr. points to one of the 459 micrometeoroid sensors which flew on LDEF and recorded some 15,000 separate strikes. Kassel is the principal investigator for the interplanetary dust experiment which is revealing new data about the origin and makeup of these space particles.

*These stories, by Craig Murden, are the fifth and sixth in the **Researcher News** series featuring Langley principal investigators. Photos are by Carol Petrachenko.*

Micrometeoroid Impact Sensors Come Home for the First Time Via LDEF

Sensors designed to record long term micrometeoroid activity in space and return to tell their story are now under study by Langley's principal investigator for the interplanetary dust experiment, Philip C. Kassel Jr. He is analyzing what the 459 sensors aboard the Long Duration Exposure Facility (LDEF) are revealing about the sources, composition and paths of these space particles. Kassel says micrometeoroid impact sensors have been sent aloft before but, "we usually never get them back and haven't had any up so long. Now we can really focus on how they worked."

The early answer, he adds, is that the sensors, all designed and built here, apparently did very well with only about eight percent failing to survive the 15,000 impacts they endured in the one year of their intended life. Further, upon post-flight inspection, a number of those failures occurred when "something big" hit them and not from material or electrical gremlins. The only other difficulty was when a combination of outgassing and sun exposure shorted out some sensors for short periods. Kassel intends to expand his investigation to determine causes of all failures in the first, active year and to examine the electrical condition of the sensors based on their additional, unrecorded time in orbit.

The sensors were positioned in six different trays; one each on the leading and trailing edges, two on the transverse faces and one each at space-facing and Earth-facing ends. Five of the trays carried 80 active detectors each while the spaceward tray bore 59. Each detector was a 50-mm diameter oxide-silicone semiconductor capacitor. Sixty percent were of 0.4 micron thickness while the rest were one micron thick. Preliminary findings are confirming that the placements on LDEF and capacity selection optimized the experiment's results.

Those initial results have a variey of intriguing aspects, says Kassel. He points to data that indicate some particles came from the Sun while other information adds to the body of research which shows that the major source of the interplanetary micrometeoroid environment is comets. The presence of micro-sized space debris has also been confirmed and postulations about their origin include the Shuttle's solid rocket motors and the Shuttle orbiter itself when the cargo bay is opened. Later, more sophisticated analysis using electronic scanning of residual material in the impact craters should provide more definitive data about both cosmic origins and specific differentiation between micrometeoroids and debris. Kassel says this phase of the investigation will be under the direction of co-investigator Dr. J. J. Wortman of the Electrical Engineering Department at North Carolina State University.

The sensors operated by sending an electrical signal to a recorder upon each impact. This sequence captured the time of the hit and the direction it came from. Although this level of capability lasted just one year of the spacecraft's much longer voyage, scientific insight from continued cratering of the sensors was possible by correlating LDEF's known orbital positions with the impact patterns established during the electrically active first year.

Kassel is now preparing to present preliminary results at the LDEF symposium when Langley will host all of the investigators for the 57 experiments flown on the spacecraft.

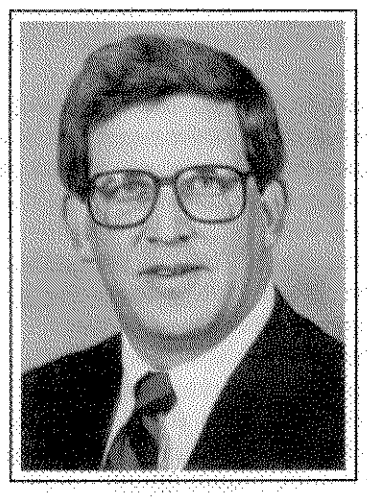
Kassel is a senior research scientist in the Photo-Optical Instrumentation Section of the Instrument Research Division where he specializes in high speed photography. He began his NASA career at Langley in 1961.

photo by Don Ward

THEY ARE SMILING BECAUSE THEY KNOW HELP IS ON THE WAY. CFC Chairman Darrel Tenney (right) is joined on a eye-opening visit to the Foodbank of the Virginia Peninsula by (from left) Milt Holt, chief, Information Systems Division; Scott Wagner, assistant chief, Atmospheric Sciences Division; and Tom Vranas, union representative. Twenty percent of all food in this country is wasted each year. This is enough to feed 49 million people three times a day for the entire year. Foodbank volunteers pictured here are working to recapture this resource in order to feed the hungry in our community. About 20,000 individuals on the Peninsula are fed each month with food provided through the Foodbank, a private, non-profit organization partially funded through the Combined Federal Campaign. If you are well nourished, your contribution to the CFC can make sure others are cared for as well. Your one contribution helps them--all year long.

CFC Virginia Peninsula

Johnston to Speak at NSS Meeting



Ralph T. Johnston, executive director of the Virginia Air and Space Center, will be the guest speaker at the first meeting of the Langley chapter of the National Space Society (NSS). This organizational meeting will be held at 5 p.m. Wednesday, October 10, in the Visitor Center.

Johnston, an active member of the NSS, will speak on "The Future of the Virginia Air and Space Center." As its first director, Johnston is charged with the overall management of the center, providing leadership in the creation and design of the exhibits as well as in the development of programs. He will also be in charge of staffing the center, which is scheduled to open in 1992.

The son of native Virginians, Johnston attended public schools in Maryland and Virginia and developed a lifelong interest in flight. His museum career began at the Smithsonian National Air and Space Museum where he was responsible for operations of the planetarium and Imax theater. He has been a consultant to the California Museum of Science and Industry and the Metropolitan Museum of Art. Prior to his assignment in Hampton, Johnston served as deputy director of the Museum of Flight in Seattle for three years.

The NSS is a 30,000-member national organization with chapters in most major metropolitan areas. The society was formed in 1987 from a merger of the L5 Society and the National Space Institute, which was founded as a result of the efforts of Dr. Wernher Von Braun to increase grass-roots support for the civil space program. The emphasis is on volunteer leadership and labor through its many chapters.

Interested members of the Langley community and the community at large are invited to attend the October 10 organizational meeting. For further information, contact Doug Stanley, ext. 44518.

Key Positions Announced

The following individuals have been selected to fill key positions at Langley Research Center:

Jimmy Staples has been named lead engineering technician, Operations Support Division, under CPP 90-51.

Barbara Fryer has been selected secretary (steno), Office of the Director, under CPP 90-58.

James Mayhew has been named aerospace technologist, Experimental Facilities Development, Facilities Program Development Office, under CPP 90-60.

Norman McRae has been selected lead electrical engineering technician, Systems Engineering Division, under CPP 90-61.

Violet Hopkins has been named secretary (typing), Fabrication Division, under CPP-90-8(3).

Thomas Barclay has been named head, Metals Section, Fabrication Division, under CPP 90-67.

Robert Sherrill has been selected head, Spacecraft Systems Section, Systems Engineering Division, under CPP 90-68.

Dana Dunham has been named assistant branch head, Flight Dynamics Branch, Flight Applications Division, under CPP 90-72.

Cynthia Dea has been selected purchasing agent, Acquisition Division, under CPP 90-73.

Martin Leatherman and **Sandra Zumbrun** have been named production controllers, Fabrication Division, under CPP 90-74.

Gail Scott has been selected head, Cost Accounting Section, Financial Management Division, under CPP 90-75.

Charles McClinton has been named manager, Numerical Applications Office, Hypersonic Technology Office, under CPP 90-76.

Gene Bowen has been selected supervisory engineering technician, Fabrication Division, under CPP 90-77.

Robert Calloway has been named deputy manager, Aeroassist Flight Experiment Project Office, Space Systems Division, under CPP 90-78.

William Williams has been selected electrical engineering technician, Operations Support Division, under CPP 90-81.

Herbert Kowitz has been named manager, Rarefied-flow Aerodynamics Measurement Experiment (RAME), Space Systems Division, under CPP 90-82.

Betty Perry has been selected secretary (typing), Space Exploration Initiative Office, under CPP 90-85.

Joseph DeLorme has been named aerospace engineer, Systems Engineering Division, under CPP 90-87.

Notes of Thanks

Joan Pitts writes: "A big thank you to all who came to my retirement party, to all who sent their best wishes and to all who called or sent cards. Such a warm display of friendship and love have almost convinced 'the butterfly lady' not to fly away. Thanks so much for the lovely gifts but, most of all, for your friendship. Wherever I go I shall always treasure my NASA friends."

Jesse Timmons writes: "I would like to extend my appreciation to all who attended or participated in my retirement party. It was very much a pleasure to join old and new friends in the partaking of a sumptuous repast, to swap memories of what has been and to speculate on what will be. My career at LaRC was very enjoyable and I shall remember with great fondness all the people with whom I have had the pleasure of meeting and working."

William M. Kahlbaum writes: "I would like to thank all of my friends and associates at Langley for the wonderful party given recently in honor of my retirement. It will provide me with a lasting memory of my career at Langley."

For Your Health

Riverside Wellness and Fitness Center enrollment certificate for sale at a discount. Call Wilson at 596-3991 after 5.

Project Thank You

Gifts for service persons stationed in the Middle East sponsored by the Langley Alumni Association

Contributions or gifts such as those listed below are being collected for distribution to our armed forces stationed in Saudi Arabia. Checks may be made payable to the Langley Alumni Association Treasurer and mailed to Mail Stop 496. Items should be taken to the Langley cafeteria and will be packaged for shipment by alumni volunteers. Be as generous as you can.

Acceptable Items

Personal care items
- toothpaste
- tooth brushes
- shampoo
- tube shaving cream
- stick deodorant
- disposable razors
- foot powder

Stationery

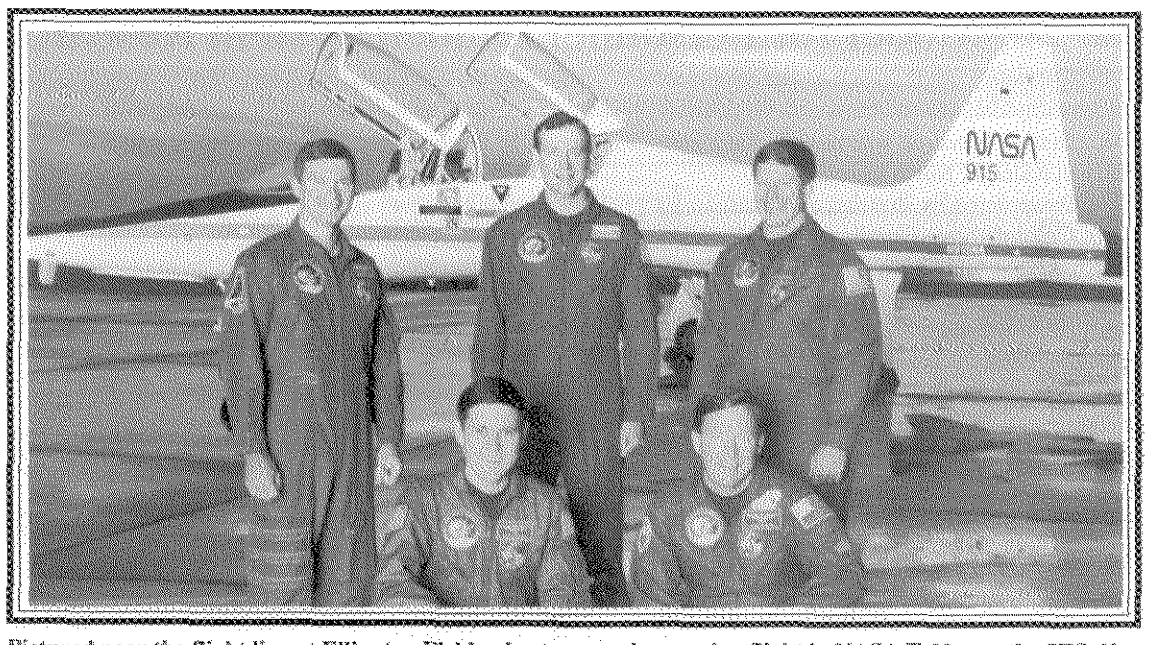
Snacks
- cracker sandwiches
- nuts
- cookies

Games
- playing cards
- puzzles
- checkers
- dominoes

Unacceptable Items

Dairy or pork products
Religious/holiday items
Heat sensitive items
Pressurized containers
Tobacco products
Perishables

Collection deadline: October 22



Pictured near the flight line at Ellington Field prior to an early morning flight in NASA T-38s are the STS-41 mission astronauts (front, L to R) Robert D. Cabana, pilot, and Richard N. Richards, mission commander; (standing behind) Bruce E. Melnick, Thomas D. Akers and William M. Shepherd, all mission specialists.

Ulysses Deployment Highlights STS-41 Mission

Space Shuttle mission STS-41 will be highlighted by deployment of the Ulysses spacecraft on a five-year journey to become the first probe to explore the polar regions of the sun. As of press time, NASA managers have selected October 6 as the launch date. The launch window extends from 7:35 a.m. to 10:05 a.m. EDT. The mission is slated to last just over four days, with a planned landing at Edwards Air Force Base, Calif.

After being deployed from Discovery under the oversight of Mission Specialist Thomas D. Akers, a two-stage Inertial Upper Stage and a single-stage Payload Assist Module will boost Ulysses on a trajectory that will take it to Jupiter in 16 months. Upon arrival, in addition to making some scientific studies of the giant planet, the spacecraft will receive a gravity assist from Jupiter into a solar orbit almost perpendicular to the plane in which the planets orbit. Ulysses is scheduled to make its first observations of the sun's southern pole between June and October 1994 and continue on to observe the northern solar pole between June and September 1995.

Also in Discovery's payload bay will be the Airborne Electrical Support Equipment, an electrical generating system mounted on the side of the bay to supply power to Ulysses. The Intelsat Solar Array Coupon, samples of solar array materials mounted on Discovery's Remote Manipulator System, is designed to study the effects of atomic oxygen wear on solar panels in preparation for a future Shuttle mission to rescue the stranded Intelsat satellite. The Shuttle Solar Backscatter Ultraviolet (SSBUV) experiment also will be in Discovery's payload bay, mounted in two Get Away Special containers. SSBUV will help fine tune the atmospheric ozone measurements made by satellites already in orbit by providing a calibration of their backscatter ultraviolet instruments.

Discovery will also carry the Chromosome and Plant Cell Division in Space experiment, a study of plant root growth patterns in microgravity; the Investigations into Polymer Membrane Processing experiment, a study of materials processing in microgravity; the Physiological Systems Experiment, an investigation of how microgravity affects bone calcium, body mass and immune cell function; the Radiation Monitoring Experiment to record radiation levels in orbit; the Solid Surface Combustion Experiment, a study of flames in microgravity; and the Voice Command System, a development experiment in voice commanding of the Shuttle's onboard television cameras.

The Ulysses Mission Up Close

Ulysses is a joint mission conducted by the European Space Agency (ESA) and NASA to study the polar regions of the sun and the interplanetary space above the poles. The spacecraft will be the first to achieve a flight path nearly perpendicular to the ecliptic, the plane in which Earth and the other planets orbit the sun.

Throughout its five-year mission, Ulysses will study three general areas of solar physics: the sun itself, magnetic fields and streams of particles generated by the sun and interplanetary space above the sun.

The Ulysses spacecraft, a ground control computer system and a spacecraft operations team are provided by ESA, while Space Shuttle launch, tracking and data collection during the mission are being performed by NASA and the Jet Propulsion Laboratory (JPL). Scientific instruments aboard the craft have been provided by scientific teams in both Europe and the United States.

After astronauts release Ulysses from Discovery's payload bay at an altitude of 160 nautical miles, a two-stage engine, the Inertial Upper Stage (IUS), attached to Ulysses will ignite, sending the craft on its initial trajectory.

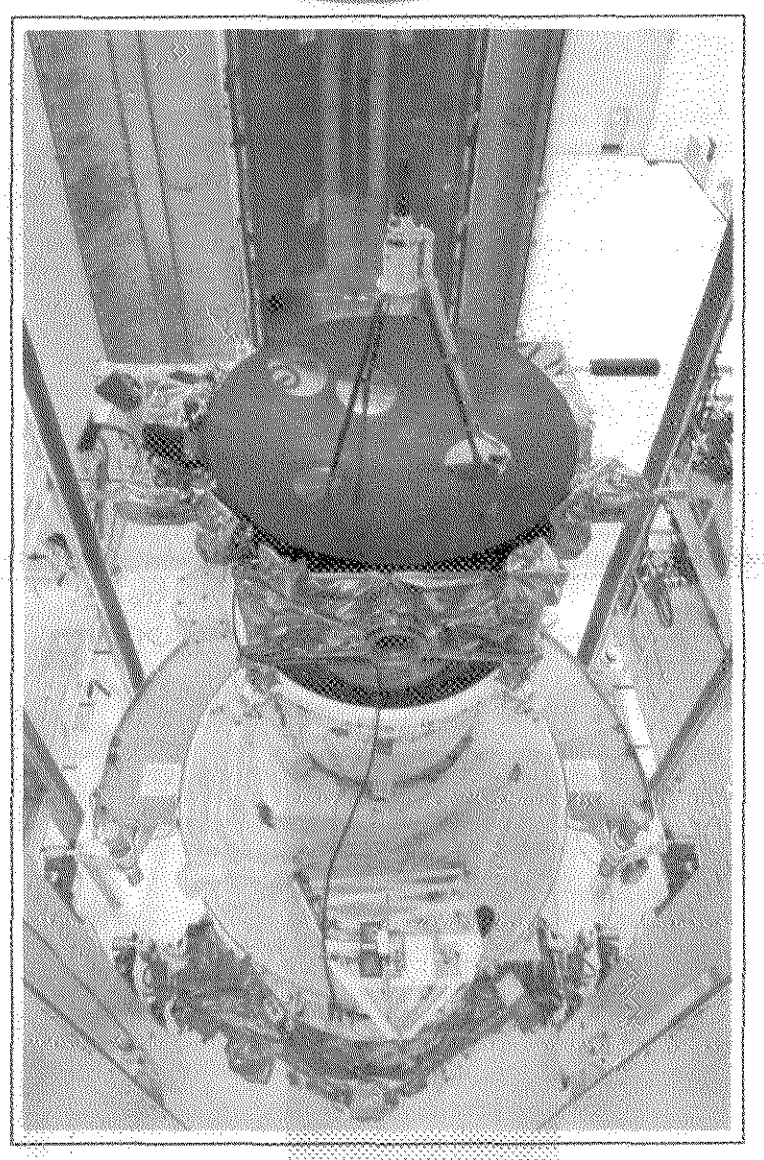
After the IUS separates, a smaller booster engine, the Payload Assist Module (PAM-S), will fire. Before the PAM-S fires, it will spin Ulysses up to a rate of 70 revolutions per minute (rpm). After the engine burn concludes, the spin rate will slow to about seven rpm. Boom deployment will further slow the spin rate to about five rpm. Ulysses will continue to spin at this rate throughout the remainder of the mission.

The booster engines will send Ulysses first to Jupiter, which the craft will encounter in February 1992. As Ulysses flies past Jupiter at about 30 degrees north Jovian latitude, the gravity of the giant planet will alter the craft's trajectory so Ulysses dives downward and away from the ecliptic plane.

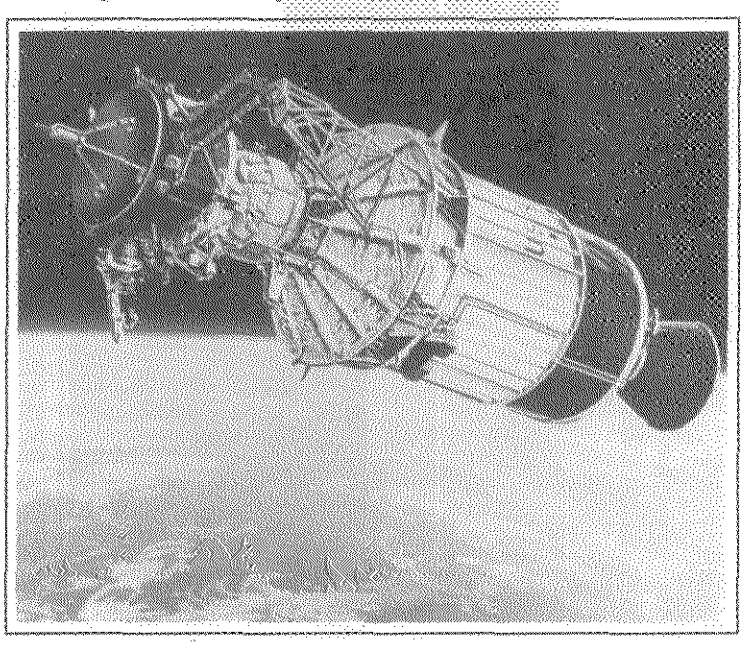
In its orbit around the sun, Ulysses' flight path will take it from a maximum distance from the sun of 5.4 astronomical units (AU), or about 500 million miles, to a closest approach of 1.3 AU, or about 120 million miles.

The spacecraft will reach 70 degrees south solar latitude in June 1994, beginning its transit of the sun's south polar regions. The craft will spend about four months south of that latitude at a distance of about 200 million miles from the sun.

In February 1995, Ulysses will cross the sun's equator, followed by its four-month pass of the sun's northern polar region beginning in June 1995. End of mission is scheduled for September 30, 1995.



The Ulysses spacecraft (upper) with two attached upper stages (lower) is transferred into the payload canister at Kennedy Space Center. Transport from the Vertical Processing Facility to the payload changeout room at Launch Pad 39B was made in late August. Ulysses was vertically installed in the cargo bay of the orbiter Discovery after the Shuttle was brought to the launch pad.



After deployment from the Shuttle cargo bay, a combined upper-stage vehicle consisting of an Inertial Upper Stage (IUS) together with a Payload Assist Module (PAM-S) will propel Ulysses away from the Earth toward Jupiter.

Happenings

LAA SOCIAL will be held Friday, October 12, from 4 to 6:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

LOW-IMPACT AEROBICS classes are held from 5-6 p.m. Tuesdays and Thursdays in the NASA gym. Cost is $12 per month. First class is free.

NASA TOASTMASTERS meet the second and fourth Wednesdays of each month. The next meeting is at 11:30 a.m. October 10 in the H.J.E. Reid Conference Center.

CONSERVATION CLUB will meet on Tuesday, October 16, at 4:45 p.m. in the H.J.E. Reid Conference Center, Building 1222. Topics include recycling, conservation of resources and community education. Call Ram, ext. 41524, for details.

STRESSBUSTERS, relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. Contact Steve Dahmen, ext. 44519, for more information.

FOR SALE: AUTOMOBILE. 1980 Plymouth Horizon for parts. Body and transmission good. Call 898-9049.

HOLIDAY IN HAWAII. Spend Thanksgiving on the islands. Eight days/seven nights, departing Norfolk November 17. Everything included except meals. Cost is $920 per person, double occupancy. A few seats still available. Call 890-0959 after 5 p.m. for details.

ASTRONOMY NIGHT. The Skywatchers Astronomy Club will host an evening of telescopic viewing of the heavens Friday, October 12, from 8 p.m. until midnight at the club observatory, Building 1231. Free and open to the public. If cloudy, event will be rescheduled for October 13. Call Marilyn Ogburn, ext. 41175.

BARBERSHOP CHORUS CONCERT. Suffolk Commonwealth chorus in conjunction with local quartets and "Arcade" will present "The Gift of Music" Saturday, November 3, at Lakeland High School Auditorium. Tickets are $5. For tickets or to place an ad in the program, contact Jim Youngblood at 588-8617.

FOR RENT: TOWNHOUSE. Woodtowne Quarters. 1 BR, furnished kitchen, W/D, patio, shed. Located off Ft. Eustis Blvd. in York County. $450 per month. Call 890-0040.

HL-20, Model for Personnel Launch System Research

A full-size engineering model of a vehicle that one day may taxi humans and cargo to Space Station Freedom was unveiled at a ceremony in Raleigh, North Carolina.

Constructed by students and faculties of North Carolina State University and North Carolina A&T University, the model will be used to study crew seating arrangements, habitability, equipment layout, crew ingress and egress, and maintenance and handling operations. The 29-foot-long research vehicle will provide full-scale external and internal definition of the HL-20, an enhanced lifting body candidate for manned orbital missions. These studies will be conducted at Langley and at Johnson Space Center, Houston.

With increasing national interest in obtaining routine access to space, a number of Earth-to-orbit transportation system options are being studied. One such option, referred to as a Personnel Launch System (PLS), could utilize the HL-20 and an expendable launch system to provide assured manned access to space, complementing the existing Space Shuttle.

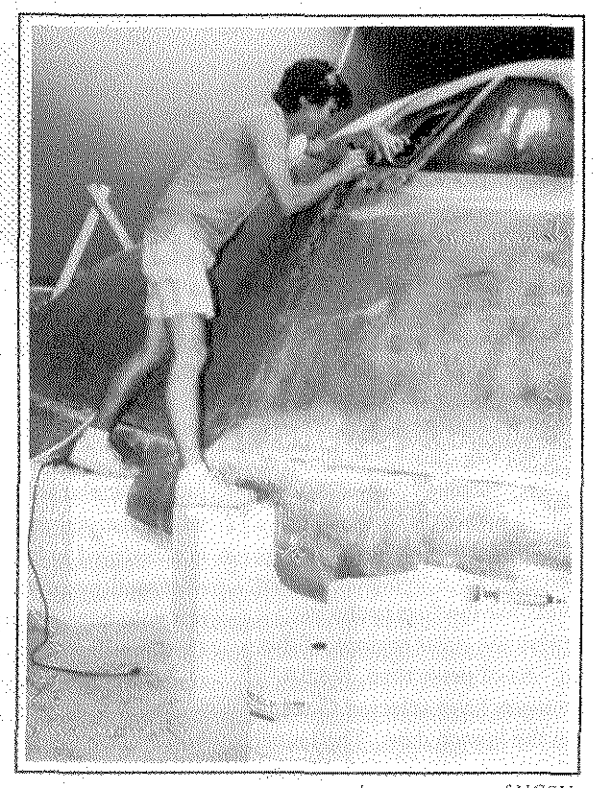
In delivering passengers to Space Station Freedom, the craft would hold eight passengers (a space station crew) and two flight crew members.

A typical PLS mission would originate at the Kennedy Space Center with the HL-20 being mated to an expendable launch vehicle, such as Titan IV, at the launch pad. The launch sequence would be initiated as the space station passes over the launch site.

Following launch, the HL-20 would initially enter a low 100-nautical-mile orbit to position itself for transfer up to the space station orbit altitude of 220 nautical miles. After rendezvous and docking at Space Station Freedom, crews would be exchanged followed by an HL-20 return to Earth at the earliest opportunity.

The HL-20 would land horizontally on a runway in a manner similar to the Space Shuttle. Total mission duration would not exceed 72 hours.

Other potential missions for a PLS include the orbital rescue of stranded astronauts, priority delivery and observation missions, and satellite servicing.



-photo courtesy of NCSU

Robert Vess, a lecturer in mechanical and aerospace engineering at N.C. State University, installs the window flange trim on an HL-20 lifting body model.

Researcher News

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CFC
Virginia Peninsula

-photo by Carol Petrachenko

A full-size engineering model of the HL-20 lifting body, one option for obtaining routine access to space, was unveiled recently in Raleigh, N.C. Funded by a $136,000 NASA grant, the fiberglass model was built by 55 students with assistance from six faculty and staff members from the Mars Mission Research Center, headquartered at North Carolina State and North Carolina Agricultural and Technical Universities. The model will be used at Langley and at the Johnson Space Center, Houston, Texas, for personnel launch system research.

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 21 October 19, 1990
Bi-weekly Employee and Contractor Publication

A Message from the Director:

Today the NASA Langley Apprentice Program graduates 30 engineering technicians.

I congratulate the young men and women of the Class of 1990. You have distinguished yourselves through your perseverance and through the numerous commendations you have received for your 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 1,267 journeymen technicians to NASA. Now, nearly 50 years later, 542 are still employed at the Center.

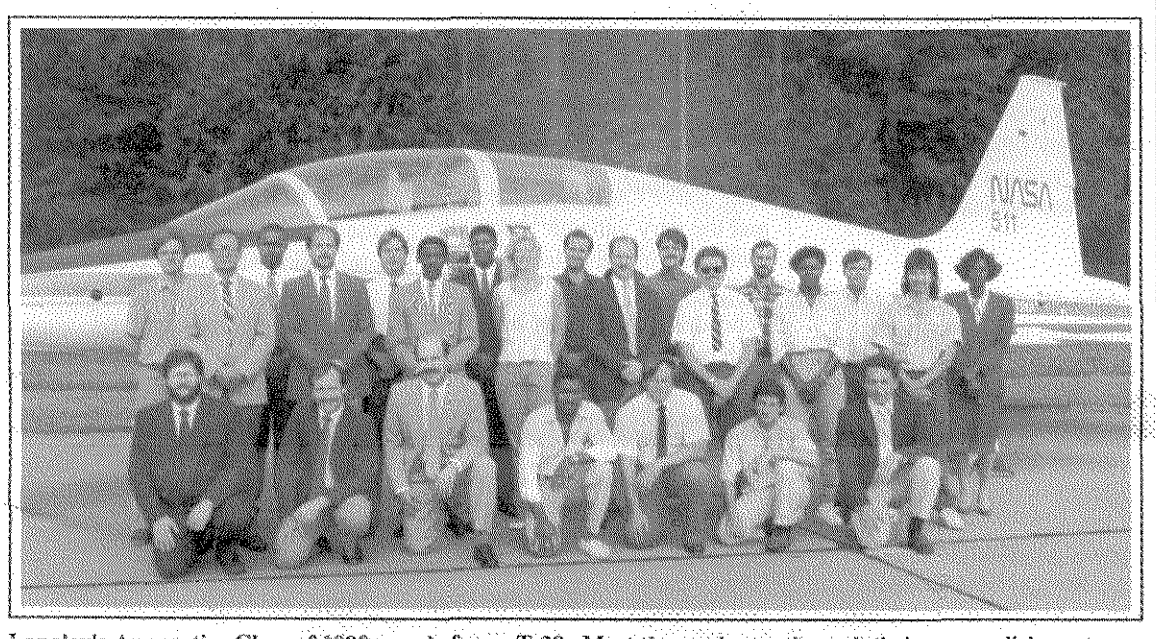
The six-year apprentice program, conducted in cooperation with Thomas Nelson Community College, Tidewater Community College and Elizabeth City State University, identifies talented individuals and fosters and channels this talent to benefit NASA.

I note with pride that seventy-three percent of the Apprentice Class of 1990 graduates with honors today. I also extend special congratulations to Brad Crawford, who was elected class speaker by his peers, and to Ed Lawless and Bill Chambers, this year's top two graduates.

I wish all of you continued success in your careers at NASA.

Pete Petersen

Richard H. Petersen
Director



Langley's Apprentice Class of 1990 pose before a T-38. Meet the graduates through their accomplishments. See Apprentice Graduation stories, pages 3-5.

Langley Colloquium

P.Q. to Address Trends in European Aeronautical Research

An inside view of European aeronautical research will be the subject of a NASA Langley Research Center colloquium Wednesday, October 24.

Philippe Poisson-Quinton, honorary senior adviser, ONERA, France, will give a talk on "Aeronautical Research as Seen From Europe" to Langley employees, retirees and contractors at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222.

The EUROMART (EUROpean Cooperative Measures for Aeronautical Research and Technology) study was initiated in 1987 to evaluate a common technology plan for the next two decades for the member states of the European Economic Community. Poisson-Quinton's presentation will summarize the main findings of the EUROMART study with a comparison between the United States and the European aerospace industries. He will give an analysis of the world aircraft markets and a review of the structure and objectives for the proposed common technology requirements plan for future aircraft products, such as commercial transport, commuter, general aviation, military, V/STOL transport, and supersonic/hypersonic/cruise transport. In addition, Poisson-Quinton will describe some key technological advances in structures, materials, aerodynamics, propulsion systems, airborne systems and manufacturing technology.

Poisson-Quinton was born in France and educated at the Sorbonne, Ecole Superieure d'Aeronautique in Paris and Institut Aerotechnique in St-Cyr. He began his research at ONERA in 1946 and has been chief of the applied aeronautics division, aeronautics coordinator of the systems department, deputy technical director for aeronautics and director for international cooperations.

He is a fellow in the American Institute of Aeronautics and Astronautics and a member of the American Helicopter Society and the AGARD's Flight Mechanics Panel. He has been awarded five medals for his aeronautical research and has been a Wright Brothers and a von Karman Memorial lecturer.

High-Speed Transport Beyond Concorde

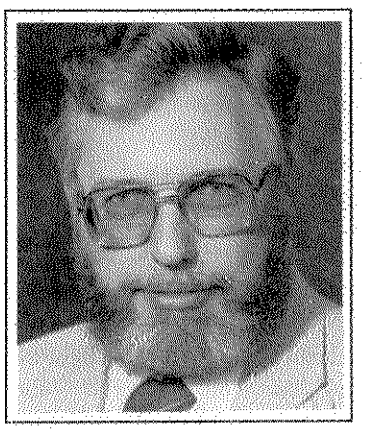
Is a supersonic transport (SST) airliner, able to cruise at Mach 2.2 to 2.4, the most attractive choice for commercial service in the next decades? Philippe Poisson-Quniton will address a second subject, "High-Speed Transport Beyond the Concorde," at a briefing Friday, October 26, at 3 p.m. in Building 1219, Room 225.

The most challenging problem for the development of a new high-speed transport system will be to satisy some "world environmental regulations" on airport noise limits, authorized sonic boom corridors around the world, and the level of a negligible "pollution" in the stratosphere.

That is why such a project needs an urgent close cooperation between the major aeronautical countries to define the rules and then to launch the required common research programs before its development.

Following this briefing, coordinated by Roy V. Harris, director for aeronautics, a reception will be held at 4:30 p.m. in the Visitor Center.

Pinson Selected to Lead Structures Division at Lewis



Larry D. Pinson, assistant chief of the Structural Dynamics Division, has been selected chief of the Structures Division at the Lewis Research Center, Cleveland, Ohio.

Pinson assumed his new position October 1, and is responsible for managing a division of some 135 civil service and contractor personnel. The focus of the division's work is on high temperature structures for application to power and propulsion systems.

Pinson began his Langley career in June 1963 as an aerospace technologist in the Dynamic Loads Division. He has served as head, Structural Dynamics Branch; head, Structural Analysis Section of the Systems Engineering Division; assistant head, Structural Dynamics Branch; and head, Vibration Section.

From August 1978 to August 1979, he participated in the President's Executive Interchange Program at Aerospace Corporation in El Segundo, Calif. He has also taught structural dynamics as an adjunct professor at George Washington University. From July 1989 to July 1990, under the Intergovernmental Personnel Agreement Act, he served as a visiting professor at the University of Colorado in the Aerospace Engineering Sciences department.

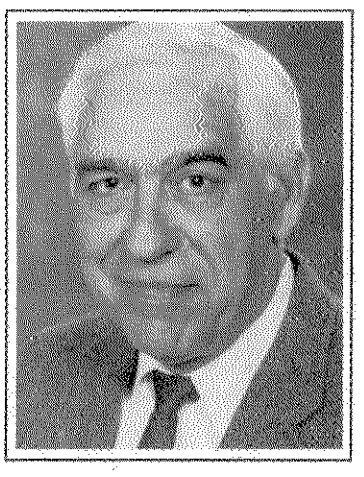
Knemeyer Retires After 46 Years

John E. Knemeyer, chief of the Facilities Engineering Division, retired October 3 after more than 46 years of service. He had served in the position of chief since 1978, and was responsible for the development, design, construction, and operation of aerospace research facilities for Langley.

Knemeyer began his career as an electrical engineer in May 1944 with NASA's predecessor agency, the National Advisory Committee for Aeronautics. He became head of the Electrical Design Branch in 1958; head of the Facilities Engineering Branch in 1971; and assistant chief of the Research Facilities Engineering Division in 1972.

Knemeyer is an engineering specialist and consultant on large wind tunnel drive systems and associated controls for aerospace research facilities. He was awarded a NASA Outstanding Leadership Medal in 1983 for "outstanding achievements and demonstrated excellence in research facilities engineering and engineering management, contributing to the high productivity of Center research facilities and the success of key NASA programs."

Mikulas On Loan to University of Colorado



Martin M. Mikulas Jr., head of the Structural Concepts Branch, has been detailed to the University of Colorado for an academic year. Mikulas, an expert in large space structures and structural dynamics, will serve as a visiting professor.

At the University, Mikulas will supervise graduate students, conduct seminars and workshops, and engage in cooperative research with other faculty. In addition, he will assist the director of the newly formed Space Construction Institute in formulating and implementing research plans for on-orbit construction of large space structures and for studying the dynamic stability of these large structures.

Mikulas began his NASA career in 1961 as an aerospace engineer. In 1970, he participated in the Mid-career Executive Development Program at Syracuse University. As a Floyd Thompson Fellow in 1977, he conducted research on advanced structural concepts at the California Institute of Technology. He is also an adjunct professor at George Washington University, where he teaches composite materials technology.

News Briefs

COBE Enters New Phase of Operations After Helium Depletion --- With the depletion of its liquid helium supply, NASA's Cosmic Background Explorer (COBE) is beginning a new phase of operations, extending its search for structure in the early universe. Six hundred liters of liquid helium was housed inside a dewar, a vacuum insulated "thermos" that provided a stable, low temperature environment for two instruments--the Far Infrared Absolute Spectrophotometer (FIRAS) and the Diffuse Infrared Background Experiment (DIRBE). Launched last November 18 into a polar orbit approximately 555 statute miles high, COBE was designed specifically to measure the remnants of the Big Bang, the primeval explosion that started the expanding universe. COBE completed one full-sky survey in mid-June and continued with a second survey before helium depletion.

U.S. and U.S.S.R. Continue Space Biology and Medicine Cooperation --- American and Soviet scientists made significant progress in standardizing methods and procedures used in ground and flight experiments at the fourth meeting of the U.S.-U.S.S.R. Joint Working Group on Space Biology and Medicine. Both countries exchanged biomedical data resulting from prior-year space missions. In addition, specialists of both countries began to analyze data obtained from short- and long-duration missions dealing with bone, muscle and cardiovascular physiology. Some of these data were collected by Soviets using equipment provided by NASA.

NASA and FAA Sign Aviation Research Agreements. --- The Federal Aviation Administration (FAA) and NASA have signed memoranda of understanding under which they will jointly seek solutions to problems of mutual concern in aviation, including ways to better understand and reduce aircraft noise. The research areas covered by the memoranda are environmental compatibility, human factors, severe weather, integration of cockpit and air traffic control operations, and airworthiness.

NASA to Cosponsor Small Business Procurement Conference. --- Small businesses seeking information on doing business with the federal government, as well as state and local governments and large contractors, can find answers at the Contract Opportunities Conference October 30-31 at the Saginaw Civic Center and International Centre, Saginaw, Mich. The conference is jointly sponsored by the NASA, the Small Business Administration, U.S. Department of Agriculture, Department of Defense, the tri-counties of Saginaw, Bay and Midland, and the Michigan Small Business Development Center of Detroit. The conference is designed primarily for small businesses, including minority-owned, women-owned and handicapped businesses that want to market their services or products to government agencies or major contractors.

NASA ROSAT Imager Return Successful First Light Pictures. --- The NASA High Resolution Imager (HRI) instrument aboard the German Roentgen Satellite (ROSAT) has demonstrated its successful operation by sending back to Earth impressive first light pictures, according to NASA officials. ROSAT, a cooperative program between the United States, East Germany and Great Britain, was launched June 1 to study cosmic X-ray emissions. X-rays are the signature of high energy processes (greater than about one million degrees). Scientists are interested in X-ray images because they specifically highlight regions in celestial systems where high energy phenomena exist.

Aldrich Named Outstanding Alumnus By Northeastern University. --- Arnold D. Aldrich, associate administrator for NASA's Office of Aeronautics, Exploration and Technology, has received Northeastern University's Outstanding Alumni Award in the field of Science and Technology. Aldrich received the award, one of the University's most prestigious honors, as part of the annual recognition program sponsored by the President of the University.

NASA Selects Centers for Life Sciences Research. --- NASA has selected three institutions that will serve as Specialized Centers of Research and Training, establishing a new program dedicated to space life sciences. The centers are located at Kansas State University, Manhatten; University of Rochester, New York; and Purdue University, West Lafayette, Ind. Chosen from 47 applicants, each institution will address one of the three research areas, including gravitational biology, environmental health and bioregenerative life support. The program is established exclusively for ground research and analysis. NASA plans to award each center approximately $1 million a year for five years.

Editor's note: The NASA Headquarters News Releases summarized above are available by calling Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request by headline listed in bold face.

Lankley

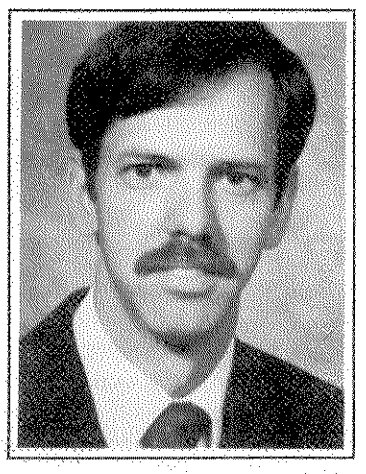
VASC Update

The Virginia Air and Space Center/Hampton Roads History Center, now under construction in downtown Hampton, will tell the story of this region's abundant history interwoven with our rich aerospace legacy through first-class exhibits and public programs. The Center is scheduled to open in the spring of 1992.

Ralph T. Johnston, executive director, will give a briefing on the center status, future plans and programs at 7 p.m. Thursday, November 8, in meeting room A, Hampton Public Library, 4207 Victoria Boulevard. This presentation is open to the public and should be of special interest to current and potential volunteers.

For additional information, call 727-0800.

Photo History to be Assembled by Smithsonian Archivist



Langley's 75 years of always distinguished, often brilliant research in aeronautic and space ventures will be the focus of a major photographic collection to be compiled by Smithsonian aeronautical history authority Brian D. Nicklas under a special one year cooperative research agreement between the National Air and Space Museum and NASA.

The work is to be a key resource in the commemoration of Langley Research Center's 75th anniversary and Nicklas will need to have direct interaction with Center research facilities to insure that the project has the best possible array of candidate photos. Equally important, says Nicklas, are the recollections of the engineers and scientists. This information is vital to fully portraying the sense of historical perspective in each photo. He intends to reach both active Langley researchers and the very valuable resource embodied in the retired cadre of Langley employees. He also concedes that much of his work with past and present Langley people, in seeking previously unpublished photos and background material, will involve a good deal of detective work as one tip leads to another until the whole historical image emerges.

The scope of the project will include coverage of the 417 different aircraft documented to have been tested here, the engineers-in-charge, the Center's directors, its Collier Trophy winners, the visits of aviation pioneers like Orville Wright and Amelia Earhart and a host of other achievements and personalities which have contributed so much to the fabric and character of Langley's celebrated history. As a starting point, Nicklas will be working with existing photo collections including the Larry Loftin collection, the flight applications collection, the Marty Weiner collection and part of the Milton Ames collection. Nicklas hastens to add, however, that there are many more outstanding photo records of Langley's activities and he is looking forward to reviewing them for incorporation into the book which will culminate the effort.

Another important use of the final product is a new link between Langley and the National Air and Space Museum. According to Cam Martin, Langley's chief of public affairs, "virtually none of our most historic photography is available to historians using the museum's archives. This initiative will introduce LaRC photo information into the museum's electronic data base for access by scholars, scientists, engineers and others interested in the many milestone projects chronicled by the Langley photos."

Nicklas brings a strong background in aviation history to the Langley enterprise. He is a graduate of the Embry Riddle Aeronautical University at Daytona Beach, Florida, where he majored in aeronautical studies and covered several Shuttle launches and a Farnborough Air Show for university publications. After a stint with a commercial photo laboratory, he joined the Archives Division of the Smithsonian's National Air and Space Museum. There, he participated in the acquisition and cataloging of historical photos and written material and he conducted a variety of research projects. His assignments frequently touched on NACA/NASA activities and, specifically, upon Langley pioneer work ranging from the streamlined engine cowl breakthrough to early astronaut training. "I feel privileged to have been given this rare opportunity to be immersed in the wealth of history that demonstrates how Langley has been the preeminent organization in so many of the nation's aeronautical and space adventures," he said.

Nicklas' specialties include lifting bodies, rotorcraft and foreign aircraft, but his expertise also extends to detailed knowledge of aircraft authenticity. He has served as one of the primary judges at several of the warbird historic aircraft restoration competitions held around the country. The native of Potomac, Maryland, calls himself an unlicensed pilot--but he has plans to remedy that condition when he enrolls in formal flight training later this year.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

Apprentice Graduation

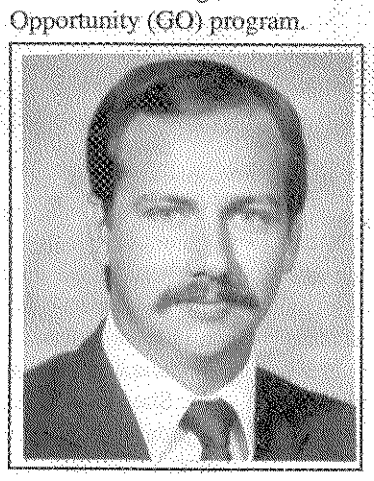
Crawford Elected Class Speaker

Apprentice Accomplishments Are Many

The Langley Research Center will graduate 30 engineering technicians at ceremonies today. Seventy-three percent of the Class of 1990 is graduating with honors.

The Forty-Sixth Annual Completion Exercises for Engineering Technicians will be held in the H.J.E. Reid Conference Center, Building 1222. Langley Deputy Director Paul F. Holloway will preside and Frederick M. Thompson, coordinator of the apprentice program, will present the certificates. Musical selections will be provided by apprentice graduate Fernandus Rattliff.

Each of the apprentices entered the program with at least two years of college. Twenty-seven of the apprentices have associate's degrees in mechanical technology or electrical engineering technology and three have bachelor of science degrees. Twenty-three of the graduates entered the program through Langley's co-op program, six are Office of Personnel Management hires and one entered through the Growth Opportunity (GO) program.

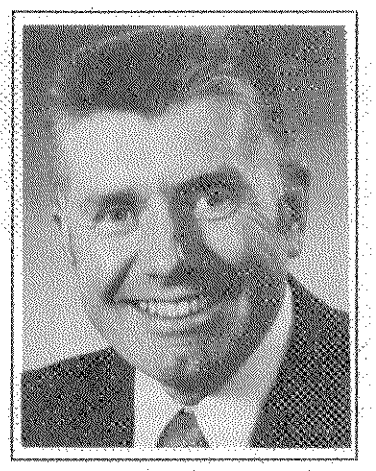


Bradley L. Crawford was elected by his classmates as Speaker for the Class of 1990 and will address the commencement assembly. He is a mechanical engineering technician in the Advanced Machining Development Section, Fabrication Division.

Crawford graduated from Poquoson High School in 1978. He earned an associate's degree in mechanical engineering technology at Thomas Nelson Community College, graduating magna cum laude. He entered the NASA technical co-op program and later was accepted into the apprentice program. Crawford received a commendation and service award for the Space Shuttle O-ring surface finish face seal fixtures, a commendation for construction of Shuttle ascent abort models, a commendation for Space Station model construction, an incentive award for contributions to HALOE, and a certificate of appreciation for his part in the redesign and manufacture of the HALOE spacecraft adaptor.

Crawford, his wife Julie and daughter Adrienne reside in Poquoson. He is currently pursuing a bachelor's degree at Christopher Newport College. He is a magna cum laude graduate of the apprentice program.

Bittner is Keynote Speaker



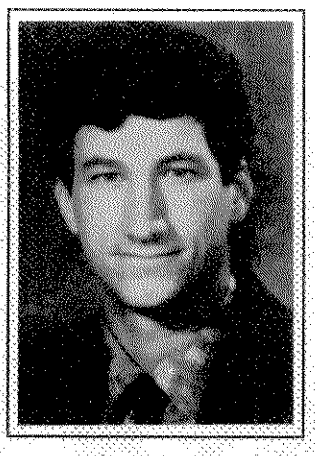
Ambrose "Red" Bittner, apprentice and training advocate, will be the guest speaker for the 1990 apprentice graduation ceremony October 19.

Bittner is currently executive assistant to the chairman of the Secretary (of Labor's) Commission on Achieving Necessary Skills. His presentation will focus on America's choice in the next decade--- a high-skill, high-wage, high-productivity workforce or a continued decline in average wages. He echoes Elizabeth Dole's contention that "throughout history, the key that has unlocked tomorrow's door of opportunity has been found in our schools." Bittner has dedicated nearly 30 years to fostering training and apprentice opportunities that will lead to meaningful employment for high school graduates.

Since 1986, Bittner has been chief of the National Program Coordination and Training Group of the Bureau of Apprenticeship, Training Employment and Training Administration of the U.S. Department of Labor. In this position, he is responsible for the approval of new apprenticable occupations and the development of national industry apprenticeship and training standard guidelines. To do this he maintains national level contact with federal agencies, national and international labor organizations and national employer and trade associations.

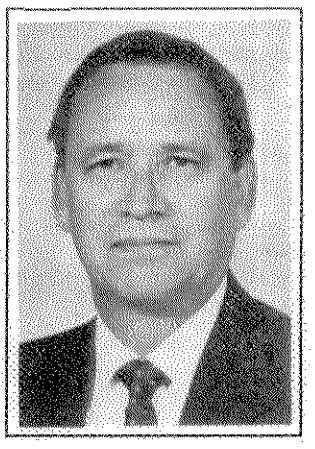
Bittner began his career in 1962 as a journeyman plasterer.

Langley Apprentice Class of 1990



Howard L. Abston Jr. is an engineering technician, aerospace model development, assigned to the Composites and Models Development Section, Fabrication Division.

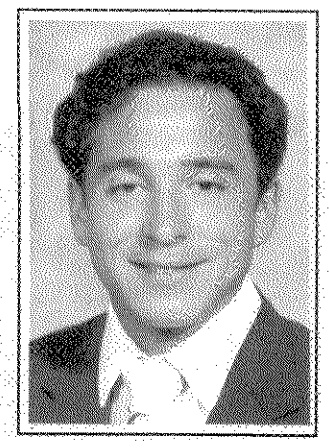
Abston graduated from Poquoson High School in 1984. He earned as associate's degree in mechanical engineering technology from Thomas Nelson Community College, graduating magna cum laude. He has received several awards, including a superior accomplishment award for an X-31 spin tunnel model; an employee suggestion award for safety floor vent covers; and group achievement awards for Space Shuttle Solid Rocket Boosters and for the National Transonic Facility (NTF) fan blade repairs.



Gerald D. Alexander is a mechanical engineering technician at the Aircraft Landing Dynamics Facility (ALDF) and is assigned to Technical Support Section A, Operations Support Division.

Alexander is a 1984 graduate of Austin Peay State University, Clarksville, Tennessee, where he earned a bachelor of science degree in industrial technology with a minor in business. He was accepted into the NASA Langley Apprentice Program in September 1986. Alexander has received a superior accomplishment award for exceptional performance in providing technical, mechanical and operational support to the ALDF.

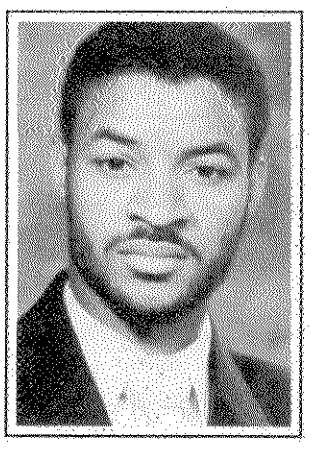
A native of Tulsa, Oklahoma, Alexander and his wife Judy reside in Hampton. They have three daughters, Michelle, Jennifer and Lisa.



Paul D. Aronsohn is an electrical engineering technician in the Electrical Drives and Systems Operations Section, Operations Support Division.

Aronsohn earned an associate's degree in electronics technology at Thomas Nelson Community College while working in the NASA co-op program. Upon graduation, he was hired as an apprentice. He has received letters of commendation for arc-sector repairs to the 8-Foot Transonic Pressure Tunnel and for his performance as part of the operations support team working on the analog controllers for the 8-Foot High Temperature Tunnel modification project.

Aronsohn is currently pursuing a bachelor's degree in electrical engineering at Old Dominion University. He graduates magna cum laude from the apprentice program.



Donald Bagwell is a mechanical engineering technician assigned to Technical Support Section A, Operations Support Division. He supports the Global Tropospheric Experiment (GTE) research managed by Langley's Atmospheric Sciences Division.

Bagwell earned an associate's degree in electrical/electronic engineering technology from the Eastern Shore Community College and is currently pursuing a bachelor of science degree in physics at Christopher Newport College

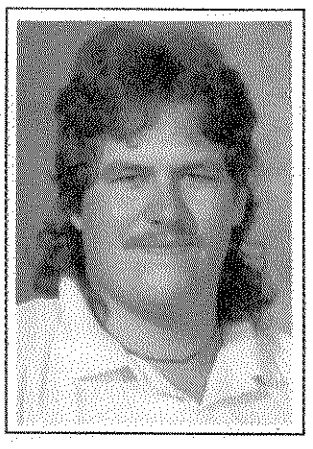
The author of several papers, he is also the recipient of a superior accomplishment award for support of research conducted by the Atmospheric Sciences Division using the ozone/aerosols detection system. He has assisted in numerous field research programs including flight missions based in Alaska, Norway, Brazil, and, most recently in North Bay, Canada.

Harry L. Belvin is an engineering technician in Tunnel Support Section D, Operations Support Division, assigned to the 16-Foot Transonic Tunnel.

Belvin earned a bachelor's degree in mathematics from Christopher Newport College in 1986. He received a superior accomplishment award for technical support to research conducted in the 31-Inch Mach 10 Tunnel. He also received letters of appreciation for his work on the 16-Foot Tunnel laser velocimeter and, from Johns Hopkins University, for his work on a portion of the NASA Galileo program.

Belvin and his wife Kelli reside in Newport News.

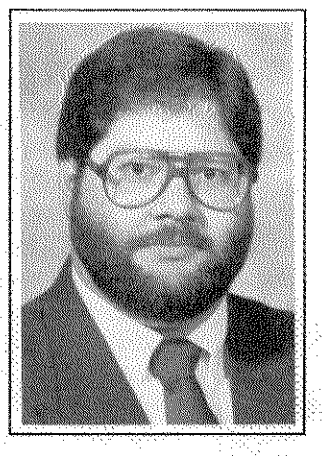
Engineering Technicians



Sean M. Britton is a mechanical engineering technician in Tunnel Support Section C, Operations Support Division.

Britton earned an associate in applied science degree in mechanical technology from Thomas Nelson Community College. In June 1985, he entered NASA's technical co-op program and, one year later, was accepted into the apprentice program. He has received a group achievement award for the reconfiguration of the 8-Foot Transonic Pressure Tunnel.

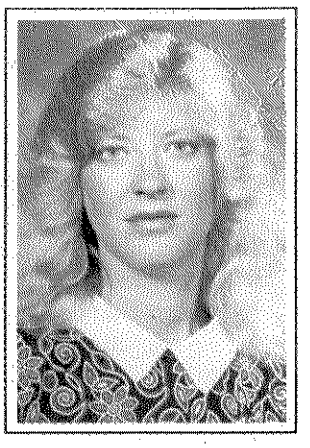
He is a cum laude graduate of the 1990 apprentice class.



James O. Bryant is a mechanical engineering technician in the Advanced Machining Development Section, Fabrication Division.

Bryant joined NASA through the co-op program at Thomas Nelson Community College where he earned an associate's degree in mechanical technology. He has been involved in a variety of programs and has received awards for his work on the CETA project. He has also received a letter of commendation from the University of Rhode Island for manufacturing the shear robe calibration assembly.

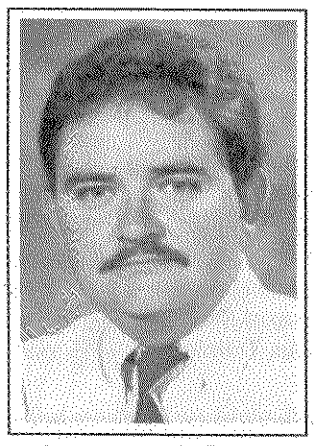
Bryant is pursuing a second degree at Thomas Nelson as well as a bachelor's degree in physics. He is a magna cum laude apprentice graduate.



Karen A. Burch is a mechanical engineering design technician in the Systems Development Branch, Systems Engineering Division.

Burch entered the apprentice program upon completion of the technical co-op program at Thomas Nelson Community College, where she earned as associate's in applied science degree in mechanical engineering technology. In September 1987, Burch was chosen through the competitive placement program as an advanced technician trainee in mechanical engineering design.

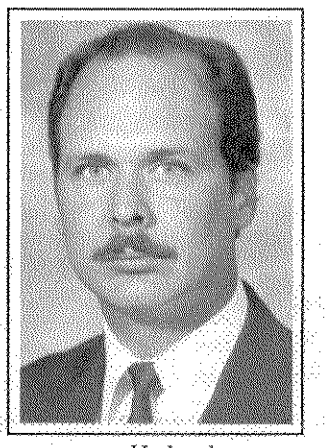
She is a magna cum laude graduate of the apprentice program and is currently pursuing a bachelor's degree in mechanical engineering.



William P. Chambers is an electronics engineering technician in the Optical Spectroscopy Section, Instrument Research Division.

While attending Thomas Nelson Community College, Chambers entered into the co-op program and earned an associate's degree in applied science. He then accepted a position in the apprentice program in June 1986. He received a superior accomplishment award for coordinating and implementing NASP tests in the 20-Inch Mach 6 Wind Tunnel.

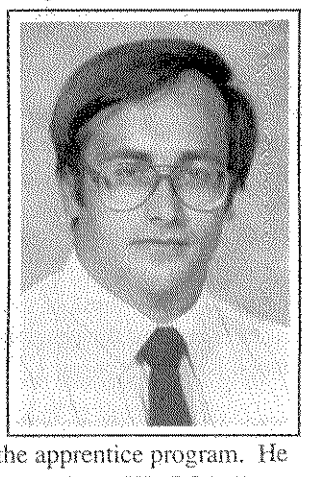
Chambers is considering pursuing a bachelor's degree in electronics engineering at Old Dominion University. He is a summa cum laude graduate of the apprentice program.



Toby Comeaux is an electronics engineering technician in the Electro-Mechanical Instrumentation Section, Instrument Research Division.

Comeaux earned an associate's degree in electronics technology from Thomas Nelson Community College. He entered NASA's apprentice program upon completion of the co-op program. He has become proficient in the use of both computer schematic design and computer mechanical design programs. He received a special achievement award for using both to develop a system currently used in the Electro-Mechanical Instrumentation Branch.

Comeaux is a summa cum laude graduate.



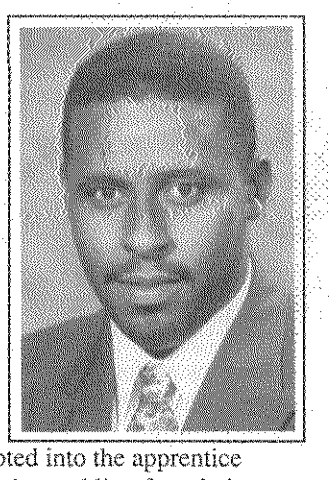
Fred D. Fitzpatrick is an electronics engineering technician in the Flight Instrumentation Branch, Flight Electronics Division.

Fitzpatrick earned an associate's degree in electronics technology at Thomas Nelson Community College. While earning his degree, he participated in the NASA technical co-op program and was hired into the apprentice program. He received an award for assisting with the HIARS helicopter rotor position sensor. He has worked on a new data system that was incorporated into the Electra aircraft. He is currently working on an upcoming project for pressure measurements on the 737.

Fitzpatrick is a resident of Denbigh and a cum laude apprentice graduate.

Dona C. Gibbs is an engineering technician assigned to the Composites and Models Development Section, Fabrication Division.

Gibbs earned an associate's degree in secretarial science at Thomas Nelson Community College and entered the apprentice program upon completion of the secretarial co-op program. She was accepted into the Growth Opportunity (GO) Program as an engineering technician apprentice. She has received a superior accomplishment award for composite fabrication of T-beam stiffeners, a group achievement award for NTF fan blade fabrication, and a letter of commendation for outstanding work in composites materials fabrication.

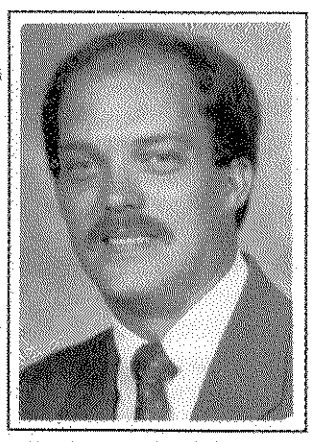


Kevin B. Johnson is an electronics engineering technician in the Electronics Section, Fabrication Division.

Johnson graduated from Thomas Nelson Community College with an associate's degree in electronic engineering technology. Upon completion of the NASA technical co-op program, he was accepted into the apprentice program. Johnson has worked on cabling for wind tunnels, micro-electronics for the HALOE project, and designing printer circuit boards for the PC laboratory. He also worked in the Satellite Video Communications Section as a video monitor and operator.

Wendy J. Johnson is a mechanical engineering technician in Technical Support Section C, Operations Support Division.

Johnson is a 1986 graduate of Norfolk State University. There, she received a bachelor's degree in mechanical engineering technology. She has received a superior accomplishment award for her support of research conducted in the 20- x 28-Inch Shear Flow Control Tunnel and the 22-Inch Hypersonic Helium Tunnel as well as a certificate of outstanding performance.



Edward L. Kirby is an electronics engineering technician in the Experimental Flight Systems Section, Advanced Transport Operating Systems Program Office.

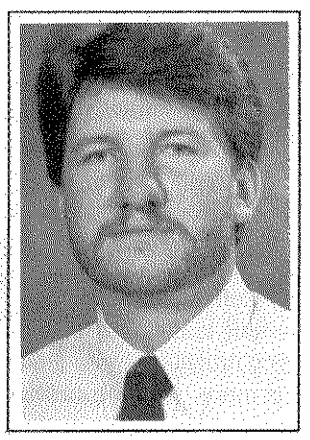
Kirby earned an associate's of applied science degree in electronic engineering technology from Thomas Nelson Community College. He has received a group achievement award for his contributions to the Advanced Color Display System for the NASA Transport Systems Research Vehicle. He also received a special service award for the renovation of the Experimental Avionics Systems Integration Laboratory.

Kirby is pursuing a bachelor's degree in electrical engineering. He is a summa cum laude graduate of the apprentice program.

Edward E. Lawless is an electrical engineering technician assigned to the Electrical Drives and Systems Operation Section, Operations Support Division.

After serving seven-and-a-half years in the U.S. Air Force, Lawless attended Tidewater Community College where he was selected to participate in the school's first co-op program with NASA. He received a special achievement award for his support of Building 1221-C and a group achievement award for Mobile Transporter Space Station Truss Assembly Team. In addition, Lawless represented NASA on career day at Western Branch High School.

Lawless graduates summa cum laude from the apprentice program.

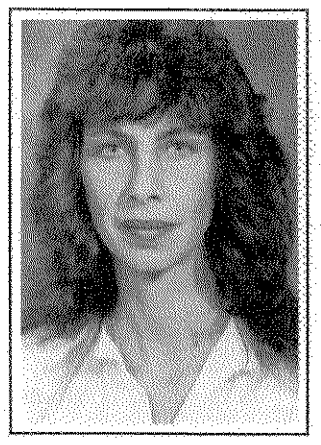


James F. Linker is a mechanical engineering technician in the Metals Technology Development Section, Fabrication Division.

Linker earned an associate's degree in mechanical technology from Thomas Nelson Community College in June 1986. He was then hired as a NASA apprentice. He has received group achievement awards for F-106 Vortex Flap Design and Fabrication Team, for LDEF Operation and Deintegration at KSC and for CETA Crew Equipment and Translation Aid. He has also received a superior achievement award for the Space Technology Experiment Platform, two employee suggestion awards and has a patent pending.

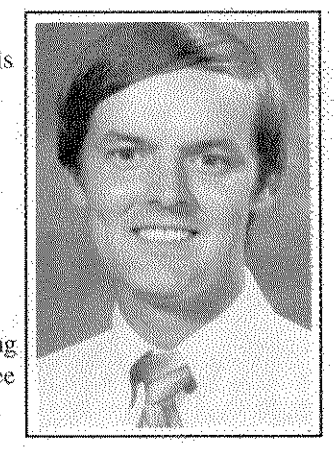
He is a magna cum laude graduate.

Class of 1990



Rhonda M. Manis is an engineering technician in the Tunnels Operations Branch, Operations Support Division.

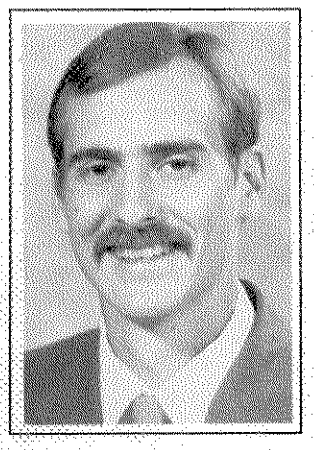
Manis earned as associate's degree in secretarial science from New River Community College. She was accepted into the apprentice program as an engineering technician in 1986. She has received a group achievement award as part of the the 8-Foot Transonic Pressure Tunnel Reconfiguration Team. She also received letters of commendation for the Lewis/LaRC Forebody Simulation Experiment and for OSD performance in the 8-Foot Transonic Pressure Tunnel.



Richard E. Martin is a mechanical engineering technician in the Metals Technology Development Section, Fabrication Division.

Martin earned an associate's degree in Mechanical Engineering Technology and is pursuing a bachelor of science degree in mechanical engineering. He has received numerous letters of commendation and certificates of appreciation and received a special achievement award for his contributions to the F-106 Vortex Flap Flight Experiment team. He also supported the LDEF Retrieval team at KSC.

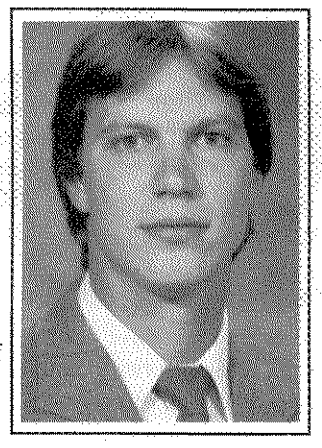
He is a magna cum laude apprentice graduate.



Stephen A. Mason is a mechanical engineering technician in the Technical Support Section D, Operations Support Division, assigned to the 14- x 22-Foot Subsonic Tunnel.

Mason has received a suggestion award for a test control information organizer, an award for the computer operational procedure for groundstand test facility, a superior accomplishment award for support to the 14- x 22-Foot Tunnel and a group achievement award for contributions to the NTF mishap recovery.

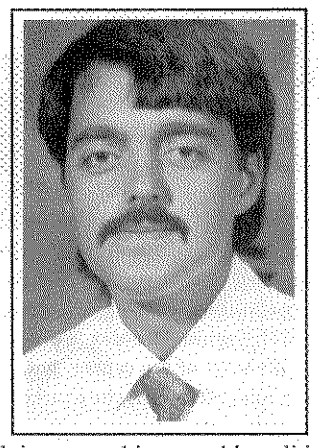
A third-generation NASA employee, Mason and his wife Lori live in Newport News.



Jaye A. Moen is a mechanical engineering technician in the Technical Support Section B, Operations Support Division.

Moen earned an associate's degree in mechanical technology from Thomas Nelson Community College. After completion of the co-op propgram, he was accepted into the apprentice program. He received a superior accomplishment award for assisting in fabricating and assembling an aircraft flight package capable of remotely measuring the column content of water vapor from on-board the Wallops L-88 aircraft, the Airborne Watervapor DIAL System.

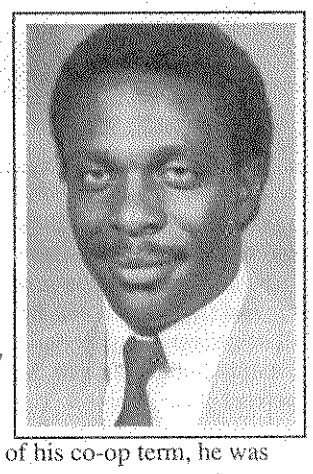
A member of the Langley Aero Club, he is accummulating flying hours to attain an instrument flight rating.



Keith E. Murray is an electronics engineering technician in the Environmental Sensors Branch, Flight Electronics Division.

Murray earned an associate's degree in electronics from Thomas Nelson Community College and entered the NASA apprentice program. He has received a superior accomplishment award for his work in researching tunable solid state lasers and presented this work at an international meeting of the Optical Society of America. He has also co-authored five technical papers on optical parametric oscillators and nonlinear optics.

Murray is pursuing a bachelor's degree at Christopher Newport College. He is a magna cum laude graduate of the apprentice program.

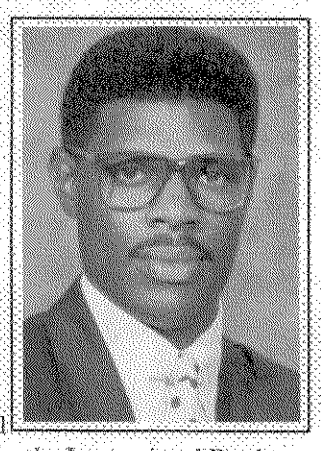


Robert Patterson Jr. is an electrical engineering technician in the Plant and Powser Distribution Section, Operations Support Division.

Patterson earned an associate's degree in electronics technology at Thomas Nelson Community College. He was then hired at NASA through the co-op program. Upon completion of his co-op term, he was accepted into the engineering technician apprentice program.

A native of Whicton Falls, Texas, Patterson and his wife Denise and their sons, Keyon Jerel and Robert Jamal, live in Hampton.

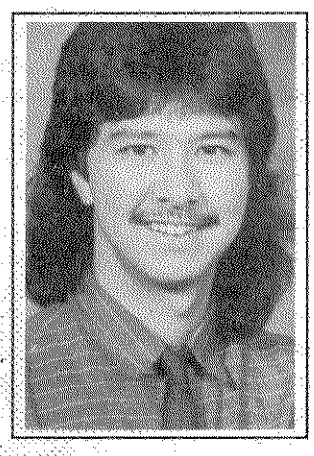
Patterson is a summa cum laude apprentice graduate.



Fernandus Rattliff is an electrical engineering technician in the Labs and Plant Operations Section, Operations Support Division.

Rattliff earned an associate's degree in electrical electronics from Thomas Nelson Community College. He entered the NASA apprentice program after serving in the State Electrical Apprentice Program offered by the International Brotherhood of Electrical Workers. He received a group achievement award for design, implementation and checkout enhancements to the National Transonic Facility which greatly improved tunnel efficiency.

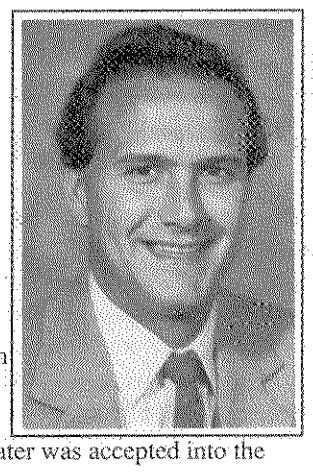
Rattliff plans to pursue a bachelor's degree at Old Dominion University. He is a cum laude apprentice graduate.



Clinton J. Reese is a mechanical engineering technician in the Laboratory Operations Branch, Operations Support Division.

Reese earned an associate's in applied science degree in mechanical technology at Thomas Nelson Community College. He was accepted into the NASA co-op program and then entered the engineering technician apprentice program. He received a superior accomplishment award for his support of the Mach 4 and Swirl Jet test areas. He is now permanently assigned to Technical Support Section A, Hypersonic Propulsion Branch.

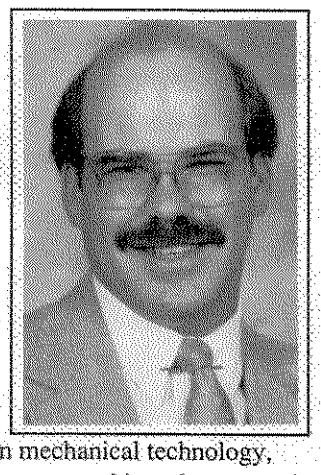
Reese is a cum laude graduate of the apprentice program.



Scott R. Runnels is a mechanical engineering technician in the Technical Support Section C, Operations Support Division.

Runnels graduated from Denbigh High School. He earned an associate's degree in mechanical engineering technology from Thomas Nelson Community College. He enrolled in the NASA co-op program and later was accepted into the apprentice program. He received a special achievement award for his support of the Helium Tunnel at the 1247 complex.

A native of Waterville, Maine, Runnels is a magna cum laude graduate of the apprentice program.



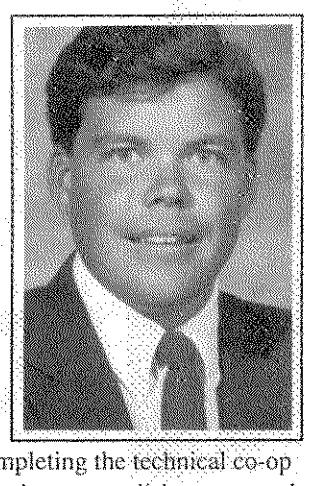
Thomas J. Skalski is a mechanical engineering technician assigned to the Advanced Machining Development Section, Fabrication Division.

Skalski graduated magna cum laude from the machine tool program at Thomas Nelson Community College and was accepted into the co-op program. He earned an associate's degree in mechanical technology, graduating cum laude, and was accepted into the apprentice program. He received a superior accomplishment award, a HALOE award for his workmanship on the spacecraft adapter, and a group achievement award for NTF fan blade enhancements.

He and his wife Carol and their two sons, Jonathan and Matthew, live in Hampton. He graduates cum laude.

Ralph M. Stephens is an electronics technician in the Microelectronics and Technical Support Section, Fabrication Division.

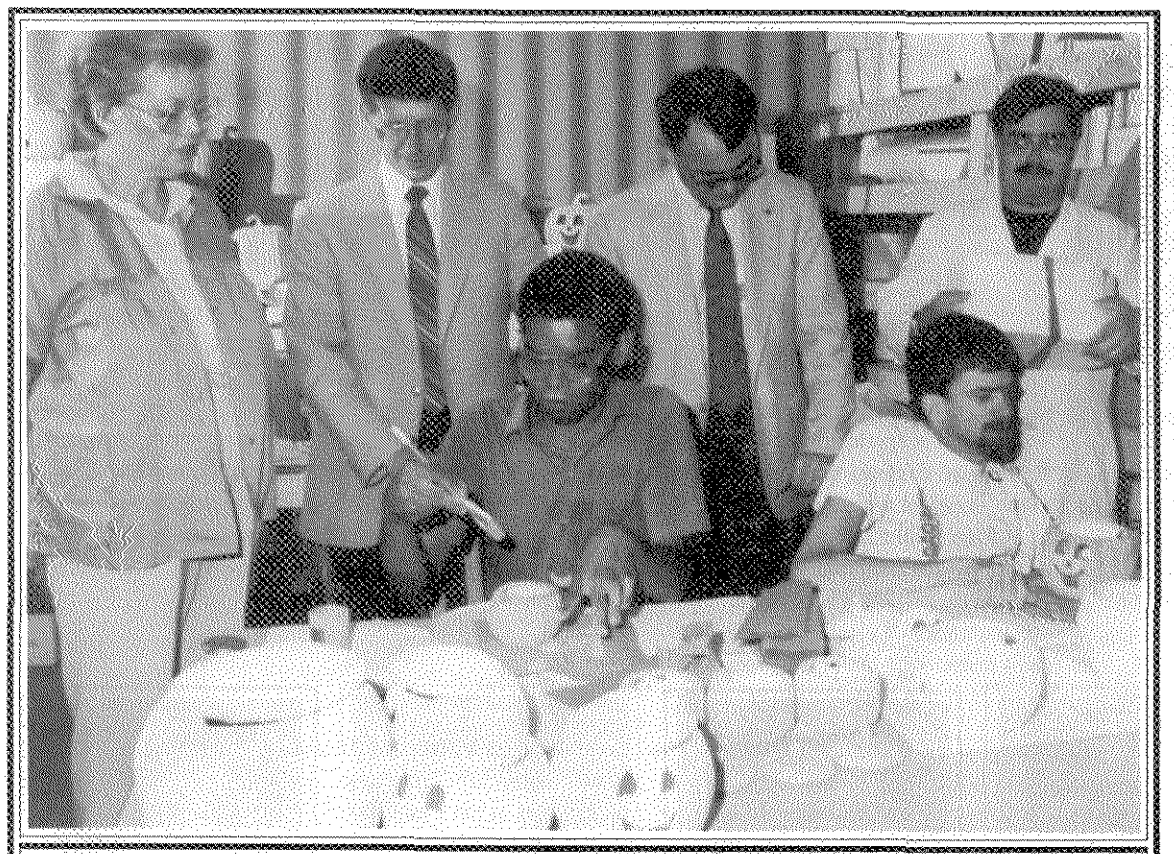
Stephens earned an associate's degree in electrical/electronics technology from Tidewater Community College. He has received several outstanding performance ratings, four letters of commendation and special achievement awards for microelectronics fabrication support. He also received a group achievement award for his support to the Unsteady Flow Characteristics of Laminar Separation on Airfoils team.



Dennis R. Williams is a mechanical engineering technician in the Hypersonic Propulsion Branch, Operations Support Division.

Williams earned an associate's degree in mechanical engineering technology from Thomas Nelson Community College and was accepted into the apprentice program after completing the technical co-op program. He received a superior accomplishment award for support of the combustion heated scramjet test facility He also received a letter of commendation for support of RocketDyne's NASP engine "A" test program.

A magna cum laude apprentice graduate, Williams is assigned to Technical Support Section A, Hypersonic Propulsion Branch.



-photo by Paul Bagby

JACK-O-LANTERN SEASON. These clients at Sarah Bonwell Hudgins Regional Center are making ceramic pumpkins for sale to the general public and to gift shops on the Peninsula for the Halloween season. Describing the molding process to Robert Wingate (second from left), deputy director for Systems Engineering and Operations, and Bruce Conway, co-chairman of Langley Combined Federal Campaign, is Betty Clemens, ceramics specialist at the center. The mission of the SBH Regional Center is to serve mentally disabled individuals and their families. Paul Babcock, associate director of the center, notes that three percent of the Peninsula's population is mentally retarded. Programs offered at the center include early prevention/intervention designed to help infants and families as soon as problems are identified; summer activities for enrichment of school-age children; residential services where residents learn to maintain their own well being; and work services where the clients earn wages based on their ability to perform their job. Designating your CFC pledge to the Sarah Bonwell Hudgins Regional Center will help this work to continue. The center has an operating budget of $3.5 million and received $102,000 from the United Way last year. Please be generous.

Langley's goal for the 1990 Combined Federal Campaign is $255,000. As of press time, Langley employees have contributed $169,075.88 for 66.3 percent of this year's goal.

CFC Virginia Peninsula

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. The following employees are approved leave recipients:

- David S. Aliff
- Robert M. Connell Jr.
- Janice R. Grow
- Joy W. Italiano
- Kenneth M. Jones
- Noel A. Talcott 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, Employee Relations Section, ext. 42610.

Note of Thanks

Larry Pinson writes: "I wish to thank all who attended the reception held in my honor on the occasion of my transfer to the Lewis Research Center. After twenty-seven wonderful years at Langley, it is heart-warming to know that I have so many friends. I will certainly treasure the expressions of good wishes expressed by so many."

Retirement Party

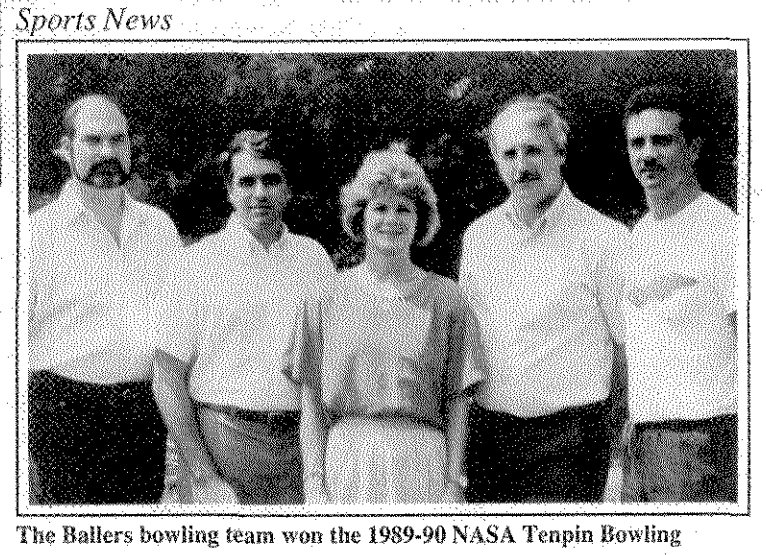
Roger N. Messier will be honored at a retirement dinner Monday, November 5, at 6 p.m. in the H.J.E. Reid Conference Center. Cost for the prime rib dinner is $13 per person, including gift. Contributions for gift only will be graciously accepted. Make checks payable to Charlene Gleaton and send to Mail Stop 424 by October 26.

Have You Seen?

The following items have been reported missing. If you have seen any of them, please contact the Equipment Management Section, ext. 42055 or 42056.

- Calculator, Elex., Display, Prog., ECN 0848550
- Disk Drive Unit, ECN 0259336
- Oscilloscope/Multimeter, Digital, ECN 0465217
- Binoculars, ECN 0470763
- Receiver, Radio, ECN 0474590
- Multimeter, Digital, ECN 0527619

Sports News



The Ballers bowling team won the 1989-90 NASA Tenpin Bowling League with a recond of 92-48. The Ballers and Strike Force ended the season in a tie and bowled a three-game roll-off. The Ballers won two of the three games as well as total pin count for the championship. Team members are (L to R) Larry Harvey, Alan Frizzell, Ruth Frizzell, Greg Keat and Rodney Russell. Not pictured are Ronnie Weber and Bobby Borchardt.

Contractor News

MLB Enterprises, Inc., Langley's groundskeeping and pest control support services contractor, held Employee Appreciation Day recently. Recognized for outstanding contributions to the company's mission were (L to R)Wally Moore, safety award winner; Robert Pauly Jr., job performance awardee; Mary Robinson, employee of the year; Alfred Gomex, job performance awardee; and Edward Bohn, job performance awardee. Awards were presented by Michael Brittin, contract manager.

Alumni Support Project Thank You; You Can Help

The Langley Alumni Association is spearheading a drive to collect items for American troops stationed in Saudi Arabia.

The effort has garnered strong support from retirees; Center personnel are also invited to support the project. A collection station has been set up in the cafeteria. Personal care items, such as toothpaste, shampoo, tube shaving cream, stick deodorant, disposable razors, and powder; stationery; snack items, such as cracker sandwiches, nuts, packaged cookies; and games may be dropped off at lunchtime.

Monetary donations are also being accepted and may be preferred as alumni members can purchase many of the supplies already listed at or below wholesale prices. Checks may be made payable to the Langley Alumni Association Treasurer and sent to Mail Stop 496. Items will be collected through October 22.

-photo by Carol Petrachenko

PLANNING A TEA PARTY IN SAUDI ARABIA are Langley Alumni Association President Don Ward (right) and Project Thank You chairman George Brooks. Ward and Brooks display items that might be included in a typical shoe-box-size package to be sent to American troops stationed in the Middle East. The Association hopes to collect items to fill 1,000 boxes, each valued at about $10.

Scouts Take Note

Abraham Leiss and Dave Shuster will be supervising the construction and launching of Estes rocket models as well as passing Boy Scouts on their Space Exploration Merit Badge. Additional volunteers are needed. This event will take place at Newpaort News Park October 27 at the Scout show. Boy Scouts wanting to study for this merit badge should call 877-2939. The space exploration booth will be sponsored by the NASA Alumni Association.

In Memoriam

Sympathy is extended to the family of **Carol Olsen**, who died September 29. Olsen was secretary for the Thermal Structures Branch. Remembrances may be made to the American Diabetes Association.

People & Places

Tidbits from Training

This is Cooperative Education Week

Governor Douglas Wilder has proclaimed October 15-19 Cooperative Education Week in Virginia. Co-op programs allow students to attend college and gain valuable on-the-job experience.

The Langley Research Center has benefitted from the many advantages of a co-op program, such as providing a valuable recruitment source for highly qualified and motivated individuals. Cooperative education programs also foster meaningful and mutually beneficial relationships with business, industry and the educational communities.

Langley has been a leader in the field of cooperative education and has maintained an on-going program since 1952. Currently, the LaRC co-op program includes offerings in office systems technology, technician, administrative professional, and scientific and engineering fields.

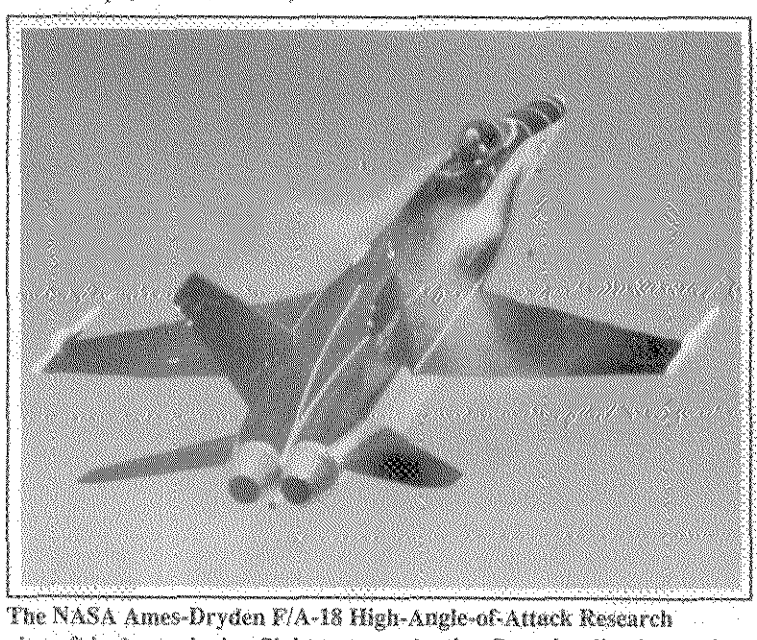
Summerlin Directs Management Training and Development Programs

Camille Summerlin has temporarily assumed responsibility for executive, management and supervisory training and development programs. She replaces Joe J. Mathis Jr., who has been selected deputy to Langley's Technology Utilization Officer.

Summerlin will be in charge of the Management and Supervisory Training (MAST) program, MAST Follow-on, the Management Education Program (MEP), and the Senior Executive Program (SEP). In addition, she will manage the Professional Development Program (PDP) and the NASA competitive fellowships, such as Sloan, Dryden, Harvard, Simmons, etc.

Summerlin joined the Langley staff in 1983 as a contract specialist in the Acquisition Division and became research and development hardware group leader in 1985. From October 1985 to March 1987, she served on the staff of, and as the Langley liaison to, the Directorate for Institutions, Office of Aeronautics, Exploration and Technlogy, NASA Headquarters.

Questions regarding any aspect of management training or training for newly-appointed supervisors should be referred to Summerlin at ext. 42585.



The NASA Ames-Dryden F/A-18 High-Angle-of-Attack Research aircraft is shown during flight tests conducting flow visualization studies, using smokers, of the leading edge extension fences. This research project is a joint effort of Ames-Dryden and Langley.

Langley Hosts Technology Conference

Langley will host a NASA-sponsored conference on high-angle-of-attack technology for high-performance military aricraft October 30-November 1.

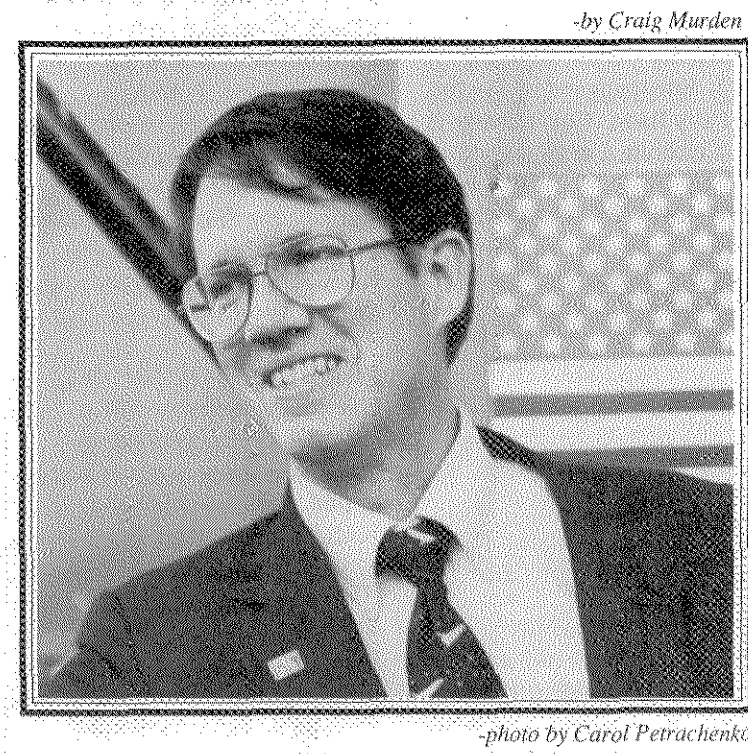
The conference, restricted to U.S. citizens, will include presentation of 75 papers by industry, the Department of Defense, universities and NASA Office of Aeronautics, Exploration and Technology centers. These papers deal with important technology issues to be faced in the design of future highly agile military aircraft.

Topics to be discussed include reviews of major flight research programs by NASA and DOD; advances in experimental and computational aerodynamics; control system design and advanced concepts; human factors; and operational considerations. Results of the current NASA High-Angle-of-Attack Technology program will be presented as well as other leading DOD and industry fighter technology programs, including the X-29, X-31, and F-15 STOL and Maneuver Demonstrator. Status reports will be given by test pilots of the YF-22 and YF-23 prototype fighters.

A banquet will be held at 7 p.m. Tuesday, October 30. For details, contact Carol Lightner at 722-0330, ext. 222, or Pat West, ext. 46399.

Jones is Pivotal Team Member in LDEF Success

-by Craig Murden



-photo by Carol Petrachenko

The Langley LDEF success story is a lesson in how to meld research objectives with engineering innovation to produce a vehicle whose mission charts new paths for future ventures in space. This unique enterprise was nurtured and directed by the leadership team of E. Burton Lightner, project manager, and William H. Kinard, chief scientist. They provided the steady focus and strong control vital to success. Another player whose hands-on involvement in every aspect of the project was also critical to LDEF's goals--Experiments Manager James L. Jones.

As this series of profiles about key Langley LDEF participants concludes, the details of Jones' part in the project serve as prelude for the next LDEF event--a science conference hosted by the Center. Nearly 1,000 world-wide scientists and engineers are expected to attend to hear first-hand preliminary results of the 57 experiments which flew on the spacecraft.

After accepting Kinard's invitation to join LDEF in 1976, Jones' first task was the acquisition of experiments. He developed the Announcement of Opportunity--the call for proposed LDEF experiments from global technical and scientific communities which resulted in the submission of over 200 high quality proposals. These candidate experiments were then stringently screened by a number of technical review committees, who made recommendations for the final experiment selections.

Next, Jones oversaw the design and development of foreign and science experiments selected for LDEF. His responsibilities continued when the experiments were shipped to the Kennedy Space Center for integration onto the LDEF. He then worked with investigators to develop plans for the functional checkout and installation of their experiments and provided interface between the experimenters' needs and KSC operational requirements prior to the 1984 launch.

Originally scheduled for a one-year sojourn in space, LDEF's journey was extended to nearly six years. Prior to the January 1990 retrieval, Jones had to ensure that there was clear understanding of the expected condition of each experiment when the Shuttle rendezvoused with LDEF. He consulted with each principal investigator to determine what the astronauts should observe and photograph during the capture, and he then worked with them to map a gameplan for incorporation of these observations into LDEF retrieval operations.

During retrieval, the capture maneuver was carefully orchestrated to avoid contamination of the experiments by the Shuttle thruster jets. After the LDEF was grappled by astronaut Dunbar, it was slowly rotated for comprehensive observation of the indicators Jones had briefed to the crew--configuration changes, missing material, color changes and other signs of the effects of long duration space exposure. After making an extensive photographic record, the astronauts then brought LDEF atop Columbia for the Shuttle's reentry and landing at Edwards Air Force Base. Finally, Jones had a hand in developing LDEF requirements for the Shuttle's ferry flight to KSC onboard the 747 aircraft.

Once ensconced in the clean room at Kennedy, the LDEF experiments were once again photographed in situ, removed from the structure, inspected and functionally checked at the work bench, and shipped to their principal investigators. During this three-month activity, Jones constantly interacted with the investigators at KSC to be sure that the objectives of each were met during deintegration of their experiments.

The project is now in an intensive data analysis phase with the investigators working hard to interpret and report how their experiments reacted to the rigors of a long space journey. And Jones is no less busy as he works to meet the programmatic needs of the investigators during this vital phase, which includes development of data bases to chronicle experiment findings. The next major milestone in this process will be the LDEF science conference, which will provide the LDEF investigative community these analyses and help determine avenues to be pursued for the future.

As he prepares for the conference, Jones reflected on the tremendous amount of technical and engineering data that can now be focused on the development of spacecraft for future ventures in space. He said that for the first time we have information on the effect of long-term space exposure on the design of spacecraft. This includes the effect of micrometeoroids and space debris on spacecraft shielding and the effects of radiation-induced radioactivity. The experiments also provide an assessment of the performance of candidate materials and components destined for spacecraft structures, thermal control, optics, power, propulsion, coatings and electronics. LDEF will establish the data base for design of spacecraft requiring long lifetimes in space, Jones added.

He also pointed to the science that is coming out of the LDEF adventure. He cites the potential for significant new insights regarding early nuclear synthesis, which led to formation of the galaxies. LDEF experimenters are also investigating materials present during the evolution of our solar system which cannot be found on Earth, unchanged from their initial state. However, they do exist unchanged in space as micrometeoroids. LDEF experiments, with these particles from our distant past, have been returned to Earth for chemical analysis to shed additional light on the origin of our solar system. Other science experiments are investigating the effects of cosmic radiation on hundreds of different types of biological specimens; are studying the origin and age of cosmic rays, including the nucleosynthesis of heavy elements; and have grown crystals, establishing processes for larger scale crystal growth experiments in space.

Jones began his NASA career in 1962 at Langley as an aerospace engineer. Specializing in space flight experimental design, he worked on several projects including Project FIRE, Lunar Orbiter, IMP, SCANNER. He became the LDEF experiments manager in 1976.

Happenings

SPECIAL LAA SOCIAL will be held Friday, October 26, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Entertainment by Foxfire, the Party Band. Cover charge is $1. Celebrate a week's work.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays in the NASA gym, 5-6 p.m. Cost is $12 per month.

NASA TOASTMASTERS meets the second and fourth Wednesdays of each month. Next meeting is October 24, at 11:30 a.m. in Building 1218, Room 107. For details, call Christine Darden, ext. 45258.

STRESSBUSTERS meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. Call Steve Dahmen, ext. 44519, for more information.

ARTS & CRAFTS EXPO sponsored by Langley Officers' Wives, November 19, from 10 a.m. to 5 p.m. $1 admission.

SKI CANADA. January 19-26. Trip includes round trip transportation departing Met Park, six days skiing, five nights lodging plus breakfasts and dinners. Cost is $445 per person double occupancy. Call Norm Willey, at 474-0212, after 5 p.m.

INTERCENTER RACES. 2-mile race will be held October 22 and 10-km race on October 25. Both races start at 5 p.m. on Doolittle Road. NASA employees, retirees, on-site contractors and co-ops at work earn points for Langley by participating. For information about the races or the Langley Runners Club, call Richard Shearer, ext 47036.

FOR RENT: TOWNHOME. Hampton waterfront. 2BR, 2-1/2BA, decks overlooking water, plus many extras. Close to I-64, Coliseum Mall and NASA. Rent with option to buy. $750 per month. Call 838-8582.

FOR RENT: TOWNHOME in Denbigh. 3BR, 2-1/2BA, FP, carpet, all appliances, fenced yard, pool. $465 per month. Call 868-7602 after 5 p.m.

FOR SALE: POQ. HOME. 2,000 sq. ft. rancher. 3BR, FR, LR, dining area, country kitchen, deck overlooks in-ground pool. Many extras. $138,000. Call 868-0503 after 5 p.m.

FOR SALE: AUTOMOBILE. 1985 Mercury Topaz. Interior and exterior excellent, needs major engineer repair. $1,000. Call 838-3336 after 5 p.m.

Brown to Discuss Aerobraking on Manned Mars Missions

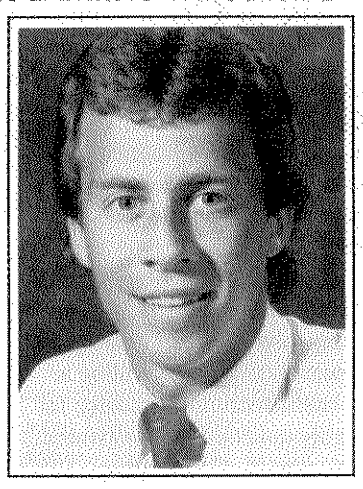
On the 20th anniversary of the Apollo landing on the moon, President Bush called for a return to the moon and then a "journey into tomorrow," a mission to Mars. To accomplish this bold initiative, aggressive programs in technology development are needed.

NASA Langley is on the cutting edge of a revolutionary new technology that will support manned missions to Mars. Robert Brown, a NASA researcher, will discuss "Aerobraking Applications for Manned Missions to Mars" at noon, Wednesday, October 24, in the Visitor Center theater.

Brown will detail the uses of aerobraking in manned missions, present Langley's system studies on performance characteristics and discuss design implications of various aerobrake shapes.

Langley has developed a braking system which uses atmospheric drag as an alternative to firing retro rockets, in order to conserve fuel and use it more efficiently on long, manned missions. Aerobraking can be used in returning from the moon as well as traveling to and from Mars.

Langley currently plans to test aerobraking technology in Earth orbit when the Aeroassist Flight Experiment (AFE) is deployed from the Space Shuttle in 1994.



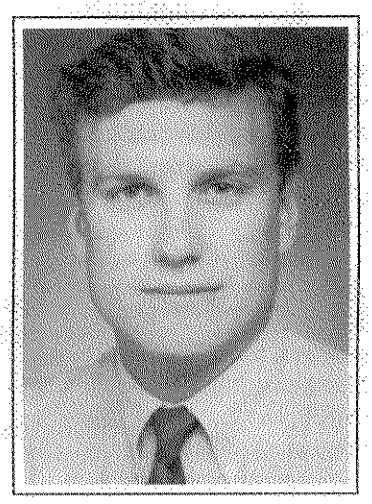
Lewis to Discuss Wind Shear Hazards on Aircraft

In August 1985, a commercial airliner crashed on approach to the Dallas-Ft. Worth International Airport killing most of its crew and passengers. An investigation later determined that wind shear caused the accident.

Michael Lewis, project engineer for Langley's Wind Shear Flight Test Program, will discuss "Wind Shear: Airliners and NASA Technology" on Thursday, October 25, at 7:30 p.m. in the Visitor Center theater.

Lewis will describe wind shear, the effect it has on aircraft and the steps NASA is taking to solve the wind shear problem. His presentation will include three graphic videos that illustrate the force and real-life severity of wind shear.

Wind shear is a sudden shift in wind velocity and direction often associated with severe storms. The "microburst," the most violent form of wind shear, has been identified as the cause of many fatal aircraft accidents. NASA research is directed toward development of technology for advanced ground and airborne systems to detect wind shear and cockpit displays for warning and avoidance of the hazard.



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Researcher News

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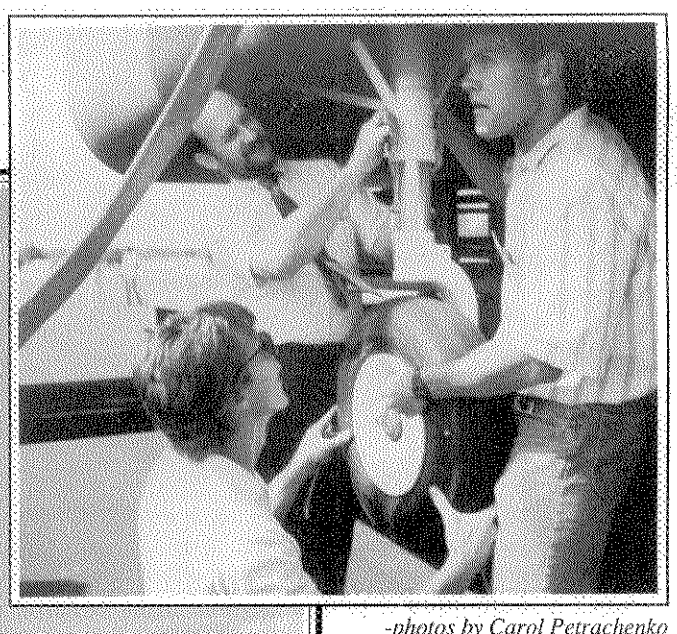
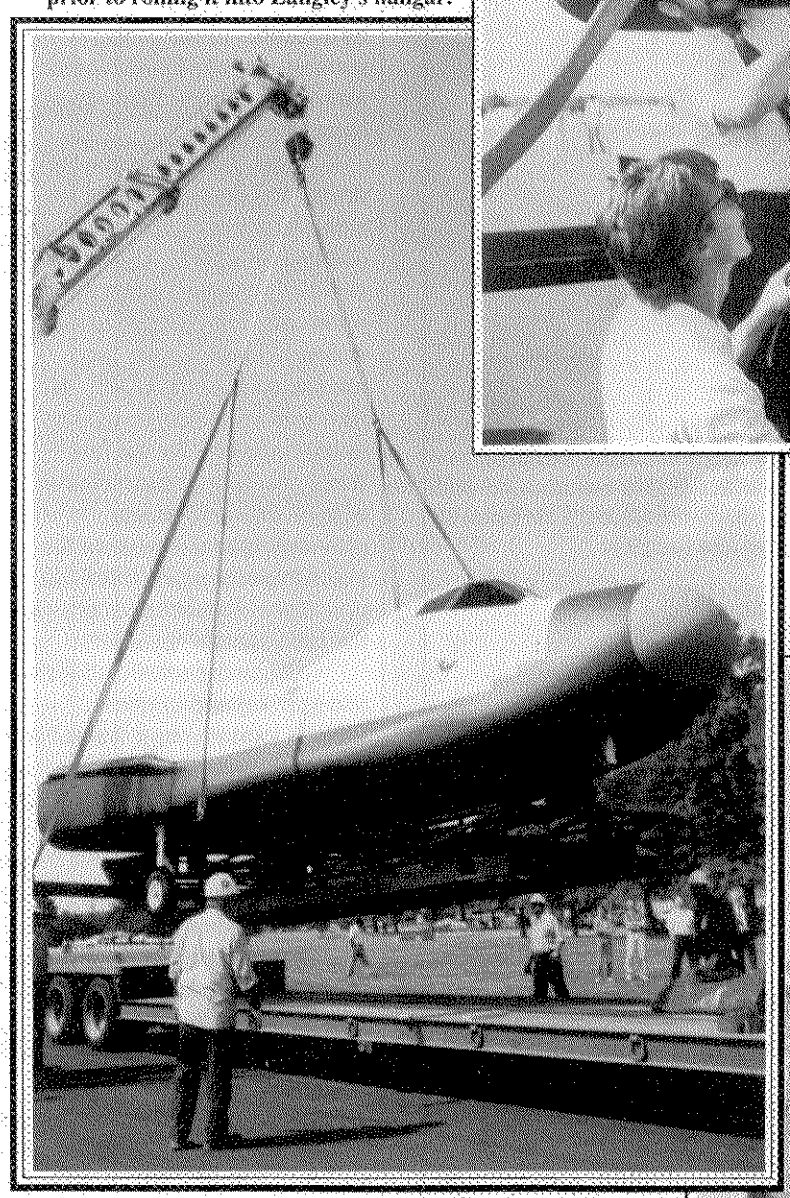
Charlie Cockrell (center), head of the Model Engineering Section, and Robert Vess and Dean Driver, both of NCSU, attach the main gear of the HL-20 model prior to rolling it into Langley's hangar.

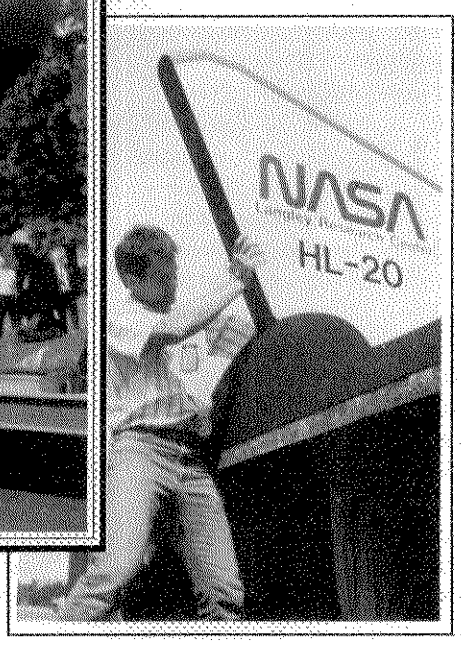


-photos by Carol Petrachenko



The HL-20 full scale model is lifted by an EG&G rigging crew from the flatbed trailer that transported it to Langley from the AIAA conference in Huntsville, Ala.

Driver, of the North Carolina State University model fabrication team, attaches the vertical stabilizer.



NASA
National Aeronautics and Space Administration
Langley Research Center

Researcher News

Volume 4, Issue 22 November 2, 1990

Bi-weekly Employee and Contractor Publication

Soviet Aeronautics Team Visits

-by Catharine Schauer

Five high-ranking Soviets, all representing the USSR's Ministry of Aviation Industry, visited Langley October 20-23 as one stop on their tour of NASA aeronautical facilities.

"The most important part of the visit," according to Dr. Victor M. Chuiko, deputy minister for the USSR's Ministry of Aviation Industry, was "to establish good relations quickly and to work toward open communication with our American counterparts. We have made many friends in America and hope we will be able to establish more."

The Soviet visit was part of an exchange effort between the United States and the Soviet Union to identify and discuss areas of mutual interest which may lead to future cooperative aeronautical research efforts. In May 1990, a NASA delegation, which included Langley Director Richard H. Petersen, visited Moscow and toured several Soviet aeronautical research facilities and met senior Soviet managers.

"I am excited about these potential new relations with the Soviet Union in aeronautical research," said Petersen, who feels we must move cautiously and that cooperative endeavors will take several years to begin. "By the year 2000, I think we could be working as well with the Soviet Union as we do now with our colleagues in Europe."

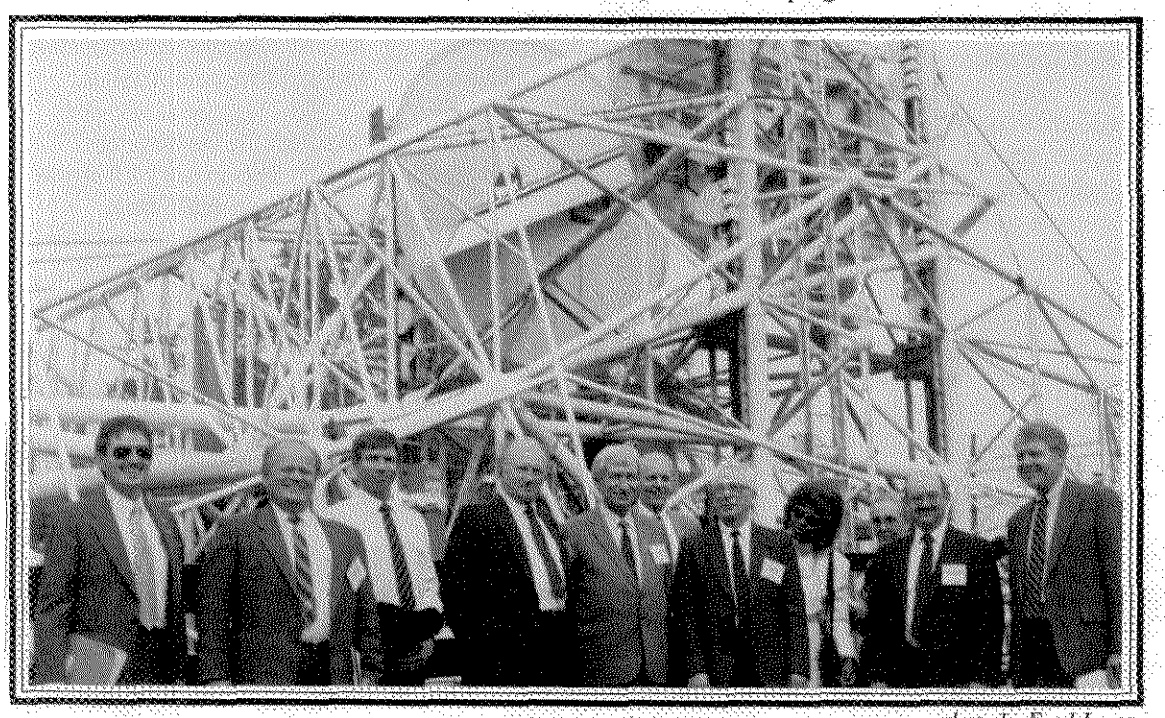
According to Chuiko, the Soviet team was most impressed with Langley's "high level of science, the high level of facilities and computer technology used in support of activities, as well as the high level of competence of the people. Most noteworthy," Chuiko explained, "were the sophisticated simulation facilities, the fundamental research on composite materials and the wind tunnels for testing scramjets. A lot of what we saw is similar to what we are doing in the Soviet Union."

Professor German I. Zagajnov, director of the Central Aerohydrodynamics Institute (TsAGI), commented that the Structures Lab is very similar to the one at his Institute, as is much of the Center. "A difference is that we investigate the whole aircraft, including production," Zagajnov explained.

While at Langley, the aeronautics team received presentations and toured the National Transonic Facility, Gas Dynamics Lab, Computational Fluid Dynamics, Computational Structural Mechanics, Structures Lab, Landing Loads Track, Civil Aircraft Simulators, Advanced Transport Operating Systems, the Hangar and the Visitor Center.

The Soviets also toured Yorktown and Williamsburg, and visited local shopping areas. According to Chuiko, "Everyone was warm and had a friendly attitude. The countryside is beautiful and the land is rich. It was a very good and pleasant trip at Langley."

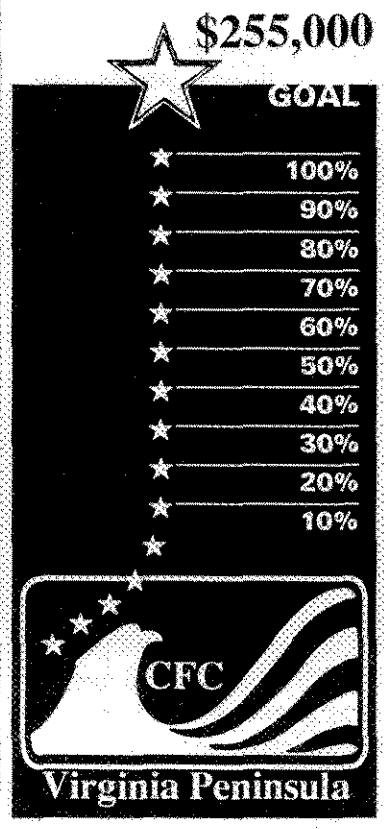
In addition to the Langley tour, the Soviet delegation also visited NASA Ames, Lewis and Dryden, as well as NASA Headquarters, Washington, D.C.



-photo by Fred Jones

AFTER THE RUN. The Soviet team and Headquarters' hosts join Langley staff for a demonstration run of a wing section on top of the Aircraft Landing Dynamics Facility (ALDF) carriage. Witnessing the heavy rain test are (L to R) Robert Medina, NASA Office of Aeronautics, Exploration and Technology; Prof. German T. Zagajnov, director of TsAGI; Dr. Vladimir I. Raschupkin, department head, CIAM; Prof. Donat A. Ogorodnikov, director of CIAM; Dr. Victor M. Chuiko, deputy minister of Aviation Industry; Charles P. Blankenship, director for Structures; Prof. Alexander M. Batkov, head of general department, Ministry of Aviation Industry; Lavonne Parker, NASA Headquarters International Relations; Natalie Latter, interpreter; Huey Carden, Landing and Impact Dynamics Branch; and Center Director Richard H. Petersen.

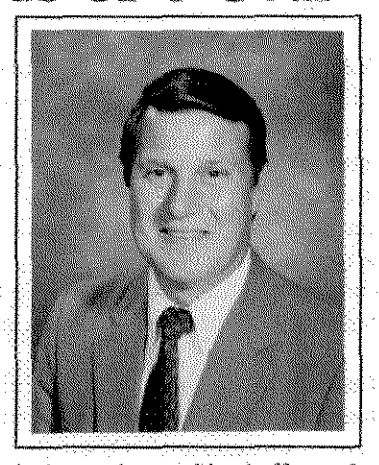
Langley Does it Again! Exceeds CFC Goal



Thank you for making our Langley Combined Federal Campaign a tremendous success and continuing our proud tradition of always exceeding our goal.

As of press time, NASA Langley employees have donated $271,231.26 to the 1990-91 campaign. This puts us more than $16,000 over our goal of $255,000. We expect that the total donations could exceed $274,000 when the final results are tabulated.

To all of you who gave, I want to personally thank you and to thank you for all the thousands of people who will be helped by your donations. Your generous giving at a time when we were being notified that we might be furloughed is particularly gratifying because it shows that you really care about others.



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 our world a better place.

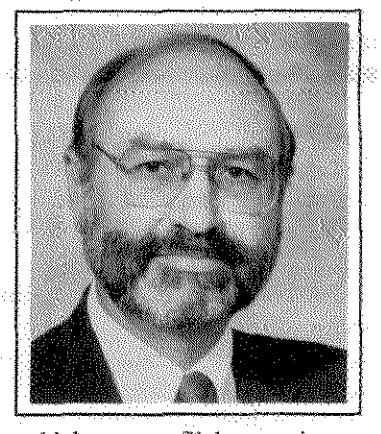
Darrel R. Tenney
Chairman, CFC

Arrington Named NASP Deputy Program Manager

James P. Arrington, assistant chief of the Space Systems Division, has been selected deputy program manager for the NASP Joint Program Office at Wright-Patterson Air Force Base, Dayton, Ohio.

The NASP (National Aero-Space Plane) program is managed jointly by the Department of Defense and NASA. Arrington will be responsible for planning and implementing the final two phases of the NASP program, conducting future application studies, and planning the development of the experimental flight vehicle (X-30) program. A decision to build and flight test the X-30 will be made by the spring of 1993. Flight tests will focus on single-stage-to-orbit capability with air-breathing engines and horizontal takeoff and landing on conventional runways.

For the past four-and-a-half years, Arrington has assisted in directing Langley's research and technology activities in theoretical hypersonic aerodynamics and aerothermodynamics, computer-aided conceptual design and technology forecasting for future space transportation systems and spacecraft. These activities support the Space Shuttle, future launch vehicles and orbital transfer vehicles, space flight experiments, Space Station development and technology, large space antennas, orbital platforms, and laser and pulsed power systems.

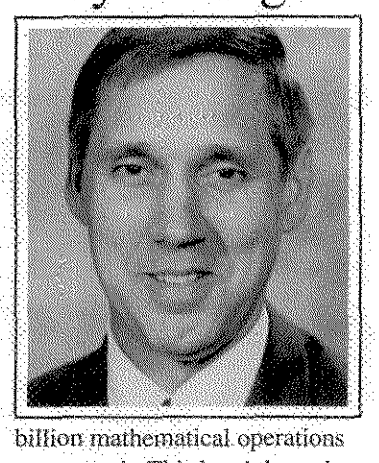


Scientist Honored by College

Dr. Olaf O. Storaasli, an internationally recognized expert on structural analysis methods using supercomputers, has received the Waldorf College Alumni Association Distinguished Service Award "for extraordinary contributions to science and engineering as research scientist and consultant, and for dedicated service to church and community."

College President Dr. William E. Hamm presented the award in ceremonies held October 7 at the Forest City, Iowa, institution. In 1985, the scientist's father, Dr. Olaf K. Storaasli, won the same award.

The Langley researcher's work was most recently recognized when he and two colleagues developed a computer general-purpose method to solve mathematical equations on the world's most powerful computer --the Cray YMP--at an unparalled processing speed of 1.5 billion mathematical operations per second. This breakthrough vastly speeded the machine's ability to solve stress and strain engineering problems such as the 55,000 complex equations associated with the O-rings on the Shuttle Challenger.



Storaasli received a Cray Research, Inc., Performance Award in ceremonies sponsored last Fall by the Institute of Electrical and Electronic Engineers and the Association for Computing Machinery.

News Briefs

1990 Antarctic Ozone Hole Equals Lowest Previous Levels --- Preliminary data indicate that depletion of stratospheric ozone over Antarctica is matching levels observed in 1987 and 1989, the lowest ozone years recorded. Research by Goddard Space Flight Center scientists indicates the Antarctic "ozone hole" began developing in the last week of August when the normal, winter polar ozone levels started decreasing. This was about one week earlier than the beginning of depletion in 1987 and 1989, though the timing of the start of the depletion has shown significant variability over the years. The ozone hole has been monitored since 1979 using the Total Ozone Mapping Spectrometer (TOMS), an instrument on the NIMBUS-7 spacecraft.

NASA to Conduct Thrust Vectoring Research Flights --- An upcoming series of research flights with an F/A-18 aircraft at NASA's Ames-Dryden Flight Research Facility, Edwards, Calif., may make it easier to control future jet fighters at very high angles-of-attack. Angle-of attack or "alpha" is an engineering term for the angle of an aircraft's body and wings relative to its actual flight path. A set of spoon-shaped paddles has been installed around the exhaust nozzles of the research aircraft's two engines. The paddles can be moved, much like the rudder on a boat, to deflect or vector engine thrust in different directions, giving the plane better controllability at nose-high attitudes up to 70 degrees. The flights are part of a continuing NASA program to help aircraft designers increase the maneuverability and safety of future high-performance aircraft at high angles-of-attack.

Lunar Mining Could Provide Future Energy Source for Earth --- What will 21st century powerplants look like? Will they derive their energy from the burning of fossil fuels like 90 percent of their 20th century predecessors? Or will they operate on a new, cleaner, more efficient fuel source? Researchers at the University of Wisconsin's Center for Space Automation and Robotics, one of 16 NASA Centers for the Commercial Development of Space, are betting on the latter. They believe the future lies with helium-3, a rare element on Earth that potentially exists in large amounts on the Moon. One ton of this so-called Astrofuel could supply the electrical needs of a city of 10 million people when combined in a fusion reactor with a form of hydrogen. In fact, lunar samples collected by Apollo astronauts show the resource is so plentiful that the Earth's energy needs could be accommodated for at least 1,000 years.

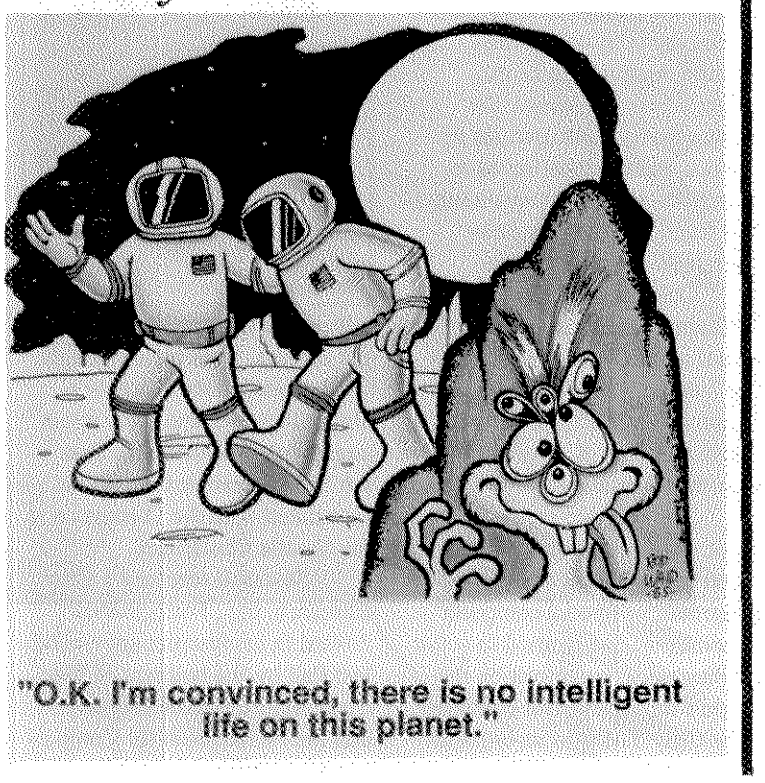
COBE Spacecraft Takes First Image of Interstellar Dust --- NASA's Cosmic Background Explorer (COBE) has taken its first image of the entire Milky Way Galaxy in a wavelength that reveals the dust from which planets and galaxies are formed. COBE investigators presented the images and their latest findings at an international workshop on cosmology at the University of Maryland, College Park. Instruments aboard the spacecraft measure cosmic background radiation, believed to be the remnant of the "Big Bang," with a precision never before achieved.

Magellan to Temporarily Halt Radar Mapping of Venus --- Nature forced Magellan Project flight controllers at NASA's Jet Propulsion Laboratory, Pasadena, Calif., to temporarily halt radar mapping of the surface of Venus in early November as Venus and Earth neared their maximum distance with the sun in between. The maximum distance between the planets, called superior conjunction, occurred November 1. The sun and Venus were less than one degree apart. While Venus did not actually go behind the disc of the sun, its nearness to the sun from Earth's point of view caused radio signals passing close to the sun to degrade. JPL controllers were still able to communicate with Magellan periodically. The time of superior conjunction was known and planned for early in the Magellan mission planning.

NASA Technologies Benefit Medical Orthopedic Science --- NASA's expertise in structural mechanics, design optimization and computer codes is finding application in medical orthopedic science. Lewis Research Center scientists and Case Western Reserve University medical specialists and scientists are working together in Cleveland to increase the life of surgically replaced human joints by providing the capability to custom design prosthetic joint implants. The objective of the program is to develop a computer code to design orthopedic implants to provide a custom fit of the prosthetic joint for each patient to ensure a prosthetic joint life span of some 20 years and a corresponding minimum of discomfort to the patient.

Editor's Note: The NASA Headquarters News Releases summarized above are available by calling Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by the headline printed in bold.

Lankley



"O.K. I'm convinced, there is no intelligent life on this planet."

VASC Update

The Virginia Air and Space Center/Hampton Roads History Center, now under development in downtown Hampton, will tell the story of this region's abundant history interwoven with its rich aerospace legacy through first-class exhibits and public programs.

Ralph T. Johnston, executive director, will give a briefing on center status, future plans and programs at 7 p.m. Thursday, November 8, in meeting room A, Hampton Public Library, 4207 Victoria Boulevard. This presentation is open to the public and will be of special interest to current and potential volunteers.

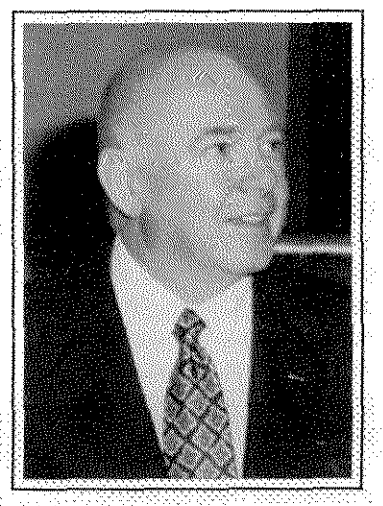
For further information, call 727-0800.

Correction:

NASA Visitor Center speaker Robert D. Braun, Vehicle Analysis Branch, was incorrectly identified in the October 19 issue of the **Researcher News**. Apologies to Mr. Braun.

Productivity Proponent Briefs Langley Management, Staff

Robert B. Young Jr., president of Lockheed Engineering and Sciences Co. (LESCo) gave a Total Quality Management, TQM, briefing to Langley senior staff October 3. His presentation was part of a planned series of TQM briefings by academic and industry leaders to increase awareness of ongoing activities in the area of productivity.



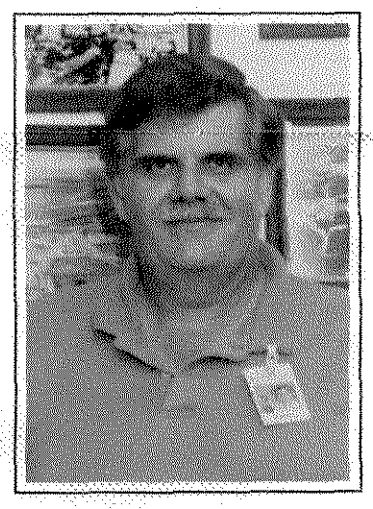
LESCo, the recipient of the 1989 NASA Excellence Award for Contractors, was the first company from the service sector to win a major national quality award.

Young is a leading TQM proponent. He shared the lessons learned from LESCo's operating philosophy. Highlights of his presentation focused on employee empowerment, the content of two courses taught by Young on coaching and leadership, as well as the many successes he has experienced. Earlier in the month, Young gave a NASA TQM colloquium hosted by the Administrator and broadcast to all NASA field centers.

LESCo is primarily a support contractor to Johnson Space Center, where Young is co-chair of the JSC Team Excellence Contractor Steering Committee. LESCo is also a contractor to Langley.

Outstanding Property Custodian Named

Robert M. Steward, supervisor, Technical Support Section B, Laboratories Operations Branch, has been selected outstanding property custodian of the quarter, April-June 1990. He was presented a certificate of appreciation by Ronald R. Krodel, chief of the Management Support Division in a ceremony August 28. One of several nominees, Stewart was selected because of the outstanding manner in which he has performed his responsibilities as property custodian.



Call for Papers

The Young Professionals Committee of the AIAA Hampton Roads Section is sponsoring a paper competition designed to recognize outstanding on-the-job technical accomplishments of young professional members.

Members under the age of 32 are invited to submit one first-author paper which has either been published or been accepted for publication in an archival and refereed publication. The paper must have been originally submitted while the writer was a professional member.

Papers received on or before January 7, 1991, will be judged for technical content and style by an independent review committee. The winner will be selected in March and presented an award at the Young Professionals Forum during the national AIAA Annual Meeting in Crystal City, Va., on April 30.

For additional information, contact Dr. Stephen A. Rizzi, Mail Stop 463, ext. 43599.

Positions Open

The following vacancies are open to NASA Langley employees with civil service status:

90-102: Program Analyst, GS-345-11, 12 or 13; Projects Division. Closes November 7.

90-103: Supervisory Electronics Engineer, AST, Data Systems, GM-855-13 or 14; or **Supervisory Computer Engineer, AST, Data Systems**, GM-854-13 or 14. Closes November 7.

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

An Irresistible Environment: Smiles Abound at the Child Care Center

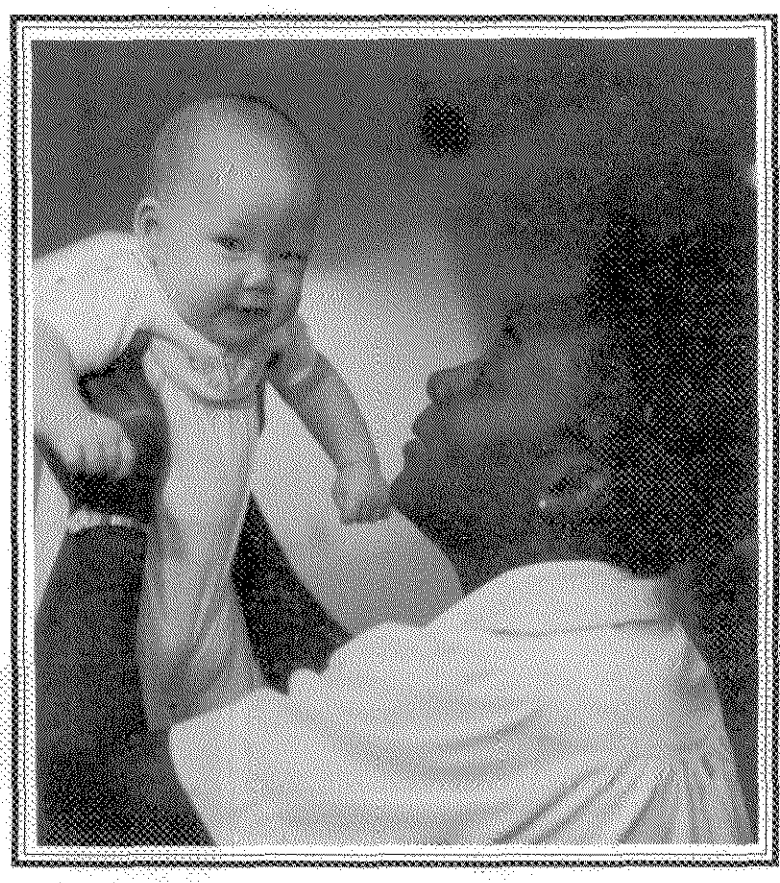
The whirr of helicopter blades has been replaced by the chatter of children in a Langley building that has undergone much transition over the past five years.

Langley's Child Development Center, located near the Credit Union, evolved from a cinder block building that once served as the shop area for a helicopter blade and rocket payload test facility. The original 880-square-foot building has more than doubled in size in three renovations aimed to convert the vacant building into a daytime home away from home for the children of Center employees.

The need to address employee day care requirements was identified as far back as 1973. A feasibility study for an on-site child care facility was initiated by a Management Operations Directorate Equal Opportunity subcommittee in 1983. Surveys indicated overwhelming interest as well as anxious clientele for such an initiative.

Opened in 1985, the center measured slightly over 1,600 square feet and served only 38 children--30 two-, three-, four- and five-year-olds and eight infants. Today the center serves 60 children--14 toddlers, 20 preschoolers and 26 infants--with hopes to expand the capacity to over 100 children by 1992, with the possibility of a kindergarten and a before and after school program.

The Langley Child Development Center (LCDC) was funded with a start-up loan from the Exchange Council and became a branch of the Council. The developmental program is now fully supported by registration fees and tuition. "Rates," noted Buena Crawford, Exchange Council member responsible for management oversight, "have remained the same since 1988.



"Mom and Dad look at me this way too! Things are great at the LCDC."

"We developed our own operating standards using the State of Virginia standards, the Air Force and Army regulations and the accreditation criteria of the National Association for the Education of Young Children," said Crawford. "We ended up with high quality standards, and the majority of them exceed state standards." The LCDC functions under the watchful eye of an advisory board made up of NASA, Air Force and Army officials as well as community professionals.

Kathryn L. Skinner is the second LCDC director. She is charged with the daily operation of this small business endeavor. In the five years, center staffing has risen from nine to 16 employees. "Our teachers are responsible for programs that develop both the bodies and the minds of the children," she said. The photographs that accompany this article point to the success of the center.

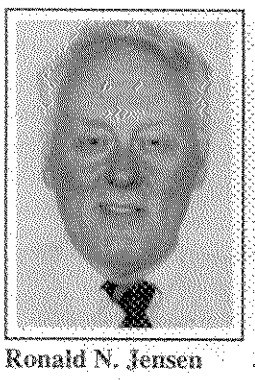
In addition to quality programming, the LCDC offers Langley employees the opportunity to be close to and visit with their children. Parents are encouraged to have lunch at the center or take the children out at lunchtime. Nursing mothers may return to work because, at the LCDC, they have access to their newborns during the day, provided they arrange their leave for non-lunch-hour visits.

"The parents of our children have been so very supportive," said Skinner. "Our Parent-Teacher Association has raised funds to purchase much-needed 'extras,' but they have also made staff development a priority Their next project is to build a tricycle track that will not only benefit our children exercise-wise but will also be loads of fun."

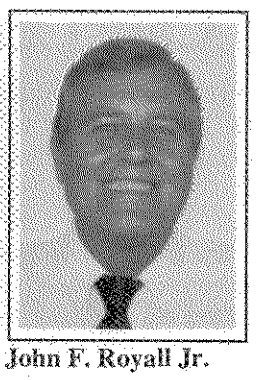
Jerry Hansbrough, chairman of the Langley Exchange Council, looks at Langley's child development center as a source of positive morale. "Day care facilities have traditionally been a plus in recruitment and have reduced management problems, such as the loss of skilled workers and frequent or unexcused absences. The LCDC is an investment in improved employee relations, enhanced public image and higher productivity rates."

photos by Carol Petrachenko

These photographs, taken in mid-October, portray a typical day at the Langley Child Development Center. Children and parents alike appear involved in and pleased with this Langley Research Center initiative.

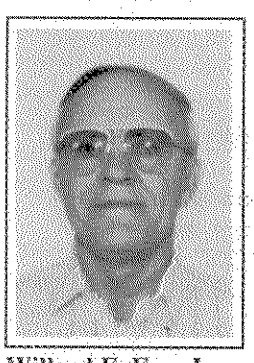


Ronald N. Jensen

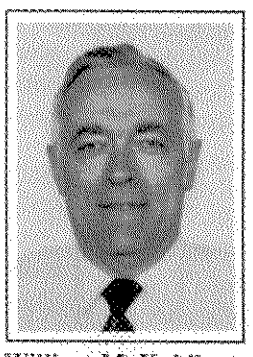


John F. Royall Jr.

Recent Retirees



Willard E. Foss Jr.



William M. Kahlbaum Jr.

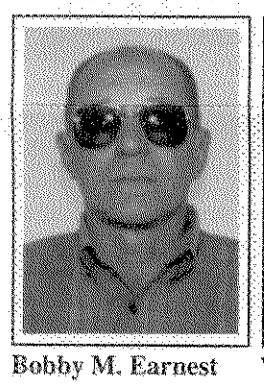
Ronald N. Jensen, Facilities Engineering Division, retired August 10.

John G. Shearin, Acoustics Division, and Frederick H. Wood Jr., Applied Aerodynamics Division, retired August 24.

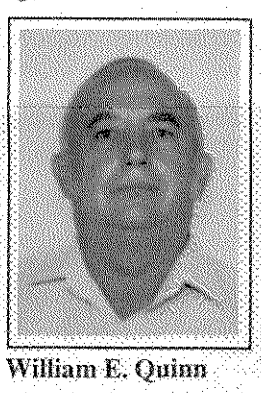
John F. Royall Jr., Acquisition Division; Willard E. Foss Jr., Advanced Vehicles Division; Bobby M. Earnest and William M. Kahlbaum Jr., Analysis and Computation Division; William E. Quinn, Instrument Research Division; William I. Watson, Projects Division; and William F. Hinson, Space Systems Division, retired August 31.

Richard E. Bardusch, Analysis and Computation Division; Leonard S. Mayo, Flight Electronics Division; Jane T. Everett, Instrument Research Division, retired September 28.

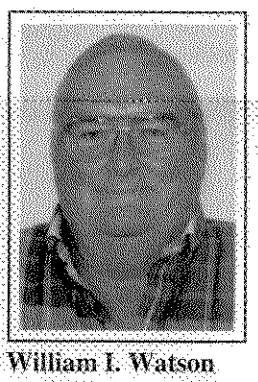
Arnette H. Adams, Aerostructures Directorate, retired October 3.



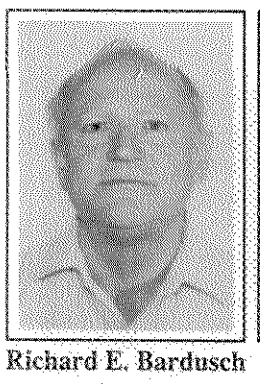
Bobby M. Earnest



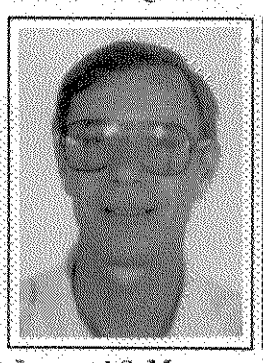
William E. Quinn



William I. Watson



Richard E. Bardusch



Leonard S. Mayo

Jane T. Everett

1991 Calendars Available from Stock

Requests for 1991 calendars can now be submitted to the Stockroom, Mail Stop 382, on NASA Langley Form 55. Stock numbers for calendars are listed below:

7510-01-225-9212	**Calendar Pad**, flipover; size 3" x 3-5/8" (EA)
7510-01-225-9216	**Calendar Pad**, executive flipover; 3-5/8" x 5-7/8" (EA)
7510-01-242-1046	**Wall Calendar**, displays 3 months at a time; 11-5/8" x 8-7/8" (EA)
7530-01-229-1610	**Loose-Leaf Appointment Book Refill**, daily and monthly calendar sheets; 6-1/2" x 5-1/2" (EA)
7530-01-233-2434	**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" (EA)
7510-01-241-0549	**Desk Blotter**, monthly sheets ruled and squared for each day; 17" x 22" (EA)

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.

1990 Softball Season in Summary

-by Lou Glaab, Softball Commissioner

The 1990 NASA softball season was a big success with a total of 27 teams involved.

These teams were initially broken into two divisions for the first round of the season, and then further grouped by capability into six leagues of approximately four or five teams for the season's second round. All of the teams participated in the double elimination championship tournament, which concluded the season in August.

In A-league, the Ballers proved to be the team to beat as they won the regular season title as well as sweeping the tournament. Their total record, 17-2, was the best in A-league.

B-league was dominated by the Ueckers, with a record of 14-7. Named after the legendary Bob Uecker, they won the regular season title and, after an early loss in the tournament, persevered to win the B-league championship.

Regular season champs in C-league were the Suds, with an 8-12 record. However, ACD, 9-10, finished very strong this year and won the C-league tournament.

The Captain Crunchers, 17-5, were the heaters in D-league, winning the regular season and the tournament championship. This team should do well in the upper division next season.

E- and F-leagues were surprise finishes this season in that both teams that won the tournament finished fairly low in regular season play. The E-league regular season champs were the Flames, 12-8, and the tournament champions were The Wild Bunch, 10-10.

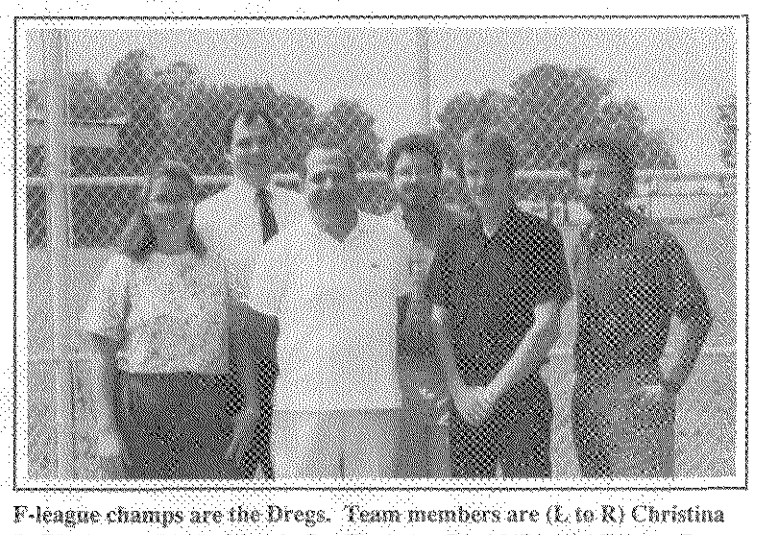
MSD won the F-league regular season championship with the Dregs, 6-13, prevailing over all others in the tournament.

Congratulations to all for a fine season.

A-league champs are the Ballers. Team members are (front row, L to R) Archie Dimery, Dennis Mowrey, Joe Vega, Alan Frizzell, Kevin Laferriere, Chip Quinn; (back row) Bob Booth, Jimmy 'Speed Man' Adams, Rodney Russell, Ed Covington, Jeff Conover and Mark Frye. Not pictured is Ronnie Weber.

B-league champs are the Ueckers. Team members are (front row, L to R) Courtney Russ, Stan Palys, Denise Kuftic, Lou Glaab, Gautam Shah; (back row) Bill Tomek, Dave Aldefer, Clements Mayes, Roy Zalemeda and James Florence. Not pictured are Gene Morelli, Mike DiFulvio, Lynn Graham, Dave Rosenbaum, Phil Arcara, Jim Rogers, Jim Fenbert and Dean McSmith.

C-league champs are ACD. Team members are (front row, L to R) Bob Arduini, John Bowen, John Wallace, Ray Gates, Mike Goode; (back row) Scott Nolf, Eric Everton, Don Randall, Scott Stalleup and Dan Morris. Not pictured are Russel Wallace, Joe Whiting, Jeff Zsoldos, Charlie Jay and Roy Hamm.



F-league champs are the Dregs. Team members are (L to R) Christina L. Bloebaum, Bill LaMarsh, Stu Flechner, David 'Digger' Barnes, Dave 'Chuck' Yeager and Tom Brinkley. Not pictured are Mike Brewer, Nancy Brinkley, Dave Carey, Kerry Gough, Ken Evans, Dennis Foley, Margo LaMarsh, Creig Humes, Rob Jakobowski, Mark Collins, Geoff Tennille, Orn Tobiason, Cathy Cronin, Raef Cronin, Mike Riley and Ronnie George.

Commissioner Spot Open

The office of commissioner of the NASA Langley Basketball Association is vacant for the 1990-91 basketball season. All persons interested in serving as commissioner, or in any any other office of the NBA, should contact Tom Brinkley, assistant commissioner, at Mail Stop 149 or ext. 42507.

Benefits of LAFB O'Club Membership

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Call 766-1361 for details.

Health Corner

Mammograms to be Offered

Mammographic exams will be offered on-site November 13-16. As in the past, the breast cancer detection vans will be located adjacent to the Health Clinic, Building 1149.

The cost for the exam is $43, the same as last year. NASA employees, retirees, contractors and family members are eligible for this low price. Call 864-3191 for an appointment.

In addition, registered nurses at the clinic will be conducting individual education and training sessions in breast self-examination November 5-9. Please call the clinic at ext. 43193 for an appointment.

The American Cancer Society recommends annual mammograms for females 50 years of age and older; mammograms every other year for females 40-49 years of age or annually depending upon medical findings; and baseline mammograms for females 35-39 years of age. Mammograms for females 34 years of age and under may be performed if medical findings are suspicious or if the female has a strong family history of breast cancer.

Program Assures Life after Death

-by Barbara Rollins-Reed

While it is difficult to think about or plan for what will happen at the time of death, there are certain things we should think about and do in preparation for the inevitable. A recent presentation introduced yet another consideration--saving or prolonging the lives of others by becoming an organ and/or tissue donor.

Bruce Nicely of LifeNet Transplant Services spoke to Langley employees October 11 in the H.J.E. Reid Conference Center. "I will meet my objective today," said Nicely, "if those of you who want to be organ and/or tissue donors will sign a donor card and will go home and discuss your decision with your families." Regional procurement co-ordinator for LifeNet, it is his responsibility to request authority from relatives to procure and process donated organs and tissue from those who die in five hospitals in the Hampton Roads area.

"If you sign a donor card, it will identify immediately your wishes and increase the chances that your organs will be used to benefit others. But," Nicely said, "it will ultimately be your next of kin who will make the final decision."

Modern transplant surgery has come a long way since the first successful kidney transplant in 1954. Today it is possible to transplant about 25 different organs and tissue, including corneas, heart, liver, kidneys, bone and cartilage, bone marrow, skin, pancreas and lungs.

Whether or not to be a donor is a very personal decision. Once made, it is extremely important that a prospective donor discuss this decision with family members. If relatives are not aware of one's wishes, the family will be faced with making a choice during an extremely stressful and emotional time.

The Virginia Tissue Bank, an affiliate of LifeNet, has published a booklet entitled "About Organ and Tissue Donation." For a copy of the booklet, which also contains a donor card, or for further information, call 800-TISSUE-2

Employees Support Bloodmobile

Langley employees, contractors and retirees donated 322 pints of blood at the September 19 Bloodmobile. Those achieving gallon status are:

13 gallons--Davis B. Wright Jr.;
11 gallons--Eric I. Madaras and Karen S. Whitley;
9 gallons--John M. Haines;
8 gallons--William F. Adkins and Warner W. Smith Jr.;
5 gallons --Timothy D. Bryant;
4 gallons--Richard N. Zacharias and Robert D. Turner;
3 gallons--Robert W. Wills, Gary F. Wesselman, James L. Puffenberger and Paul A. Garu;
2 gallons--David R. Wilson and Robert A. Mitcheltree;
1 gallon--Robin L. Freeman, Charles E. Townsley Jr., Herschel G. McCoy, Lynn D. Curtis, Robert C. Redman Jr., Gary A. Wainwright and Nancy K. Sheulin;

First timers--Michael A. Scott, Kathryn D. Lay, Rodney A. Robertson, Carol C. Winbush, Paula A. Garcia, Carmella B. Bradshaw, Connie D. Jones, Doug J. Vail, Frank F. Caldwell, Ginger R. Millar, Daniel C. Vergano, Regina L. Schells, Pamela J. Haley and Elias E. Guy.

Annette L. Forrest was the NASA coordinator and Sylvia Howard was the coordinator for the American Red Cross. The next bloodmobile will be held Wednesday, November 21. Give the gift of life, give blood.

-photos courtesy of Cal State, Los Angeles

The Langley-sponsored, Cal State LA-designed and built solar powered electric car, *Solar Eagle*, finished fourth in General Motors' Sunrayce USA. *Solar Eagle* now moves on to world competition November 11 in Darwin, Australia.

Solar Eagle Wins Invitation to World Competition

-by Margaret O'Keefe

Since the price of oil began its upward spiral in the 1970s, commuters have dreamed of a future in which clean, efficient vehicles would be powered by a free and unlimited energy source--the sun. Langley Research Center has sponsored a team of students at California State University, Los Angeles, in the development and design of just such a vehicle: Cal State LA's *Solar Eagle*.

Solar Eagle was one of 32 solar-powered electric cars selected to compete in General Motors' Sunrayce USA in July. It finished in fourth place in the 11-day, 1,800-mile race--ahead of such engineering powerhouses as MIT and Stanford. Using secondary roads through eight states, Sunrayce USA began on July 9 at General Motors' "World of Motion" in Epcot Center, Florida, and ended July 19 at GM's Technical Center in Warren, Michigan.

Langley's Dr. Samuel Massenberg, who arranged NASA support of Cal State LA's project, attributes *Solar Eagle's* success to teamwork. "Cal State LA has an extremely diverse student body with large Hispanic and Black student populations. The *Solar Eagle* project team is comprised of Black, Hispanic, Asian and Caucasian students, and the aerodynamic designer is a woman. It's a perfect illustration of what teamwork and cooperation can accomplish, " Massenberg explains. The Department of Energy presented the *Solar Eagle* team awards in three categories: the first place award for artistic design, the second place award for electrical power system design, and the third place award for teamwork.

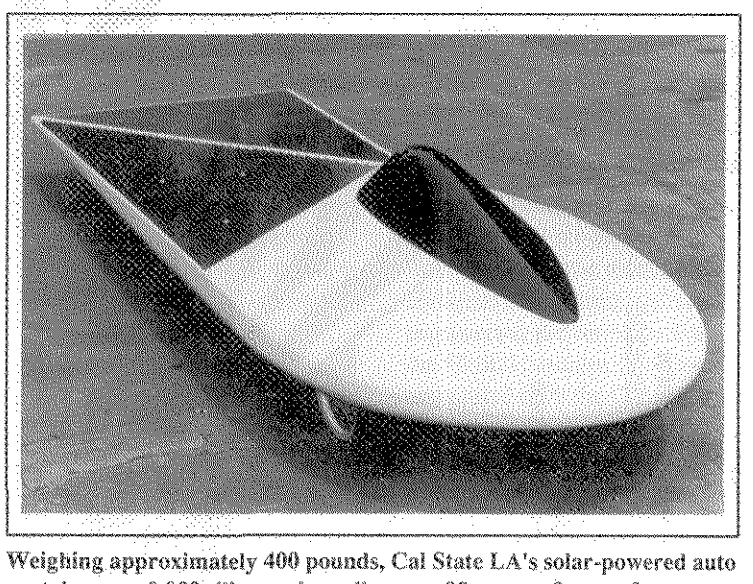
In addition to awards and national recognition, *Solar Eagle's* achievement earned an invitation to compete in the World Solar Challenge in Darwin, Australia, on November 11, where it is expected to perform well. The sunny days in Australia should enable the Cal State LA entry to perform even better than it did in the sometimes overcast weather during Sunrayce USA.

. . . commuters have dreamed of a future in which clean, efficient vehicles would be powered by a free and unlimited energy source--the sun.

NASA is also sponsoring *Solar Eagle* in the world competition in Australia. The rough roads and high cross winds of that region are not expected to be a problem for the solar-powered auto. Since *Solar Eagle* was the only vehicle in Sunrayce USA to experience no mechanical or electrical failures, such conditions could be an advantage because they will test the reliability of the other entries.

With a curb weight of approximately 400 pounds, *Solar Eagle* contains over 9,000 silicon solar cells on an 85-square-foot surface. The cells provide electrical power to a motor and rechargeable batteries. Solar cars can generate only about two horsepowers of useful electrical energy under ideal conditions. *Solar Eagle's* maximum speed is 65 mph at peak power; therefore, the aerodynamic design is a crucial element in its success.

Cal State LA is the only minority institution selected to participate in the World Solar Challenge. Raymond Landis, dean of the School of Engineering, believes that NASA's support has been a significant part of its success.



Weighing approximately 400 pounds, Cal State LA's solar-powered auto contains over 9,000 silicon solar cells on an 85-square-foot surface. These cells provide electrical power to the motor and rechargeable batteries.

Happenings

SPECIAL LAA SOCIAL will be held Friday, November 16, from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Music will be provided by a DJ and there will be a $1 cover charge.

NASA TOASTMASTERS meet the second and fourth Wednesdays of the month. Next meeting is November 14 at 11:30 a.m. in the H.J.E. Reid Conference Center.

STRESSBUSTERS relaxation and recharge group meets Wednesdays from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. Call Steve Dahmen, ext. 44519, for details.

LOW IMPACT AEROBICS classes are held Tuesdays and Thursdays, 5 to 6 p.m., in the NASA gym. Cost is $12 per month. First class is free.

ARTS AND CRAFTS EXPO Saturday, November 17, LAFB Officers' Club. 10 a.m. to 5 p.m. Admission is $1.

FLEA MARKET, Saturday, November 3, from 9 a.m. to 2 p.m., Ocean View Holiday Inn parking lot, Willoughby section of Norfolk. Spaces available at $10 each. For more information, call 588-4548.

SCI-CON 12. Tidewater's oldest and largest science fiction convention. November 2-4. Holiday Inn Executive Center, Newtown Road, Virginia Beach. Convention memberships $25 for the weekend. For more information, contact John Kaiser, ext. 47380.

FREE COMPUTER SHOW, Langley AFB NCO Club, November 6, 10 a.m. to 3 p.m. Over 30 leading vendors will demonstrate information systems. Call 1-800-638-8510.

FOR SALE: AUTO. 1966 Plymouth Barracuda 318 ci V8, AT, AC. In daily use. Restorable. Asking $850. Call Jim at 1-588-8617.

FOR SALE: AUTO. 1983 Chevrolet Cavalier, 2-door, AM/FM stereo. Good condition. $1,500. Call 850-5882.

FOR SALE: EQUIPMENT. Western saddle and pad for small horse. Very good condition. $100. Blanket for pony. $25. Call Cindy, 874-7414.

FOR SALE: CONDO in Newport News. 2 BR, FP, all appliances. Assumable loan. $479 per month, plus $41 condo fee. $2,000 down. Must sell quickly. Call 591-8734.

Langley Colloquium and The Sigma Series

Park Seed Co. Official to Discuss Space Seeds

-by Jean Drummond Clough

The Long Duration Exposure Facility (LDEF) returned to Earth aboard Space Shuttle Columbia on January 20, 1990, carrying 57 science and technology experiments which had been exposed to the space environment for nearly six years. One experiment tray on the facility housed 12.5 million Rutgers tomato seeds and 2 million other vegetable and flower seeds.

Preliminary results of the Space Exposed Experiment Developed for Students (SEEDS) and the Seeds in Space Experiment will be the topic of two lectures to be given in Hampton Tuesday, November 13, by Dr. Jim A. Alston, director of research at Park Seed Company.

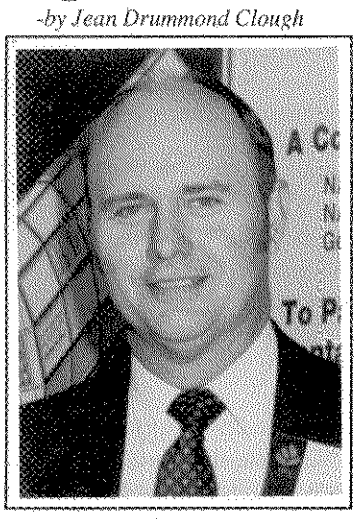
At 2 p.m., Alston will give a slide presentation to Langley employees, retirees and contractors at a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 7:30 that evening, he will present the same lecture at the Holiday Inn Coliseum Hotel and Conference Center as part of The Sigma Series. Sponsored by the Virginia Air and Space Center, the Daily Press and NASA, the Sigma Series presents free public lectures on timely topics.

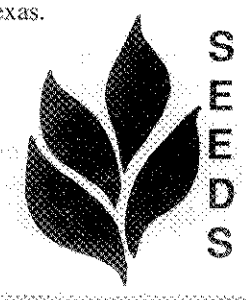
The SEEDS experiment was designed to offer students the opportunity to experiment with tomato seeds that had been exposed to the radiation of space. Students were to use the scientific method in evaluating the survivability of the seeds and in determining the possible mutants and changes in the mutation rate which might occur.

The Rutgers tomato seeds that were flown in the SEEDS tray were packaged and sent along with control seeds to approximately 130,000 classrooms across the country and to approximately 1,450 classrooms in foreign countries. About 3.5 million students were involved in the project during the spring of 1990.

In addition to the tomato seeds, Park Seed Company also had 120 varieties of flowers and vegetables, including marigolds, impatiens, zinnias, cucumbers, peas, onions and corn, on the experiment trays.

Alston has been with Park Seed Company, Greenwood, S.C., since 1970 where he is involved in seed quality control, seed germination and storage research, and federal and state seed and plant regulations compliance. In addition to the experiments flown on LDEF, Alston was principal investigator for a flower and vegetable seed Getaway Special flown aboard Challenger on STS-6 in April 1983. From 1968 to 1970, he was supervisor of the plant breeding department, Baker Castor Oil Co., Plainview, Texas.





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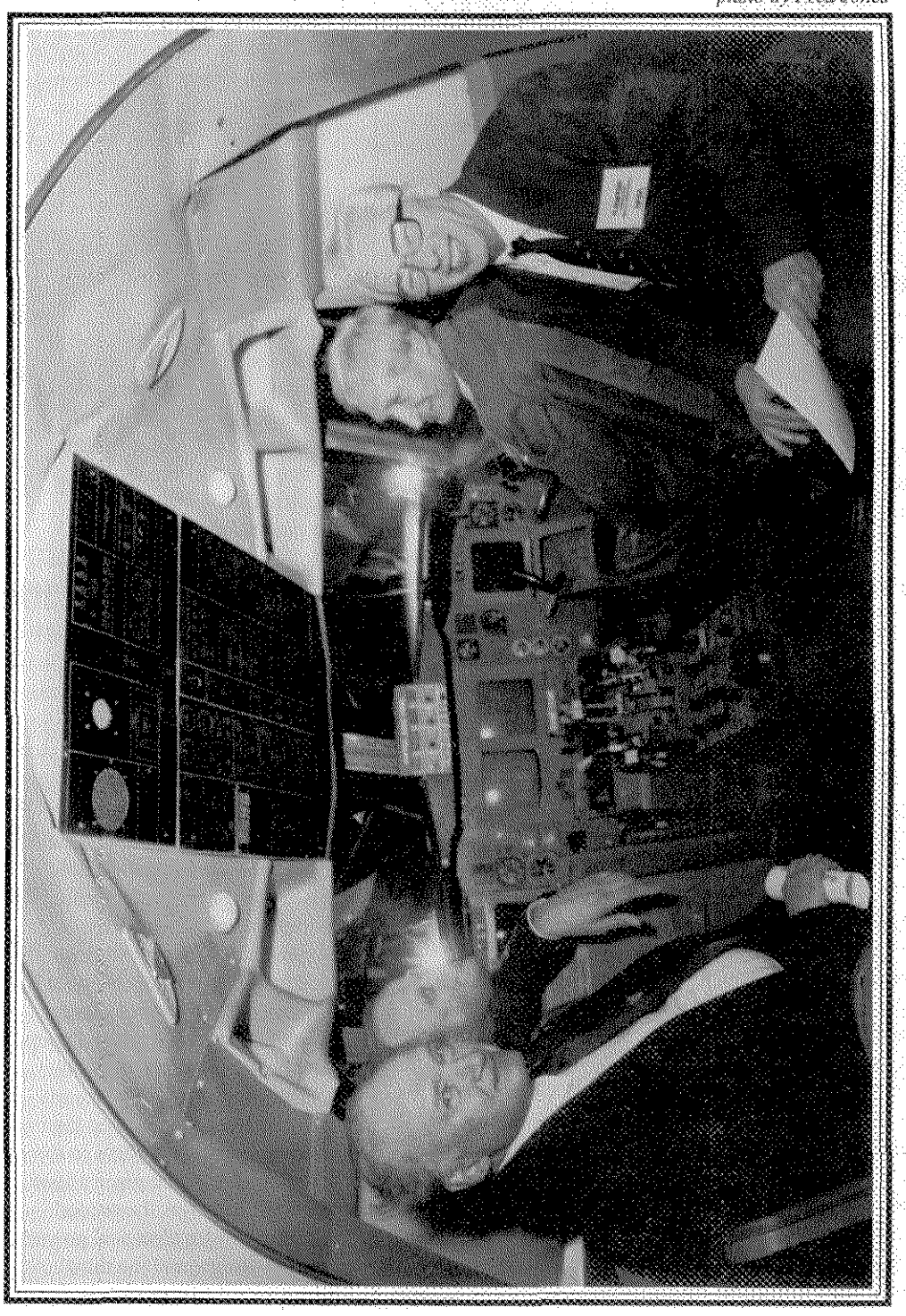


-photo by Fred Jones

SOVIET VISITORS AT THE CONTROLS. Members of the Soviet aeronautics team who recently visited Langley sit in the cockpit of the transport systems research vehicle (TSRV) simulator, which tests new concepts for aircraft controls and displays. Shown (L to R) are Prof. Donat A. Ogorodnikov, director of Central Institute of Aviation Motors, CIAM; Prof. German T. Zagajnov, director of the Central Aerohydrodynamics Institute, TsAGI; Dr. Victor M. Chuiko, deputy minister of Aviation Industry; and Prof. Alexander M. Batkov, head of general department, USSR Ministry of Aviation Industry.

NASA
National Aeronautics and Space Administration
Langley Research Center

News Researcher

Volume 4, Issue 23 November 16, 1990

Bi-weekly Employee and Contractor Publication

NASA To Conduct Thrust Vectoring Research Flights

An upcoming series of flights with an F/A-18 aircraft at Ames-Dryden Flight Research Facility, Edwards, Calif., may make it easier to control future jet fighters at very high angles-of-attack.

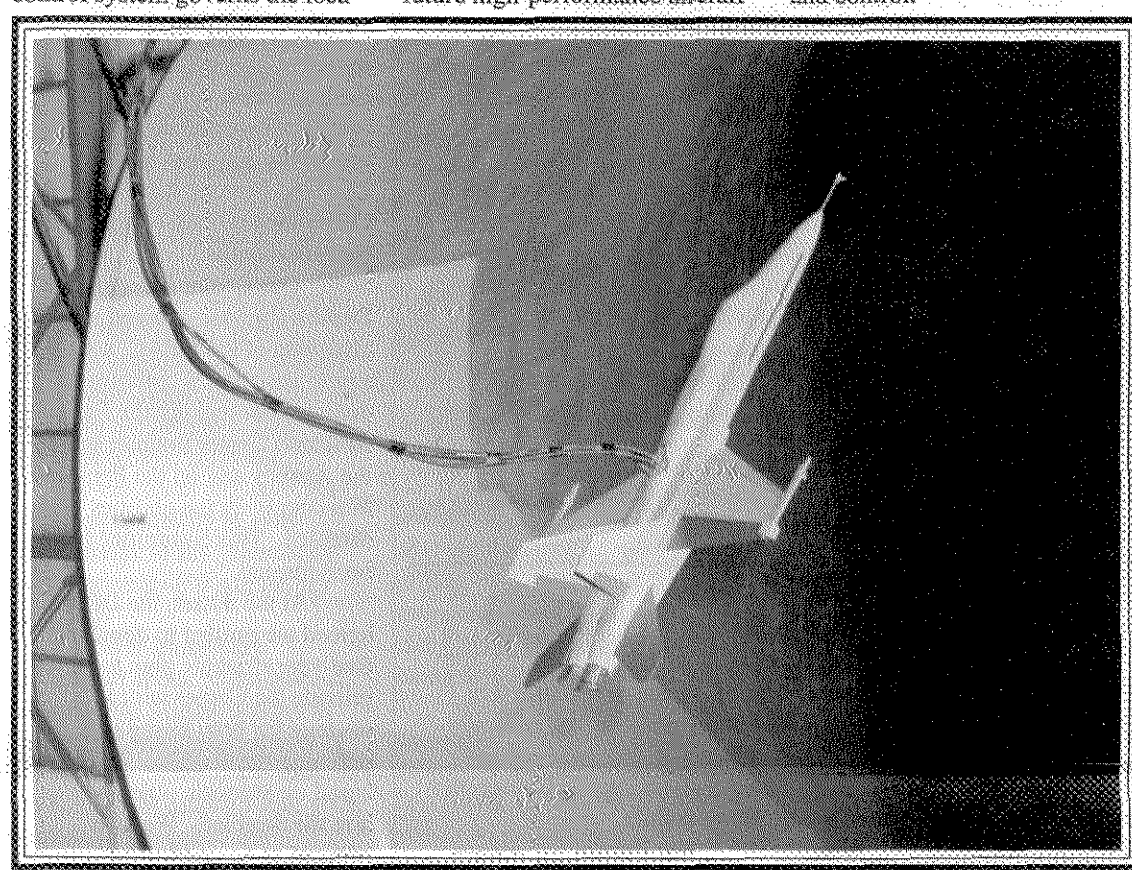
The flights are part of an integrated high angle-of-attack research and technology program jointly conducted by the Ames, Langley and Lewis Research Centers. Langley hosted the NASA High-Angle-of-Attach Technology Conference held October 30 through November 1.

Angle-of-attack or "alpha" is an engineering term for the angle of an aircraft's body and wings relative to its actual flight path.

A set of spoon-shaped paddles has been installed around the exhaust nozzles of the research aircraft's two engines. The paddles can be moved, much like the rudder on a boat, to deflect or vector engine thrust in different directions, giving the plane better controllability at nose-high attitudes up to 70 degrees.

Each paddle, made of Inconel steel and able to withstand nearly 2,000 degrees F., rotates 25 degrees into the engine exhaust stream to vector the thrust. When not in use, the paddles are positioned out of the exhaust streams where they will not interfere with normal engine operations. The aircraft's flight control system governs the location of the paddles using special research software developed for the thrust vectoring studies.

The flights will help aircraft designers increase the maneuverability and safety of future high-performance aircraft at high angles-of-attack. When angle-of-attack increases during tight turns and maneuvers, an aircraft's control surfaces may not generate enough lift for the pilot to maintain aircraft stability and control.



A series of tests in Langley's 30- x 60-Foot Tunnel helped pave the way for thrust-vectored flights to begin soon at Ames-Dryden. Vanes on the rear of the wind tunnel model were deflected into the simulated engine exhaust for added directional control.

The vectored thrust modification to NASA's F/A-18 High-Alpha Research Vehicle will let Ames-Dryden pilots obtain data about the behavior of air over the aircraft's body and wings at higher angles-of-attack than previously attempted in the research program. Earlier flights took the same aircraft to a 55-degree angle-of-attack without using thrust vectoring.

The first checkout flight following installation and ground testing of the thrust vectoring system is scheduled for this month. Research flights with the new system operating will begin early in 1991 and should continue through most of 1993.

NASA program officials stress that the thrust vectoring system is designed solely to provide test capabilities for low-speed high-alpha research and is not a prototype or a production model being tested for operational use on the F/A-18 or any other aircraft. Results of the aerodynamic studies will be used to validate computer predictions and wind tunnel results. The unique flight control system also will be used to investigate new flight control laws for high angle-of-attack maneuvering.

Marathon Presents Challenge for Langley Runners

-by Allan C. Hanrahan

Back in Hampton after participating in the New York Marathon are Langley runners Steve Bauer, Applied Aerodynamics Division; Dan Hawley, Lockheed Engineering and Sciences Co.; and Bob Ferguson, Flight Electronics Division.

The marathon, a grueling race made even more arduous this year by the unseasonably high temperature and humidity, took place Sunday, November 4, and 23,467 of the 25,000 who started out, wound their way through all five boroughs of the city.

"The training schedule is the grueling part," said Ferguson. "You begin training four months before, running 60 to 70 miles a week . . . .You put a lot of time into it." He admitted that by the time he runs the race, the distance has become almost routine. "But you push harder," he added. "And when it all comes together ---the training, the conditions, the route--well, it's great."

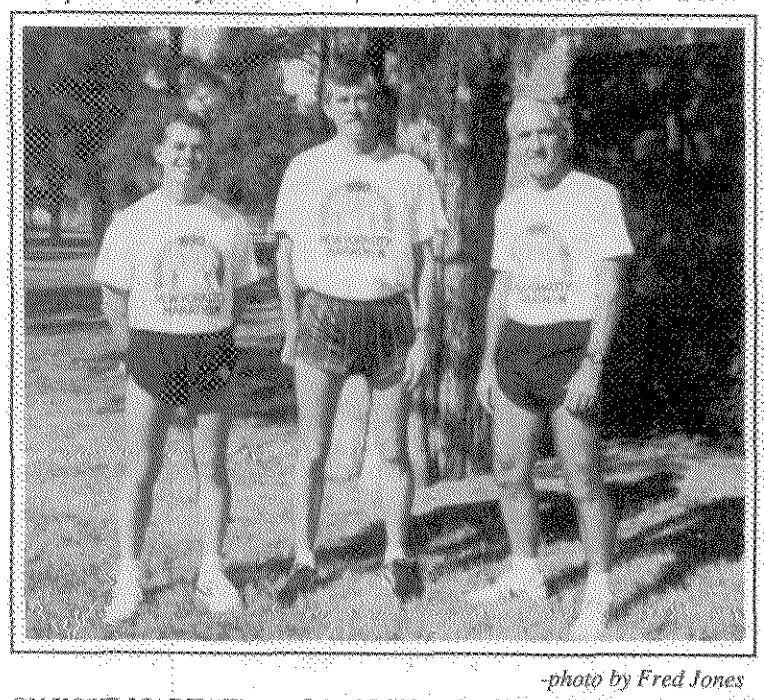
"And you meet a lot of nice people," added Hawley.

As for the equipment, "You'll go through two or three pairs of shoes a year, at least," Bauer estimated, "and some years, as many as six or seven."

All three runners admitted that they loved the sport. "It's never too late to start," interjected Hawley.

All three have also run in the Boston Marathon. Between them they have almost 20 years running experience, and 37 marathons to their credit. Ferguson leads with participation in 17 marathons. He also leads in time at the Center. Joining NASA Langley October 1, 1958, he is a charter employee. Hawley spent 22 years at Johnson Space Center before coming to Langley a year ago. Bauer began as a co-op here in January 1983.

For the record, all three completed the 26-mile, 385-yard footrace and each earned a "respectable" time in the marathon.



-photo by Fred Jones

ON YOUR MARK. Three of the 25,000 enthusiasts who participated in the New York Marathon were Langley runners (L to R) Steve Bauer, Dan Hawley and Bob Ferguson.

'Sail On'---Voyager Program to Preview at Langley

Voyager, the longest-running U.S. space mission, is the focal point for an unusual episode of *The Infinite Voyage*, a Public Broadcast System (PBS) award-winning science adventure series to be broadcast in November.

A preview showing of "Sail On, Voyager!" will be held Tuesday, November 20, from 12 to 1 p.m. in the Visitor Center theater. Employees, contractors and retirees are invited to attend this brown-bag luncheon showing. Seating will be on a first come-first served basis. A second airing is planned for local educators at 4:30 p.m. also in the Visitor Center. Seating for this viewing is by reservation only. For additional information on either opportunity, contact Arlene Levine, ext. 43318, or Visitor Center Director Dr. Mark Nataupsky, ext. 41580.

The opportunity to preview "Sail On, Voyager!" is made possible by WHRO-TV, the local PBS affiliate. The showing is sponsored by the Visitor Center, AIAA and the National Space Society.

Launched in 1977, two Voyager spacecraft flew close to Jupiter in 1979 and to Saturn in '80 and '81, sending back photographs and data that astounded scientists. Voyager 2 proceeded on to Uranus in 1986 and to Neptune in 1989, adding even more scientific surprises to the epic.

"This episode of *The Infinite Voyage* tells a story that embraces 60 worlds, thousands of people, 13 years of time and five billion miles of travel. It's quite a story," says Lionel Friedberg, writer/producer of "Sail On, Voyager!"

Early in the episode, viewers will find out what made the two robotic spacecraft work. The answer is a combination of human innovation and computer technology that was advanced in the 1970s.

On the journey viewers will have the informed commentary of key experts, including the project scientist, Dr. Edward C. Stone, who will become director of the Jet Propulsion Laboratory in Pasadena, California, shortly after the show airs. Other featured scientists include astronomer Carl Sagan, who designed a recorded message to extraterrestrial beings that is attached to each spacecraft.

News Briefs

NASA Selects Small Business Innovation Research Proposals --- NASA has announced the selection of 280 research proposals for immediate negotiation of Phase I contracts in NASA's 1990 Small Business Innovation Research (SBIR) program. Proposals selected were submitted by 229 small, high technology firms located in 30 states. SBIR objectives are to stimulate technological innovation in the United States by using small businesses, including minority and disadvantaged firms, to help meet federal research and development needs and to encourage commercial applications of federally supported research innovations. These awards were selected competitively from 2,148 proposals. Selections were made on the basis of scientific and technical merit, capabilities of the firm and value of the proposed research to NASA.

NASA Presents Excellence Award to Rockwell and Marotta --- The Rockwell International, Space Systems Division, Downey, Calif., and Marotta Scientific Controls, Inc., Montville, N.J., have been named recipients of the 1990 Excellence Award. This award was recently renamed the George M. Low Trophy by NASA Administrator Richard H. Truly. The award recognizes NASA prime contractors, subcontractors and suppliers for outstanding achievement in quality and productivity improvement and total quality management. Rockwell's Space Systems Division provides a diverse base of products and services ranging from production of the fifth Space Shuttle orbiter to existing orbiter refurbishment and a variety of specialized studies in support of space operations. Marotta, the first winner in the small business category, provides critical valves and systems for NASA flight vehicles, launch pads and engine test facilities.

NASA, TADCORPS Sign Information Exchange Agreement --- NASA and the Technical and Administrative Services Corp. (TADCORPS), Washington, D.C., have signed a memorandum of understanding which will provide a forum for the exchange of research information associated with closed environment systems related to food production both on Earth and in space. Under the mutually beneficial agreement, NASA will explore controlled environment systems and hydroponics technology to develop the food production systems necessary to sustain crewmembers on long-duration space missions such as the establishment of lunar communities or an expedition to Mars. TADCORPS will explore development research concepts for test facilities which could provide technology applications for domestic farm crop enrichment in hostile environments in remote regions of the world.

Editor's note: The NASA Headquarters News Releases summarized above are available by calling Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by the headline printed in bold.

Early SCAN Team Recommendations Implemented

They have examined how we do things at Langley. They have made recommendations for improving some of the things we do. Their goal is to make Langley an even better place to work. *They* are the members of Langley's SCAN--Strategic Culture Assessment for the Nineties--teams.

Empowered by the Center Director, these employee teams have taken a hard look at three targeted areas--communications, career development and rewards and recognitions. After extensive data collection and data analysis periods, the SCAN teams presented their findings to senior management in late August. Their report has been widely disseminated down through the branch level. These findings and corresponding recommendations are available for employee perusal.

Several recommendations have already been enacted. Two of the new policies are presented on this page.

Senior Management Research Review (SMRR) sessions continue to be open to all employees. Consistent with SCAN team recommendations, the location has been moved to accommodate a larger crowd. Associate Director Sid Pauls notes that the sessions will be moved to the H.J.E. Reid auditorium should even more seating be required.

"The SMRR is an opportunity to keep the Langley community informed about the latest work going on in our labs," said Pauls. Langley scientists are selected from Center directorates to brief employees and management on program accomplishments and, under the new format, will make their presentations prior to program directors' status reports.

Taking a renewed look at another form of communication, the *Langley* **Headquarters Forum** column that generally appears on this page will no longer be a regular **Researcher News** feature.

The **Forum** has accomplished two of its main goals. For the past two-and-a-half years it has served as a vehicle for Langley employees to view the "big picture" through the eyes of senior management. It has also given senior staff "face recognition" to those employees who rarely visit Headquarters.

Today's **Headquarters Forum** presents a new way to look at an on-going Center initiative--the hiring and retention of the disabled in our work force. This column begins the practice of running a message from senior staff, not on a regular basis, but when the topic demands communication. Thanks go to Frank Allario who submits our first voluntary editorial.

Senior Management Research Review

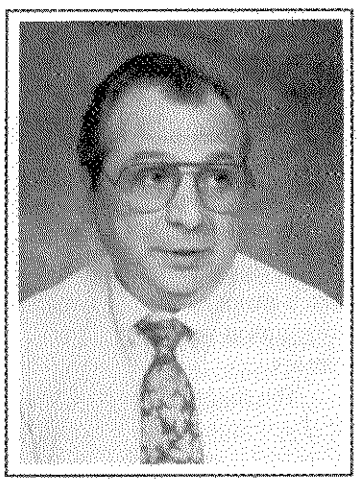
The Senior Management Research Review will be held Monday, November 19, from 10 to 11:30 a.m. in Building 1212, Room 200. All employees are invited to attend. Program accomplishments will be given by the following Langley scientists:

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
10:00	Adaptive Analysis Procedure Demonstrated on Nonlinear Response of Composite Panel	Jonathan B. Ransom (SMD, CMB)
10:15	Tail Buffet Research	Gautam Shah (FAD-FDB)
10:30	Estimated Aerodynamic Parameters for the NASA F/A-18 HARV at High Angles of Attack	Vladislav Klein (GWU)
10:45	Nonlinear Unsteady Aerodynamic Improve Prediction of Transonic Aeroelastic Behavior of the AFW Model	Walter A. Silva (Lockheed E&S Co)
11:00	Intercomparison of ERBE Scanner and Nonscanner Measurements	Richard Green (ASD-RSB)
11:15	Multi-Attribute Task (MAT) Battery Developed for Pilot Strategic Behavior, Workload and Complacency Research	J. Raymond Comstock Jr. (FLMD-C/VIRB)

Following these presentations, the program directors will give status reports.

Editorials

Langley
Headquarters Forum



The Federal Government recognizes the important role the disabled work force plays in attaining our nation's goals. In fact, this year President Bush and the Congress, through legislation, institutionalized a new recognition of the important contributions of disabled persons towards meeting vistas for America's future.

At Langley Research Center, we took the President's initiative seriously, even before the legislation was signed into law. I am writing now to inform you of the activities of the Disabled Persons Advisory Committee (DPAC) during the past six months.

Our Center Director and Deputy Director charged me, as chairman of the DPAC, a year ago to assemble a committee dedicated to making the Langley Research Center premier within the Agency and on the Peninsula in recognizing the abilities of the disabled. This committee has been formed.

At the outset, the DPAC agreed we needed to develop a five-year strategic plan to provide the Center with a strategy for both hiring and retaining the disabled. We focused on strategic objectives to hire the disabled. We also adopted as an underlying principle, an initiative to ensure that current members of our disabled work force have the opportunity for career growth.

As a goal, we labored to finalize the plan by the month of October, which has been traditionally recognized as Disability Awareness Month. This has been accomplished.

As part of our strategic plan, we adopted the underlying philosophy that our goals can only be achieved if we, the members of the DPAC, are dedicated to extending the awareness highlighted during Disability Awareness Month for the remaining 11 months of the year. In recognition of this goal, I invite you to call me personally with any ideas you may have to assist us. I, and all members of the committee, welcome your thoughts. We also plan, through line organizations, to solicit your help. Our strategic plan is completed and will be finalized for formal publication this month. Excerpted below is the forward page of the plan which, we believe, summarizes our dedication and the dedication of Center management "to be premier" in our recognition of the abilities of our workers, no matter what their situation.

Frank Allario
Chairman, Disabled Persons Advisory Committee

Foreward

This year, the Disabled Persons Advisory Committee (DPAC) was restructured with new personnel and with a renewed commitment. The underlying theme for the DPAC was established early and recognized that the disabled work force at the Langley Research Center has been a vital element in the technical and administrative successes of the Center.

Two guiding principles were adopted by the DPAC: one, to develop an environment at the Center where the disabled work force will continue to be recognized as an invaluable source of technical, administrative and managerial talent; and two, to make the Center premier, within the Agency and in the local community, in its commitment to hire and retain the disabled.

Using these established principles, the committee then decided to conduct a strategic planning exercise with the goal of developing a five-year investment strategy that would fully realize implementation of the steering principles. The strategic planning exercise was conducted with members of the DPAC over a period of six months. Don Quakenbush guided us through many hours of deliberation and discussion. Additionally, several members of the committee visited other Centers and other federal installations to gain a perspective of their experiences, both successes and failures. This document is the result of the strategic planning exercise.

The recommendations in this document are intended to be aggressive. It must be realized that the committee members fully understand the traditional barriers to hiring and retaining the disabled, both at the national level and at the local level. The committee feels the goals can be realized with a strong commitment from senior and middle management and the continued involvement of the DPAC members. The recommendations in this report will be continually assessed and measured by the DPAC members during the course of the year. The intent is to maintain awareness of progress and to take bolder steps in meeting our goals.

Langley Electrical Engineer Spreads Message of Hope and Survival

"If it is to be, it's up to me." This is the message of hope and determination Langley's Terry Morris, Information Systems Division, has spread in speaking engagements from Cleveland to California.

Abused as a child and then abandoned by the side of the road 500 miles from home, Morris is featured in the promotional videos distributed by the Combined Federal and United Way campaigns. Morris is on the road again, this time recounting his beginnings and recalling the care and support a CFC-funded United Way agency provided him.

"The staff at Alpha House (a group home for boys) helped me turn my life around--because they convinced me someone cared," said Morris, who has spoken to nearly 50 groups and organizations since the kickoff of this year's CFC/United Way campaigns.

"Before I went to Alpha House, I always thought I was a bad kid," said Morris. "When I was growing up, my mother would beat me a lot. I thought it was because I didn't fit into the mold. Later, I learned she beat me because I reminded her of my father who deserted her.

"Places like Alpha House can make a big difference in a young child's life, especially when that child has been abused or abandoned. I could lose everything and still be on top, because these people showed they cared for me."

Morris has told his story at several NASA centers, military air bases across the country and numerous federal agencies in Washington, D.C. He also spoke to NASA Headquarters employees this month at the invitation of Administrator Richard H. Truly.

"Terry Morris is full of hope, full of positive energy," said a Washington spokesman. "His life was changed because someone cared. And he firmly believes that each one of us has the power to change lives through our love and generosity. That has been his message to thousands of federal employees."

Morris is Comfortable as Community Role Model

Terry Morris has spoken to well over 10,000 federal employees in the Washington, D.C., area in the past few weeks. On October 30, he spoke to an auditorium full of local middle school students. Morris counts the second as his greater accomplishment.

Many wouldn't have the courage to share his kind of story. Terry Morris brings everyone into his family circle and reminds all who will listen that we have to be there for each other. In a matter of seconds, he breaks down walls and forms bonds.

"I value the opportunity to pass my story along to young kids who might be involved in a difficult situation and not know that there are people in this world who care," says the Langley electrical engineer. "I feel a responsibility to alert others at risk to my philosophy about survival--*if it's to be, it's up to me!* "

Morris spoke very candidly to about 70 students at Gildersleeve Middle School in Newport News about aspects of his early life. "What are some of the things you dislike about your home life?" he asked the assembly.

"Restrictions!" said one seventh grader.

"Having to do the dishes after dinner," answered another.

"Being treated like a child by my parents," said a third.

Morris then proceeded to tell the group some of the things he disliked about his home life--"being beaten regularly, getting kicked out and having to spend several nights out in the cold, being blamed for things I did not do, being deprived of food for several days at a time. Take my advice. Be thankful your parents protect you. Be patient if they overprotect you. The worst thing I ever experienced was being totally alone."

It was the realization that someone cared that enabled Morris to turn his life around. "At Alpha House, the rules were strict and punishment for disregarding the rules was harsh. The discipline that I learned at Alpha House helped me set priorities, helped me realize the power education could give me, helped me mold my future."

Gildersleeve students opened up to Morris in letters they wrote inviting him to be a guest speaker at the school.

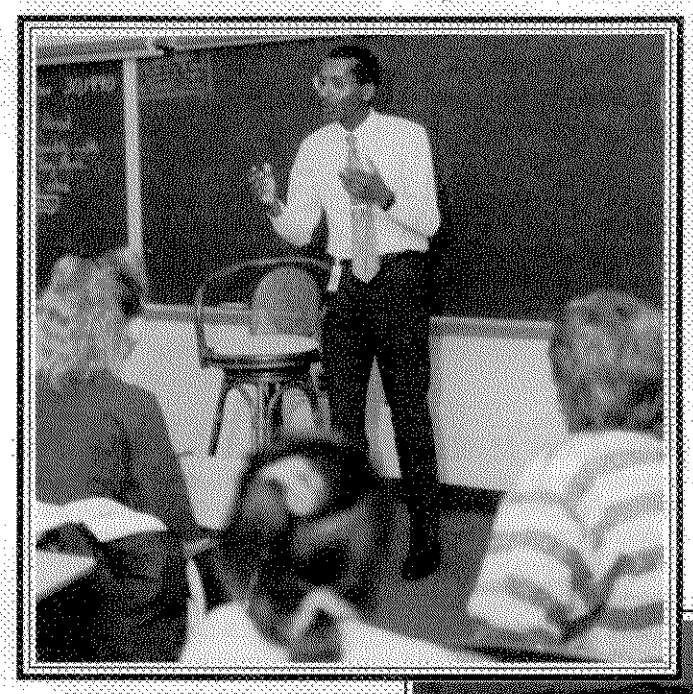
"Your story changed me and my life," wrote Maureen. "I appreciate things more than I used to. One thing I appreciate more is having my mom around."

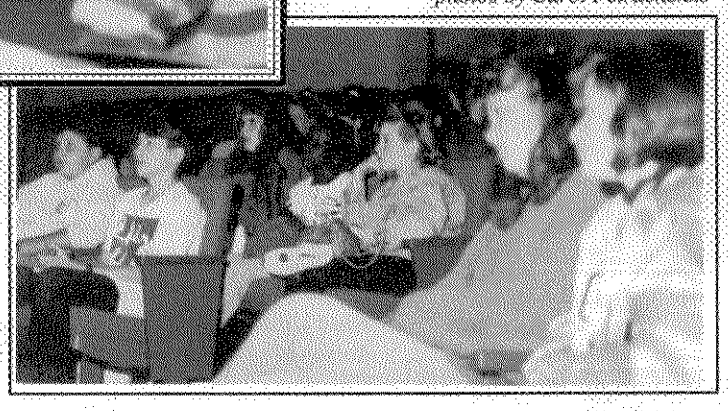
"Your article in the paper made me think about all of the times I asked for things, even though we didn't have the money," wrote April. "I feel now that I should be satisfied with what I have. I don't need everything."

"You helped me realize that I am so lucky for what I am and what I have. I have a wonderful family," noted Jill. "Some people don't have anyone."

"Hearing your story has affected my life," said Adam. "I have many problems in my life and you taught me to be the best I can be. You taught me to be brave and strong no matter what happens."

Morris moves graciously from his role as NASA electrical engineer to community role model. "It's important for me to do all I can to help others because it was that kind of caring that gave me the path, the incentive and the will to help myself."





'If it is to be, it's up to me'

Morris responds to letters written him by Mrs. Stallings' reading class (left) after presenting his story to an auditorium of seventh grade students at Gildersleeve Middle School in Newport News. In each instance, Morris stressed the importance of caring about others--and the difference that genuine concern can mean to another individual.

-photos by Carol Petrachenko

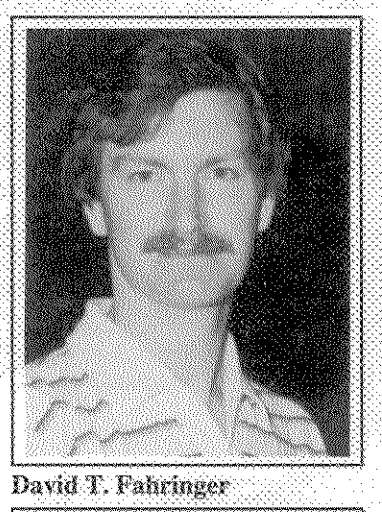
Employees Earn Suggestion Awards

The Center recently adopted three suggestions made by employees through the Employee Suggestion Program. This program encourages employees to think about ways to improve NASA and its operations. It recognizes and rewards employees, either individually or collectively, for ideas which directly contribute to productivity, economy, efficiency or directly increase effectiveness in carrying out NASA or government programs.

David T. Fahringer and Alan P. Scheidegger were awarded for their suggestion entitled "PC Point Generator for Numerical Control Programming." This suggestion involved a menu-driven computer program which allows dimensions to be entered directly from drawings and automatically generates the x-y coordinate values and/or polar coordinate values. Adoption of this suggestion has resulted in an 80 percent reduction in time required to develop coordinate points.

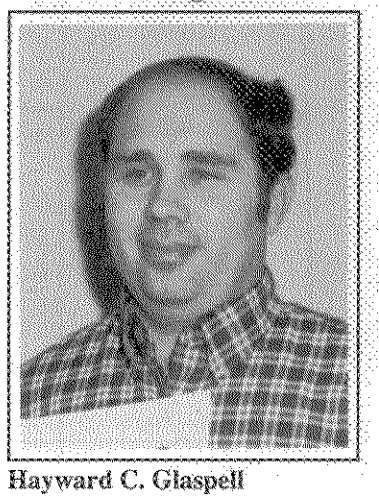
Hayward C. Glaspell suggested "Pressure Caster." Glaspell's suggestion to replace the rubber diaphragm previously used in pressure casting equipment with an air cylinder has eliminated diaphragm failure and provided a savings of man-hours and material costs.

Rex M. Meadors and Robert V. Doggett Jr. (not pictured) jointly suggested a "System for Checking Aero-elastic Models for Damage in the Langley Transonic Dynamics Tunnel." They proposed installation of a remotely controlled telescoping robotic arm capable of holding a television camera or other device which would be able to inspect and check the model in the tunnel without opening the tunnel. The new procedure resulted in both an electrical power savings and a significant reduction in heavy gas processing.

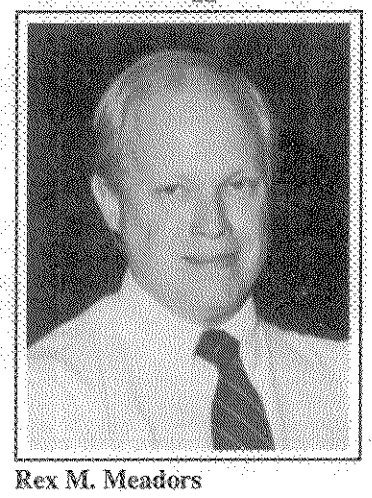


David T. Fahringer

Alan P. Scheidegger



Hayward C. Glaspell



Rex M. Meadors

News Researcher

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

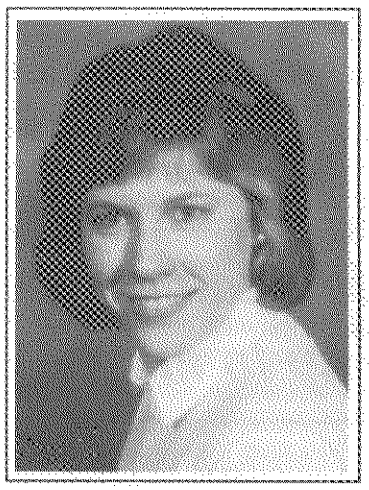
Managing Editor ..... Jean Drummond Clough

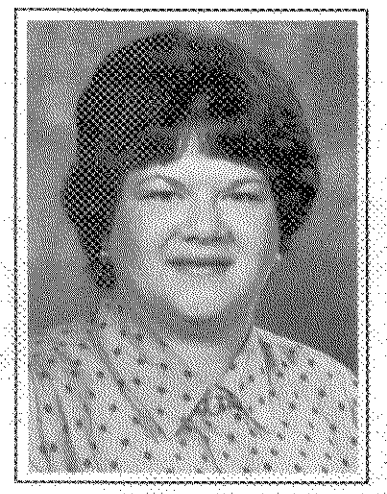
Editor ..... Marny S. Skora

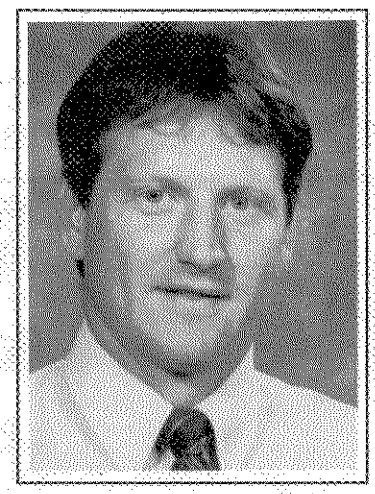
Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

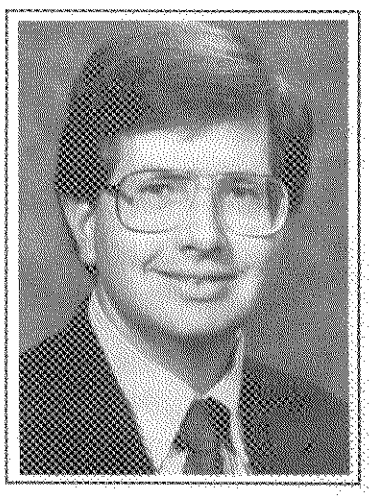
The privilege of advertising in this publication is restricted to the employees and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.


Kathy H. Abbott


Karen E. Jackson


Brian J. Jensen

Sherry L. Sullivan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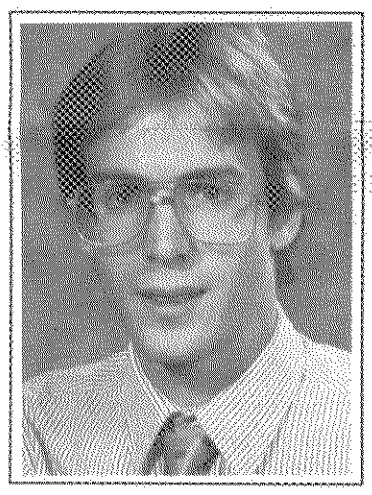
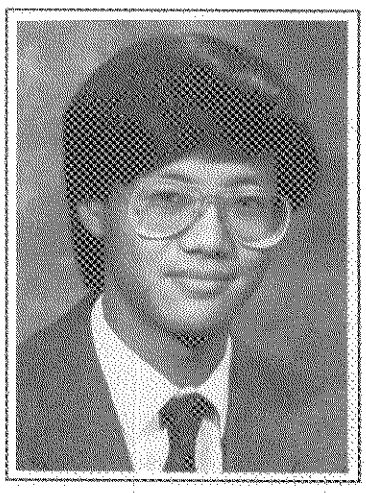
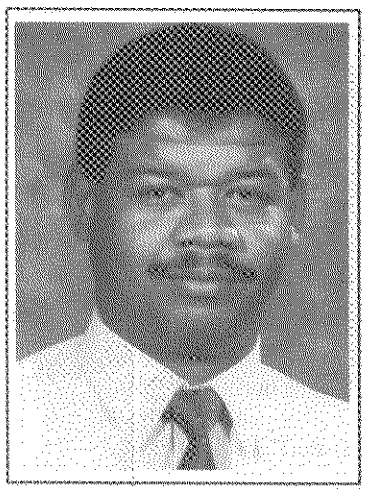
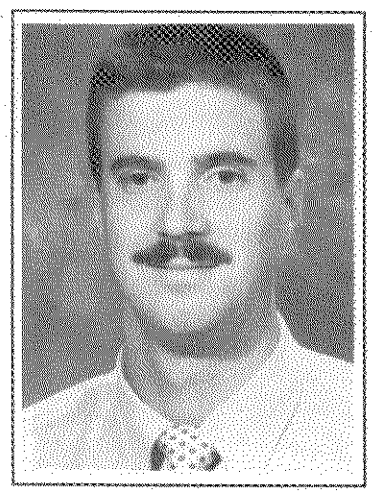
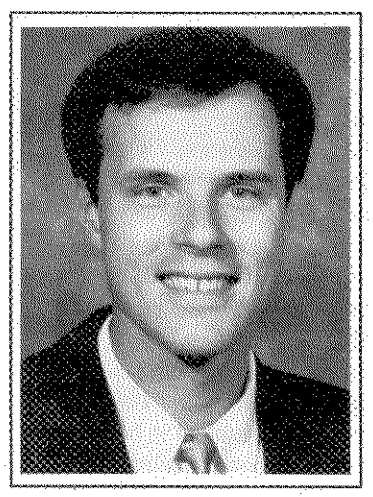
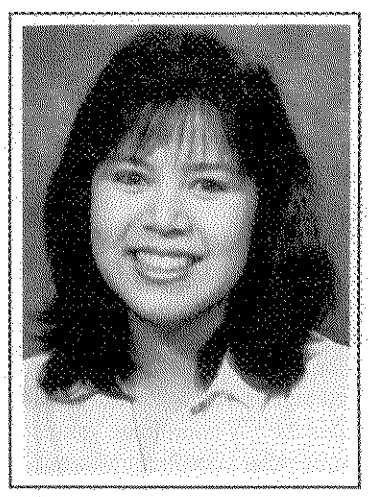

James L. Garrison


K. Chauncey Wu


Miguel A. Alvarez


Chris A. Mouring


Guy T. Kemmerly


Terri L. Lazarus

Employees Earn Advanced Degrees

Fourteen Langley Research Center staff members received advanced degrees through the Center's Graduate Study Program.

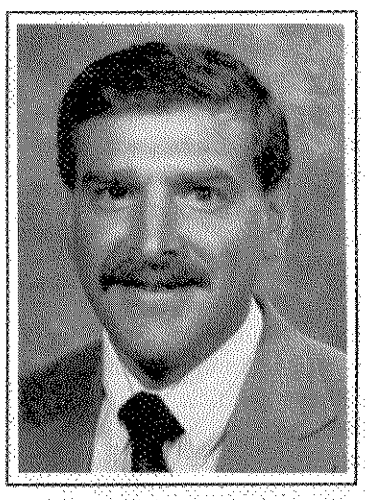
The program, established in the 1940s, provides Langley engineers, scientists and administrators an opportunity to improve their proficiency in aeronautical and space research and earn advanced degrees while working at Langley. Approximately 1,400 employees have been awarded master's or doctoral degrees under this program.

Doctoral degrees have been awarded to three employees: Kathy H. Abbott, Flight Management Division, received a doctor of philosophy in computer science from Rutgers University; Karen E. Jackson, Structural Dynamics Division, received a doctor of philosophy in engineering mechanics from Virginia Polytechnic Institute and State University; and Brian J. Jensen, Materials Division, received a doctor of philosophy in chemistry from Virginia Commonwealth University.

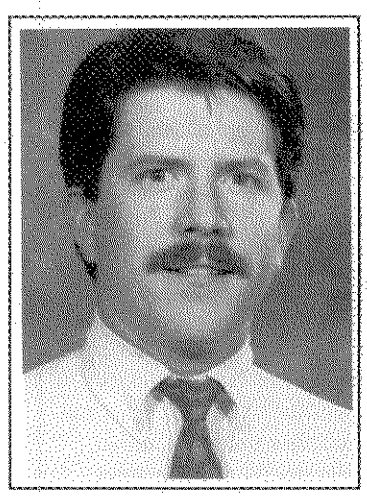
Master's degrees were awarded to the following employees: Sherry L. Sullivan, Human Resources Management Division, received a master of science in human resources management from Golden Gate University; J. Chris Naftel, Space Systems Division, received a master of science in astronautics from George Washington University; Gordon G. Degear, Industry Relations Office, received a master of business administration from the College of William and Mary; James L. Garrison, Space Systems Division, received a master of science in aeronautics and astronautics from Stanford University; Kristine R. Meadows, Acoustics Division, received a master of science in aeroacoustics from George Washington University; K. Chauncey Wu, Structural Mechanics Division, received a master of science in theoretical and applied mechanics from the University of Illinois at Urbana-Champaign; Wendell R. Ricks, Flight Management Division, received a master of science in computer science from the College of William and Mary; Miguel A. Alvarez, Analysis and Computation Division, received a master of science in electrical engineering from Old Dominion University; Chris A. Mouring, Facilities Engineering Division, received a master of science in civil engineering from the University of Florida; Guy T. Kemmerly, Applied Aerodynamics Division, received a master of science in aeronautics from George Washington University; Terri L. Lazarus, Flight Electronics Division, received a master of science in physics from the College of William and Mary.

The Training and Education Section congratulates these individuals for the long hours and hard work necessary for this 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, please call George Allison, ext. 42594.


Gordon G. Degear

Kristine R. Meadows


Wendell R. Ricks

American Indians Honored

Congress recently passed a landmark bill honoring America's tribal people by designating November "National American Indian Heritage Month."

Princess Pale Moon, president of the American Indian Heritage Foundation, credits the bill's passage to the combined efforts of a number of senators and congressmen, letters of support from many tribes, and the foundation which spent several years securing national support for this recognition.

Langley is proud to recognize its American Indian employees. Because representation of this group is small, special efforts are underway to expand recruiting to targetted colleges and universities with large numbers of American Indian students. An increased resource pool of qualified applicants will allow Langley to incorporate the contributions of the American Indian in the mission and equal employment opportunity goals of NASA.

During this month-long observance, Langley will pay tribute to American Indians by serving special foods in the cafeteria and by disseminating written materials to interested employees. Please contact the Equal Opportunity Programs Office, ext. 43290, for information on the history and culture of these native Americans.

Note of Thanks

Joy W. Italiano writes: "I wish to thank everyone who donated leave to me so that I could stay home with my husband. I also wish to thank all those who were so considerate and thoughtful while he was in the hospital. The cards, flowers, food and everything else were so very much appreciated. I would also like to take this opportunity to tell the people in the Research Information and Applications Division how much their support and comfort have meant to me during this time."

Retirement Parties

Robert W. Koenig will be honored at a retirement luncheon Monday, November 26, at 11:30 a.m. in Building 1251, Room 209. For details, contact Velma Martin, ext. 45223.

Frank Robinson and **Kenny Williams** will be honored at a retirement party Friday, November 30, in the H.J.E. Reid Conference Center. Festivities will begin with a cash bar at 6 p.m.; dinner is at 7 and a program will follow. Cost is $11 per person or $21 per couple. Contributions to gift only are welcomed. Reply by November 23 to Robin Rubrecht, Mail Stop 171, ext. 43690.

People & Places

Health Corner

Ward off the Flu--Get Your Shot Now

The annual flu season is here again. Countless work hours and off-duty leisure time will be lost to high fever, aching bones, sore throat and the general misery of the flu. These losses can be largely prevented by simply taking the flu shot.

Remember, the protection you receive from the flu shot prevents you from carrying the virus home to family members who are usually at higher risk.

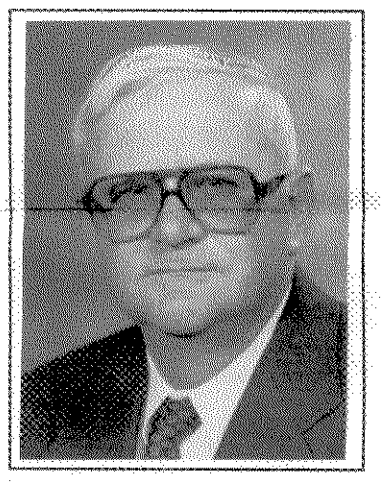
The new flu vaccine is now available at the Occupational Health Clinic for all Langley employees and on-site contractors at **no cost** to the individual. (Women who are pregnant will not be offered the flu shot and should check with their own obstetricians.)

The Occupational Health Clinic will offer the flu shot to individuals Monday through Friday from 7:30 a.m. to 3:30 p.m.

To save you time, clinic staff 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 the clinic, ext. 43196, to arrange a mutually agreeable time.

Freeman to Speak at NSS Meeting

A meeting of the newly formed chapter of the National Space Society (NSS) will be held Tuesday, November 27, at 5 p.m. in the Visitor Center to familiarize interested persons with the purpose and goals of NSS and to plan activities for the coming year.



Also at this meeting, Del C. Freeman will speak on "The Personnel Launch System/HL-20 Studies." The Personnel Launch System (PLS) would serve as a crew transport complement to the Space Shuttle in the era of Space Station Freedom and would also assure manned access to space in the event the Space Shuttle was unavailable for a prolonged period. In addition, the PLS vehicle could be stationed on-orbit at Freedom to serve as an emergency return vehicle for the Space Station crew.

The candidate configuration being assessed by Langley is a moderate lift-to-drag ratio lifting-body concept. A full scale mockup of this vehicle has recently been completed and is currently being outfitted for human factors research that will utilize volunteers from the NASA Langley community.

Freeman is head of the Vehicle Analysis Branch of the Space Systems Division. In this position he is charged with managing a variety of studies of advanced space transportation systems and supporting technologies.

For further information about this meeting or about the local NSS chapter, contact Doug Stanley, ext. 44518.

Tidbits from Training

PDP Nominations Sought

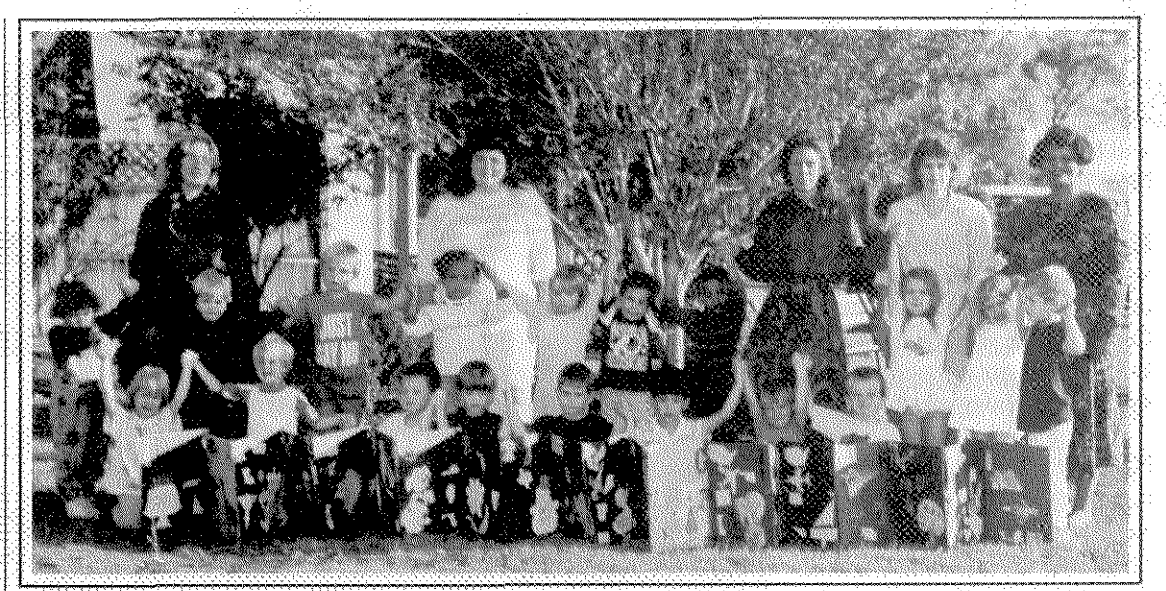
Nominations are being sought for the NASA Professional Development Program (PDP). This program gives individuals an opportunity to have a 12-month work assignment at NASA Headquarters or other NASA installations.

The work assignment provides experiential learning in new tasks. Functioning from an Agency-wide perspective, it is supplemented with briefings and formal training. Selectees will participate in a one-year assignment beginning August 1991.

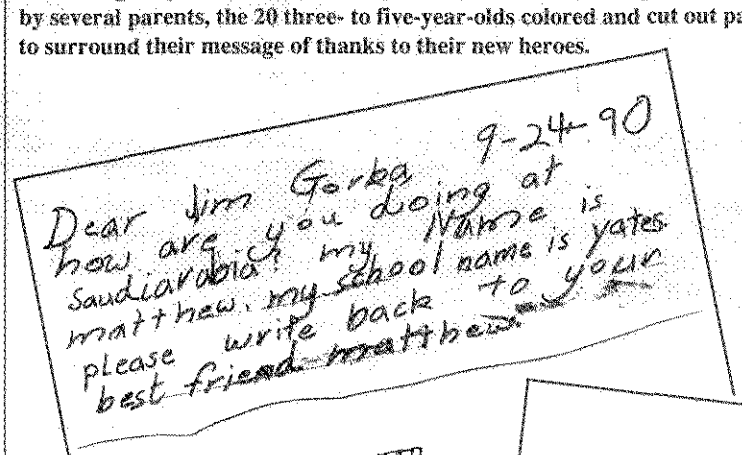
The PDP has two levels: Level 1 is for employees at the GS/GM-15 and Senior Executive Service (SES) levels. Level 2 is for GS/GM 13s and 14s and, in special circumstances, may include GS-12s. Individuals may nominate themselves to their directorate office if they are in the specified grades and have demonstrated the potential both to manage and to be a leader in the Agency.

The Langley Executive Resources Panel, chaired by Paul F. Holloway, will select Langley's nominees in early January. If interested, call Camille Summerlin, Training and Education Section, ext. 42549, for a nomination form. It is important that applicants notify their directorate-level training coordinator of their plan to complete the form. The nomination deadline for directorate offices is mid-December.

Car passes for Shuttle launches are available from Ann Suit, ext. 43305



A VERY L-O-N-G MESSAGE FROM HOME. Langley Child Development Center pre-school class prepared a Thanksgiving card for our military from the 1st Tactical Fighter Wing deployed in the Middle East. Aided by several parents, the 20 three- to five-year-olds colored and cut out patriotic symbols and geographical areas to surround their message of thanks to their new heroes.



Dear Jim Gorka 9-24-90
how are you doing at
Saudiarabia? my Name is
matthew. my school name is yates
please write back to your
best friend matthew

Matthew Thomas, eight-year-old son of EG&G's Luckey Thomas, wrote a letter to TSgt. Jim Gorka, LAFB, as part of a school project. Matthew is a second grader at Yates Elementary School. He was thrilled to get a return letter and looks forward to communicating with his new "best friend."

Mail from home is just one way to say "thanks" to local troops stationed in the Middle East. Anyone interested in participating may address a letter:

Any Service Member
Operation Desert Shield
APO New York 09848-0006

9 Oct. 90

Thank you very much for your letter and the picture that you drew. Both were very nice and a real surprise.

We are all doing just fine here in Saudi Arabia, although it is very hot and dusty. Sometimes I look out at the desert and think of it as a hugh beach but with no water. When we get letters like the one you sent, our problems and worries disappear and a big smile comes. Thank you very much for brightening up my day.

Let me tell you a little about myself. My name is TSgt Jim Gorka and I am assigned to the 1st Security Police Squadron at Langley AFB. While here in Saudi Arabia our job is to make sure that all of the people and airplanes here are safe and secure--that no harm comes to them. It is a big and important job but it is enjoyable to know that we are helping other people. My wife and I live in Hampton, close to the air base, so it was nice to get your letter from "home."

Perhaps when I return we can meet each other and I can show you around the air base and show you around our security police squadron.

Sincerely,
Jim Gorka

-photo by Pilar Kitchin

ALUMNI WIND UP PROJECT THANK YOU. Filling the last of the 360 boxes of goodies to be sent to troops in Saudi Arabia are Alumni Association members (L to R) Beryl Brooks, Ada Ward, Betty Boyer, George Meidinger, Clarence Brown, Mary Mesic and George Brooks.

Happenings

SPECIAL LAA SOCIAL will be held today from 4 to 8 p.m. in the H.J.E. Reid Conference Center, Building 1222. Music will be provided by a D.J. and there will be a $1 cover charge.

HOLIDAY OPEN HOUSE will be held Friday, December 7, in the H.J.E. Reid Conference Center. Mark your calendar now to join with your co-workers to ring in the holiday season.

NEW YEAR'S EVE DANCE tickets are on sale now at the Activities Office, Building 1222. Sponsored by the Langley Activities Association, the dance will be held Monday, December 31. Cost is $35 per couple. For additional information, please call Andrea Lewis, ext. 46369.

VA CHORAL SOCIETY presentations tonight in Norfolk, tomorrow in Hampton. Call 591-0439 for information.

BLOODMOBILE. The American Red Cross will hold a Bloodmobile Wednesday, November 21, in the H.J.E. Reid Conference Center. As the holiday season approaches, remember those who may need that precious gift of life--blood.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. For further information, contact Steve Dahmen, ext. 44519.

LAA CONSERVATION CLUB will meet Tuesday, November 20, at 4:45 p.m. in the H.J.E. Reid Conference Center. Topics include recycling, conservation of resources and community education. Call Rom, ext. 41524, for details.

NASA TOASTMASTERS will meet Wednesday, November 28, at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are always welcome.

BIBLE STUDY GROUP. If interested in participating in small group Bible study on Tuesdays, 4:30-5:30 p.m., call Mike Scott, ext. 44347.

HOLIDAY SALE, Nov. 30-Dec. 1. 911 Todds Lane, Hampton. 9 a.m. to 5 p.m. Jewelry, ornaments, stockings, pillows, decorations, bears, garage sale items and more.

FOR SALE: DOLL HOUSE, hand-built, 50"Lx 21"Wx40"H; very good condition. $225. Call Carolyn Carey, 865-8332. If no answer, please leave message.

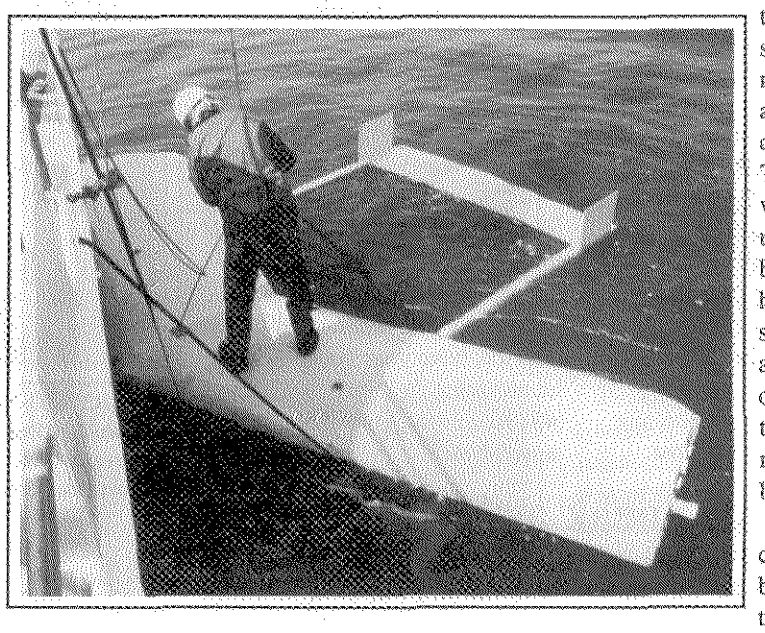
LOST: LIBRARY BOOK. *Theory of Turbulent Jets* by G.N. Abramovich. Please return to Troy Middleton, Mail Stop 439, ext. 46948.

FOR SALE: MEMBERSHIP. Riverside Wellness and Fitness Center enrollment certificate at 40 percent off cost. Call Wilson, 596-3991 after 5 p.m.

At the VC during November

Marine Scientist and NASA Researcher Discuss 'Water Wings'

NASA Langley Research Center and the Virginia Institute of Marine Science (VIMS) have joined forces in a unique project that blends marine science and aerodynamic research to improve the water quality of the Chesapeake Bay. Dr. Don Wright, a professor at VIMS, and George Greene, a NASA researcher, will discuss "Water Wings: Innovative New Bay Clean-Up Technology," at 7:30 p.m., Thursday, November 29, in the Visitor Center theater.



Wright, head of Geological and Benthic Oceanography at VIMS, and Green, an aeronautical engineer, will discuss the Chesapeake Bay problem that brought them together, the birth of the "Water Wings" project, the results of the York River testing and the current plans for this unique program.

A threat to marine life exists in portions of the Chesapeake Bay due to low levels of oxygen at the bottom of the bay. This condition occurs during the summer when low saline water is fixed over the denser, saltier water. The dense layer of water stops the oxygen from moving downward and organic decay uses up the remaining oxygen in that lower level, producing an uninhabitable environment for most marine life.

Built like the wing and tail sections of a light aircraft, the "water wing" uses tidal currents to generate the same mini-tornadoes an airplane wing creates in flight. This swirling vortex breaks up the boundary between the high and low-salinity water, allowing oxygen to reach the bottom regions of the bay.

The concept has been tested in the York River by VIMS. NASA Langley played an associate role in the project by supplying design specifications and construction support.

A "water wing," on loan from VIMS, will be on display outside the Visitor Center until November 30. The display will describe the aerodynamic phenomenon used to generate turbulence.

It's beginning to look a lot like . . . .

HOLIDAY ITEMS like this greeting card are now on sale at the Visitor Center Souvenir Counter and will also be available at the Christmas Shop in the cafeteria December 10-21. Appropriate for the upcoming holiday seasons, it was designed by Karen Freidt and illustrated by Bill Kluge, both of Langley's Graphics Section.

Please Note:

Due to the Thanksgiving holiday, the deadline for the November 30 **Researcher News** will be **Monday, November 19.** The December 14 issue will be the final issue for 1990. Please keep this in mind when planning announcements for holiday events.

Langley is an equal opportunity employer, but . . . .

-photo by Carol Petrachenko

WILL THE REAL FRANKENSTEIN STEP FORWARD? A number of Langley employees turned up for work in costume October 31.

Researcher News

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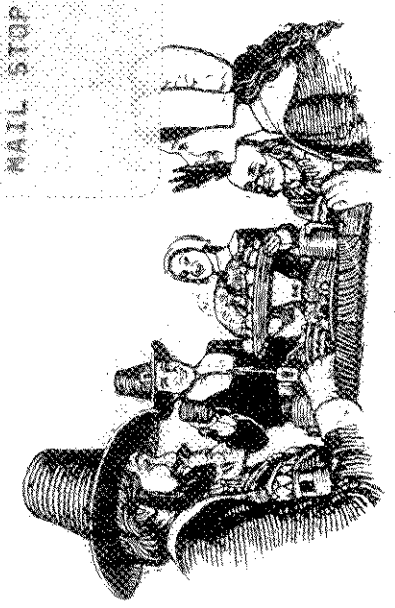


NASA
National Aeronautics and Space Administration
Langley Research Center

Volume 4, Issue 24 November 30, 1990

Researcher News

Bi-weekly Employee and Contractor Publication

NASA Invention Cited by *Popular Science* as Among 1990s Outstanding Products and Technological Achievements

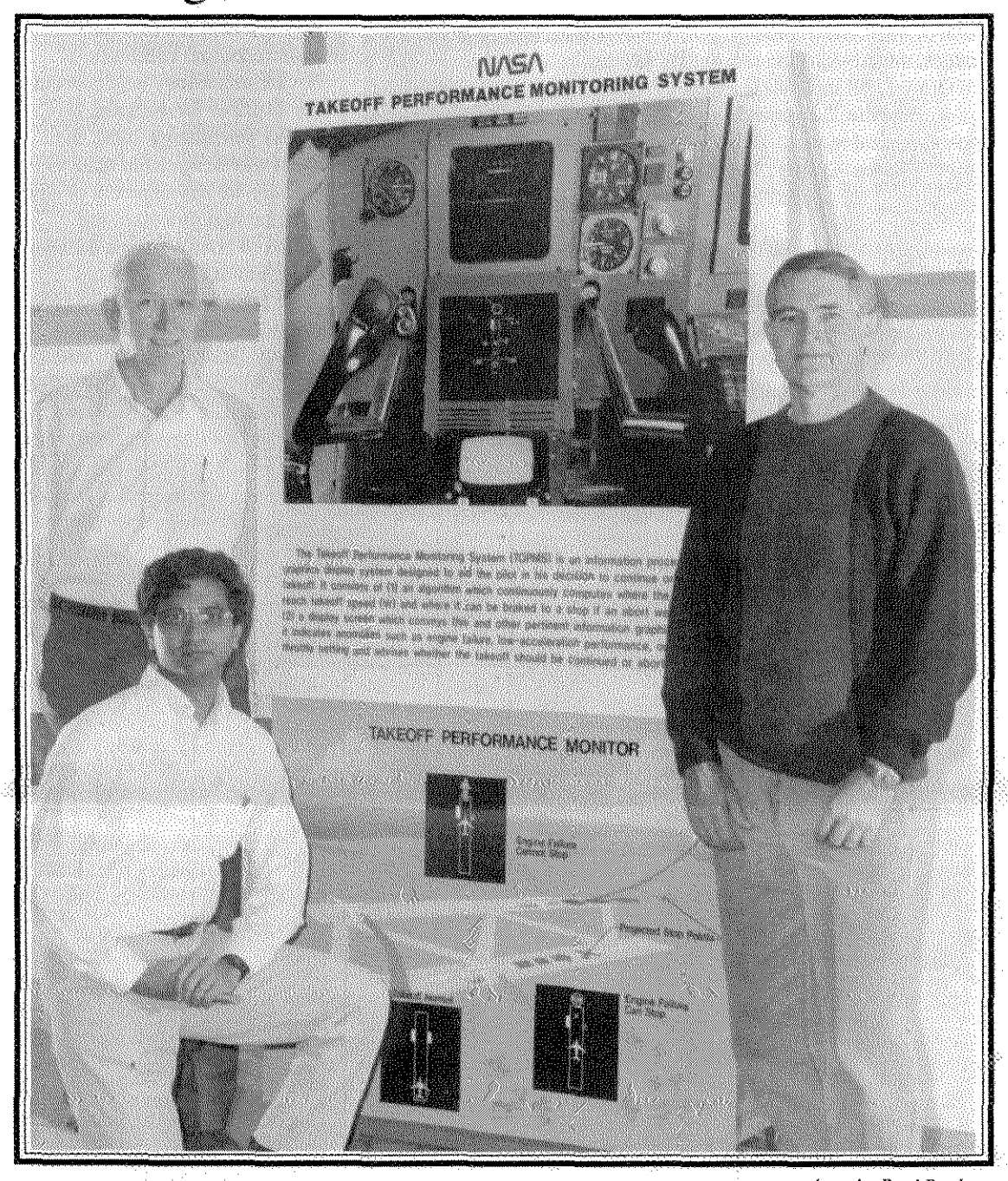
-by H. Keith Henry

NASA's Takeoff Performance Monitoring System (TOPMS) has been cited by the editors of *Popular Science* as one of 1990s technological achievements in the magazine's annual "Best of What's New" special awards section in its December issue.

TOPMS is an invention designed to help airline pilots decide--routinely or in a sudden emergency--whether to continue or abort an attempted takeoff. The computer-driven system combines information already available in various locations in the cockpit with new information in a single, easy-to-use display. The TV-like display, located on the pilot's console, consists primarily of a runway graphic integrated with active graphic and alpha-numeric information, indicating the current "health" of the aircraft.

TOPMS was developed and tested at NASA Langley. TOPMS inventors are aerospace engineers David B. Middleton, Dr. Raghavachari Srivatsan and Lee H. Person Jr., a senior NASA research pilot who also serves as project pilot.

"*Popular Science* regularly provides its readers with news and analysis of innovative products and technological achievements," states Editor-in-Chief Fred Abatemarco. "We are extremely pleased that our 'Best Of What's New' awards will be able to give proper recognition to those products and technologies that will help shape our lives."



-photo by Paul Bagby

Inventors David B. Middleton (left), Dr. Raghavachari Srivatsan (below) and Lee H. Person Jr. pose before the TOPMS exhibit displayed in New York City for the *Popular Science* magazine awards reception.

This marks the third consecutive year that *Popular Science* has honored 100 of the year's most innovative products and achievements in science and technology. Winning selections were divided into 10 categories.

TOPMS was also featured in *Popular Science's* 1990 "Best of What's New" exhibition on November 13 at New York City's Tavern on the Green. The exhibition showcased the winning selections. CNBC, the Consumer News and Business Channel, aired a special prime-time cable program devoted to the "Best Of What's New" on Sunday, November 18.

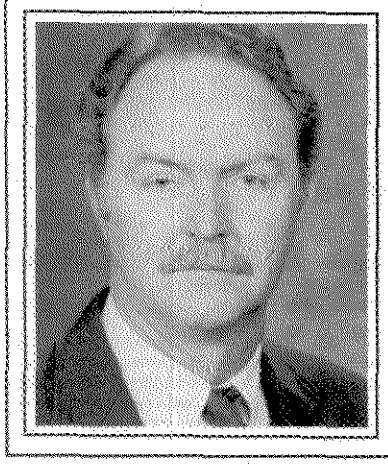
The 10 categories are: Audio and Video, Auto Technology, Aviation and Space, Cars, Computers and Electronics, Environmental Technology, Photography, Recreation, and Science and Technology.

Popular Science's December issue, featuring the "Best Of What's New," has been the magazine's best-selling issue since the awards were introduced in 1988.

Key Managers Retire from NASA Langley

Two key managers retire from government service today. Charlie M. Jackson Jr., chief of the Advanced Vehicles Division, retires with 35 years of service to the Agency and Sadie L. Boyer, assistant chief of the Programs and Resources Division, retires with 32 years of service.

Jackson began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics (NACA), in 1955 as an engineering co-op in the Fabrication Division. In addition to his present position, he has served as head, Propulsion Aerodynamics Branch; head, Supersonic Aerodynamics Branch; and assistant chief for Special Programs, High-Speed Aerodynamics Divison. As a division chief, Jackson is primarily responsible for multidisciplinary advanced aeronautics studies and identifying potential new research thrusts. He also is responsible for focused research and systems technology programs on long-haul transports, advanced military aircraft and general aviation and commuter aircraft.



Boyer began her career with the NACA in 1958, as a mathematician in the Flight Research Division, where she co-authored two technical publications. In addition to her present position, she has served as head, Research and Development Programs Branch, and as a computer systems analyst in the Analysis and Computation Division. As an assistant division chief, Boyer works with the division chief in assisting center management in the planning of center research programs and projects by providing an integrated overall analysis of resource allocations required to accomplish technical objectives in accordance with near and long-range center and agency plans.

Langley Colloquium

Phillips Remembers Langley in the 40s

-by Jean Drummond Clough

What was it like to work at the Langley Memorial Aeronautical Laboratory in the forties? Join Hewitt Phillips Monday, December 10, as he reflects on Langley in those days.

Phillips' talk, "Recollections of Langley in the Forties," is part of the Langley Colloquium Series. The lecture will be held at 2 p.m. in the H.J.E. Reid Conference Center, Building 1222, followed by a question and answer session and an informal discussion.

Phillips entered on duty at LMAL, now the Langley Research Center, on July 1, 1940, and was assigned to the Flight Research Division. The first ten years of Phillips' career included the period of World War II with the resulting tremendous growth of the center and of the aeronautical industry. In addition, the design of airplanes was revolutionized by the advent of the jet engine and the attainment of transonic and supersonic speeds.

Phillips will discuss the social life and surroundings at the Center, the growth in personnel and facilities, and the research programs and projects of importance in the forties.

The greatest research emphasis in this period was on

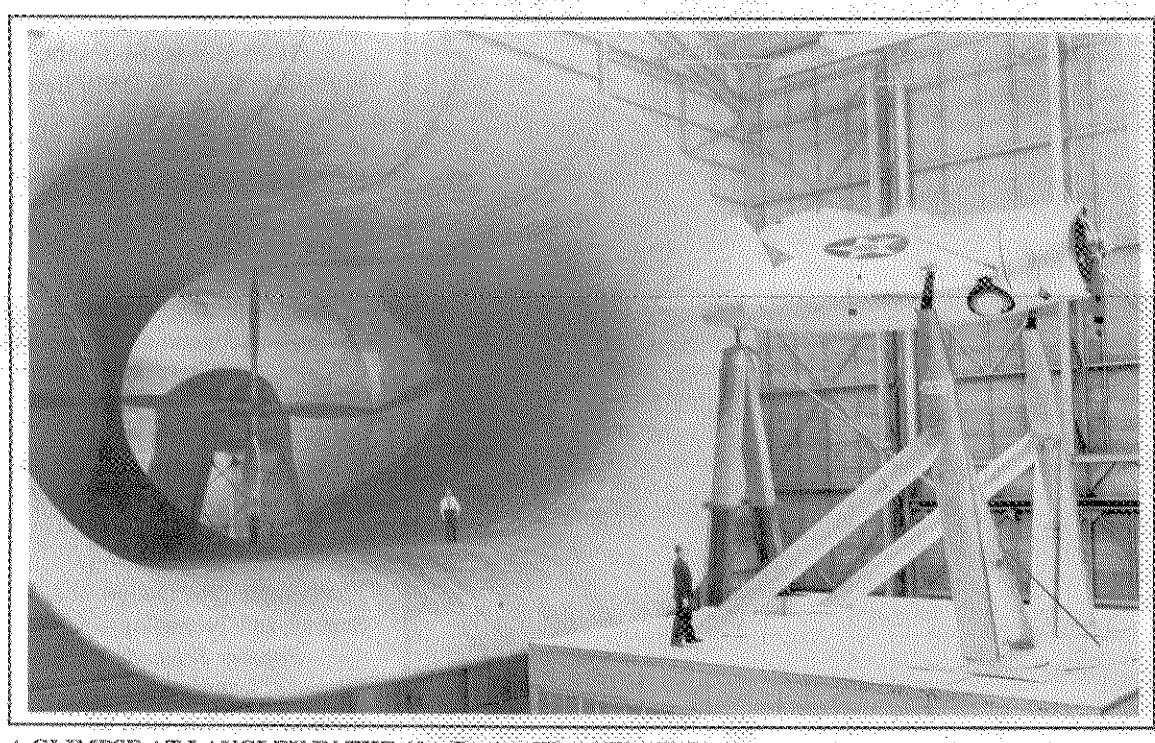
Continued on page 2.

News Briefs

New Ames Research Center Deputy Director to Head Ames-Dryden --- Arnold D. Aldrich, NASA associate administrator for Aeronautics, Exploration and Technology, has announced an organizational change at NASA's Ames Research Center, Mountain View, Calif., designed to reinforce and strengthen national flight research capabilities at the Ames-Dryden Flight Research Facility, Edwards, Calif. A new Ames deputy center director position will be located at Dryden and will serve as the director of the Dryden facility. Kenneth J. Szalai has been selected Ames deputy director who, under the new Ames management organization, will be located at Dryden and will direct Dryden's research and operations, effective December 3.

NASA Selects Investigators for Cassini Saturn Orbiter Mission --- NASA has selected the principal investigators for the Saturn Orbiter portion of the Cassini mission, scheduled for launch in 1996. The investigators come from 11 U.S. universities, three NASA centers and three other U.S. laboratories as well as 13 foreign countries. The Saturn Orbiter will include 62 investigations encompassing analysis of the structure and composition of Saturn's atmosphere, the physical properties of ring particles, a survey of moonlets within the rings and a close look at several moons. The Cassini Saturn Orbiter also will deploy the Huygens Probe, supplied by the European Space Agency, which will descend through the atmosphere to the surface of Saturn's moon Titan.

NASA to Use World's Fastest Supercomputer --- NASA researchers will have access to the world's fastest supercomputer as a member of the Concurrent Supercomputing Consortium, a newly-formed group of the nation's premier research organizations. Consortium members will be able to access Intel Corporation's Touchstone DELTA supercomputer system, slated for installation at the California Institute of Technology, Pasadena, Calif., next spring. The DELTA system has a peak speed of 32 billion floating point operations per second, making it the world's fastest computer. The consortium will tackle some of today's most demanding computational and scientific challenges, such as global climate modeling, space science data analysis and pattern recognition of DNA sequences in the human genetic makeup. NASA will use the DELTA system as part of the agency's High-Performance Computing Initiative (HCPI), an ambitious program to accelerate the computing research capabilities required to maintain U.S. aeronautical and space science leadership in the 21st century.



A GLIMPSE AT LANGLEY IN THE 40s. During World War II, Langley experienced a whirlwind of change and expansion. A Langley Full-Scale Wind Tunnel team found ways to modify a Navy Brewster Buffalo shown mounted for drag reduction studies, increasing the top speed from 250 to 281 miles per hour.

Colloquium Speaker Sees Langley in the 40s

Continued from page 1.

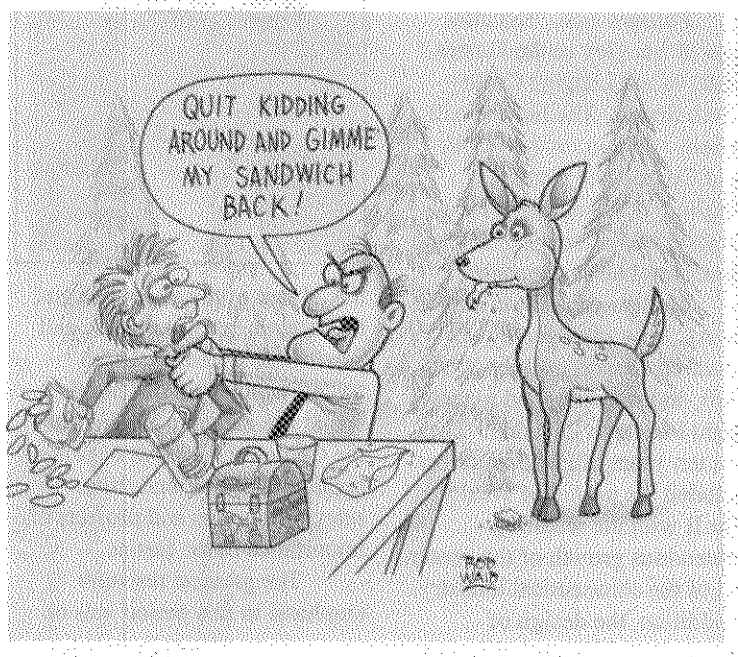
the study of compressibility effects, and the development of airplanes capable of transonic and supersonic speeds. The roles played by key research leaders in bringing about these developments will be the central theme of the presentation.

Early in his career, Phillips was involved in studies of flying qualities of airplanes. He studied the effect of rolling on longitudinal and directional stability, a subject that became known as "roll coupling," and that affected the design of many high-speed fighter and research airplanes. He later studied problems associated with power controls, stability augmentation devices and command control systems. He designed the first motion simulators, called the "roll chair" and "yaw chair," to study human pilot control characteristics. He conducted a flight study of gust-alleviation systems in the years 1954-58.

Phillips directed research on the design of entry vehicles and developed simulation techniques for study of many space operations, such as rendezvous, navigation, atmospheric entry, and lunar approach and landing. These research developments were incorporated into the Mercury, Gemini and Apollo programs. He conceived and designed the Lunar Landing Research Facility, which was used to train the astronauts for Lunar landings in the Apollo missions. This facility was used later for aircraft crash research. He frequently served as a consultant with other organizations. This work included reviews of the Apollo Lunar Module descent and landing system, the Viking lander control system, and the Space Shuttle entry and approach system.

At the time of his retirement in 1979, he was chief of the Space Mechanics Division.

Lankley



Langley Research Spin-Offs Help Strengthen U.S. Industrial Clout

-by Craig Murden

Langley scientists and engineers presented inventions and innovations in science and technology which could bolster the Nation's competitiveness in the global marketplace when they attended the first national conference and exhibition of NASA technology held November 27-28 in Washington, D. C. Called Technology 2000, the event was designed to offer to industry for development of new products and processes the results of NASA's three decades of technological leadership.

John Samos, head of Langley's Technology Utilization and Applications Office, said that while many firms have used NASA's ideas in the past, this was the first large-scale effort to show industry leaders the full spectrum of commercially attractive NASA work. The conference focused on encouraging R&D partnerships, showcasing the latest innovations in a variety of high-tech fields and exploring future applications of space-based research, he added.

In addition to the Langley speakers, second largest group among the nine NASA field centers, six actual examples of commercial hardware or products resulting from the Center's research were available to attendees. They were the burn depth measurement device, the X-ray florescence spectrometer, the composite wheelchair, the cool suit, the urodynamic catheter and the pressure measurement system. Samos pointed out that the Langley work was all done in support of national aerospace research objectives and that now the American taxpayer can see the additional benefit of spin-offs in health, environment and consumer product improvement.

Technology 2000 was sponsored by NASA, *NASA Tech Briefs* magazine and the Technology Utilization Foundation, a not-for-profit organization dedicated to technology transfer.

Langley Technology 2000 presenters and their subjects:

- o Dr. John D. Buckley--*Rapid Induction Bonding of Composites, Plastics and Metals*, and *Superconductive Wires and Devices for Cryogenic Applications*
- o Dr. Franklin H. Farmer--*A Semi-Automated Process for the Production of Custom-Made Shoes*
- o W. Tom Freeman--*Cost-Efficient Manufacturing of Composite Structures*
- o David L. Gray--*Field-Deployable Digital Acoustic Measurement System*
- o Nelson J. Groom--*Large Gap Magnetic Suspension System Ground-Based Experiment*
- o Stephen J. Hales--*Superplastic Forming of Al-Li Alloys for Lightweight, Low-Cost Structures*
- o Paul M. Hergenrother--*High Performance Polymer Development*
- o Dr. Joseph S. Heyman--*Quantitative Nondestructive Evaluation-Requirements For Tomorrow's Reliability*
- o Harlan K. Holmes--*Urodynamic Pressure Sensor*
- o Stephen Jurczyk (presenting for Dr. Thomas A. Shull)--*Rewritable Optical Disk Recorder*
- o Warren C. Kelliher--*Water Quality Analyzer*
- o James F. Meyers--*Frequency Domain Laser Velocimeter Signal Processor*
- o Thomas C. Moore--*Practical Approaches for the Application of Resistance-Type Strain Gages on High Temperature Composites*
- o Sharon S. Welch--*Optical Storage Device*
- o Dr. W. Tom Yost--*The Transfer of Technology to Measure Skin Burn Depth in Humans*

News Researcher

The Researcher News, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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.

New Supercomputer To Enhance NASA Langley Research Initiatives

-by Craig Murden

The latest model of the world's most potent supercomputer has been added to the Langley Research Center computational network to provide greatly improved focus on some of NASA's most pressing aeronautical and space research challenges. The lightning quick Cray Y-MP joins the formidibly responsive Cray-2 already in place to give the Center one of the most powerful supercomputing installations in the country.

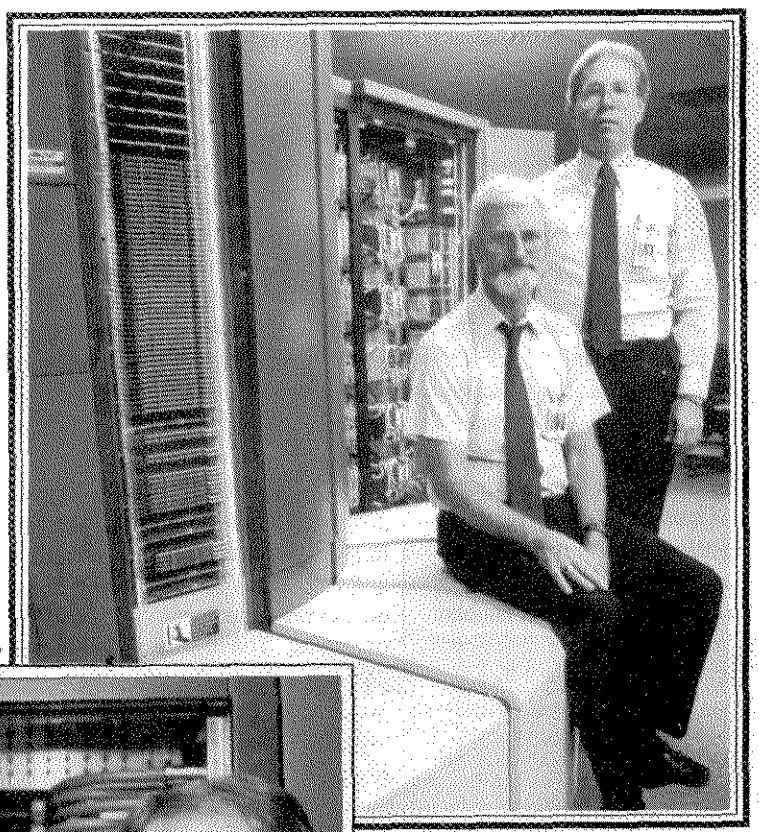
The new machine will more than double the problem solving capability applied to the thousands of equations that flash through the inter-linked supercomputing hardware, enabling Langley researchers to attack their projects with much greater concentration and far quicker feed-back. This incredibly fast computer, which can perform up to 1.5 **billion** mathematical operations per second, is a tool for the scientists and engineers working on a wide range of cutting-edge ventures.

At Langley, the largest users of supercomputers are the scientists who analyze the aerodynamic characteristics of proposed vehicles like the revolutionary National Aero-Space Plane or in research aimed at achieving unparalled maneuverability for fighter aircraft with new designs that allow operation at extremely high angles of attack. The process involves establishing points over the entire three-dimensional shape of the vehicle and mathematically determining the flow of air and other forces prevailing at each of those points. The number of points may be in the hundreds of thousands and the differential equations to be solved may require trillions of computations. The results of these runs from the supercomputers are used to complement and verify wind tunnel tests and can greatly reduce the number of those very expensive experiments. Or, when tunnel testing is not feasible, the computers can provide key research data that would not otherwise be available to Langley researchers.

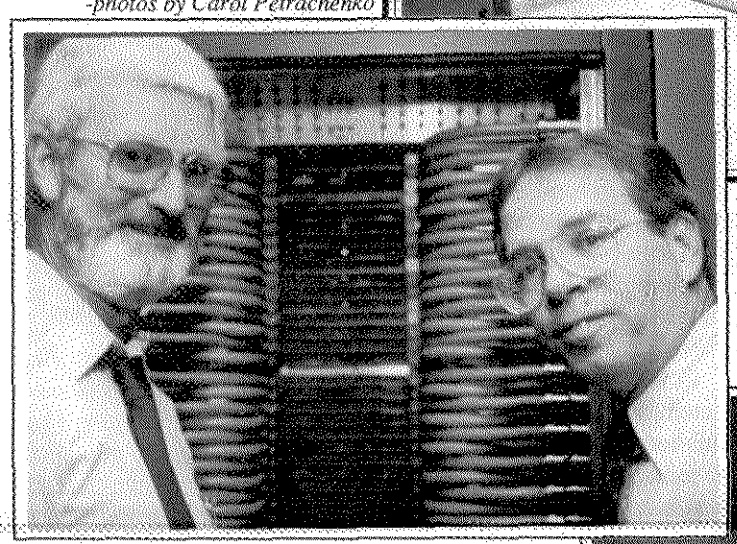
Another important application is in structural analysis where scientists seek to determine structural loads. Here also, large groups of equations cannot be practically addressed without benefit of supercomputing power. The Cray machines serve these needs very well, according to Mickey G. Rowe, assistant chief of Langley's Analysis and Computation Division which oversees the Center's supercomputer operation. "The first supercomputer, a Cray-2 system, has been an immensely successful experience, and we look forward to working with Cray Research to make the Cray Y-MP system equally successful in support of NASA's research programs," he adds.

Structural applications have included analysis of the bonding characteristics of Shuttle tiles and of the cause of the O-ring failure together with the exhaustive analysis of its proposed redesign. Future work will include continuing emphasis on development of high speed aerodynamic technology and on the emerging role of composite materials destined to play a major role in the fabrication of Space Station Freedom and vehicles and habitat components for Lunar and Mars missions.

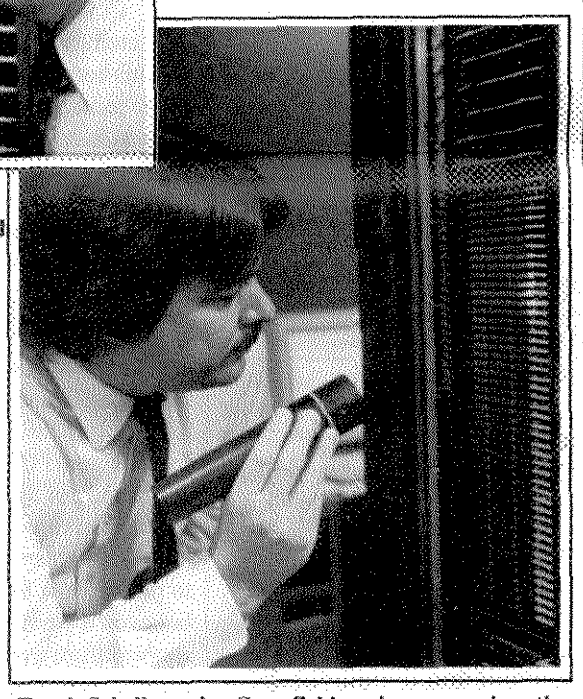
-photos by Carol Petrachenko



Mickey G. Rowe (left) and Dr. Jules J. Lambiotte pose with Langley's new Cray Y-MP supercomputer now undergoing acceptance testing. The open section behind them houses the mainframe power supply elements.



Rowe and Lambiotte examine the computer's processor and memory circuitry. The tubes in the foreground carry special coolant to vital parts of the Cray.



Frank Schelb, senior Cray field engineer examines the input-output sub-system of Langley's new supercomputer. A permanent staff of three Cray field engineers oversee the health of the Cray-2 and the new Y-MP.

How Fast is Fast?

The speed at which the Cray supercomputers process trillions of computations is difficult to comprehend. The basic unit of supercomputer speed is the Nano-second: the time it takes light--travelling at one billion feet per second--to go one foot. In contrast, it takes sound or a jet airplane, one million times longer to travel the same foot. The Cray Y-MP is a six Nano-second machine, and can perform two mathematical calculations (one multiply and one add) in that period. Therefore, in the time light travels two yards, the Cray has completed two operations of a complicated structural analysis computation. Without such astounding performance the Langley research, which must examine massive numbers of variables in designing future aircraft and space vehicles, would not be possible, says Dr. Jules J. Lambiotte. He is head of the Computer Applications Branch and responsible for the analysis, development and application of computational and programming techniques for use in the solution of Center aerospace research problems.

From Cray Inc. . . .

"Cray Research is committed to making NASA Langley's Y-MP system and its supercomputing network extremely successful," says John Rollwagen, chairman and chief executive officer. "NASA Langley does truly meaningful aerospace research and design, and we look forward to continuing to provide these researchers with the most powerful computer tools and fastest networks available."

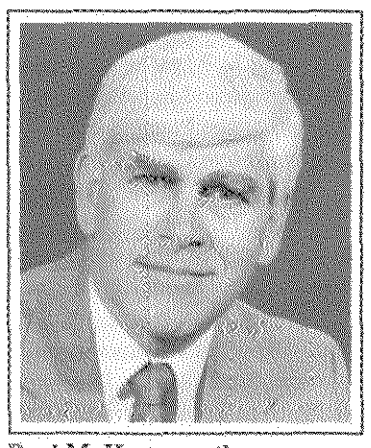
Langley's Y-MP Dubbed 'Sabre'

Langley has a practice of naming the main-line computers in its Supercomputing Network Subsystem after famous airplanes to honor the Center's significant contributions to the design of aircraft. The new Y-MP has been named ***Sabre*** after the North American F-86 jet fighter which was the first swept-wing subsonic fighter to serve in the USAF. The effect of sweepback on the critical mach number was first pointed out in the United States by Robert T. Jones of NACA in 1945. This aircraft saw extensive service in the Korean War and must be ranked, along with its illustrious World War II ancestor the P-51 Mustang, as one of the great fighter aircraft of all time. Langley's Cray-2 supercomputer was named **Voyager** after the ultra-light aircraft which flew non-stop around the world without refueling in 1987.

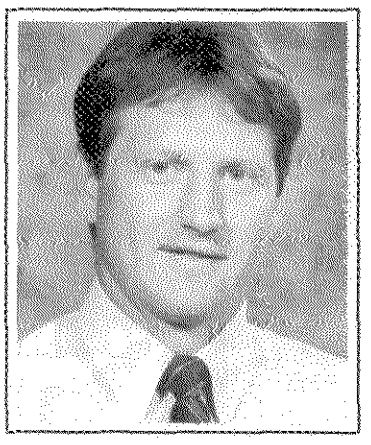
NASA Langley Scientists Receive SAMPE Award

Paul M. Hergenrother and Dr. Brian J. Jensen were honored at the 22nd International Society for the Advancement of Material and Process Engineering (SAMPE) Technical Conference held November 6-8 in Boston, Massachusettes.

Hergenrother, senior polymer scientist, and Jensen, polymer scientist, both of the Polymeric Materials Branch, are co-winners of the Best Paper by a SAMPE Member Award for their paper "Functionalized Poly (Arylene Ethers) as Toughness Modifiers for Bismaleimides." This paper was co-authored by H. D. Stenzenberger and W. Romer, Technochemie/Shell Corp. in Germany, and W. Breitigam, Shell Development Co., in Houston, Texas.



Paul M. Hergenrother

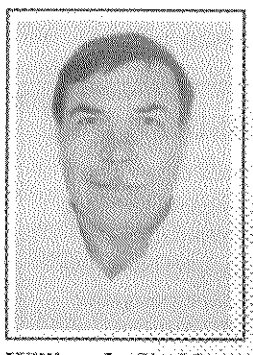


Brian J. Jensen

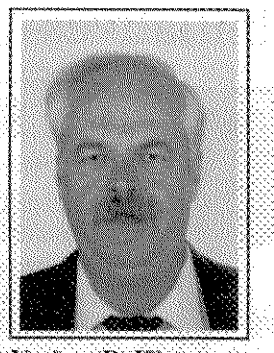
The SAMPE is an international society providing continuing education in new materials technology and processing as well as technical forums in which engineers and scientists can exchange ideas. As the only technical society encompassing all fields of endeavor in materials and processes, SAMPE provides a unique and valuable forum for scientists, engineers, technicians and corporations.

Hergenrother joined the Langley Research Center in 1980. He is internationally known for his work in high performance organic polymers. In his present position, he is responsible for the development of these polymers for potential use as structural resins on aerospace vehicles. The author or co-author of more than 100 publications, he is the holder of numerous patents.

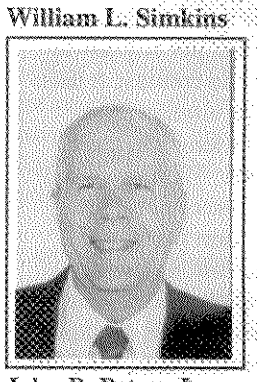
Jensen also joined Langley in 1980. He is responsible for the synthesis and characterization of high performance polymers for aerospace applications. The author or co-author of more than 20 technical papers, he is the holder of two patents; two additional patents are pending. Jensen recently earned a doctorate in chemistry from Virginia Commonwealth University.



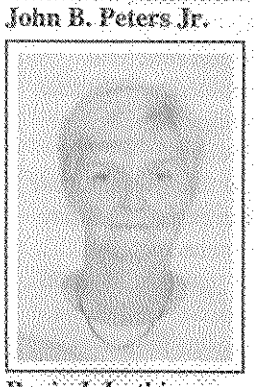
William L. Simkins



Nathan D. Watson



John B. Peters Jr.



Roxie J. Luthie

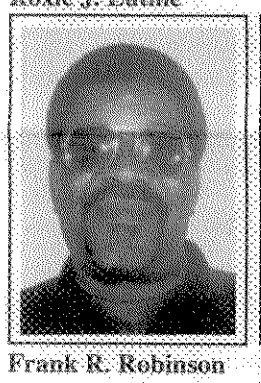
Recent Retirees

Patricia D. Hurt, Instrument Research Division, retired October 23.

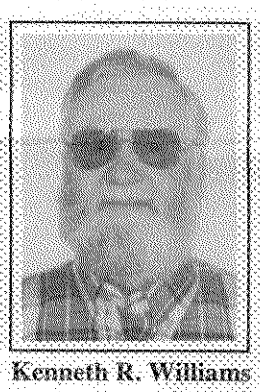
Langley employees who retired October 31 include William L. Simkins, Management Support Division, and Nathan D. Watson, Systems Engineering Division;

John B. Peterson Jr., Applied Aerodynamics Division; Roxie J. Luthie, Fabrication Division; and Doris J. Forrest, Office of External Affairs;

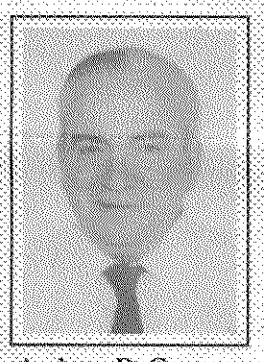
Frank R. Robinson and Kenneth R. Williams, Operations Support Division; and Andrew D. Carey, Research Information and Applications Division.



Frank R. Robinson



Kenneth R. Williams



Andrew D. Carey

In Memoriam

Sympathy is extended to the families of:

Ida Young, who died September 20 in Cedartown, Georgia. A native of Polk County, Georgia, Young began her NASA career at Langley in 1939. At the time of her retirement in 1968, she was supervisory technical publications editor.

Murray Edwards, who died September 8. Edwards retired in 1967 as building trades foreman, Plant Maintenance Division, after 25 years of service.

Runners Club

The Langley Runners Club will hold an Interdirectorate team 5-km road race on Thursday, December 6, starting at 4:45 p.m. on Doolittle Road. Teams consist of four or more runners from a directorate or contractor. Team score is the sum of the finish positions of the top four members, and low score wins. There will also be a women's division, the teams consisting of two women. Contractors may run with the directorate to which they are assigned. For more information, call Richard Shearer, ext. 47036.

A Holiday Challenge

Angels Come in All Shapes and Sizes

For the third consecutive year, Langley's Acquisition Division is gearing up for a holiday tradition which has proven to all participants that it is better to give than to receive.

There will be the customary tree in the conference room, the holiday door decorating contest and the annual Christmas party, but the tradition that really puts the spirit in the season is "adopting" their Angel Tree kids.

A Salvation Army program, Angel Trees are set up in local department stores, malls and churches. These trees are decorated with tags in the shape of angels. The tags carry age and size information about needy children whose Christmas "wish" may not otherwise be granted.

"I was amazed at the magnitude of the children's needs," said Stan Ward, Acquisition Division project coordinator. "These kids don't even have warm clothes for playing outdoors."

In 1988, the division collected enough funds to adopt 10 children. Each child was given jeans, a warm shirt or sweatshirt, underwear, socks, gloves, a knit hat, a special need (like a coat) and a toy. Last year, enthusiasm--and donations --increased and 13 children were so outfitted. This year, "who knows!" said Ward. "This project has really drawn our division together. It's hard to determine who is happier Christmas morning--the givers or the receivers! But we feel the glow from the time the first Angel Tree kid is selected through the whole season."

Acquisition Division employees shop for their kids after work hours. The Salvation Army requests that gifts not be wrapped but placed in plastic bags with the Angel Tree label affixed to them. Last year, Ward delivered the bundles to Salvation Army headquarters on Big Bethel Road.

"It looked like Santa's workshop," he reported. No child goes without. Any remaining Angel Tree tags are collected by the Salvation Army and all kids are "adopted."

Langley's Acquisition Division challenges every division on Center to participate in this worthwhile activity. Adopt one kid or a whole family. For more information, call the Salvation Army at 838-1443.

CHRISTMAS 1989. Preparing bundles for 13 "adopted" kids are Acquisition employees (L to R) Stan Ward, Mary Deuell, Linda Urquhart. The division has launched a 1990 challenge to all Langley divisions to share in this worthwhile and heartwarming activity.

Turkey Trot: A Race Against Time

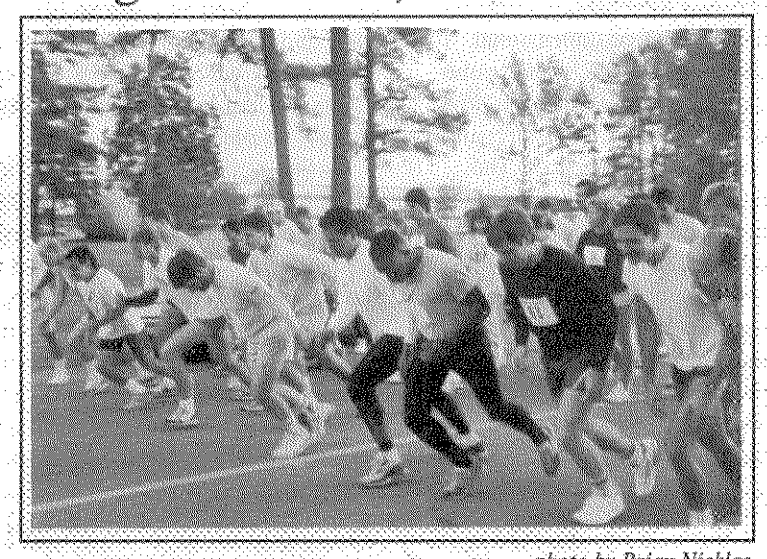
-by Barbara Rollins-Reed

Forty NASA employees participated in the annual Turkey Trot November 15. Sponsored by the Fitness Center, entrants competed not against each other but against time.

Participants were required to predict how long they believed it would take them to run/walk/trot over a two-mile course. Those completing the course closest to their predicted time were the winners.

This year's winners were: Rusty Jenkins, first place; Bob Bennett, second; and Bob Mitchelltree, third, for the men. Winners for the women were: Wendy Pennington, first place; Judith Watson, second; and Regina Spellman, third.

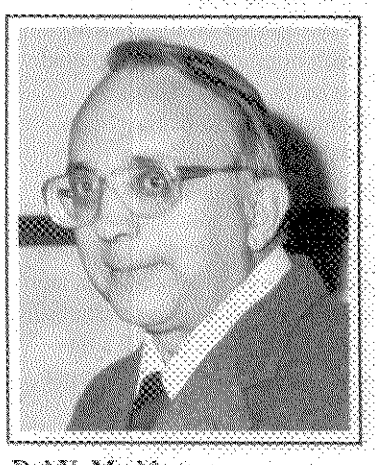
An awards ceremony was held in the Fitness Center following the completion of the run. Names were drawn from all participants for prizes. Six turkeys (hence the name of the race) and 10 water bottles were awarded.



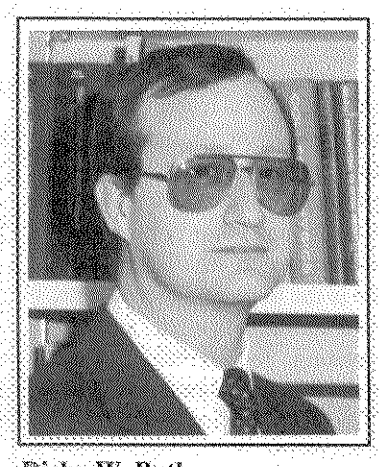
-photo by Brian Nicklas

Competing against their own prediction of their success, Langley Turkey Trot participants commence the two-mile race.

Tech Brief Award Winners



Dal V. Maddon



Ricky W. Butler

Sally C. Johnson

Herbert D. Hendricks

Four Langley employees received NASA Tech Brief Awards recently.

Dal V. Maddon was cited for "Design and Fabrication of Large Suction Panels for Laminar Flow Control;"

Ricky W. Butler, for "PAWS/STEM--Pade Approximation with Scaling and Scaled Taylor Exponential Matrix;"

Sally C. Johnson, for "ASSIST--The Abstract Semi-Markov Specification Interface to the Sure Tool Program;"

Herbert D. Hendricks, for "Optical Backplane Interconnect."

People & Places

Health Corner

Employee Assistance Contract Awarded; New Provider Announced

Kelsey-Seybold, Langley's contractor responsible for the operation of the Health Clinic, has awarded a new contract for the Employee Assistance Program (EAP). Effective December 1, 1990, employee assistance will be provided by First Hospital Corporation Options.

FHC Options is headquartered in Norfolk, Virginia, and has EAP contracts in Virginia, Maryland and Florida. The local office for LaRC employees and family members is located at 606 Denbigh Boulevard, Suite 501, Denbigh Professional Park, Newport News. The phone number is 1-800-255-3046.

Through Center distribution, FHC Options will provide each Langley civil service employee with an information package containing: wallet cards, EAP brochures and telephone stickers. EAP posters and newsletters will also be provided on a routine basis.

Employee orientation sessions will be conducted in the near future. At that time, FHC Options personnel will discuss the Employee Assistance Program in its entirety and provide an opportunity for questions and answers.

Any questions or comments concerning the new EAP provider should be directed to Peter J. Edgette, the employee assistance program coordinator, at extension 43189.

Good Eyesight Hits the Target

Every year shooting accidents occur when hunters either mistake people for game or fail to see others standing in their line of fire.

In 1989, the Virginia Game Commission reported four deaths and 48 people injured due to hunting accidents. To help prevent these tragic accidents, the National Society to Prevent Blindness advises hunters to have their eyes checked before taking to the field.

"Many hunters are unaware that their vision is defective; they think that they see just fine, while others hesitate to admit they have a problem for fear they will have to give up their sport," said Frank J. Carlomango, executive director, National Society to Prevent Blindness, Virginia affiliate. This attitude sends hunters with poor eyesight into the field, thus a real menace exists to other hunters and their safety.

Hunters should be especially cautious at dawn and dusk, when weak light and shadows tend to play tricks on the eye. The hunter who is bothered by glare will find that a good pair of safety sunglasses is an excellent aid to combat this problem. Smoke or neutral gray is recommended, followed by green and brown tints for lens colors. Yellow lenses are unsuitable because they can interfere with color perception and the ability to judge distance.

Hunting is a sport that requires excellent eye-hand coordination. Reflexes must be fast and the hunter's eyesight true in order to hit the target with accuracy. Having an eye examination before taking to the field will not only improve the hunter's aim, but increase safety for other hunters.

AIAA Program

Real Estate Tips for the First-Time Buyer Presented by Local Broker

Ann Pane, residential specialist and brokerage manager, will speak at an after-work meeting of the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA) Wednesday, December 5, in the H.J.E. Reid Conference Center, Building 1222. There well be a social at 5 p.m.; the program will begin at 5:30.

Pane's presentation is intended to educate first-time buyers about the process of purchasing real estate. The program should also benefit current owners of real estate who are interested in additional investments. Topics to be discussed in the presentation range from how much one can afford, to property selection, and issues related to financing. A question-and-answer session will follow the program.

Pane is co-owner and principal broker of a local real estate company. She has been active in the Virginia Association of Realtors and the National Association of Realtors. Pane is the recipient of a number of sales and service awards.

The program is free and open to the public. Reservations are not required.

Car passes for Shuttle launches are available on a first come-first served basis. Contact Ann Suit, ext. 43305.

Personnel Profile

Cooper Looks Beyond Walls and Barriers

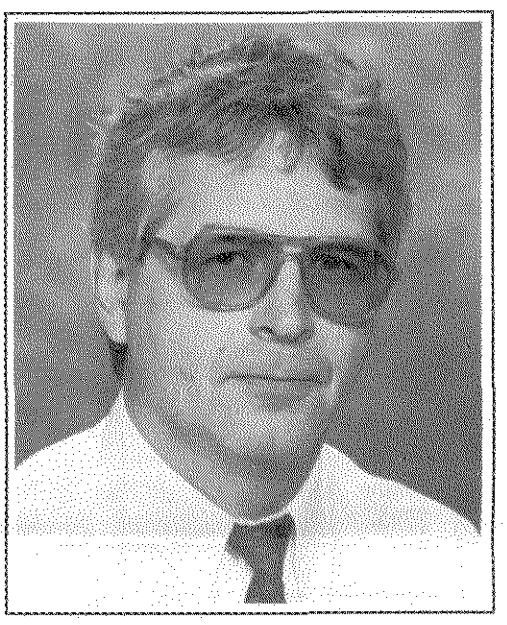
-by Allan C. Hanrahan

Lines written a few miles above Kitty Hawk, where it all started, and where a nor'easter sweeps the beach and flings the sea foam, and screams through the lines of a catamaran pulled up on the dunes.

Writing about Lawrence B. Cooper III poses somewhat of a dilemma: which of the many facets of his life to feature first?

Let's take the alphabetical tack and begin with his award, and let his life sail from there.

At the annual awards ceremony last June, Larry, as he is known to his many friends--and fellow engineering technicians in the Materials Processing and Development Section of the Fabrication Division--was presented an Outstanding Volunteer Service Award "for outstanding volunteer service in supporting the Newport News Volunteer Fire Department, disabled veterans, and handicapped citizens."



Cooper began his volunteer service in the Newport News Volunteer Fire Department in 1973, and has over 6,000 hours of fire fighting service time, achieving the rank of captain in the Volunteer Unit. For the last five years, he has been working as an aide to the fire chief. He has received training at both state and local fire schools, achieving the highest levels of certification in fire fighting and in the use, handling and disposal of hazardous materials.

He was a volunteer Emergency Medical Technician for the Newport News Fire Department for five years and, during that time, he rescued five people from certain death. He was credited with saving a man trapped in a house fire in 1975 and, in 1984, he rescued a fellow fireman who had been overcome by heat and smoke inhalation while fighting a fire. In 1987, Cooper rescued an elderly lady from a burning automobile. Then, when he was sure the woman was safe, he put the fire out, preventing the car from exploding in a crowded shopping center parking lot.

Cooper has also been trained and certified by the state of Virginia to work on the Critical Incident Stress Debriefing Team. This group meets once a month and is on call 24-hours each day to help public safety and medical personnel deal with extreme mental stress that is common to their respective professions. He has contributed his services at numerous debriefings with public servants and medical personnel to provide them with the psychological techniques and methods to deal with stress brought on by life-threatening incidents.

Cooper has served for six years on Langley's Disabled Persons and Disabled Veterans Work Force Program and served as chairman on the DPDVWFP Employee Satellite Committee. (He served in the U.S. Army from 1972 to 1974 when he received a medical honorable discharge.) He organized and developed the disabled display for the Hampton Bay Days and has lectured to various church groups about working with disabled persons. In 1989, he assisted the LaRC Disabled Committee in setting up a program for non-disabled Center personnel. Specified individuals "adopted" a disability for half a day. The program increased managers' and volunteers' sensitivity to the problems facing disabled employees in their work environment.

"Never let yourself be a crutch for your disability. Look beyond the walls and barriers because you have much to be thankful for in life."

Larry Cooper is somewhat of a celebrity because he was one of 17 NASA employees recently profiled in *Space for All*, a publication by the American Association for the Advancement of Science on the career opportunities in science, mathematics, engineering and computer science for students with disabilities.

An accident left Cooper without sight in one eye. He advises disabled students to "obtain all the knowledge that you can by taking all of the science and mathematics courses possible." Larry received an associate of applied science degree in 1973 from Thomas Nelson Community College, and he periodically takes classes in thermal processing.

Reflecting on his own experience, Cooper says, "Never let yourself be a crutch for your disability. Look beyond the walls and barriers because you have much to be thankful for in life."

Cooper is a 1969 graduate of Hampton High School and lives in Newport News with his wife, the former Debbie Liverman, and their three children: Clayton, Michael and Robert, ages 11, 10, and 8 respectively. In those rare moments when he is not doing for others, he enjoys golf, basketball, weightlifting, and spending time with his family.

Is this eight-year-veteran of the Center content to rest and ruminate on past accomplishments? Not so. He answered the memo of September 9, 1990, to all LaRC personnel, "Request for Participants in the HL-20 Personnel Launch System Full-Scale Research Model Evaluations . . . for human factors engineering, ingress and egress procedures, and maintenance accessibility in order to formulate recommendations for future development." On November 9, he was selected for the "B" Group.

Don't Miss Winter Computer Expo

The Langley Research Center Winter Computer Expo will be held Wednesday, December 5, from 9:30 a.m. to 2:30 p.m. in the H.J.E. Reid Conference Center, Building 1222.

Over 35 exhibitors will display the latest in engineering capabilities, office automation, technical/scientific computing, graphics, optical disk, workstations, software packages and more.

All Langley personnel are invited to attend. The event is sponsored by the National Small Business Council and Langley's Evaluation and Information Center.

Happenings

HOLIDAY OPEN HOUSE will be held Friday, December 7, from 3 to 8 p.m., in the H.J.E. Reid Conference Center, Building 1222. Join with your co-workers to ring in the holiday season.

NEW YEAR'S EVE DANCE tickets are now on sale at the Activities Office, Building 1222. Sponsored by the Langley Activities Association, the dance will be held Monday, December 31, from 9 p.m. to 1 a.m. Cost is $35 per couple. For additional information, please contact Andrea Lewis, ext. 46369.

LOW-IMPACT AEROBICS classes are held Tuesdays and Thursdays from 5 to 6 p.m. in the NASA gym. Cost is $12 per month. First class is free.

STRESSBUSTERS relaxation and recharge group meets each Wednesday from 11:45 a.m. to 12:30 p.m. in Building 1232, Room 236. For additional information, contact Steve Dahmen, ext. 44519.

NASA TOASTMASTERS will meet Wednesday, December 12, at 11:30 a.m. in the H.J.E. Reid Conference Center. Guests are always welcome.

SEA EXPLORERS. Young men or women, ages 13-20, interested in sailing, learning to sail, or other maritime activities, call Chauncey Wu, 722-1266, or Tom Dade, 868-8822. No experience necessary.

BOOKFAIR sponsored by the Langley Child Development Center (LCDC). Books for infants through children age 8 will be available for sale December 3-7, 9-11 a.m. and 2:30-5:30 p.m. in the LCDC lobby, and December 10-12, 11 a.m. to 1 p.m. in the NASA cafeteria. For more information, call Barb Merrill, 864-4827.

WANTED: ROOMMATE. Female to share Magruder Commons townhouse. 2 BR, 1-1/2 B, washer/dryer. $275 per month plus 1/2 utilities. Call 868-6557.

FOR SALE: DOLL HOUSE, hand-built, 50"Lx21"Wx40"H, very good condition. $225. Call Carolyn Carey, 865-8332. If no answer, please leave message.

FOR SALE: TRUCK. 1982 S10 pickup, 4 cylinder, 4 speed, AC, AM/FM, new paint and tires. 60,000 miles on a new engine. $3,500 firm. Call 722-3795.

OLD TIMERS COFFEE. Langley retirees are invited to a coffee-time get-together , Saturday, December 15, in Building 1244, Room 232, at 9 a.m. For additional information, call Dale Dennis, ext. 45291.

GRAND ILLUMINATION. Colonial Williamsburg will open the holiday season with a lighting of the historic area, fireworks, music and entertainment beginning at 5:30 p.m., Sunday, December 2. Programs will be held at the Capitol, Powder Magazine and Governor's Palace.

AFCEA LUNCHEON. Armed Forces Communications and Electronics Association will meet at 11:30 a.m., December 4, at the Langley NCO Club. For reservations, call Lt. Morgan, 764-7534, or Lt. Lewis, 764-6656.

HOW TO ADVERTISE. The privilege of advertising in this publication is afforded at no cost to Langley employees, contractors and retirees. Please submit ads to the Editor, Mail Stop 115, by Tuesday noon following this publication date for inclusion in the next issue of the **Researcher News**. All submissions are subject to editing.

FINAL DEADLINE. The December 14 issue of the **Researcher News** will be the final issue for 1990. Deadline is Tuesday, December 4. Plan now for holiday announcements.

At the VC During December

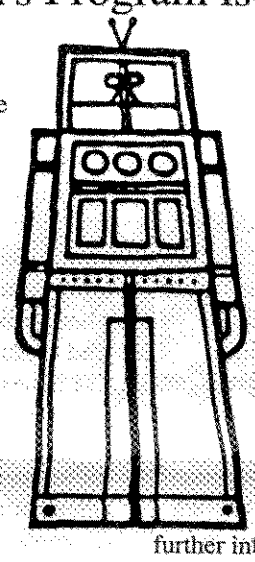
Former Employees Reminisce About When Computers Were Human

Before the electrical evolution of the 1960s, most of Langley's mathematical calculations were done by women known as "human computers." In honor of these women and their contributions to Langley, the Visitor Center will hold a forum, titled "When Computers Were Human," at noon, Thursday, December 13, in the Visitor Center theater.

This brown-bag lunch forum will feature a panel of women who worked at Langley as "human computers." The panel will discuss the integral role they played as mathematicians and how they adapted to the world of electronic computers. A moderator will lead the discussion and audience participation will be encouraged.

With the onset of World War II, women in large numbers came to work at Langley, many of them doing jobs formerly done by men. The "human computer" units (one of them entirely made up of black women) were added to several of the wind tunnel staffs. These units took over most of the slide rule work and curve plotting, allowing engineers to focus on wind tunnel testing and research.

VC Children's Program is 'Robo Kids'



The Space Shuttle, planetary space probes and space structures all require help from robots to work specific jobs. As part of a career-oriented program centering around robotics, the Visitor Center is offering "Robo Kids," a free children's program, on Saturdays, December 15, January 19 and February 16 at 10 a.m. in the VC theater.

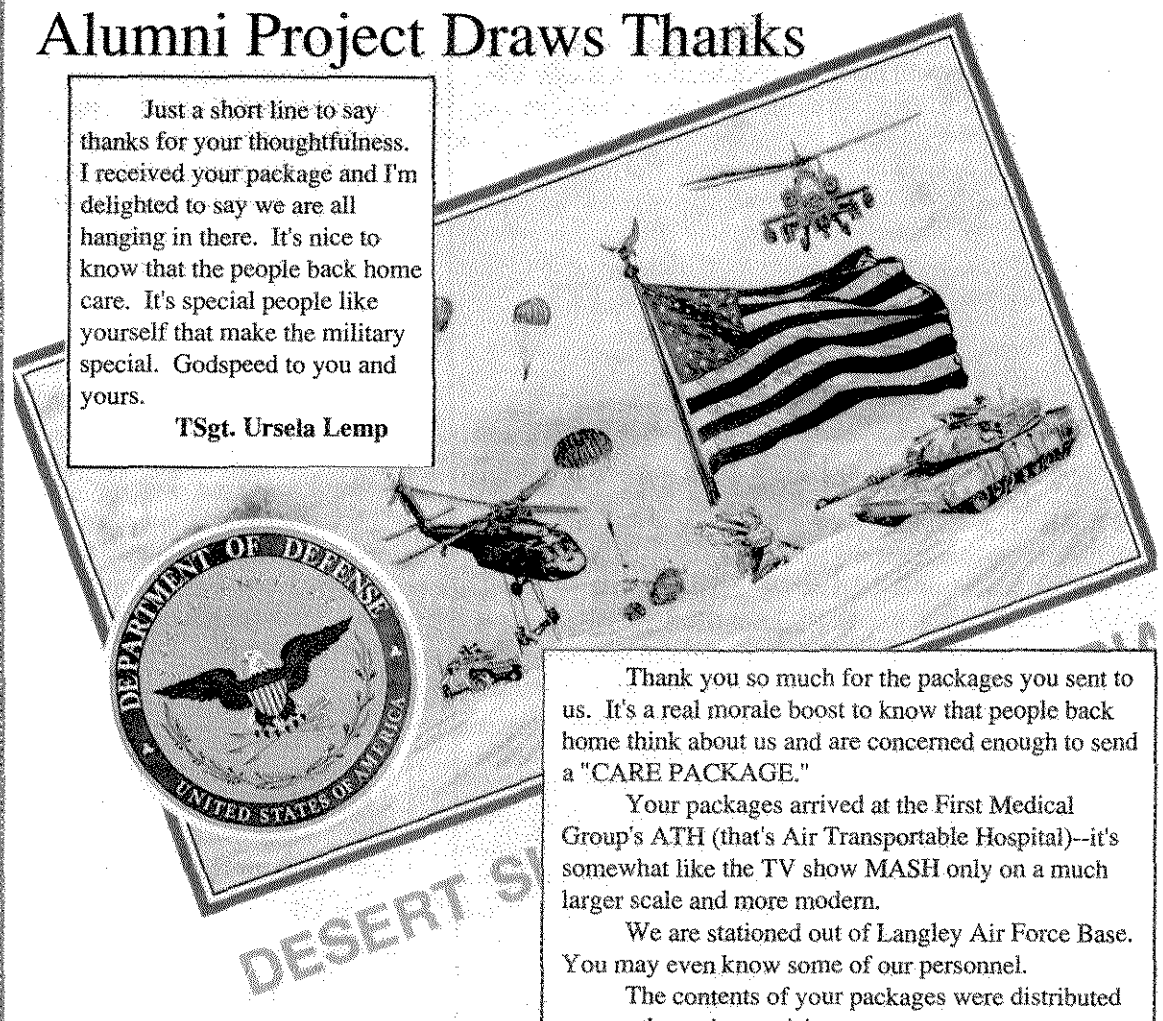
The hands-on program, designed for children ages eight to 10, will demonstrate the uses of robotics in a space environment and identify the job skills needed for a career in robotics. As the highlight of the one-hour program, the children will be involved in robotic activities with three remote control robots. The children will direct the robots in performing assigned tasks.

To register children for the program or for further information, call the NASA Langley Visitor Center at 864-6000. Due to limited seating, advance reservations are required.

Alumni Project Draws Thanks

Just a short line to say thanks for your thoughtfulness. I received your package and I'm delighted to say we are all hanging in there. It's nice to know that the people back home care. It's special people like yourself that make the military special. Godspeed to you and yours.

TSgt. Ursela Lemp



Project Thank You, initiated by the Langley alumni and supported by Center employees, sent over 350 packages to our troops in the Middle East. This 'Thank You' has drawn countless notes of thanks from the service men and women in Saudi Arabia. Here are two examples.

Thank you so much for the packages you sent to us. It's a real morale boost to know that people back home think about us and are concerned enough to send a "CARE PACKAGE."

Your packages arrived at the First Medical Group's ATH (that's Air Transportable Hospital)--it's somewhat like the TV show MASH only on a much larger scale and more modern.

We are stationed out of Langley Air Force Base. You may even know some of our personnel.

The contents of your packages were distributed among the patients, visitors to our emergency room, and some of the people assigned to the ATH who are not receiving much from home.

Thank you again. We appreciate your prayers.

Sincerely,
Maj. Richard C. Cole, M.D.
First Medical Group

Researcher News

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Researcher News

Volume 4, Issue 25 December 14, 1990

Bi-weekly Employee and Contractor Publication

NASA and Honeywell Conduct Automated Landing Research

-by H. Keith Henry

Langley Research Center and Honeywell's Space Systems Group, Clearwater, Fla., have successfully concluded a joint flight research project that may improve automated landing capabilities in spacecraft and aircraft.

During the flight tests performed over the last two months, NASA's Boeing 737 research airplane made 36 automated landings using a Honeywell-integrated differential navigation system linked to the Global Positioning System (GPS). GPS is a worldwide constellation of U.S. satellites that provides precision navigation information.

The test data will form the basis for design of such systems in future spacecraft and will help researchers assess how risk can be reduced in automatic landings. The results also will help determine the accuracy of GPS-aided navigation systems that could ensure safe automatic landings under various weather conditions.

Currently there are 15 GPS satellites, four to eight of which were in view during the NASA/Honeywell flight tests. There will be 24 satellites in the GPS constellation when it is complete in 1993.

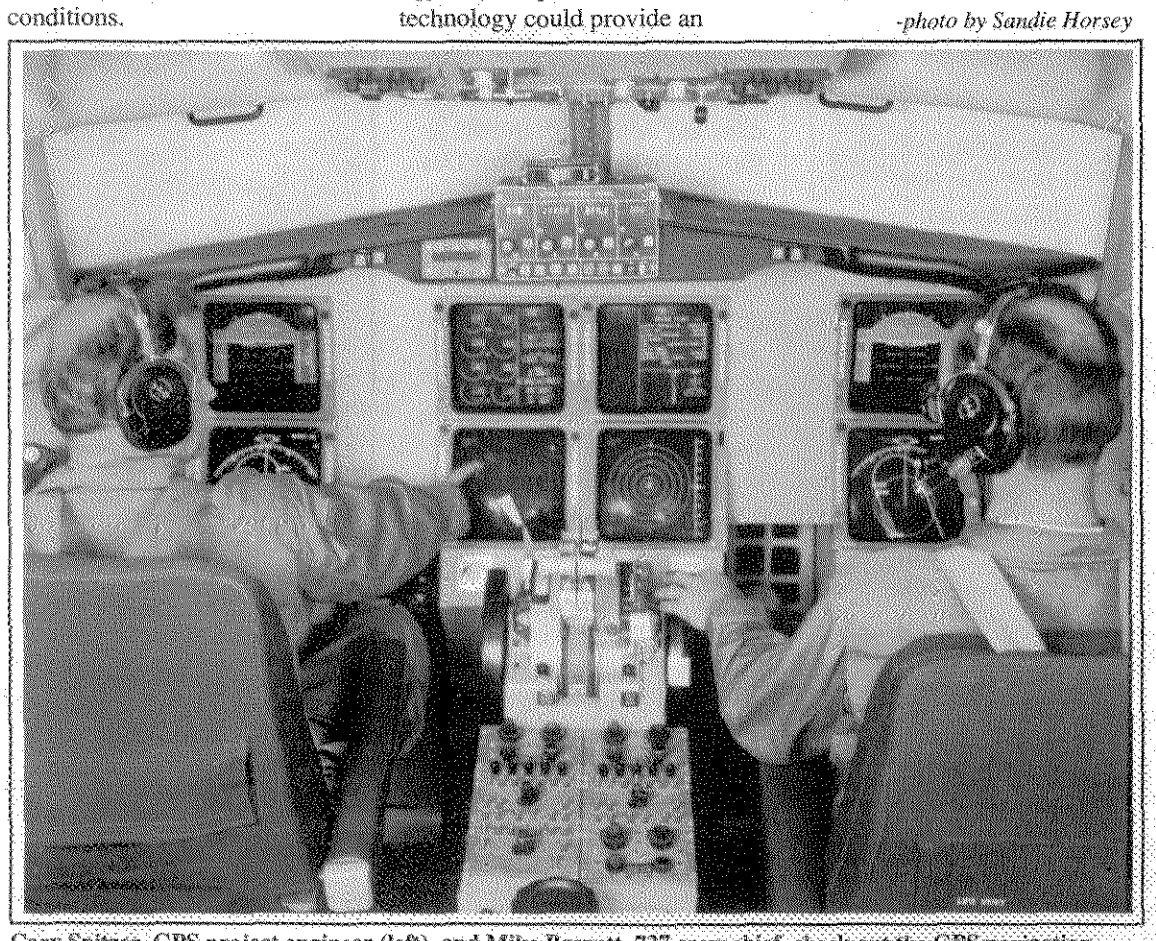
Six days of flight tests from October 23 to November 14 accumulated 25 hours of flight time. Langley's Boeing 737 Transport Systems Research Vehicle (TSRV) was fitted with Honeywell's Integrated Global Positioning Inertial Reference System/GPS Sensor Unit (GPSSU). A ground station with a second GPSSU receiver located at Wallops Flight Facility, Wallops Island, Va., provided differential GPS corrections to the aircraft via VHF radio. During the tests, the TSRV made 111 landings, including 36 GPS-aided automatic touchdowns.

There are many potential space and commercial applications of this advanced technology. In the space arena, the technology could provide an automatic landing capability to the next-generation manned space transport vehicles that will be less demanding on the crew and require less training than the current Shuttle auto-landing system. Unmanned space vehicles could return expensive engines and avionics that otherwise would be expended after a single mission.

In commercial aviation, an automatic landing system based on differential GPS offers the potential for complete guidance: precision approaches from a variety of air traffic patterns, landing rollout and taxiing to the gate in poor visibility conditions.

This research and development effort is a cooperative project between Langley and Honeywell, Inc. Honeywell's efforts are led by its Space Systems Group with engineering support from its Systems and Research Center in Minneapolis and system hardware from its Commercial Flight Systems Group in Phoenix.

-photo by Sandie Horsey



Cary Spitzer, GPS project engineer (left), and Mike Basnett, 737 crew chief, check out the GPS navigation display before a test flight in November. Langley and Honeywell's Space Systems Group successfully completed a joint flight research project that may improve automated landing capabilities in air and spacecraft.

Visitor Center to Present 'Wind Tunnel Wizardry'

With winds ranging from a gentle breeze to several times the speed of sound, wind tunnels are important tools for aeronautical research. As part of a program to take the mystery out of wind tunnel operations, the Visitor Center and Tom Vranas, an engineering technician in the Composites and Models Development Section, will present "Wind Tunnel Wizardry."

The hands-on program, offered to students ages 12 to 15, will provide an overview of wind tunnel functions, illustrate the principles of flight and demonstrate air flow designs. The highlight of the 75-minute program will include actual wind tunnel testing. Vranas will set up a small wind tunnel and teens are invited to bring their own model car, boat, train or plane, (1/24th scale model, not to exceed 12 inches long, four inches high, four inches wide).

The program is offered on Saturdays, December 29, January 26 and February 23 at 10 a.m. in the Visitor Center theater. To register teens or for more information, call the Visitor Center at 864-6000. Due to limited seating, advance reservations are required.

Holiday Greetings!

The first year of the 1990s is drawing to an end. NASA launched six Shuttles, including the recovery of LDEF and the launch of the Hubble Space Telescope. A new spirit of "glasnost" prevailed as aeronautical researchers from the United States and the Soviet Union exchanged visits. Langley continued its strong support of the National Aero-Space Plane, the Earth Observing System, High-Speed Research and Space Station.

Last year we wished for peace in the 1990s. Now we are faced with a crisis and grave risks in the Middle East. Let us all pray for a peaceful and honorable resolution, so that all our men and women can come home in 1991.

Thanks to all of you for making 1990 a good year for Langley. We wish you all the very best at this holiday season and look forward to working with you in 1991.

May God richly bless you and all your loved ones.

Richard H. Petersen, Director
Paul F. Holloway, Deputy Director
Sidney F. Pauls, Associate Director

John Samos Honored for Technology Transfer Initiatives

The head of Langley's Technology Utilization and Applications Office was presented the Lifetime Achievement Award in Technology Transfer from NASA *Tech Briefs* magazine in ceremonies held November 27 in Washington, D. C. John Samos, in the Langley post for 23 years prior to his retirement on November 30, received the award from the magazine's publisher Bill Schnirring at a national technology transfer conference and exposition entitled Technology 2000.

The event was held to recognize continuing efforts to capitalize on the spin-off of NASA research and technology to the business and consumer sectors and to bolster America's competitiveness in the global marketplace. In presenting the award to Samos, Schnirring said there was no higher practitioner in the art of technology transfer and that, "since the middle-1960s, no one has contributed more to the success of NASA's technology transfer program than John Samos."

Samos has been involved in a large number of Langley-originated transfer candidates over the span of his time at the Center. Most recent examples are the burn depth measurement device, the X-ray fluorescence spectrometer, the composite wheelchair, the urodynamic catheter and the pressure measurement system.

Samos is a veteran of World War II, serving in the European Theater with the U.S. Army Air Corps, an experience which included four months as a prisoner of war. In 1947, he came to Langley where he worked in the 8-Foot High Speed Tunnel. From 1949 to 1966, Samos served in the U.S. Air Force as a B-47 and C-135 crewmember, among other positions. Before rejoining NASA in 1966 upon retirement from the USAF, he was the scientific and technical liaison officer between the Air Force Systems Command and NASA Langley.

Happy Holidays
from the staff of the *Researcher News*.

News Briefs

New Treatment Eases Effects of Space Motion Sickness --- Physicians at NASA's Johnson Space Center, Houston, have instituted a new treatment for space motion sickness that has markedly decreased the severity of the illness in crewmembers. Promethezine, an intramuscular treatment administered after the onset of symptoms, has helped decrease the symptoms of space motion sickness on 14 occasions since NASA's return to flight in September 1988. Medical researchers believe changes in the body's vestibular system (the system that regulates the sense of balance) contribute significantly to space motion sickness.

NASA Receives Award for Minority Business Development Program --- NASA Administrator Richard H. Truly has accepted the "Government Agency of the Year Award" from the Black Business Association of Los Angeles for NASA's participation in minority business development. The award, given annually in conjunction with the association's trade mission to Washington, D.C., is presented to the government agency which has the most successful program designed to encourage minority business development.

NASA Selects Small Business Innovation Research Projects --- NASA has announced the selection of 84 research proposals for immediate negotiation of Phase II contracts in NASA's Small Business Innovation Research Program (SBIR). Proposals selected were submitted by 79 small, high technology firms located in 25 states. Proposals were chosen competitively from 201 submissions for Phase II continuations of SBIR Phase I projects initiated in 1989. Total value of awards will be about $42 million. SBIR objectives are to stimulate technological innovation in the United States by using small business, including minority and disadvantaged firms, to help meet federal research and development needs and to encourage commercial applications of federally supported research innovations.

Review of U.S./Japan Space Cooperation --- NASA and the Space Activities Commission of Japan (SAC) held a series of meetings in Arlington, Va., recently, culminating in the fourth meeting of the NASA/SAC Cooperative Space Activities Planning Group. The planning group meets annually to review ongoing space cooperation between the U.S. and Japan. Discussions focused on a number of collaborative projects in the fields of astrophysics, solar system science, microgravity science, life science and Earth observation.

NASA Awards Commercial Middeck Augmentation Module Contract --- NASA has awarded a contract to SPACEHAB, Inc., Washington, D.C., to provide the services of commercial middeck augmentation module (CMAN). The firm-fixed-price contract covers a five-year period. The total amount of the negotiated contract is $184,236,000.

Editor's note: The NASA Headquarters News Releases summarized above are available by calling Jolyn Rivenbark, Mail Stop 146, ext. 43293. Please request information by the headline printed in bold.

Senior Management Research Review

The Senior Management Research Review will be held Monday, December 17, from 9 to 11 a.m. in Building 1212, Room 200. All employees are invited to attend. Program accomplishments will be given by the following Langley scientists:

TIME	PROGRAM ACCOMPLISHMENT	SPEAKER
9:00	Stagnation Point Nonequilibrium Radiative Heating and the Influence of Energy Exchange Models	Lin C. Hartung (SSD, Space)
9:15	Antarctic Ozone Depletion: Three-Dimensional Modeling Studies	Richard S. Eckman (ASD, Space)
9:30	Subjective Response to Simulated Sonic Booms	Jack D. Leatherwood (ACOD, Structures)
9:45	Forebody Strake Vortex Study	Bobby L. Berrier (AAD, Aeronautics)
10:00	Relaminarization of Supersonic Attachment-Line Boundary Layers	Theodore R. Creel (FLMD, Aeronautics)
10:15	Candidate Control Design Metrics for an Agile Fighter	Dr. Patrick C. Murphy (GCD, Flight Systems)

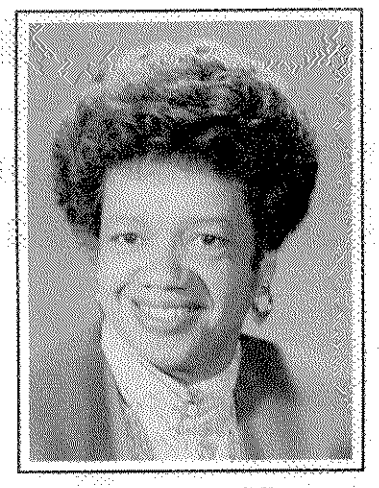
Following these presentations, the program directors will give status reports.

Lankley

Weather Forecasts

Recorded weather forecasts for the NASA Langley Research Center are available by dialing 864-3700.

Darden Honored at NCSU Ceremony



Dr. Christine M. Darden, project engineer in the Advanced Vehicles Division, was honored by North Carolina State University (NCSU) December 4 at the University-Community Brotherhood Dinner. This annual event, hosted by the University chancellor, salutes an African American who has made a contribution to the nation, both as a scholar and a humanitarian.

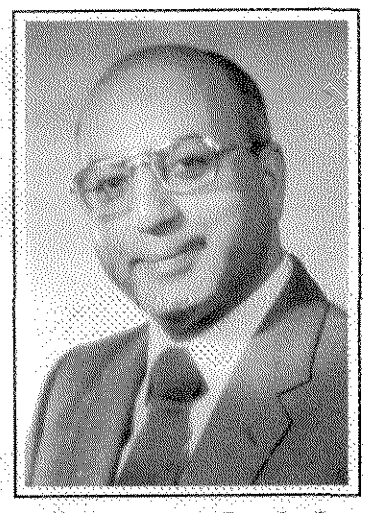
A native of Monroe, N.C., Darden joined the research staff at Langley in June 1967 as a data analyst and qualified as an aerospace engineer in June 1973. She is recognized as an expert in sonic boom minimization and plays a lead role in Langley's research in this area.

Prior to her NASA employment, Darden was a mathematics teacher in public schools in Brunswick County and Portsmouth, Va., and a mathematics instructor at Virginia State College.

Her commitment to mentoring young people is expressed in her leadership roles in projects for the National Technical Association, her local church, and the presbytery and synod levels of the Presbyterian Church. She often speaks to student groups, especially minority students, encouraging them to enter scientific and technical careers.

Prior to the Brotherhood Dinner ceremonies, Darden gave a presentation to NCSU faculty and students on sonic boom research at NASA Langley. Sonic boom, along with ozone depletion and community noise, are concerns that need to be addressed in feasibility studies for a High Speed Civil Transport. Such a vehicle, perhaps available in the year 2010, would be capable of traveling around Mach 2.4 (1,375 nautical mph) and carrying 250-300 passengers 6,500 nautical miles in less than six hours.

UVA's Noor Heads CST Center



Dr. Ahmed K. Noor has been named Ferman W. Perry Professor of Aerospace Structures and Applied Mechanics at the University of Virginia. This is one of the very few endowed chaired professorships at UVA.

In addition, Noor will serve as director of the newly-established Center for Computational Structures Technology (CST) at NASA Langley.

The new center will be the focal point for research in the diverse areas of computational structural mechanics and dynamics as well as computational material science. In addition to conducting research, the center will function as a pathfinder, working to identify future directions for research, serving as a clearing house for CST information and helping to transfer research results.

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 George Washington University's Joint Institute for Advancement of Flight Sciences.

Deadline/Distribution Dates Announced

For your convenience, **Researcher News** deadline and distribution dates for the first half of 1991 are listed below. Please clip and save.

Deadline	Distribution Date
January 2	January 11
January 15	January 25
January 29	February 8
February 12	February 22
February 26	March 8
March 12	March 22
March 26	April 5
April 9	April 19
April 23	May 3
May 7	May 17
May 21	May 31
June 4	June 14
June 18	June 28

News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23665-5225, is published every other Friday in the interest of all Langley staff and retirees. Submit 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

Photojournalist ..... Carol Petrachenko

Photographic Support ..... Photo Lab

The privilege of advertising in this publication is restricted to the employees 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 Bids Farewell to Scout: the Unsung Hero of Space

-David Ferraro and Deborah Marquardt contributed to this tribute to Scout

Date: *May 9, 1990*

Place: *Vandenberg Air Force Base, California*

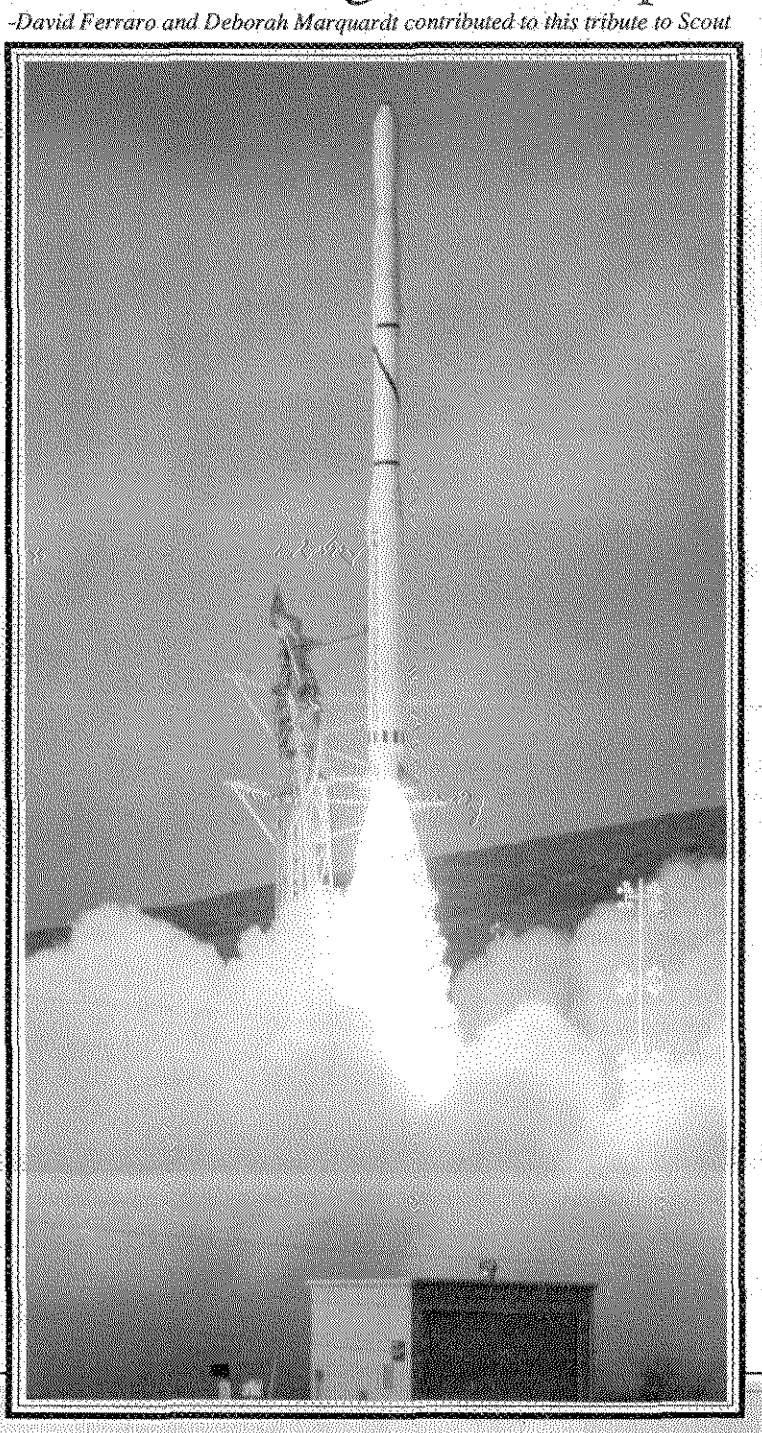
Action: *NASA mission control counts down to liftoff of the 113th flight of the United States' most reliable launch vehicle system:* ***Scout.***

Accomplishment: Launched two Multiple Access Communications Satellites (MACSATs) for the U.S. Navy.

Success comes as no surprise to the planners, designers, engineers and controllers of this launch vehicle system. Success is a result of over thirty years of a relentless quest for reliability and quality in performance. The story of Scout is little known outside NASA circles, but it is a story worth knowing . . . a story of triumph over adversity . . . of teamwork . . . and of the pursuit of excellence.

Scout tells the story of people who shared success and failure ---some of whom spent an entire career on the project. Ultimately, it is the story of a vehicle that proved itself, over and over, to be reliable and dependable.

Scout is a product of 1950s technology that can still compete in the 21st century. For awhile, though, it looked as though the little rocket would remain a gleam in an engineer's eye.



Since its early development, the configuration of Scout has continued to evolve. Each of the motors has been upgraded at least twice, and numerous other changes have been implemented. Even so, the current Scout G-1 configuration is very similar in appearance to that of the original vehicle---a testimony to the soundness of the original design.

Scout is 76 feet long, 45 inches in diameter and weighs 48,600 pounds. It consists of four solid propulsion rockets joined by transition sections.

The first stage is the Algol. It is 30 feet long and 45 inches in diameter. The motor burns for an average of 82 seconds with a maximum thrust of 140,000 pounds. At the bottom of this motor are the first stage altitude control jet vanes and fin tips, which steer the vehicle during initial launch.

The second stage, Castor, is 20 feet long and 30 inches in diameter. Controlled by hydrogen peroxide jets, this stage fires for 40 seconds and develops 60,000 pounds of thrust.

Stage three, the Antares, is 10 feet long and 30 inches in diameter. It burns for 40 seconds at 21,000 pounds of thrust. Connecting these stages are transition sections containing guidance, ignition, spin up motors and separation instrumentation necessary for flight.

The heat shield covering the fourth stage and payload section is made of cork and fiberglass laminate.

In the beginning . . .

By 1957, advances in flight had moved from beyond the speed of sound to transonic. As technology advanced, engineers at NASA Langley were tantalized by the prospect of achieving orbit. Then, on October 4, 1957, the Soviet Union startled the world by launching the first satellite into outer space: Sputnik.

The United States responded by mounting a comprehensive program of missile development and space exploration. The National Advisory Committee for Aeronautics (NACA) was dissolved in September 1958 and, on October 1, NASA was born, the agency charged with running the "space race" for the United States.

There was an immediate need for a relatively inexpensive, quickly produced rocket to launch small research spacecraft. If the United States was to catch up in the space race, NASA had to gather information and perform a variety of experiments. Engineers at NASA Langley's Pilotless Aircraft Research Division were asked to take on this challenge.

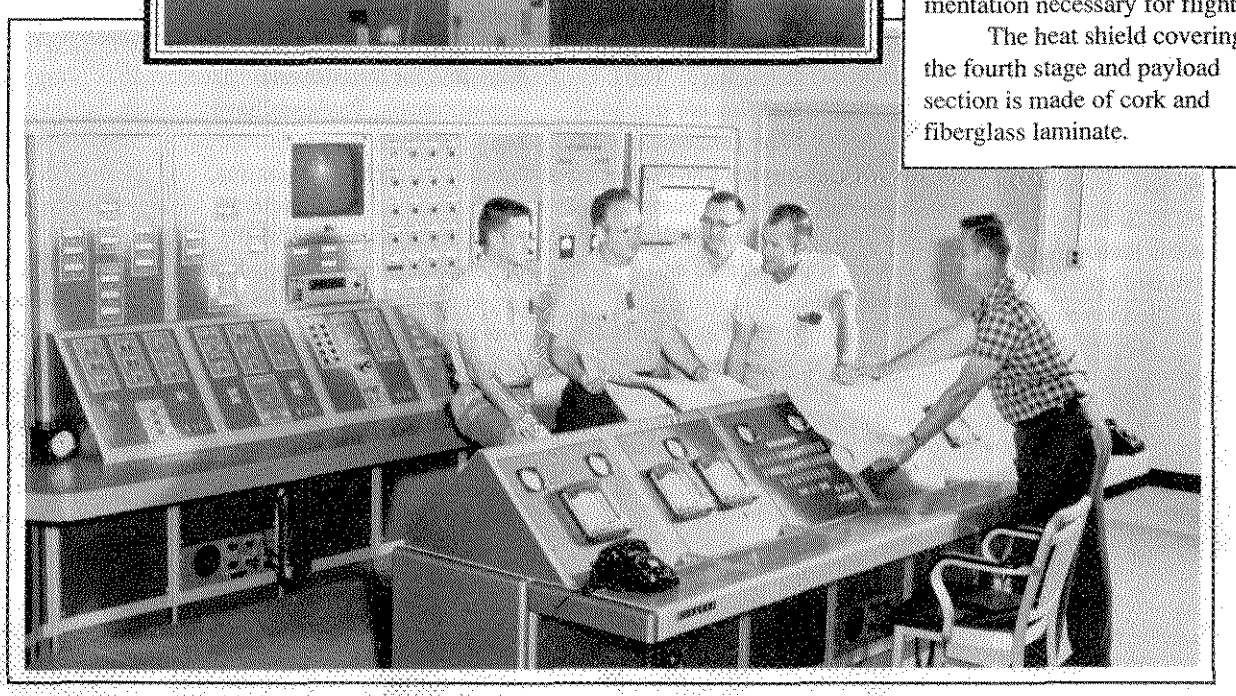
The project was in trouble before it even got off the drawing board. There was no money immediately available to develop the rocket and it was considered by some to be in direct competition with military projects. Its selling points, however, were its lower operating cost, its operational simplicity, and--as everyone had hoped--its greater reliability.

In March 1958, the new rocket was listed as a requirement for investigation into manned flight reentry. In May, authorization was requested for research into the development of a four-stage solid fuel satellite system capable of launching a 150-pound satellite into a 500-mile orbit. It was christened Scout--Solid Controlled Orbital Utility Test system.

To save time and money, Scout was built with off-the-shelf hardware. Designers selected from an inventory of solid-fuel rocket motors produced for military programs: the first stage came from the Navy Polaris; the second stage came from the Army Sergeant; and the third and fourth stage motors were designed by Langley engineers who adapted a version of the Navy Vanguard.

James Hall, Scout operations manager, remembers, "Langey was a hectic and exciting place to work in those days. We constructed and assembled the first four models. We had a lot of young employees; the place was abuzz with enthusiasm. This was the first space program and it was extemely intensive." There were 200 people in the Pilotless Aircraft Research Division. PARD was working two shifts with lots of overtime. "People were consumed because the project was exciting, time-driven and dramatic."

In 1959, NASA Langley awarded contracts for the development of Scout systems. Chance Vought Aircraft, now LTV Missiles and Electronics Group of Dallas, won a competitive bid to develop the airframe and launcher. This began a partnership between NASA Langley and LTV that has lasted for over thirty years.



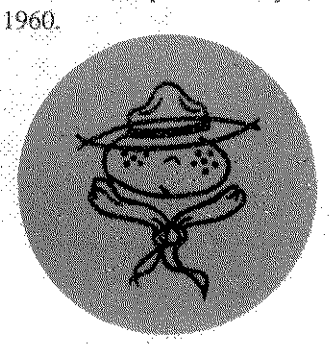
TROUBLESHOOTING AT THE BLOCKHOUSE. Langley electronics engineering technicians install equipment which tests and monitors the entire Scout vehicle during countdown and launch at the Wallops Flight Facility blockhouse. Bill Johnson (second from left), head of the Operations Support Section, reviews plans with technicians Al Gurganus, Joe Dixon, Frank Fromal and Ralph Parks.

From "Cub Scout" to the First Test Flight . . .

Langley's PARD personnel worked tirelessly to prepare the Wallops Island launch site and Langley engineers worked against deadlines to prepare the first test rocket. A launch tower was erected on the Wallops site and a dummy rocket was positioned on the launcher to study effects of wind on the vehicle.

There were problems. Launch dates were set and were slipped. Delays made managers impatient and NASA Headquarters suggested an unguided Scout be launched to test the overall configuration of the vehicle. This "Cub Scout" test was conducted with only the first and third stages live. The test was a failure, a blow to the prestige of the program, but an important design flaw in the heat shield was discovered.

The first official test flight of Scout took place on July 1, 1960.



From Test Flight to First Launch

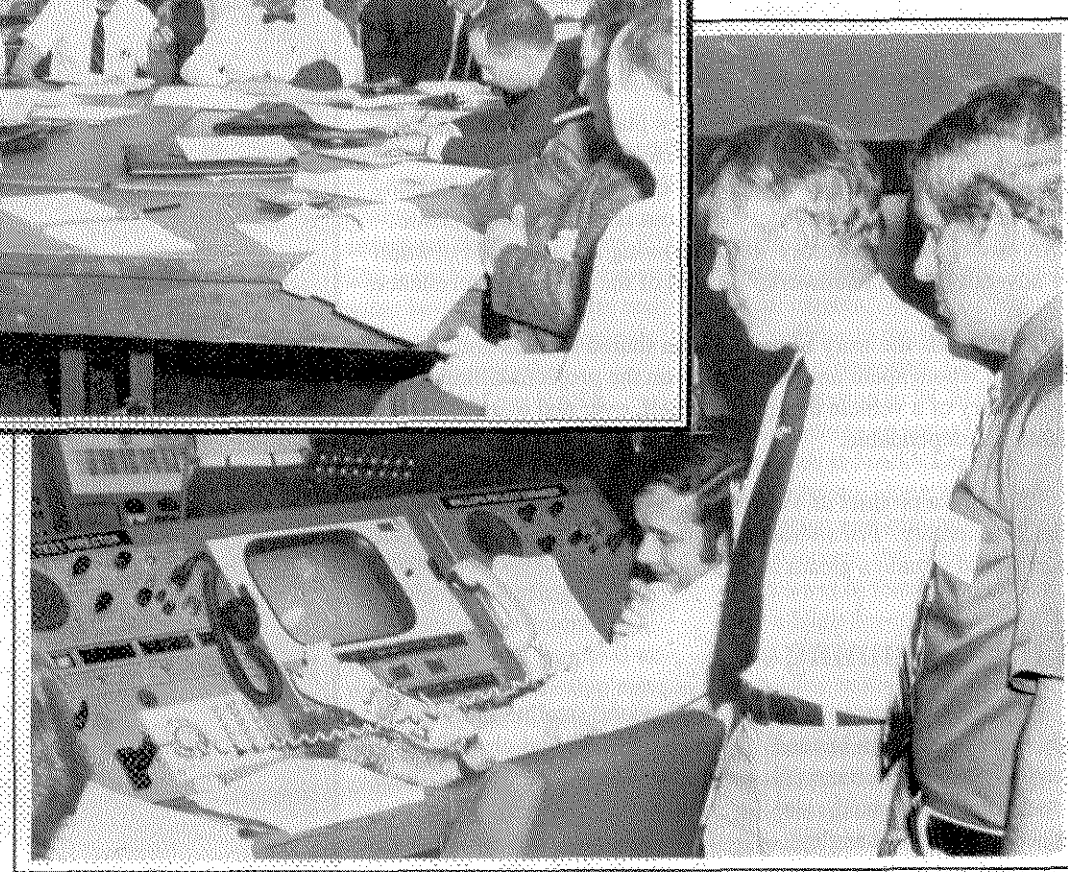
Scout Team Develops Space Program's Certification Process

Scout's first test flight, designed as a probe, carried a 193-pound research payload designed by Langley and consisting of a acceleration and radiation package. The launch started well, but trouble arose when the radar tracking device indicated that the rocket was off course. A radio command prevented the fourth stage from igniting. After reaching an altitude of 860 miles and a downrange flight of 1,500 miles, the rocket returned to Earth. It was later discovered that the report of the vehicle going off course was the fault of the radar ground tracking system.

The first fully successful launch of Scout took place three years after Sputnik I. Carrying a 78-pound research payload, Scout Test Two reached an altitude of 3,500 miles before falling back to Earth. At this point, Scout designers and engineers believed that the testing was complete and that the missile was ready to start service.

The degree of procedural standardization and configuration control achieved by the Scout project was unique in the space business. "Scouts were often composed of components tested separately and then assembled in the field by different crews at different sites using different procedures," said Gene Schult, retired Scout manager. "Lack of standardization was killing us. The problems were different every time." As a result, everything was standardized—test equipment, procedures, even the cable lengths in LTV's labs were matched at the launch site. Lists of these standard operating procedures filled seven volumes.

EARLY SCOUT PLANNING. Langley and LTV Scout Project officials often had round table discussions on the design of the Scout and the vehicle's capability. Attending a planning group meeting in 1961 are (L to R) Milt Green, LTV Scout Project manager; Bill Kilgore, Connie Schultz, Clarence Robins, Abe Leiss, Emedio Bracalente, Jim Hall, Gene Schult, Bill Stoney, George Burrill, Jim Coburn, unidentified, Bob Latta and a second unidentified participant.



100th SCOUT LAUNCH. Bill Burns, Wallops payload coordinator; Lee Foster, Scout project manager; and Larry Tant, mission integrator, monitor the countdown of the 100th Scout launch June 2, 1979. More than 1,000 gathered at Wallops to watch the Scout place the United Kingdom's UK-6 in orbit.

A Record of Reliability . . .

Scout's reliability stems not only from standardization but also from its simple, old-fashioned technology. The heatshield and fins are insulated with cork. The guidance system uses simple gyros that cannot be reprogrammed after launch. But this old-fangled technology makes Scout reliable and predictable.

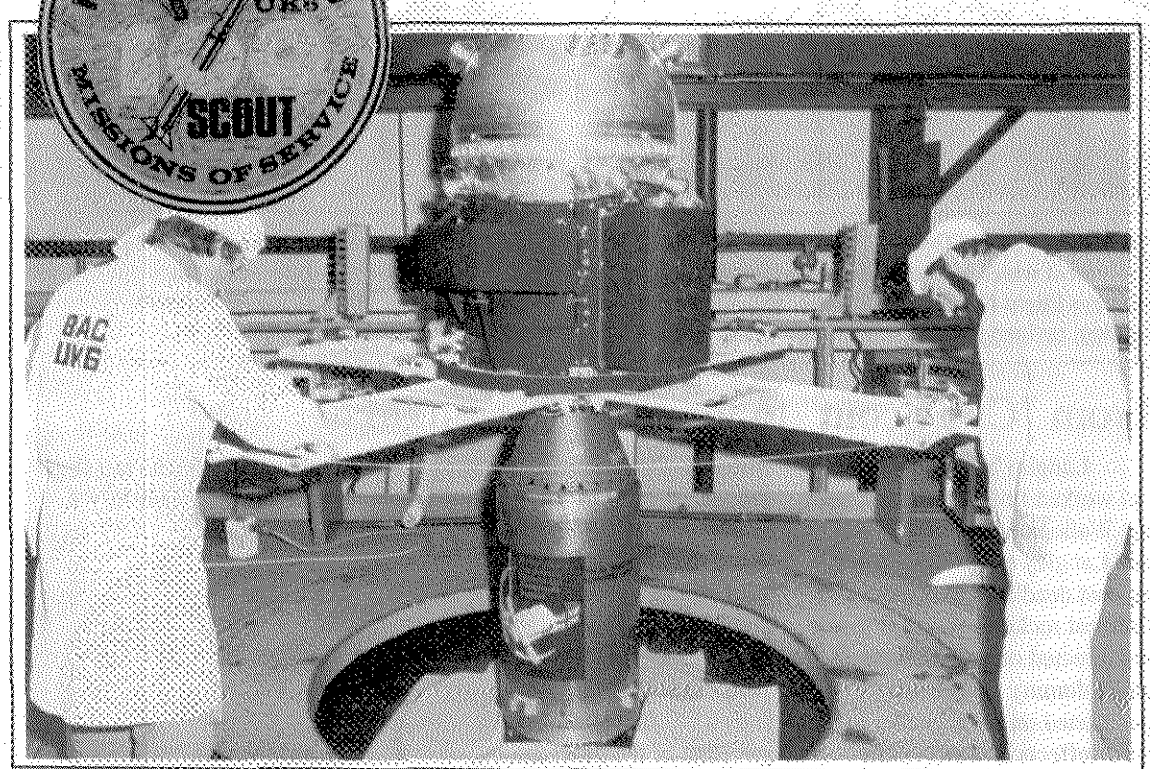
Improvements in rocket engine design have enabled the rocket to carry larger payloads. Cost control has made this "poor man's rocket" one of the most versatile in the industry. Scout's honor roll includes 23 satellites launched for international space organizations. Payloads have been launched for the European Space Research Organization, for Germany, for the Netherlands, for France, and for the United Kingdom. Through the years, Scout has launched 31 Navy navigational satellites, 21 scientific satellites, seven probe missions and 12 reentry missions.

The Future for Scout . . .

"On January 1, 1991, Langley's Scout Project Office will turn the operation of launching the remaining vehicles in the inventory over to Goddard Space Flight Center," reports Jon Van Cleave, Scout project manager. NASA Langley will return to its primary mission—research. LTV will continue to market Scout for commercial applications. "The turnover marks the end of an era in the history of missile development in the United States," concludes Van Cleave.

Scout's overall 96 percent success rate has earned this workhorse a spot in the National Air and Space Museum, where it stands beside other veterans of America's space program, such as Jupiter, Aerobee and Vanguard rockets.

Those who have worked on the Scout program have made a unique contribution to the U. S. space program. They have created a launch vehicle system that set a standard for reliability. They did it by establishing standards of exactness and by an unwavering pursuit of excellence. In these accomplishments, they created an atmosphere of teamwork and mutual respect that those who worked on Scout will never forget.



READIED FOR THE TRIP. Technicians perform pre-launch preparation tasks on the United Kingdom's UK-6 payload at Wallops Flight Facility in preparation for the 100th Scout launch. The 340-pound UK-6 is now in orbit to help increase man's knowledge on high-energy astrophysics, such as quasars and pulsars.

Farewell Celebration

Scout Moves to Goddard

After more than 30 years, management of the Scout Project will be moving from Langley to Goddard Space Flight Center January 1. All employees, retirees and contractors are cordially invited to attend the "Salute to Scout" ceremony Friday, February 1, 1991, in the NASA Hangar, Building 1244. The program will begin at 2 p.m. and a reception will follow the ceremony. Time should be charged to Job Order A1980.

A "Salute to Scout" banquet will be held Saturday, February 2, 1991, at the Langley Air Force Base Officers' Club. The cash-bar social will begin at 5:30 p.m., followed by dinner at 7 p.m. and a short program. Dancing to music provided by Gator Allmond and the "Spice-of-Life" band from 9 p.m. to 1 a.m. will conclude the evening.

Cost of the prime rib banquet is $17 per person. Checks should be made payable to the NASA Langley Conference Center and be mailed to Ann Suit, Mail Stop 154, by January 18, 1991. Be sure to include complete names, addresses and phone numbers of attendees for badge purposes.

People & Places

Health Corner

Employees Support Bloodmobile

Langley employees, contractors and retirees donated 301 pints of blood at the November 21 American Red Cross Bloodmobile.

Those achieving gallon status were:

18 gallons—Billy B. Dancy;

11 gallons—William L. Terrill;

8 gallons—Thomas Walker;

7 gallons—Melvin Jones and Wayne Barfoot;

6 gallons—Robert Miserentino, Otto C. Ripley and Michael F. Fleck;

5 gallons—Robert L. Myers, Debra P. Mabe, Vincent J. Fleck and Gregory Brauckmann;

4 gallons—Alan P. Scheidigger and Robert Sleeper;

3 gallons—Robert J. Mack, Michael J. Hemsch, Wendy F. Pennington and Jeffrey D. Singleton;

2 gallons—Dale Babcock, Kevin Bonilla; Lyle D. Sanders;

1 gallon—Mark A. Hutchinson, Harry E. Stotler III and Richard L. Shearer;

First Timers—Letty L. Bright, Jane I. Druen, Todd C. Denkins, Donna M. Heath, Efren Carattini, Stephen F. Borg, Hector I. Iribarne and Heide C. Ellis.

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

Many thanks to generous NASA Langley employees and retirees who have donated nearly 2,000 units of blood this year. There is no substitute for the "gift of life."

The first Bloodmobile for 1991 will be Wednesday, January 16, in the H.J.E. Reid Conference Center.

Thompson Fellow Endorses Unique Opportunity

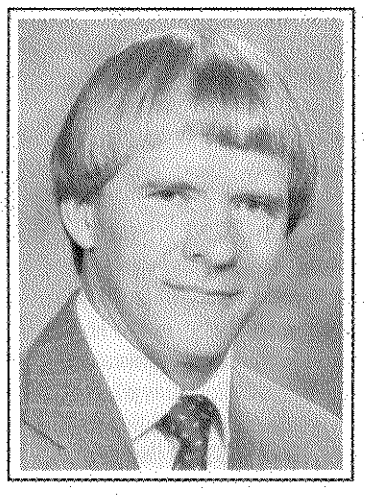
-by Margaret O'Keefe

Langley Research Center offers to researchers a unique opportunity to enhance their professional development in an academic environment. The Floyd L. Thompson Fellowship Program, Langley's most prestigious grant, was established in 1977 to foster increased research capability among Langley professional staff. Previous recipients of the fellowship have conducted research at such centers of excellence as the Massachusetts Institute of Technology and Harvard University.

William M. Adams Jr., senior research engineer in the Guidance and Control Division, recently spent a year as a Thompson Fellow at MIT conducting research in adaptive control theory. The fellowship enabled him to work with internationally recognized educators and researchers. "My efforts during the year resulted in a significantly expanded technical base and provided a foundation for future research in adaptive control," Adams explains. He also made contact with and observed some of the current and future leaders in the controls discipline.

Although relocation of family for a year seems daunting to some, the Thompson Fellowship year was an exciting experience for Adams and his family. They particularly enjoyed sightseeing in the Boston area and socializing with other families at MIT. "I strongly encourage those who may be considering making application for the Thompson Fellowship to do so," he says. "The benefits far outweigh the effort associated with relocating for a year."

The Thompson Fellowship Program is intended for nonsupervisory researchers who have demonstrated continued growth in research capability.



Each year, one or two fellows are selected and supported by salary, travel, per diem and general research expenses.

Applications for the 15th Annual Thompson Fellowship will be accepted until January 31, 1991. Questions concerning the program should be directed to George Allison, Training and Education Section, ext. 42594.

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.

The following are approved leave recipients:

- o David S. Aliff
- o Robert M. Connell Jr.
- o Linda E. Edmundson
- o Joy W. Italiano
- o Noel A. Talcott Jr.
- o Catherine B. Worth

To donate annual leave or for more information on the leave transfer program, contact Linda Park, Employee Relations Section, ext. 42610.

Note of Thanks

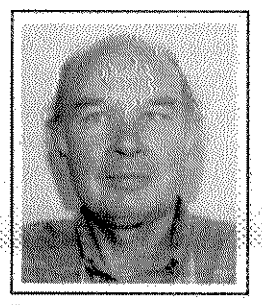
Roger Messier writes: "A special thank you for the outstanding retirement party you gave me. My family and I are extremely grateful to all who contributed to the success of the occasion and to all who attended and shared their time with me. All of you in the LaRC family have etched a special place in my heart and thoughts. My time spent within the Agency and at LaRC have been such a meaningful part of my life.

Retirement Party

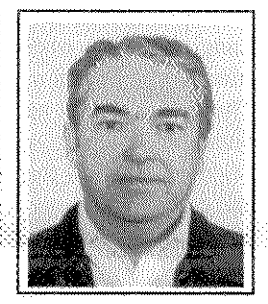
Sadie Boyer will be honored at a retirement party Tuesday, January 8, in the H.J.E. Reid Conference Center, Building 1222. Heavy hors d'oeuvres will be served beginning at 5 p.m. Cost is $10 per person including gift. Contributions to gift only are also welcome. For reservations, contact Lisa Davis, Mail Stop 104, ext. 46080, by January 2.

Recent Retirees

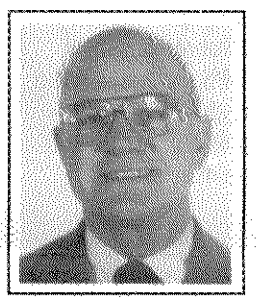
Janice R. Grow



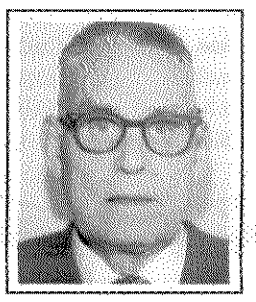
Robert W. Johnson



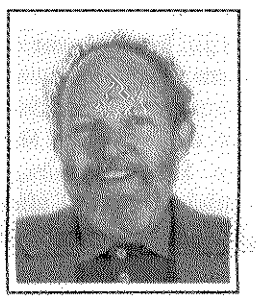
James H. Siviter Jr.



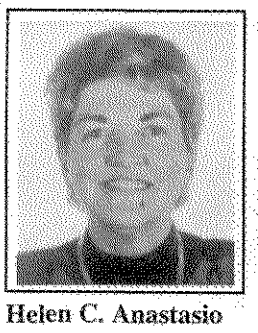
Maywood L. Wilson



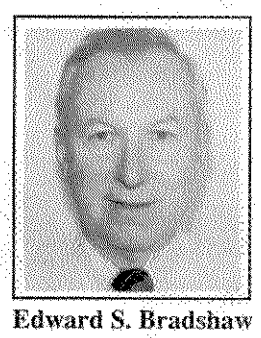
Vinton T. Land



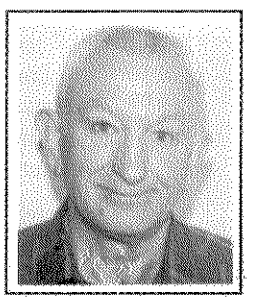
Carroll T. Tiller



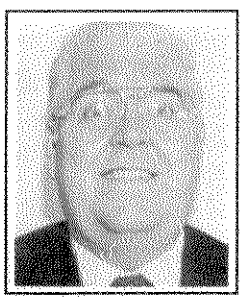
Helen C. Anastasio



Edward S. Bradshaw

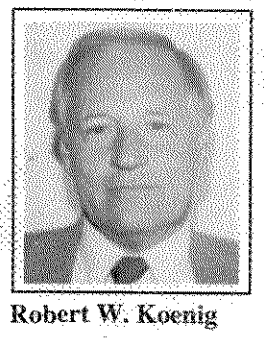


Wilson W. Clark



William F. Perdue

Mary B. Gauthier



Robert W. Koenig

The following employees retired November 30:

Janice R. Grow, Robert W. Johnson and James H. Siviter Jr., Atmospheric Sciences Division; Maywood L. Wilson, Fabrication Division; Vinton T. Land and Carroll T. Tiller, Facilities Engineering Division;

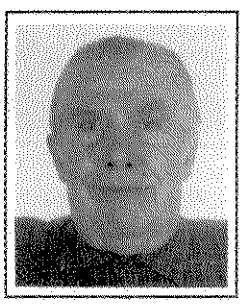
Helen C. Anastasio, Financial Management Division; Martin T. Baxter, Flight Applications Division; James Bene and Robert G. Webb, Flight Electronics Division; Barbara B. Holley, Fluid Mechanics Division;

Edward S. Bradshaw, Guidance and Control Division; Wilson W. Clark and William F. Perdue, Instrument Research Division; Mary B. Gauthier, Management Support Division;

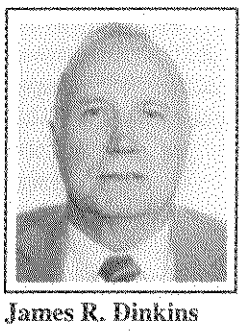
Joseph M. Shinn, Materials Division; Robert W. Koenig, Office of the Director for Aeronautics; James R. Dinkins, Office of the Director for Systems Engineering and Operations;

Benjamin R. Freeman and Daniel R. Hamlin, Operations Support Division; John Samos, Research Information and Applications Division; Franklin P. Keesee, Scout Project Office; David J. Carter and Fred M. Smith, Space Systems Division;

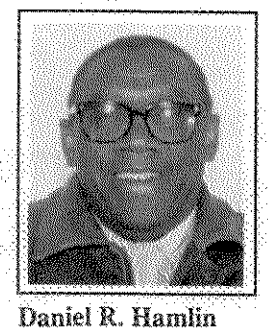
Robert H. Tolson, Structural Dynamics Division; Snowden C. Mills Jr., Systems Engineering Division; and Joseph A. Poslik, Systems Safety, Quality and Reliability Division.



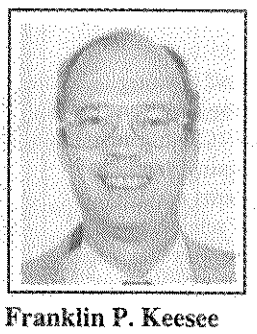
Joseph M. Shinn



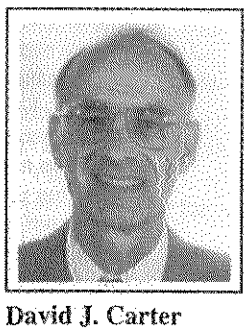
James R. Dinkins



Daniel R. Hamlin

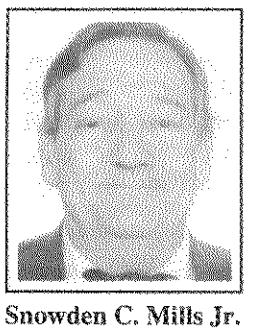


Franklin P. Keesee

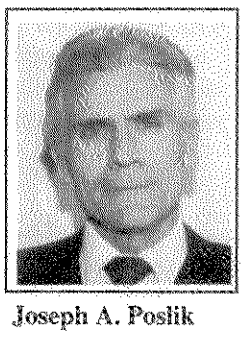


David J. Carter

Fred M. Smith



Snowden C. Mills Jr.



Joseph A. Poslik

Happenings

NEW YEAR'S EVE DANCE tickets are on sale at the Activities Office, Building 1222. Sponsored by the Langley Activities Association, the dance will be held from 9 p.m. to 1 a.m. Cost is $35 per couple. For more information, contact Andrea Lewis, ext. 46369.

LaRC ALUMNI ASSOC. annual meeting and election of board members will be held January 16, 1991, in the H.J.E. Reid Conference Center, Building 1222. Heavy hors d'oeuvres social will begin at 6 p.m. Cost is $7.50 per person. Paid reservations are required by January 5. Call 722-0443 for additional information.

BASKETBALL TRIP. See the Boston Celtics take on the Washington Bullets Saturday, January 12, at the Cap Centre. $50 complete. Great Christmas gift! Limited seats. Call 890-0959 after 5 p.m. for details.

WANTED: CHILD CARE. Babysitter needed for five-year-old girl in your home or mine. Teens welcome. Tuesday and Thursday evenings, 5:30 to 8 p.m. in the Denbigh High School area. $1.50 per hour. Call Patricia, 877-2140, after 5 p.m.

LOST: LIBRARY BOOK. *Theory of Turbulent Jets* by G. N. Abramovich. Please return to Troy Middleton, Mail Stop 439, ext. 46948.

FOUND: GLASSES. Bi-focal lenses in blue frames found at Activities Center picnic grounds. Call ext. 46126 to claim.

FOR RENT: ROOM with kitchen privileges on water in Hampton. Merrimac Shores area. Call 722-2440 after 3 p.m.

FOR SALE: DOLL HOUSE, hand-built, 50"Lx21"Wx40"H. Very good condition. $225. Call Carolyn Carey at 865-8332.

FOR SALE: FREEZER. Sears 15 cubic foot. Excellent condition. $250. Call Ann, 825-0978, after 6 p.m.

FOR SALE: DINETTE table and chairs. Octagon glass table with four chairs. $75. Call Blanche at 825-9144.

FOR SALE: AUTO. 1981 Olds Cutlass Supreme LS, six cylinder, AT, PS, AC, AM radio, rear defog., high miles but runs well. Asking $900 (neg.). Call 826-1485 after 4:30 p.m.

FOR SALE: AUTO. 1985 Mercury Topaz, interior and exterior excellent. Needs major engine repair. $800. Call 838-3336 after 5 p.m.

FOR SALE: AUTO. 1978 Olds Custom Cruiser Stationwagon, full size, trailer hitch. Needs work. $500 or best reasonable offer. Call 851-0552.

Notes of Thanks

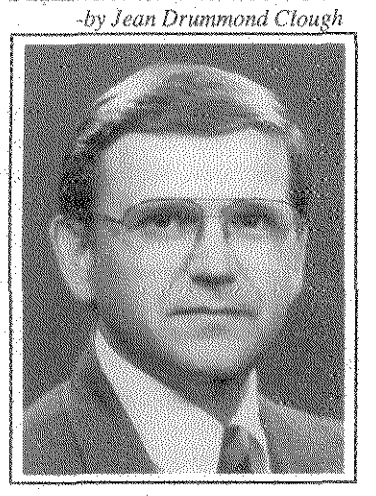
Jack Royall writes: "I would like to extend my appreciation to all who participated in my retirement party. Thanks so much for the nice gifts and for such a great night. It will provide me a lasting memory of my Langley career."

George Brooks, coordinator for the Alumni Association's Project Thank You, writes: "My deep appreciation to all Langley alumni, employees and friends who helped make Project Thank You a great success. The numerous letters from the Middle East show that our love and concern were welcome and comforting. Many thanks to all of you."

Langley Colloquium and The Sigma Series

Garbage: Topic of Peninsula Lectures

-by Jean Drummond Clough



Americans generate more solid waste than any other nation, and we are running out of places to put it. Landfill capacity in some locations is almost filled to the saturation point, and new facilities and approaches, such as incineration and recycling, have become difficult to implement because of the "not in **my** backyard" syndrome.

Although solid waste management is primarily a local responsibility, the problem is national in scope. Thus, beginning in February 1988, the Environmental Protection Agency (EPA) formulated "The Solid Waste Dilemma: An Agenda for Action."

This EPA report will be discussed during two lectures on the Peninsula Monday, January 14, 1991, by Harry E. Gregori Jr., director, Office of Policy and Planning, Virginia Department of Waste Management, Richmond. Gregori also will present the issues involved, both real and emotional, and will give recommendations on how we can manage the garbage that threatens to engulf us.

At 2 p.m., Gregori will speak to Langley employees, retirees and contractors during a colloquium in the H.J.E. Reid Conference Center, Building 1222. At 7:30 that evening, Gregori will give the same presentation at the Holiday Inn Coliseum Hotel and Conference Center as part of The Sigma Series. Free public lectures, the Sigma Series is sponsored by the Virginia Air and Space Center, the Daily Press and NASA.

Gregori has held planning positions in Virginia, Maine and Pennsylvania. He is responsible for developing new waste management programs and initiatives, short and long term planning and certifying sites for the development of hazardous waste management facilities for the State of Virginia.

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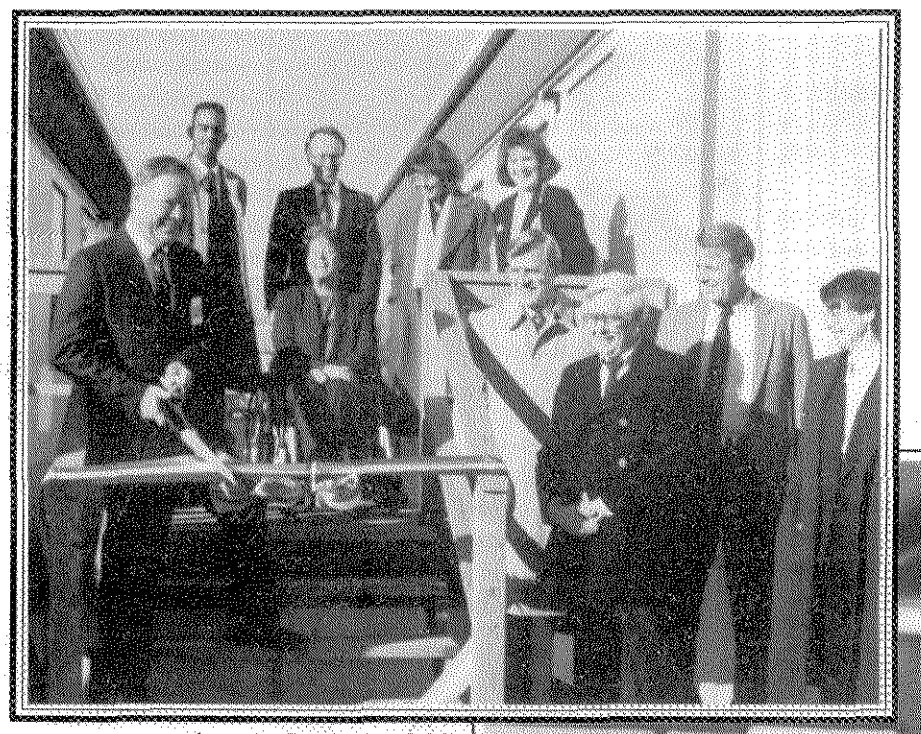
Seasons Greetings
NASA Langley Research Center

Researcher News

EIC: An Early Christmas Present for Langley



-photos by Carol Petrachenko

Robert R. Moore, assistant director for Management Operations, cuts the ribbon opening Langley's Education and Information Center (EIC) at its new and larger location. Relocated to Building 1130, Trailers 1 and 2, the EIC will continue to provide information on and hands-on evaluation of computer systems as well as dedicated classrooms for personal computer training.

Following the grand opening ceremony, Ed Prior and Sandra Barnes examine EIC equipment. In addition to training, troubleshooting problems and dispensing computer advice, the EIC offers a "try before you buy" opportunity to examine hardware and software.