National Aeronautics and
Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

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## *Dr. Wesley L. Harris Visits Langley*

**Harris, center, talks with, left to right, Wayne Geouge, Sam Harper and Bob Davis by a tail section model during a tour of the Advanced Machining Development Section.**

Dr. Wesley L. Harris, associate administrator for Aeronautics at NASA Headquarters, visited Langley in late December for what he hopes will be the "first of many such visits. "In a two-day whirlwind tour, he visited more than 20 of Langley's facilities, stopping to ask detailed questions at each site.

"I have been impressed," Harris said, "with the interaction between the people and the technology that I observed at Langley. It is obvious that the Center's management has considered both human and technological factors and produced a synergy that has made them blend productively."

*Photos by Fred Jones*

**Harris, with Richard B. Holt, Advanced Machining Development Branch, looks at an aircraft model.**

## Evolution of Space Station Is First Colloquium Topic of the New Year

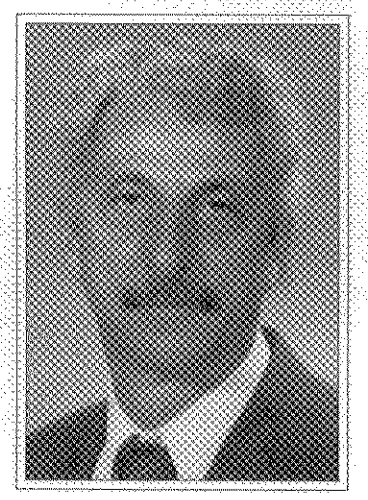
**BY CATHARINE G. SCHAUER**

The January 31 colloquium features Langley's Dr. Ralph J. Muraca who will discuss the evolution of the space station configuration with emphasis on designs developed from March to June 1993.

The presentation will concentrate on configurations developed by teams at three NASA centers: Langley, Marshall Space Flight Center and Johnson Space Center. This work reflects the schedule, cost constraints and requirements now levied on NASA. The current joint United States, European, Japanese, Canadian and Russian-configuration will also be discussed.

Muraca will also review the earliest ideas about uses for an orbiting space station and some proposed configurations for it.

Muraca joined NASA in 1962 following three years employment in the aerospace industry working for General Dynamics and Martin Marietta. A former deputy manager of the Center's space station activities, he is currently chief of the Systems Engineering Division.



**Dr. Ralph J. Muraca**

A resident of Poquoson, Muraca received his bachelor of science degree from Drexel Institute of Technology, his master's degree from the University of Virginia and his doctorate from Virginia Polytechnic Institute and State University.

The colloquium will be at the H.J.E. Reid Conference Center at 2 p.m. Monday, January 31.

*Goldin Keynotes Bateman Technology Forum*

## Bold Approach Is Key to Aero Leadership

**BY CRAIG MURDEN**

NASA's Administrator called for sharply renewed boldness in the Agency to stop erosion of U.S. leadership in aeronautics when he spoke to Peninsula business leaders, the media and Langley staff recently at the Continuous Electron Beam Accelerator Facility (CEBAF.)

Keynoting the NEWTECH 93 program sponsored by Virginia Congressman Herbert H. Bateman, Goldin said the country has lost its ability to take risks and has instead chosen to set easy goals where "success" is assured. Also, the concentration is on punishing people when they stumble, further discouraging risk-taking, he noted.

For instance, Goldin said the Agency could have backed away from the Hubble servicing as too hard, especially when the press was saying failure would doom the space station and threaten other initiatives. But, he said, NASA showed the boldness that was once the Agency's hallmark. (The Administrator had just flown in from the White House where he helped President Clinton and Vice President Gore congratulate the Endeavour's crew for their successful replacement of major Hubble components).

Moving his theme back to aeronautical research, Goldin talked about how the country had walked away from the supersonic transport because it was too hard while the Europeans went ahead with the Concorde. "Sure it had some things wrong with it," he said. "It is noisy, inefficient and ozone threatening. But, working through those challenges gave them the technology for the Airbus series of commercial airliners that now own 30 percent of the world market." Further noting the decline of U.S. presence in general aviation, he said that in 1980 we produced 18,000 airplanes against today's production of 654 machines.

Goldin said one of the basic problems is the excessive time it takes to get high-technology research into the marketplace; it becomes perishable if we wait too long. Compounding this condition is the age and sophistication of our wind tunnels. American companies are taking their new ideas to European test facilities and there is no way innovative technology can be protected in such an environment, he said.

*Photo by Fred Jones*

**NASA Administrator Daniel S. Goldin presents Virginia Congressman Herbert H. Bateman with the official patch of the shuttle Endeavour's Hubble servicing mission. The exchange followed Goldin's keynote remarks at the Bateman-sponsored NEWTECH 93 technology forum.**

The Administrator announced a four-point approach to restore American preeminence in aeronautical research and production. The cornerstone lies in a strong NASA partnership with industry. First, NASA laboratories must continue to tackle the problems industry is less equipped to deal with like noise, environmental effects, supersonic propulsion, composite materials, etc.

Second, NASA must intensify its research in subsonic technology where quieter, cleaner, safer airplanes will operate in more productive air traffic control and terminal area environments. Third, an improved NASA infrastructure must provide new wind tunnels complemented with vastly increased computational capabilities.

Finally, Goldin said NASA and industry must collaborate to build a hypersonic aircraft capable of Mach 25. This will be the culminating product of the partnership and will signal the return of boldness in the nation's ability to go forward in aeronautics.

Goldin brought Langley into the arena when he said that the Center is ideally postured to take a leadership role in this new enterprise. Langley's long history of achievement in aeronautics and its management approach which fosters innovation will doubtless be instrumental in the success of this new thrust.

### Inside NEWTECH 93

For the 11th year Virginia Congressman Herbert H. Bateman assembled a varied program to feature the latest technology from Federal and private sectors. But this year, those ingredients were a springboard for a larger focus: the aggressive Peninsula-wide effort to transfer that high technology into the hands of local private enterprise. The objective is not just to stem the tide of defense drawdowns but to buttress the Peninsula's long-term economic posture with the trappings of high-tech cross-fertilization.

This effort is an ideal fit for NASA Langley. Not only has tech transfer been a long-practiced initiative at the Center but Langley's director, Paul F. Holloway, has chartered a renewed focus by emphasizing Langley research applications in non-aerospace commercial arenas. His recently concluded Technology Opportunities Showcase attracted over 750 potential transfer customers to 190 Langley research exhibits.

Equally compatible with Langley priorities and Peninsula business interests is the added emphasis on advanced technical education needed to support the work forces of expanding technical businesses. Again, Langley's past efforts and Holloway's recently established senior-level Office of Education

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# News Briefs

## Around the Agency

**IO'S "GHOST" DETECTED ON JUPITER** – A faint spot of infrared emission that moves across Jupiter in concert with the orbital motion of its moon Io has been discovered by researchers at the Goddard Space Flight Center, Greenbelt, Md., and the University of Hawaii. "What we're looking for is a false image – or ghost – of Io that appears near the limb, or visible edge, of Jupiter when Io is in a favorable orbit position," said Goddard's Dr. John E. P. Connerney, lead author of a paper published in the journal *Science*. The image is caused by the electrical interaction between Io and Jupiter's magnetic field. This interaction generates about five million amperes of current and two million megawatts of power — roughly three times the total electrical generation capacity of the United States, Connerney said. The image was detected with NASA's three-meter infrared telescope atop the Mauna Loa volcano on the island of Hawaii.

**TOPEX/POSEIDON DATA CONFIRMS EL NINO PREDICTIONS** – Sea surface measurements taken by the U.S.-French TOPEX/Poseidon satellite have confirmed that conditions are ripe for development of an El Nino event in the eastern equatorial Pacific Ocean this winter. The El Nino phenomenon has been blamed for causing devastating weather conditions around the world including the severe floods in the U.S. Midwest, colder than normal winters in the eastern United States and wetter than normal conditions in California. The TOPEX/Poseidon mission is addressing long-term climate issues. By mapping the circulation of the world's oceans over several years, scientists can better understand how the ocean transports heat, influences the atmosphere and affects long-term climate, said Dr. Lee-Lueng Fu, TOPEX/Poseidon project scientist at the Jet Propulsion Laboratory, Pasadena, Calif.

## Virginia Consortium of Universities Provides New Vistas for Langley

The University of Virginia, Old Dominion University, the College of William and Mary and Virginia Polytechnic Institute and State University have formed the Virginia Consortium of Engineering and Science Universities (VCES). The consortium will offer on-site engineering and science courses at the Peninsula Graduate Center in Hampton, in addition to the satellite courses.

Doctoral students serve a residency at the center, rather than at their home institutions. Students from participating schools are allowed to take up to 50 percent of their course work from the other consortium members. However, a student must meet the degree requirements at the school of his or her major professor. A resident director, working closely with faculty from the four schools, helps each student plan a program of study.

Possible doctoral degrees include thermal sciences, structures, computational and applied mechanics, materials science, electrical engineering, engineering management and nondestructive evaluation and testing.

The consortium is an addition to the successful, decade-old Virginia Cooperative Graduate Engineering Program, a series of televised courses that allow students to obtain master's degrees in engineering. The courses, offered by the University of Virginia, George Mason University, Old Dominion University, Virginia Commonwealth University and Virginia Polytechnic Institute and State University, are beamed to sites around the Commonwealth and parts of the United States.

VCES has chosen David Chesnutt as its executive director for the Peninsula operation. Chestnutt was the head of the Applied Acoustics Branch. He has been at Langley since 1967 and has written many technical papers on noise reduction techniques for commercial and military aircraft. His new office will be at the Peninsula Graduate Center, 2713 Magruder Boulevard, Hampton.

For information about the consortium, Chestnutt may be reached by calling 865-1777.

## R&D 100 Award Nominations Sought

Langley employees who have developed a product, material, process, software program or system of scientific or technical origin in 1993 are urged to submit an entry for *Research and Development* magazine's annual R&D 100 Awards.

A panel of judges will select the 100 most technologically significant new developments of the past year from items submitted by organizations throughout the world.

Besides being prestigious to the winning organization and the developer, R&D 100 Awards generate considerable industrial interest, resulting in a greater opportunity to transfer technology.

Langley has won 25 of these coveted awards in the 31 years of the competition.

Individuals who are uncertain of the candidacy of the proposed development, or who need an entry form, should call the Technology Utilization and Applications Office (TU&AO) at ext. 42482. Completed entry forms should in the TU&AO by February 16 to allow time to be checked for completeness and forwarded to meet the deadline.

The TU&AO will provided the entry fee. Winners will receive awards at a September 22 banquet in Chicago.

## NEWTECH 93

*Continued from Page 1.*

will provide highly complementary services to these expanding educational needs.

In addition to Administrator Goldin's keynote remarks (see story), the program included General John Michael Loh, commander of the Air Force's Air Combat Command at Langley Air Force Base, and Dr. Robert G. Templin, president of Thomas Nelson Community College. Their remarks highlighted the growing impetus for moving military technology into the Peninsula's business community and the prospects of new business and jobs from that part of the overall project. Additionally, potential linkages between NASA Langley, CEBAF and the Air Force's Wright Laboratory were explored.

Also on the NEWTECH 93 agenda was Dr. M. Patrick McCormick of Langley's Atmospheric Sciences Division who discussed the scientific evolution of stratospheric ozone depletion and relationships to the greenhouse effect. He also described the Langley-developed, satellite-borne instruments which are currently measuring atmospheric chemistry and those scheduled for future deployment under NASA's Earth Observing System.

NEWTECH 93 was also sponsored by the Virginia Peninsula Chamber of Commerce and the Virginia Peninsula Economic Development Council.

## Thank You for the Retirement Party

From Larry Edwards: "I want to take this opportunity to thank all my co-workers and friends for the great retirement send-off you provided. You not only made work fun, but the parting pleasant as well."

## *Community Corner*

## Road Race for Volunteers Is On; Don't Need to be a Runner to Help

The annual POMOCO Group Hampton Coliseum Road Race will be held Sunday, February 13. All proceeds will benefit the United Way of the Virginia Peninsula.

In addition to runners, volunteers are needed in many areas *before* as well as *the day of* the race.

### Here's how you can help . . .

Volunteers are needed from 7 to 9 p.m. Tuesday, February 8, through, Thursday, February 10, at Coliseum Mall to help stuff bags for the competition's runners.

Help is also needed to staff package pick-up from 3:30 to 8 p.m. Friday, February 11, at Coliseum Mall and from 4 to 9 p.m. Saturday, February 12, at the Holiday Inn-Coliseum.

Finally, on the day of the race, Sunday, February 13, the following volunteer jobs are available:

- Set-Up (6 to 9:30 a.m.)
- Registration, Package Pick-Up (10 a.m. to 12:30 p.m.)
- Race Staff (11 a.m. to 4 p.m.); jobs include:
  - Course Marshals--direct traffic along course
  - Split Timers--call time to runners
  - Water Stops--hand water to runners
  - Refreshments--serve food and drink
- Clean-Up (3 to 5 p.m.)

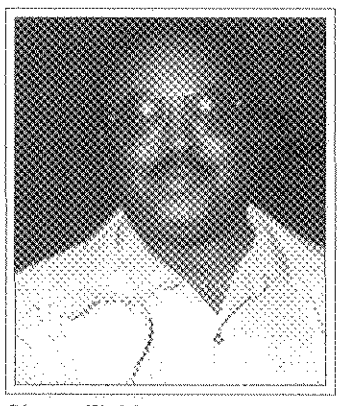
There's something for everyone. No experience needed!

If you can help, call Marny Skora at ext. 43315 for a volunteer form. Forms are due to the United Way by **January 28**, so please call today.

*If you know of a health/human services agency with a pressing need or a co-worker involved in an interesting volunteer activity, call Marny Skora, Community Services Officer, at ext. 43315.*

## In Memoriam

### Cicero Fields



Cicero Fields

Cicero Fields, 60, an engineering technician in the Tunnels Operation Branch, died unexpectedly December 3.

Fields began his Langley career in 1979 at the High-Temperature Materials Laboratory. During his 14 years of service to Langley, he supported eight wind tunnel and research laboratories. For the past seven years, Fields had been the main technician at the 20-Foot Vertical Spin Tunnel. He retired from the Air Force in 1979 after 26 years as a flight engineer and aircraft mechanic. He was a Vietnam War veteran.

"Cicero's dedication while preparing and testing the complex radio-control 'free spin' models and in maintaining the facility will be greatly missed by all who worked with him," said Wayne Martin, unit supervisor of the 30- x 60-Foot Complex. Fields was to have received his 40 years of government service pin on December 13.

### Dick J. Cole

Dick J. Cole, 85, died Dec. 26. He retired from Langley in 1971 after 26 years of service.


**News Researcher**

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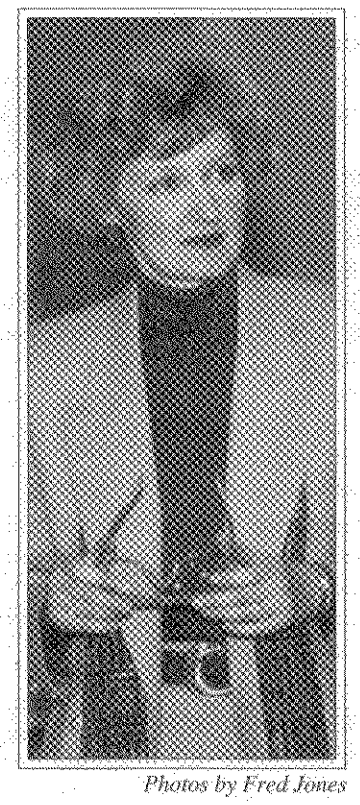
All materials are subject to editing.

# *Personal Profile:* Meet Dr. Kristin A. Hessenius



*Photos by Fred Jones*

Dr. Kristin A. Hessenius has transferred to Langley from NASA Headquarters to fill a key management position in the Center's new organization.

Hessenius had been at Headquarters since April 1990 where she was deputy director of the Aerodynamics Division, director of the Aeronautical Research Division and, most recently, deputy associate administrator for Aeronautics. She played a key role in advising the associate administrator in the development of strategic plans, advocacy and direction for NASA's aeronautics research programs at Langley, Lewis and Ames Research Centers and Ames-Dryden Flight Research Facility.

The ***Researcher News*** recently had a chance to talk with Hessenius about NASA, its future and her role at Langley.

**RN:** As Langley's newest staff member, would you share some of your ideas about NASA and the direction in which it is heading?

**KH:** I think that NASA is facing the most difficult challenge of its existence, bigger than the challenge of Apollo. And that challenge is re-inventing itself to demonstrate its relevance to the American public. We've lost credibility with certain groups. There have been performance problems in the Agency that need attention. We have our light hidden under a bushel basket to a certain extent. I think that the American people don't understand many of the benefits of investing in science and technology and we need to better educate the public.

**RN:** What do you think NASA can do and what is the time frame for change?

**KH:** Many inside the Agency do not realize the urgency with which we must act. We do not have 10 years to turn this around. There are already forums that are discussing the dissolution of NASA. It's an idea that comes up more and more frequently and we've got to take it very seriously. When I speak with people here, I try to impress upon them that I really want to retire from this Agency, and I am not at all convinced that I'll be able to, if things continue the way they are. So I have a great sense of urgency that we need to revolutionize the way we conduct our business and what we conduct as our business. We have to show the American people and our Congressional funders that what we do is relevant to today's problems.

**RN:** How are we going to accomplish all this?

**KH:** First, we must broaden our relevancy base. We must show that NASA contributes its knowledge and technology not only to support the aerospace industry but also that we support all of industry, non-aerospace as well. That is the Center's new focus. Of all our initiatives, the one that will be most critical to the survival of the Agency and of Langley will be technology transfer. It must become our banner.

We need to start thinking a bit nearer term in our research endeavors. We have been in this business of transferring research for 76 years here at Langley. We had ideas five or six or eight years ago that are bearing fruit today and we can advertise and help develop them for broader applications. It is not that we don't have a pipeline of ideas that we can harvest. But, what we tend to do is talk in the past: *I did this for you 10 years ago and now it has arrived.* Politicians, especially, want to know *what did you do yesterday?* Or, *what did you do during my term of office?* There is a lot more technology in the pipeline that NASA can capitalize on for other than its primary application. That, for example, was what TOPS was all about.

**RN:** How do you see your role in the new structure?

**KH:** I intend to support this vital function of technology transfer. To set the stage, I am concerned about NASA and its long-term survival. When I view the Agency, since I had that vantage point at Headquarters, I see all the other centers preoccupied with some other major crisis — Space Station redesign, loss of jobs or reassignments of jobs, performance problems with certain missions, centers facing difficult times and unrest in their work force, center management, etc.

Then there is Langley. Langley, I believe, is the only center in the Agency that is ready to move out and lead this reinventing process. This is very significant, and it was critical to my decision to come here. I wanted to be a part of the reinventing process at the leading edge, and I believe Langley is the only center that can move out aggressively. We have to lead the Agency, and I believe the commitment from the Director's office and from the various group leaders to this new structure is the first step in that process.

I will be directly involved with about 1,600 people. They constitute a large percentage of the Center working in engineering, technical services and administrative services areas. The people that I represent on senior staff are part and parcel members of the research teams that will help accomplish the goals of the programs of the Center.

**RN:** What do think we can expect in the future?

**KH:** The expertise and the infrastructure at Langley are being directly challenged budgetarily as NASA seeks to reinvent itself. There has been talk in Washington that the infrastructure of NASA is too large and that it costs too much. There is a challenge to downsize this infrastructure to create more money for programs and contracts, grants with universities, etc.; to do more with less. My challenge is to develop a strategy for the long-term health of the Langley institution. Langley and the other NACA centers were founded to develop facilities that were too expensive for an emerging industry to invest in themselves. The health of critical elements of our infrastructure and the institution is very important to our long-term survival.

The challenge that the Agency faces necessitates that we become extremely lean and mean. We need to find new ways of doing business so we can produce more for each dollar spent. I am very excited about the challenge. It is a difficult puzzle, but I don't feel disheartened by it. We must make sure that we retain the strength of that institutional foundation. We can't let the pillars be eroded; we have to find the non-weight-bearing members and pull them away. The budgetary pressures will be severe. We haven't seen anything yet. It has been difficult so far and, I know people have been asked for years to do more with less, but we have not yet seen the full magnitude of the fiscal pressures.

When I talk about this environment with managers, I refer to it as a time of fiscal depression. That depression may last the rest of my career, so we've got to stop thinking about how we are going to get through tomorrow or the next fiscal year. We have to start planning how we're going to weather the depression. We have to begin planning for the long-term such that the foundations of Langley will remain when we emerge from that depression. And, at the same time, demonstrate to the public that NASA cannot only reinvent itself but that it is relevant to solving today's problems.

**RN:** What have been your impressions of Langley?

**KH:** I have been overwhelmed by the breadth and depth of the capabilities I have found here at Langley.

I know of no other center that has the capabilities that exist within the shops here and the ability to manufacture virtually anything that can be designed. The technical expertise in all the disciplines and the quality of the administrative services are rarities at a NASA center and they are very impressive to me. Because of this breadth and depth, I am convinced that Langley can surmount the challenges it and the Agency face. Not many centers are as well-positioned from an expertise and capability standpoint as Langley is. I have also seen the commitment of people. They seem ready to move out, to change, and I'm very encouraged by that. We are going to have to move fast, and I sense that people here are ready.

**RN:** What in your background has prepared you for the task ahead?

**KH:** I've been in management for nearly 10 years, but what has prepared me the most for this assignment is my recent Washington experience where I saw more directly how NASA is being challenged. I was part of the Presidential Transition Team, and it made me realize how precarious NASA's position is. We really can't consider ourselves a sacred cow, because we're not. That time in Washington created a passion in me to be a part of the solution. To be a part of the solution, you must be at a center because that's where things happen.

I also spent 11 years at Ames and, toward the end of my time there, I worked on many problems on the institutional side including setting up the budget.

**RN:** Any final thoughts to leave with our readers?

**KH:** I would really like to stress the message of the urgency with which we in NASA need to act and to emphasize that we have the capability and the strength to meet the challenges ahead. We also need to increase our communication to the public—to regularly communicate the outstanding contributions of Langley.

## A Biographical Note:

*Dr. Hessenius began her NASA career at Ames Research Center, Mountain View, Calif., as a researcher and manager in the field of applied computational fluid dynamics. She earned a bachelor of science degree in mechanical engineering from the Virginia Polytechnic Institute and State University and both her master's and doctoral degrees in mechanical engineering from Stanford University.*

*She was one of 10 women honored by the National Aviation Club for outstanding contributions to the field of aviation. She also earned the government-wide William A. Jump Memorial Foundation Award for exemplary service in Public Administration.*

## Legislative News

The second session of the 103rd Congress begins January 25. Again in 1994, there will be many critical budgetary and programmatic decisions affecting NASA. The deficit, national competitiveness, health care and other major issues will continue to force the Administration and the Congress to re-examine NASA's programs and budget.

Because of the importance of the coming debates, Center Director Paul F. Holloway is encouraging Langley employees to follow activities in Congress and in Washington more closely. Reflecting the Director's emphasis, the Office of External Affairs has created a new position, Congressional Affairs Officer, to help the Center monitor administrative and legislative activities which affect NASA and Langley and to assist in understanding the legislative process.

Lee Rich, who formerly worked in the Headquarters' Congressional Affairs organization, now staffs the position. Rich has extensive Washington experience and is well acquainted with Langley's research efforts having previously worked here as a mathematician in the 16-Foot Wind Tunnel.

Rich has prepared the following lists of (1) primary Congressional committees and their chairmen/ranking members which oversee NASA's programs and budget and (2) members of the Virginia Delegation. If anyone has a question or wants more information, telephone Rich at ext. 46529.

### THE 103RD CONGRESS (1993-1994)

**Committees/Subcommittees That Authorize NASA Programs or Appropriate Funds for NASA Programs:**

**House of Representatives**

**Committee on Science, Space and Technology**

George E. Brown (D-CA), Chair
Robert S. Walker (R-PA), Ranking

***Subcommittee on Technology, Environment and Aviation***

Tim Valentine (D-NC), Chair
Tom Lewis (R-FL), Ranking

***Subcommittee on Space***

Ralph M. Hall (D-TX), Chair
F. J. Sensenbrenner Jr. (R-WI), Ranking

**Committee on Appropriations**

***Subcommittee on Veterans Administration, Housing and Urban Development and Independent Agencies***

Louis Stokes (D-OH), Chair
Jerry Lewis (R-CA), Ranking

**Senate**

**Committee on Commerce, Science and Transportation**

***Subcommittee on Science, Technology and Space***

John D. Rockefeller IV (D-WV), Chair
Conrad Burns (R-MT), Ranking

**Committee on Appropriations**

***Subcommittee on Veterans Administration, Housing and Urban Development and Independent Agencies***

Barbara A. Mikulski (D-MD), Chair
Phil Gramm (R-TX) Ranking

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John Warner (R) (-2023)
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| | |
|---|---|
| 1st | Herbert H. Bateman (R)(-4261) |
| 2nd | Owen Pickett (D)(-4215) |
| 3rd | Robert C. Scott (D)(-8351) |
| 4th | Norman Sisisky (D)(-6365) |
| 5th | L. F. Payne (D)(-4711) |
| 6th | Robert W. Goodlatte (R)(-5431) |
| 7th | Thomas J. Bliley (R)(-2815) |
| 8th | James P. Moran (D)(-4376) |
| 9th | Rick Boucher (D)(-3861) |
| 10th | Frank R. Wolf (R)(-5136) |
| 11th | Leslie L. Byrne (D)(-1492) |

***NOTE:** Committee Assignments: Sen. Robb, Science, Technology and Space Subcommittee; Rep. Scott, Science, Space and Technology Committee.

Committee Assignments Related to NASA: Rep. Sisisky, Small Business Technology Subcommittee; Rep. Payne, Ways and Means, Trade Subcommittee; Rep. Boucher, Chair of Science Subcommittee, Science, Space & Technology Committee; Rep. Byrne, Compensation and Employee Benefits Subcommittee, Post Office & Civil Service Committee.

# Virginia Air and Space Center News

BY KIM HINSON

## CNU Donates Aerospace Tapes

Christopher Newport University and its Lifelong Learning Society donated 16 tapes entitled, "Hampton Roads: The Cradle of Aerospace" to the center. These documentary tapes provide a wealth of information covering the history of aerospace development in Hampton Roads.

The tapes were produced during a recent Elderhostel course, "Hampton Roads: The Cradle of Aerospace," sponsored jointly with the national Elderhostel Institute Network. The course was recognized in 1993 by the Association of Continuing Higher Education as the "Outstanding New Program of the Year." The course consisted of lectures from 15 researchers, many of them "legends" in the field, as well as visits to the center, NASA Langley, Langley Air Force Base, Norfolk International Airport and the aircraft carrier USS Eisenhower CVN-69.

The tapes, each approximately one hour and 20 minutes in duration, are of significant historical and educational value. The tapes are available for viewing in the center's library. For more information, call (804) 727-0800 or 1-800-296-0800.

## Special Days for Seniors

Senior citizens 62 years of age and older are invited to Seniors Only at the center during January and February. Seniors can tour the center, see one IMAX® film and enjoy coffee in our Sea the Stars Cafe, all for only $5; center senior members for $4.

This special opportunity is good Monday through Wednesday during January and February after 2:30 p.m. Film times are 2:30, 3:30, and 4:30 p.m. Currently showing in the IMAX® Theater are *The Discoverers* at 2:30 and 4:30 p.m. and *The Dream Is Alive* at 3:30 p.m.

## Family Discovery Weekends

During January and February, the center will offer Family Discovery Weekends. This program provides families with an opportunity to participate in the wonders of "discovery." Family Discovery Weekends are included with basic admission to the center. As visitors tour the center, they may stop at different locations where they will find informal demonstrations on a variety of subjects. Saturday demonstrations will be from 10 a.m. to 3 p.m. and Sunday programs from noon to 4 p.m.

The following is a schedule of the programs:

– Jan. 8 and 9, *Light and Color:* Discover the properties of color and light; Jan. 15 and 16, *Magnets and Gravitation:* Learn why the Earth goes round and round; Jan. 22 and 23, *Cartography and Navigation:* Demonstrations show how to find one's way around the world; and Jan. 29 and 30, *Signs and Symbols:* Investigate the communication systems man and animals use to understand each other.

– February 5 and 6, *Weather:* Discover the principles of weather; February 12 and 13, *Rocks and Fossils:* Explore the Earth and other planets to learn about history and geography; February 19 and 20, *Sounds:* Listen to the world around us and find out how sound serves as a guide; and Feb. 26 and 27, *Motion:* Discover the world of motion.

The center is open 10 a.m. to 5 p.m. Monday through Saturday and noon to 5 p.m. on Sunday. Basic admission is $4 for adults and $2 for children.

## Meet an Astronaut

Byron Lichtenberg, who has flown two space shuttle missions as a payload specialist, will be at the center at 1 p.m. on Saturday, Jan. 22. He will discuss his journeys into space in 1983 and 1992.

Lichtenberg has represented more than 100 scientists with experiments from all over the world on his two missions. As the first non-NASA astronaut, Lichtenberg flew his first mission, SPACELAB 1, in 1983 aboard the shuttle Columbia. He spent 10 days in orbit conducting 72 different experiments in five scientific disciplines.

His second flight, ATLAS-1, was in 1992 aboard the shuttle Atlantis. Lichtenberg conducted 14 experiments during his nine days in space. He studied the upper atmosphere and the sun. During the mission, the crew created the first artificial aurora by firing a beam of electrons into the lower atmosphere to produce spots of light similar to, but much dimmer than, the "northern lights." Visitors can meet Lichtenberg with basic admission to the center.

# *Lights, Camera, Research . . .* Video Helps Tell the Research Story

It has progressed beyond merely documenting the flight of a test plane or capturing the launch of a missile. Video now plays an increasingly important role in the production, transfer and use of scientific and technical information in the field of aerospace.

Video products, such as report supplements and conference proceedings, are now used and accepted as scholarly communications for transferring the results of NASA's aerospace research and development. In response, a Video Section was formed in Langley's Visual Imaging Branch, Research and Applications Division. The Video Section is the single point of service for videography and video production to acquire, document, present and disseminate the Center's research results.

In operation since 1989 and located in Building 1201-T, the Video Section provides broadcast-quality video productions and presentation, uplink feed and live broadcasts, editing and post production services, tape duplication, film-to-tape conversion and narration, as well as archive storage and retrieval of video file imagery. In their short tenure, the Video Section has become a major asset to the research community and the staff has attracted national attention by winning several awards.

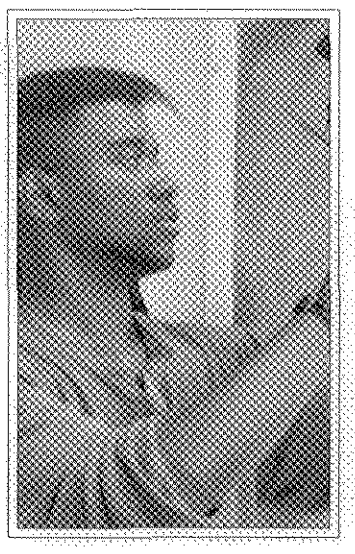
## Talk to the users . . .

Dr. John Lamar, senior scientist in the Flight Research Branch, uses video in his research at Langley. Lamar captured on video basic data on flow visualization of vortex systems. Following flight experiments conducted on the F-106 research aircraft, the video data were enhanced with animation. This video supplement created on Center has increased both the understanding of Dr. Lamar's research and the use of the findings.

John Rogers, researcher on the Lidar In-space Technology Experiment (LITE), also uses video in his work. Rogers reports that the work produced by the Video Section is outstanding, and he emphasizes the importance of video as a method of documenting research. "The ability of video to graphically display, in a short time span, what is happening has been extremely helpful," Rogers claims. And the research may be reviewed over and over as needed.

## About the staff . . .

"The quality of work produced is due in large part to the experience level of the employees working in the section," states Tom Sweeney, head of the Video Section. "NASA has hired a professional staff. Within the group, there is close to 100 years experience."



*Photos by J.J. Miller*

**Above left, Keith Patterson works on proper lighting before the cameras roll. At right, Kim Tatum adjusts a light umbrella prior to a shoot.**

Producer Mike O'Hara, who formerly worked at the New York Power Authority as video manager, explains, "I work with a good bunch of people. The most exciting part of the job is being able to work with the brightest minds in the country and being involved in programs that will affect us 10 years down the road."

Video Section employees do more than shoot raw footage. They have experience in creating concepts, script writing and final editing—in effect, they can make the whole job come together. The staff of seven includes two shooters/editors, one engineer for equipment maintenance and three producers.

The average turn-around time for a job developed by the Video Section is four to five months. Of course, projects that require less research and writing take less time. According to Sweeney, a "quick shoot and edit" can be done in as few as one or two days.

The Video Section has also offered to tape conference presentations for individuals whose travel funding has been reduced. Right now, taping is done on site in any available conference room. "We are hoping to expand both services and facilities," says Sweeney, "but our most pressing need is for a studio. Unfortunately," he continues, "we waste a lot of time setting up for the shoot and then tearing down. If we had a studio, we could more easily accommodate the Center's increasing video needs."

## Their accomplishments . . .

Producer Brian Igelman won a silver Telly for his production of the robotic assembly of space structures. A Telly award is the equivalent of an Emmy award for non-broadcast video productions.

Igelman's award-winning video supports the research of Marvin Rhodes of the Structures Directorate.

O'Hara received a bronze Telly award for his production *Dreams* designed to inspire middle school students to consider a career in math or science. Commissioned by Langley's Contractor Steering Council, this video is used as a teaching tool by Langley employees involved in the Middle School Education Initiative. More recently, *Dreams* received an award of merit from the National Association of Government Communicators in the educational development category.

Producer Terry Shepard won an award of merit from the Society for Technical Communication for the first video supplement to a NASA Langley technical report. Shepard helped depict the inertial oscillation of a new mathematical model for spinning up a single supercell storm, a study by Robert C. Costen, Space Directorate, and Larry V. Stock, Hampton University.

Shepard and Brian Harrell of Langley's Graphics Section were finalists in the 1992 New York Film Festival in the non-broadcast film and video category for their video animation and creative editing of an Analysis and Computation Division product. The competition drew over 7,000 entries from 51 nations.

"We expect this talented group of professionals will play a significant role in ensuring the effective transfer of NASA Langley technology to the U.S. aerospace industry," says Dr. Thomas E. Pinelli, head of the Visual Imaging Branch.

*Photos by J. Clements Mayes*

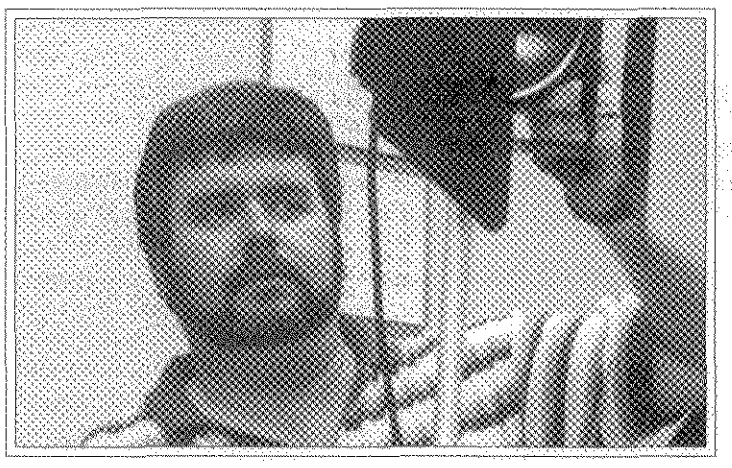
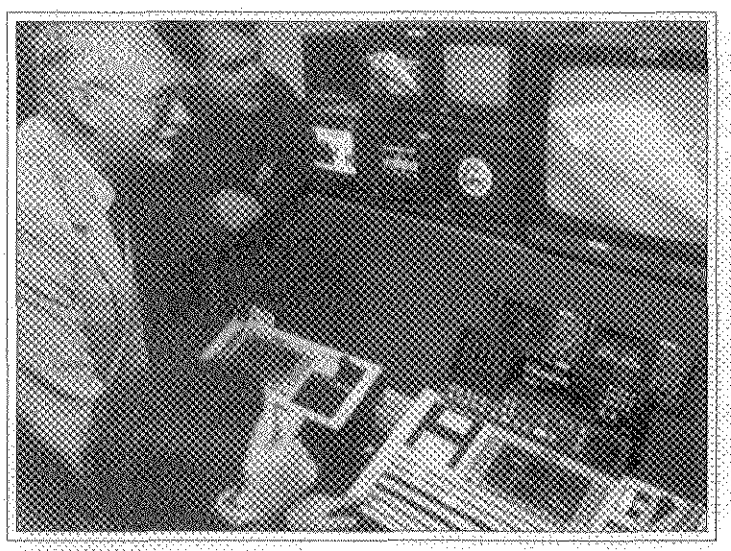


*Photo by J.J. Miller*

**Producer Mike O'Hara is one of three producers involved in overseeing the making and editing of videos in the section.**



**Dr. John Lamar, left, and Kurt Severance work with video editor Chuck Kramer, lower right.**

**Tatum, right, and Patterson, left, assist producer Brian Igelman in shooting a video for senior researcher Tom Yager, center, about tire friction studies. The video was shot for viewing at a conference in West Berlin.**

# The Federal Women's Program Committee 1993 Synopsis

BY PATSY CAMPBELL AND LOUTRICIA JOHNSON

Each year, the Federal Women's Program Committee (FWPC) shares a synopsis of its activities and accomplishments for the year. FWPC would like to thank the many offices whose resources and support make these programs and activities possible: The Employee Development Branch, for funding the speakers; the Office of External Affairs, for funding refreshments; the H.J.E. Reid Conference Center, for logistics; the Research Information and Applications Division, for photography, video, graphics and reproduction; the Microelectronics and Technical Support Section, for transportation; and the NASA Cafeteria, for luncheons.

## FWPC 1993 Activities

**January:** On the 7th, Jo Horvath from Thomas Nelson Community College conducted an orientation meeting to familiarize the secretaries on Center about the Certified Professional Secretary program (CPS) and how to prepare for and take the exams.

**February:** February 3, the Women's Advisory Council Video teleconference was held. Discussions included the mentoring program at Kennedy Space Center and the "Take Your Daughters to Work" program at Johnson Space Center. Also, on the 19th, John DiDio, president of Professional Personnel Services, Inc., presented "Multiculturalism at NASA Langley — Myth or Reality?" for Black History Month.

**March:** March 9, Julie Vaisvil, a certified professional secretary from the Hampton Roads Police Academy, presented a briefing on the Certified Professional Secretary (CPS) Program. She gave her insights on the value of the CPS program. The Female Achievers' Panel was held the 16th for Women's History Month. Career development was discussed. On March 30, the Second Annual Awards Program for Employee and Supervisor of the Year was held. Mary Lewis was the keynote speaker and her topic was "Career Development."

**April:** On April, FWPC held a Professional Secretaries Day Social, to recognize all Center secretaries.

**May:** On the 13th, Robbins, Parker and Associates presented "Gender Differences in Communication." The seminar provided information on how to decipher the asymmetries in cross-gender conversation to achieve a more productive workplace.

**June:** The FWPC held a retreat on June 16. Discussions about the issues identified by the committee and solutions were given and compiled.

**July:** Ms. Jeanne Evans, administrative assistant from the Office of Congressman Owen Pickett, D-VA, 2nd District, presented "Family Legislation" on July 12. She spoke about bills signed by the President or pending in Congress and explained the provisions on issues which concern almost everyone. Other topics were Federal pay, family and medical leave, health care, child support, child care, economic equity and education. The program was co-sponsored by the American Institute of Aeronautics and Astronautics (AIAA).

**August:** On the 26th, Billi Lee of Billi Lee and Company presented "Acquiring Savvy . . . Beyond Hard Work and Talent." The seminar was designed to highlight key aspects of every day pragmatic political awareness and system skills necessary for individuals to be more effective in working toward the success of the organization. It was also Women's Equality Day.

**October:** The FWPC participated in the American Management Association's Second Annual Satellite Conference for Working Women on October 20. The speaker addressed pertinent issues that affect working women such as gender communication, sexual harassment and negotiating techniques. October 28, FWPC hosted the Peninsula FWP Network's Third Annual training session. Workshops were presented on "Communication Skills" by Dr., Linda McAllister of Christopher Newport University; "Interviewing from Both Sides" by Jack Lundy of the Fort Eustis Job Assistance Center; and "Valuing Diversity" by Dr. Carolyn Hines of C & W Associates. Dr. Belinda H. Adams opened the program by welcoming the 300 participants.

**December:** On the 6th, Dr. France A. Cordova, NASA's new Chief Scientist, presented a lecture, "Role of the NASA Chief Scientist." The event was co-sponsored by the Hampton Roads Section of Women in Aerospace. (See story on page 7). December 7 and 8, Citizens Against Crime (CAC) conducted two seminars, "Living Safely in a Dangerous World." These were educational and entertaining presentations about crime prevention techniques in the home, the car and public places. Co-sponsored with the Security Services Branch, this was CAC's second visit to Langley.

# Office of Education Shows New Facilities At Official Open House

Dr. Samuel Massenberg, head of the Office of Education, and fellow staff members welcomed about 200 visitors to their official Open House, held December 15.

Refreshments and tours of the facilities, offices and classrooms were provided. Videos and large screen televisions told the tale of educational programs made available by NASA through the office displayed the numerous programs sponsored by Langley's education arm.

"It was a high point in Langley's history that we could celebrate the new Office of Education with our open house," Massenberg said. "Visitors from on Center, pre-college and higher education institutes and community officials were given tours and briefed by staff members. We are pleased that all of Langley's education programs are housed under one roof and, organizationally, under one manager. This makes for a highly efficient arrangement for the delivery of educational services to our customers."

*Photos by Dan Axelrad*

**Ed Prior shows a visitor one of the building's classrooms.**

**The Office of Education staff members are left to right, back row, Camille Jennings, Dr. Sandra Proctor, Pat Link, Debbie Young, Lloyd Evans, Joni Williams, Kathy Powell, Gwen Wheatle and Myra Green. In front are Ed Prior, Dr. Massenberg, Roger Hathaway, Bob Yang and Gerri Polhemus.**

# Langley "Earthbound" Production Airs Nationally

The first of six, one-hour episodes which examine Earth's complex balance of atmosphere, oceans, chemistry and temperature airs today at 2 p.m. EST. *Mission EarthBound* features a duo of curious extraterrestrial students who come to Earth in search of information about its delicate atmosphere which has nurtured life for 4.5 billion years.

Viewers will have the opportunity to call and FAX in questions during the live, interactive broadcasts. In addition, interested parties will be invited to post E-mail questions on an Internet mailbox from January through June.

**See the whole series:**

**Jan. 14** – Mission EarthBound
**Jan. 28** – The Earth's Atmosphere—A Cosmic Perspective
Feb. 25 – Atmospheric Ozone—What It Is & What Is Happening?
**Mar. 25** – Greenhouse Gases and Climate Change
**Apr. 29** – The Climate System and Climate Modeling
**May 27** – Challenges/Solutions to Global Atmospheric Change

# Solar Eagle II Cruises Australia

The Solar Eagle II, built by students at California State University, Los Angeles, and partially funded by Langley, competed in the 1993 Solar Challenge across Australia in late fall. The Solar Eagle II finished 13th in the 54 car field during the six-day, 3,035-km race down the Stuart Highway from Darwin to Adelaide.

The car averaged 37 mph for the race, exceeding the average speed in the 1990 race by more than nine miles per hour. It finished the race on the afternoon of the sixth day, two days less than in 1990.

Ray Landis, Dean of the School of Engineering and Technology, said, "I want to thank the sponsors for your support of the project. We would not have been able to do it without you. Over the past five years, the Solar Eagle project has brought tremendous recognition to our School of Engineering and Technology, to California State University and to you, our sponsors. Thank you for your commitment to the project and to our students. It has been the experience of a lifetime."

# *Voluntary Leave Transfer Program*

The Voluntary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing personal or family medical emergencies.

The following employees are approved leave recipients: David S. Aliff, Karen L. Bibb, Monica L. Cooper, Bette L. "Jeanie" Duncan, Brandy R. Edmondson, Janice B. Mongesku, Lori Nichols Pennington, Carissa T. Smith Robinson, Terry L. Shepard, John P. Stack, Marie C. Storms, Geraldine M. Tucker, Belle L. Wood and Darrell A. Wood.

Contact Lisa Allen at ext. 42610 for more information.

# Employees Respond to Morning Town Meetings

BY H. SCOTT WAGNER

Two town meetings have been held on Friday mornings using the open-door, open-topic format. The first meeting was December 3, which was attended by about 80 people, and the second was December 17, 1993, with about 180 people. These morning one-hour meetings were announced by Center Director Paul Holloway during each of the four November all-hands meetings. Holloway promised that at least one member of the Director's staff would talk with the attendees, but he couldn't guarantee which one because of current demands to attend meetings in Washington, D.C. The plan was to try the one-hour format twice in a pilot test, evaluate the meetings' usefulness, and then make a decision in January on their continuation.

## The Meeting Model

These meetings were modeled after similar meetings at Malcolm Baldrige National Quality Award winning organizations.

Hank Hayes, the CEO of Texas Instruments Electronics and Defense Division, visited Langley and related many of the quality things done in their organization. One was the open-door, open-topic meetings held with his work force before work hours. Hayes started this process after a benchmarking visit to the Cadillac Motor Division where he learned of their positive experience with regular meeting between the senior staff and the work force.

## Topics of Discussion

The topics raised by the Langley attendees at both meeting were diverse with questions coming from a number of people. Deputy Director H. Lee Beach fielded the questions at the first meeting and Holloway was the principle respondent at the second.

For example, in response to a question about the tight travel budget, Beach said that the present budget gives us only half of the travel money available last year. "We have few options," he said. "The Agency can go back to Congress and ask to move money from our research budget to that part of the budget that funds travel. But, when we do that, we lose research funds in this zero sum world we live in."

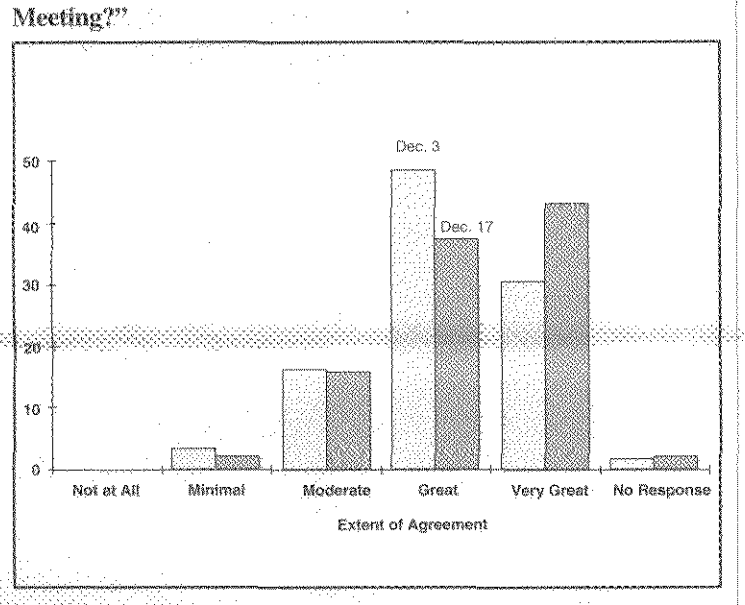
Holloway was asked about the future of the apprentice program as a feeder for future technicians. He responded that we now have a hard freeze on hiring that is keeping us from meeting our plans to hire anyone. Both Holloway and Beach indicated they plan to keep our present ratio of engineers to technicians because this has been a successful formula that has permitted Langley to be very efficient in carrying out its research programs.

Questions ranged from funding technology transfer to relations with the other aeronautical centers. Other topics of interest were space sciences; roles and missions; electronic transfer of information; technical reports and their quality; total quality culture growth, process improvements and re-engineering the organization; loss of informal networks and processes; the new accountability for workhour reporting; program support budgets; how we can raise the awareness of the general public about our programs and their contributions to the nation; approval of outgoing correspondence; facilities studies on the national level; continuing cooperative education programs; and dual ladder promotion path perceptions.

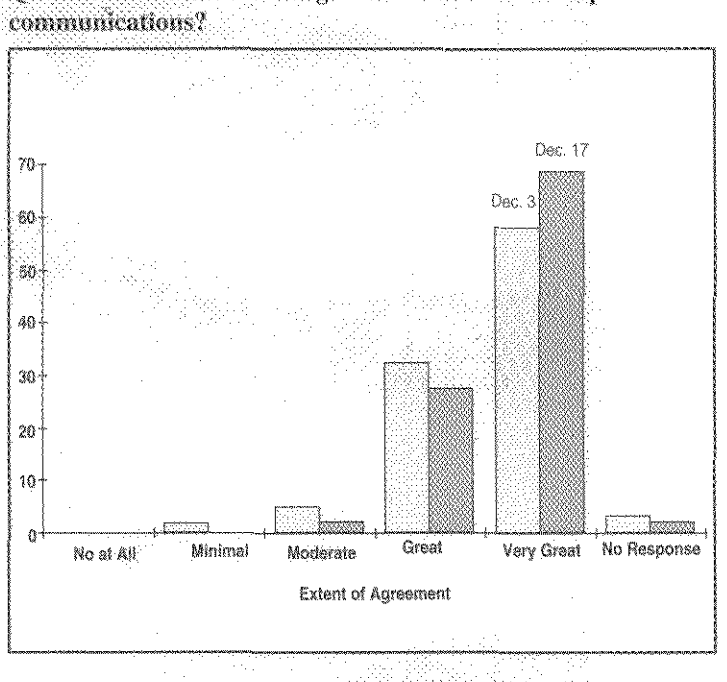
## Attendee Feedback

Attendees were asked to rate the meetings in seven areas. The composite responses for the two meetings are shown in the following bar charts for the third and sixth questions:

**Question 3: Was your time was well spent at this "Town Meeting?"**




**Question 6: "Town Meetings" will contribute to improved communications?**




## Future Plans

The senior staff reviewed the results from the two pilot December town meetings and decided to continue the bi-weekly format for another two months.

The cafeteria will be used for next three meetings as renovations are being made to the lighting at the Reid Conference Center.

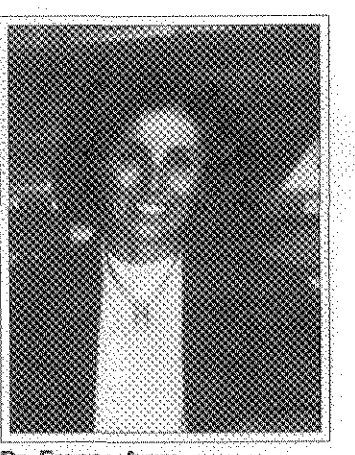
### Upcoming Meetings

| DATE | TIME--LOCATION |
|---|---|
| Jan. 14 | 7:30 a.m.--Cafeteria |
| Jan. 28 | 7:30 a.m.--Cafeteria |
| Feb. 11 | 7:30 a.m.--Cafeteria |
| Feb. 25 | 7:30 a.m.--Reid Ctr. |

# Agency Chief Scientist To Include Aeronautical Sciences in Program

BY GAUDY M. BEZOS-O'CONNOR

We often ask ourselves "what difference can I make at Langley and in the Agency?" In reality, each of us has many chances to make a difference if we just recognize and seize the opportunity.


Dr. France Anne Cordova

For example, during the question-and-answer period following the address of our new Agency Chief Scientist early in December, Christine Belcastro and Celeste Belcastro, research engineers in the Flight Systems Directorate, asked Dr. France Anne Cordova why aeronautical sciences were not included in her plans to educate the general public about NASA's contributions.

Since NASA has traditionally defined science to include only the research funded by the space sciences offices, neither she nor her predecessors had included aeronautical sciences in their span of responsibilities. Cordova suggested in response to the question that educating the public about our aeronautical programs is equally as important as educating them about the (traditional) basic science programs. In fact, she urged the NASA aeronautical research centers and their employees to take leadership in promoting aeronautical science. "I hope that Center employees will send me their ideas about educational outreach," said Cordova, "including details of benefits to the nation that aeronautics has provided."

Cordova, who began her job as the Agency Chief Scientist in October, toured Langley for the first time Monday, December 6. That afternoon she spoke about her vision for NASA and her role in the Agency to an audience of about 150 people. She visited at the invitation of the Federal Women's Program Committee and the Hampton Roads Section of Women in Aerospace (HRS of WIA). This was her first speaking engagement since joining NASA.

The agenda, prepared by HRS of WIA members, included an overview of the Atmospheric Sciences Division's flight projects and research activities. The afternoon included a car tour of Langley's experimental facilities and a walking tour of the Center's research aircraft.

## Town Meeting . . . the story continues

Center Director Paul F. Holloway was asked the same question posed to Cordova by the Belcastros at the December 17 town meeting. Holloway reported that, when Dr. Cordova returned to Washington and was in a senior staff meeting the day after visiting the Center, she shared her experiences at Langley. She said she was overwhelmed at the number, breadth and quality of the women that she had met at Langley.

Cordova added that, as head of the Astronomy and Astrophysics Department at Pennsylvania State University, she had traveled all over the country and there was not an organization that she had visited that could match Langley in terms of the number of quality women on its staff. "I was especially struck by the genuine enthusiasm of these women for research and the pride they evidenced in their laboratories and experimental facilities," said Cordova.

## A Plan of Action . . .

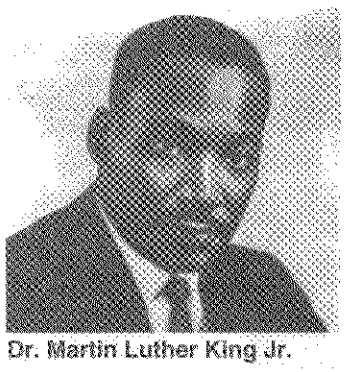
Holloway told the town meeting participants that later in the meeting Cordova met with the three aeronautics Center directors and told them that she wanted them to think about how aeronautical sciences could be included in the role of her office.

The Langley experience had made a tremendous impact on the importance of aeronautical sciences. Cordova told them that she would work with them in early 1994 to incorporate aeronautical sciences into the NASA science structure.

Holloway also mentioned that Cordova, in talking about the inclusion of aeronautics in her public relations agenda, indicated that she plans to find an aeronautics counterpart to Carl Sagan for space sciences and Jacques Cousteau for oceanography. She has enlisted the three aeronautics Center directors to help with the search. As Chief Scientist, Cordova intends to change the NASA science paradigm. Holloway expressed confidence that she will be successful.

# Happenings

## King Urges Problem-Solving



Dr. Martin Luther King Jr.

Anticipating the 10th anniversary of Martin Luther King Day, the widow of the civil rights legend is asking Americans to "celebrate the dream and observe the holiday by offering their hearts and their hands" to make a difference.

Coretta Scott King urged Americans to "move beyond just another day to shop and play," during a news briefing recently at the United Nations in New York. Instead, she said, "We want the King holiday to become a time for every American to make a contribution to alleviate homelessness . . . fight drugs and crime and violence in whatever form."

The holiday, which is celebrated in 100 nations, will be observed January 17.

**SYMPHONY TICKETS** are on sale at the Langley Exchange Shop for the Symphony Pops and Gary Guthman, trumpet, in a tribute to Harry James, on Jan. 25 at Ogden Hall in Hampton. For more information, call the Exchange Shop at ext. 41585, TicketMaster or the Virginia Symphony Ticket Store at 380-0040, Peninsula.

**VOLUNTEERS NEEDED** to work in the Virginia Symphony office. Anyone interested in volunteering should call the symphony office at 623-8590.

**INCOME TAX PREPARATION:** Member of National Association of Enrolled Agents. Please leave message for appointment, Nancy Taylor, E.A. 723-5227.

**NEW YEAR'S RESOLUTION #1:** Free aerobics are offered at the Langley Fitness Center from 6:15 to 7:15 a.m. and 11 to 11:45 a.m. on Mondays, Wednesdays and Fridays. Bench, interval and low-impact classes offered. Accessories are provided. For information, call ext. 46387.

**INCOME TAX PREPARATION** Member of National Association of Tax Practitioners. Electronic Filing and direct deposit offered. Small business bookkeeping. We travel to you. By appointment, 874-3121.

**AEROBICS, WEIGHT TRAINING AND NUTRITION ADVICE:** Join the LAA Aerobics Club for a fat loss program designed by certified personal trainers. Progress measured with Body Composition Analysis and Cardio Fitness Assessment. Low-impact, bench, body-sculpting and circuit training classes are held on Tuesdays and Thursdays from 5-6 p.m. and Saturday at 9:30 a.m. in the LAA gymnasium. Call ext. 42295 for information.

**"SUNSHINE TOO"** will be presented by the National Technical Institute for the Deaf, a College of Rochester Institute of Technology Feb. 9 at the H.J.E. Reid Conference Center. Children's Show is at 9 a.m., Adult Show at 1 p.m. and Family Show at 7 p.m. Time may be charged to A1619.

**CARS FOR SALE:** Ford 1986 Ranger, long bed, AC, power steering, power brakes, $2,000. Ford 1986 Escort, four-door hatchback, AC, power steering and power brakes, am/fm radio, excellent gas mileage, $1,600. Both are one owner vehicles. Call 930-0251 for more information.

**AIAA-HAMPTON ROADS CHAPTER** will present Lt. Col. Mark L. Jefferson, commanding officer of the 27th Fighter Squadron, 1st Fighter Wing, Langley Air Force Base Jan. 26 at the H.J.E. Reid Conference Center. Social begins at 6 p.m. with dinner at 7 p.m. Members and guests are $14, non-members, $15 and student members, $10. Reservations are required by noon Jan. 21. Call Dan Vicroy at ext. 42022.

**INTERNATIONAL FAMILY FUNFEST** and Oriental Bazaar, Saturday, Jan. 29, Columbian Center, 12742 Nettles Dr., Newport News. Folk dancing, ethnic food and international bazaar from 11- 5 to benefit KOVAR – Knights of Virginia Assisting the Retarded. Admission is $2. For information, call 596-5113.

**WORKSHOP PLANNED:** Women in Aerospace (WIA) and the Office of Public Services will again offer a workshop to prepare National Engineers Week volunteers to go into area classrooms. Sessions are planned for Feb. 1 and 2 in The H.J.E. Reid Conference Center. Additional details will appear in the next issue.

## Door Prize Drawing

Three individuals holding winning numbers in the Center Director's holiday reception door prize drawing have claimed their prizes: Nancy Shevlin, Patsy Campbell and retiree Jesse Kent.

Unclaimed prizes go to the holders of the remaining winning numbers:

6158082
6158127
6158366

If you are holding one of these tickets, contact Margaret Hunt at 864-6125.

*Photo by Carol Petrachenko*

**BE "TEACHER FOR A DAY." Deputy Director Dr. H. Lee Beach takes to the chalkboard while discussing a lesson on careers with fifth grade students at Kraft Elementary School in Hampton during last year's National Engineers Week school visitation program. More than 265 Langley scientists, engineers, technicians and support personnel "taught" over 800 classes in the area's schools. Volunteer teachers are still needed. Call ext. 48241 to help. Be a part of the solution--transfer technology to ensure tomorrow's work force.**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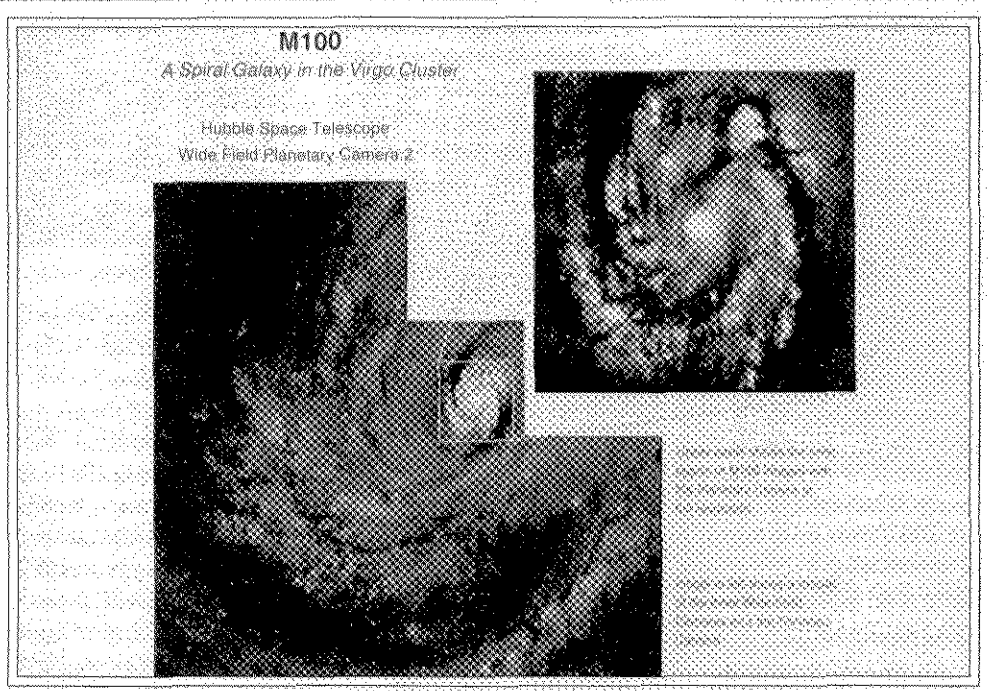
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 2 ❖ January 28, 1994




NASA Photo

## *Hubble: A Picture Is Worth a Thousand Words or More*

**The Spiral Galaxy M100 as Seen with the Hubble's Improved Vision: This image of the grand design spiral galaxy M100 was obtained with the second generation Wide Field and Planetary Camera (WFPC-2), newly installed in the Hubble Space Telescope. Though the galaxy lies several tens of millions of light-years away, modified optics incorporated in the WFPC-2 allow Hubble to view M100 with a level of clarity and sensitivity only previously possible for nearby galaxies. The image, taken on December 31, is a mosaic of WFPC-2's three wide-field cameras and one planetary camera. The three wide-field detectors in the camera reveal individual stars and filamentary dust lanes in the outer arms of the majestic spiral galaxy. The instrument's planetary camera image (smaller square, upper right) resolves complex structure in the core of the galaxy, which is the site of vigorous star formation.**

# Administrator Announces Management Changes

NASA Administrator Daniel S. Goldin has announced a number of management appointments and organization structural changes at NASA Headquarters, Washington, D.C., and at several NASA field centers.

"These appointments and realignments will enhance and strengthen the Agency's programs and institutions," Goldin said. "They will affect NASA science, technology, research facilities and major programs, as well as the Agency's advisory committee structure. All will benefit.

"The appointments and the emphasis they bring to their respective areas of expertise are in keeping with the President's goal to make government less expensive and more efficient and to reinvigorate NASA."

### *New Center Directors*

### Ames Research Center

Daniel S. Goldin

Dr. Ken K. Munechika has been appointed director of the Ames Research Center, Mountain View, Calif. He has been serving as the executive director of the Office of Space Industry of the State of Hawaii.

"The Ames Research Center will continue to play a major role in aeronautics becoming, along with the Langley Research Center, a Center of Excellence for Aeronautics," Goldin said. "These centers will provide an essential function supporting the U.S. aeronautics industry in maintaining a competitive edge and an advanced and far-reaching research capability."

### Dryden Flight Research Facility

Effective March 1, the Dryden Flight Research Facility will be established as a separate entity, and will no longer be part of the Ames Research Center. Kenneth J. Szalai, who currently heads Dryden as a deputy director of Ames, has been appointed as the new director of Dryden, reporting to Dr. Wesley L. Harris, associate administrator for Aeronautics. Goldin said that Szalai "will develop a timely transition plan to reflect the establishment of Dryden as a separate entity with responsibility for all functions related to its management.

"Operating as a separate facility, Dryden will be able to support the Agency's aeronautics and space programs in a streamlined manner, by working directly to serve each of the research and flight centers," Goldin said. He said that Dryden will work with the centers and aerospace community customers to formulate and implement flight research and test programs and streamline program execution. Project reporting lines will directly link the centers and the NASA Headquarters offices Dryden supports.

"This change reflects the commitment on the part of NASA to reduce layers of management and empower operating organizations to carry out their mission with maximum benefit to the country. It fully supports the fundamental principles to reinvent government," Goldin said.

### Johnson Space Center

Dr. Carolyn Huntoon has been appointed director of the Johnson Space Center, Houston, Texas. She has served as the director of Space and Life Sciences at the Johnson Space Center since 1987. Previously she was the associate director of the center, assisting the director and deputy director in its management. She is a pioneer in human life science research, having created and supervised projects in the Apollo, Skylab, Apollo-Soyuz and space shuttle programs.

### Marshall Space Flight Center

G. Porter Bridwell has been appointed director of the Marshall Space Flight Center, Huntsville, Ala. The current director, Thomas J. (Jack) Lee, will become the agency's special assistant for Access to Space.

*Continued on Page 5*

# Unique Accord to Expedite Clean-Up

Langley, the U.S. Environmental Protection Agency (EPA) and the Commonwealth of Virginia have formalized an unusual agreement which will speed-up the investigation and clean-up process at the Center, a proposed Federal "Superfund" site. A *Daily Press* report said provisions of the pact may be unprecedented in EPA experience.

"We have worked closely with the EPA and the Virginia Department of Environmental Quality to complete this agreement even though we haven't been formally listed as a 'Superfund' site," John Lee, head of Langley's Environmental Engineering Branch, explains. Normally, an agreement is not signed until after formal listing. Lee said that signing the agreement early is significant in that it clearly demonstrates the willingness of the agencies to cooperate in accelerating the clean-up process. The agreement, signed in mid-December, establishes Langley's role and responsibilities for the site clean-up and formalizes the oversight role of EPA and the State. "Superfund" refers to locations included on the EPA's National Priorities List.

Langley intends to work closely with the community during clean-up. "One of the first formal documents we plan to release," Lee says, "will be the Community Relations Plan. It defines how Langley intends to communicate with citizens to ensure their involvement in the decision-making process. We are working with the community, the media and our own employees to be sure everyone is informed. And, we are looking at ways to receive their input." Langley will be investigating a number of techniques to keep lines of communication open throughout the effort. To date, the Center has conducted media tours, held employee and community forums, and published environmental fact sheets.

The areas currently being studied include Tabbs Creek, Stratton Substation, Warehouse Area E, Chemical Waste Pit and Construction Debris Landfill. A sixth site, the Stormwater System, has been studied and clean-up plans finalized under a separate agreement signed by the EPA and NASA in 1990. Contaminants found at the Langley locations include chemicals such as PCBs (polychlorinated biphenyls), PCTs (polychlorinated terphenyls), metals and solvents. The areas being investigated on Center are not readily accessible to the general public.

According to Lee, "We have been investigating our sites for several years on our own initiative, based on what the EPA would require us to do as a "Superfund" site. As we move toward formal inclusion on the "Superfund" list, we will continue our efforts to accelerate clean-up of our past problems. At the same time, the Center is committed to maintaining environmental compliance and providing leadership in other areas such as pollution prevention."

# News Briefs

## Around the Agency

### WHO'S FLYING IN '94?

**ASTRONAUTS SELECTED FOR ATLANTIS' STS-66 MISSION** – Air Force Lieutenant Colonel Donald R. McMonagle has been selected to command Space Shuttle Mission STS-66 aboard Atlantis in the Fall of 1994. The mission, called ATLAS-03, will continue the series of Spacelab flights to study the energy of the sun and how it affects the Earth's climate and environment.

The remaining crew members for the third Atmospheric Laboratory for Applications and Science mission include USAF Major Curtis L. Brown Jr., pilot; mission specialists Scott E. Parazynski, M.D., Joseph R. Tanner and Jean-Francois Clervoy, European Space Agency astronaut. Ellen Ochoa, Ph.D., earlier was named payload commander for the flight.

In addition to the ATLAS-03 investigations, the mission will include deployment and retrieval of the Cryogenic Infrared Spectrometer Telescope for Atmosphere, or CRISTA. Mounted on the Shuttle Pallet Satellite, the payload is designed to explore the variability of the atmosphere and provide measurements that will complement those obtained by the Upper Atmosphere Research Satellite launched aboard Discovery in 1991. CRISTA-SPAS is a joint U.S./German experiment.

**CREW SELECTED FOR STS-67 ASTRONOMY MISSION** – Veteran astronaut Stephen S. Oswald will command the STS-67 flight, an astronomy mission aboard Space Shuttle Columbia in late 1994. The mission objectives are to study the far ultraviolet spectra of faint astronomical objects and to study the polarization of ultraviolet light coming from hot stars and galaxies.

Joining Oswald on the mission are USAF Major William G. Gregory, who will serve as the pilot; Navy Lieutenant Commander Wendy B. Lawrence, mission specialist; and payload specialists Ronald A. Parise and Samuel T. Durrance. They will join payload commander Tamara E. Jernigan, named to the crew in August 1993, and mission specialist John M. Grunsfeld, named in October 1993.

The Astro-2 mission is the second dedicated to the conduct of astronomical observations in the ultraviolet spectral regions. The experiments will observe a variety of targets ranging from objects inside the solar system to individual stars, nebulae, supernova remnants, galaxies and active extragalactic objects. The first Astro mission was flown in December 1990 aboard Columbia.

## *Professional Development Program Seeks Nominations for 1994*

Nominations are being sought for the NASA Professional Development Program (PDP). This program provides a 12-month work assignment at NASA Headquarters or another NASA installation.

While on assignment, employees participate in experimental learning related to new tasks and functions from an Agency-wide perspective. The work assignments are augmented with briefings and formal training. Those selected will begin their assignments in August 1994.

The PDP has two levels within the Headquarters-sponsored program. Level I is for employees at GS-15 and Senior Executive Service (SES) levels. Level II is for those at GS-13 and 14, and GS-12 in special circumstances. Individuals may nominate themselves through their directorate offices if they are in the specified grades and believe that they have demonstrated the potential to take on broader responsibilities in future positions. The Langley Executive Resources Panel will select nominees in February.

This year, a PDP III level program is being offered to provide on-Center developmental opportunities. Persons selected to participate in this program will be identified by the Langley Executive Resources Panel and, like those persons participating in PDP I and II, will begin their one-year assignment in August 1994. Additionally, under the provisions for PDP III, employees may, in cooperation with their respective organizations, identify short-term developmental assignments which may be approved at the division level.

If you are interested in PDP Level I, II, or III programs, contact Janet M. McKenzie of the Employee Development Branch, ext. 42598, for a nomination form and/or information related to the available positions. Interested persons are encouraged to inform their respective directorate offices as soon as possible so that appropriate consideration may be given each application. The nomination deadline for directorate offices is February 4, 1994.

## Tall Tales Contest Won by Lin

Dr. John C. Lin, Experimental Flow Physics Branch, was the "Tall Tale" contest winner at the NASA Langley Toastmasters Club competition held recently. Representing the Center club, Lin won the Area-Peninsula Division Tall Tale Contest for the second straight year at the H.J.E. Reid Conference Center with his humorous story about "Mongolian Airlines." Participants must write their own original stories. As the defending state-level winner, he will continue to compete against the best Toastmasters at the state level in Charlottesville later this winter.

The Toastmasters Club holds its meetings every other Wednesday, from 11:30 a.m. to 1 p.m. at the H.J.E. Reid Conference Center. All are welcome to attend. The next two meetings are on February 9 and February 23. For more information, call Lin at ext. 45556.

## Evolution of Space Station Is January 31 Colloquium Topic

The January 31 colloquium features Dr. Ralph J. Muraca, chief of the Systems Engineering Division, who will discuss the evolution of the space station configuration emphasizing designs developed in 1993.

His talk will concentrate on configurations developed by teams at three NASA centers: Langley, Marshall Space Flight Center and Johnson Space Center. The current joint United States-International configuration will also be discussed as will the earliest ideas about uses for an orbiting space station and some proposed configurations.

The colloquium will be at the H.J.E. Reid Conference Center at 2 p.m.

## *Outer Banks Alumni Chapter Begins*

The first meeting of the Outer Banks Alumni Chapter of the NASA Alumni Association was held in November, according to organizer Charlie Nixon of Manteo, N. C.

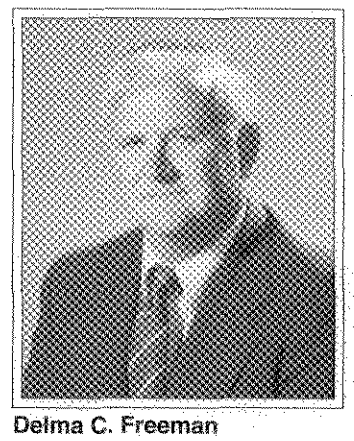
Attending the meeting were Bill and Barbara Taylor, Jo and Dick Fessler, Dick Mapp, Bob Clark and Charlie Nixon. Those also involved who were not able to attend are Frances and Gertrude Rogallo, Garland and Shelly McCoy and Anita Karns.

Most members of the group hail from Kitty Hawk, Kill Devil Hills, Southern Shores and Manteo, but membership is open to any interested NASA Alumni. Contact Nixon at Box 970, Manteo, N.C. 27954, (919) 473-1656.

## Three Named AIAA Fellows

Three Langley employees will be honored this year by being elevated to Fellow by the American Institute of Aeronautics and Astronautics (AIAA). They are Delma C. Freeman Jr. of the Space Systems Division, Jerry N. Hefner of the Fluid Mechanics Division and Dr. Suresh M. Joshi of the Guidance and Control Division.

Jerry N. Hefner



Delma C. Freeman

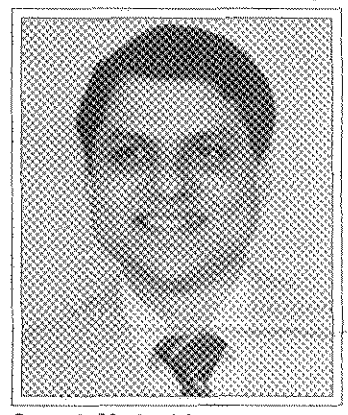
Freeman is the assistant chief of the Space Systems Division. During his 28 years at Langley, he has worked in the areas of aerodynamics, stability and control and space transportation systems analysis.

Freeman has worked in support of the development of the space shuttle and in analyzing advanced space transportation concepts for future NASA programs. He has served on the AIAA Atmospheric Flight Mechanics Technical Committee and serves on both the AIAA and International Aeronautical Federation (IAF) Space Transportation Technical Committees.

Hefner has been the assistant chief of the Fluid Mechanics Division since 1989, assisting the chief in planning, directing and coordinating all aspects of research, operations and administration of the division. He was head of the Civil Aircraft Branch prior to that where he supervised multidisciplinary research to identify and quantify the impact of emerging technologies leading to advances in civil aircraft, create new markets and provide potential economic benefits. He served as Langley's advocate for the High-Speed Research Program.

Hefner is chairman of the AIAA Aircraft Design Technical Committee and its program coordinator for the High-Speed Civil Transport Program.

Joshi, a senior research scientists with the Guidance and Control Division, is internationally recognized for his research on robust control and stability theory and applications to aerospace systems. Before starting his NASA career in 1983, he was a National Research Council research associate and research professor with Old Dominion University.



Suresh M. Joshi

Joshi is a Fellow of the Institute of Electronical and Electronics Engineers (IEEE) and has been on IEEE-Control Systems Society's Board of Governors since 1989. He was chosen as an AIAA Fellow for "contributions to the theory and methodology of control systems synthesis and integrated design of flexible spacecraft."

Selection of AIAA Fellows is limited to those who have not only distinguished themselves in the field of aerospace and who show strong potential for leadership in the future.

## In Memoriam

### James A. Watson

James A. Watson, 91, died Wednesday, January 5. Watson retired in 1972 as a tunnel mechanic after 30 years at Langley.


Researcher News

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, 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 the Tuesday following the date of this issue.

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All materials are subject to editing.

# Langley Plays Major Role in Development of Composite Airplane Structural Components

Boeing recently announced it will fabricate and assemble the new 777 airliner vertical tailfin and left and right horizontal stabilizers from composite materials which had much of their origin here.

Composite materials have been attractive to aircraft manufacturers and to airlines since the early 1970s because they offer the potential to reduce aircraft weight, reduce fuel consumption, eliminate corrosion and, possibly, significantly extend the life of the aircraft.

## Langley's Basic Research

Basic composite structure research had begun at Langley in the 1960s and, in 1972, the Air Force-NASA Long-Range Planning Study for Composites (RECAST) was formed. In 1972, industry and Langley began an alliance that lasts to this day and has produced much of the technology that led to Boeing's opening of a new manufacturing center. Composite spoilers for the Boeing 737 were developed and entered flight service in 1973. Composite ailerons for the Lockheed L-1011 were also placed in flight service that year and, subsequently, composite McDonnell Douglas DC-10 upper aft rudders were placed in flight service. The major intent was to determine the performance of composite structures in the actual operating environment.

## Successful Testing

Some of the components were removed from the aircraft after one year, five years, 10 years and 15 years. Each part was tested for any major degradation of its structure. Many of the parts have been left on the transports. In 1991, the group of composite components had accumulated about 5.5 million flight hours. Some of the individual components logged over 50,000 flight hours.

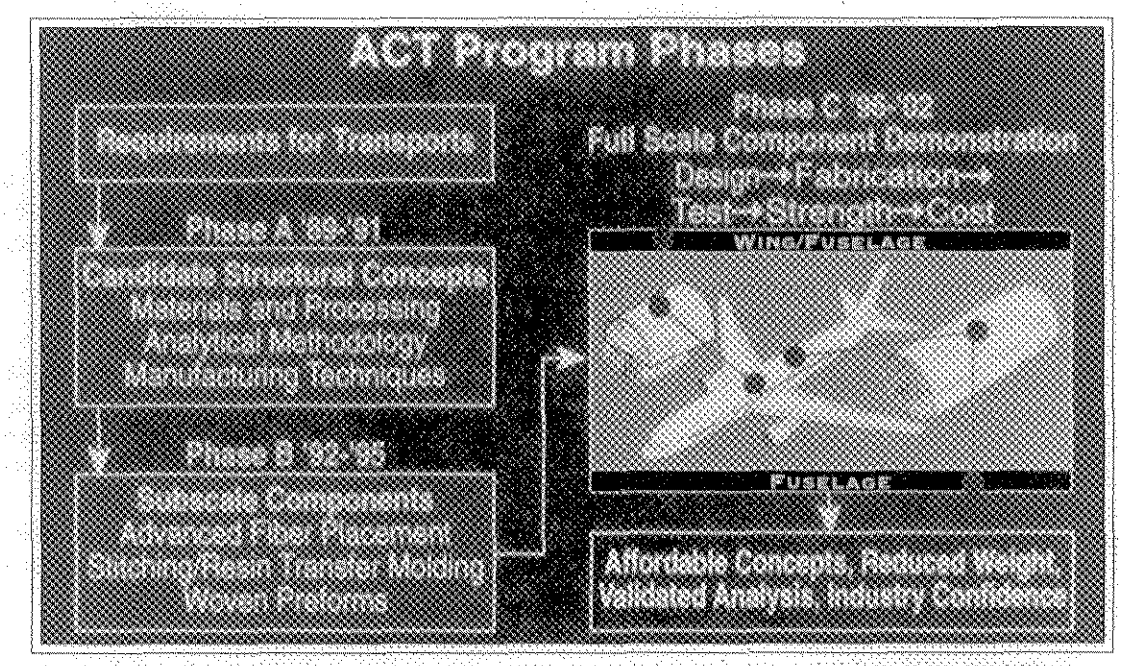
## ACEE Program

The next phase of the alliance was the Aircraft Energy Efficiency (ACEE) Program, which lasted from 1976 to 1985, and had as its main focus three obstacles to overcome: Experience with composites resided with research groups rather than with designers and manufacturers of aircraft; uncertainties in the development and production costs of composites made it difficult for them to compete with established metal technology; and long duration performance and maintenance requirements of composites were unknown. Therefore, users had been reluctant to commit to the use of the new materials in their aircraft.

## Development and Fabrication

As part of the ACEE Program, Langley contracted with Boeing, McDonnell Douglas and Lockheed to fabricate and test various composite structures for transport aircraft. The program set out to prove that the parts' performance could be predicted, that composite structures could meet FAA certification and that the cost to the manufacturer could be determined. Composite structural components developed and put into flight included: Boeing 737 horizontal stabilizers, Boeing 727 elevators and McDonnell-Douglas DC-10 vertical stabilizers.

During the ACEE Program and during the last half of the 1980s, Langley researchers were developing technology to permit application of composite structures to wing and fuselage components. Major advancements were made in understanding compression after impact (CAI) strength, degradation due to moisture absorption, failure prediction and more cost effective manufacturing approaches.




**The Advanced Composite Technology Program, (outlined above) lead by Dr. John Davis, is currently operating in Phase B, the fabricating and testing of fuselage and wing panels from composite materials. The ultimate goal is the production of full-scale fuselage barrel components and wing/fuselage intersection components from composites.**

## The ACT Program

In 1989, NASA initiated the Advanced Composite Technology (ACT) Program which is lead by Langley's Dr. John G. Davis Jr. of the Structures Technology Program Office. According to Davis, the ACT Program has three phases. "During Phase A, from 1989-1992 ," he said, "the program mainly focused on identifying structural concepts and manufacturing approaches that have the potential for building components that will cost and weigh less than similar aluminum components." Boeing and McDonnell Douglas are major contractors in the ACT Program. Boeing's aim is to fabricate a composite fuselage for a large transport; Douglas' task is to develop a wing structure for a large transport.

In Phase B, which will run from 1992 through 1995, cost effective fabrication approaches are being scaled up and fuselage and wing panels have been built. Tests to date indicate these panels have the capability to support all design load conditions.

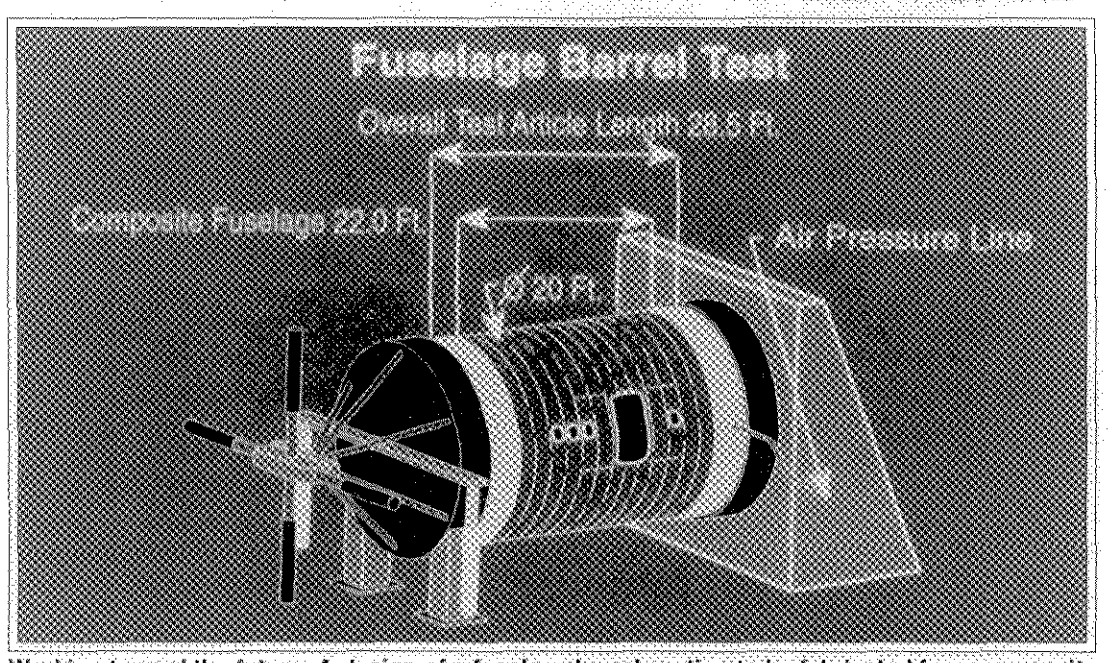
A new composite manufacturing center will act as a proving ground for streamlining aircraft production to hold the line on costs of composite structures. If costs can be controlled, orders for additional aircraft parts could follow for either new or existing Boeing aircraft. *

## What's Next?

Phase C is slated to run from 1996-2002 and will include development of full-scale fuselage barrel and wing/fuselage intersection components that will be built and tested. According to Davis, Boeing's representatives have said that due to the NASA programs, the firm was given the impetus to go forward in the introduction of composite structures in the Boeing 757, 767 and now, the 777.

"We see the manufacturing of the 777 tailfin as a major stepping stone for Boeing and other companies," Davis said. "Next, the composite wing can be manufactured and then, further on down the road, the composite fuselage. We are well on our way to achieving the goals of the Advanced Composite Technology Program."

**Aviation Week & Space Technology,* November 22, 1993




**Working toward the future: A design of a fuselage barrel section to be fabricated from composite materials will then be tested in Phase C of the Advanced Composite Technology Program.**

The Coleman Commuter CONNECTION

# Coleman Closings Cause Concern

Plans to widen the Coleman Bridge are causing concern on both sides of the York River.

Two two-week closures in late 1995 will impact both Langley employees who live on the Gloucester side of the river and Williamsburg residents who will face increased traffic on I-64 as motorists are detoured through West Point.

Langley's Community Services Program will sponsor a briefing on the Coleman Bridge project at 10 a.m. Tuesday, February 15, in the H.J.E. Reid Conference Center. Bill Cannell, Suffolk District Office of the Virginia Department of Transportation, Carol Russell, Tidewater Transportation District Commuter Coordinator, and Barbara Zimmerman, Middle Peninsula Rideshare Coordinator, will be the featured speakers. A question-and-answer period will follow the brief presentation.

The proposed bridge closures are required to install the new, widened bridge center sections. The February 15 briefing will detail services available to those affected and give advanced notice of expected delays so that employees can plan ahead.

Civil servants should charge their time to J.O. A 3092.

## *Virginia Air and Space Center News*

Virginia Air and Space Center
Hampton Roads History Center

### Looking for a Few Good Volunteers

Docents are important to the success and daily operation of the center. Docents are being recruited for the next training class beginning January 31.

The training offers potential docents a great way to expand and share their knowledge with the public. Weekday docents will attend a three-week training program on Monday, Tuesday and Wednesday, from January 31 through February 16, from 9 a.m. to 3 p.m. Training for weekend docents will be held February 5, 12, 19 and 26 from 9 a.m. to 3 p.m. All training will be at the center.

What does it mean to be a docent for the Virginia Air and Space Center? The term docent is derived from the Latin word "docents" which means "to teach." In medieval times the term docent was applied to an unpaid teacher or lecturer. Center docents act as tour guides promoting a greater understanding and appreciation of the Center's artifacts by teaching, interpreting and guiding visitors. It is not necessary to be an expert in history, aviation and space to be a docent — the training course teaches everything necessary. The time spent interacting with visitors and learning about interpreting history and technology is a rewarding experience. Weekday docents must agree to work 100 hours per year; weekend docents donate 50 hours per year.

Center docents will conduct focused tours and special children's programs for the general public, school groups and unscheduled tours for daily visitors. Docents may also be trained to work in NASA's Teacher Resource Center and to help the center's educators deliver special programs.

There are many benefits associated with being a center volunteer. They include a 10-percent discount in the center's gift store, an opportunity to earn a bronze membership, free parking and invitations to special events and volunteer functions.

For more information, contact the Public Programs Department at 727-0900, ext. 735.

### Get IMAXed in February

See Four Different Films . . . For Four Weeks Only

The center is offering an opportunity for visitors to preview large screen IMAX® films during February and will ask viewers to rate the films and use the results in determining which films to feature in the future.

The center will show four spectacular films: *Beavers*, *Antarctica*, *Speed* and *Flight of the Aquanaut*. A different film will be shown every Thursday through Sunday at 3:30 p.m. on the following dates:

– February 3, 4, 5 and 6 *Antarctica*
– February 10, 11, 12 and 13 *Beavers*
– February 17, 18, 19 and 20 *Flight of the Aquanaut*
– February 24, 25, 26 and 27 *Speed*

Each film will run for one week only. The fee is $4 for the general public and $3.75 per film for members. This is a great opportunity to see four films that have never been shown before at the center.

The center will continue to show *The Dream Is Alive* and *The Discoverers* in the IMAX® Theater at their regular times. However, at 3:30 p.m. on Thursday through Sunday during February, the preview films will be shown.

For more information, call 727-0800 or 1-800-296-0800.

### Discovery Tours

Visitors can enjoy a Discovery Tour at the center during January and February at 2 p.m. daily. Docents will guide visitors on a tour to discover the center's aviation, space and history exhibits.

The center is open 10 a.m to 5 p.m., Monday through Saturday, and noon to 5 p.m. on Sunday. Basic admission is $4 for adults, $3.50 for senior citizens and $2 for children. The Discovery Tour is included with basic admission to the center.

## *Health Corner*

### Blood Borne Pathogen Information

In 1992, the Occupational Safety and Health Administration passed the Blood Borne Pathogen standard. This new regulation is designed to prevent workers from becoming ill due to occupational exposure to blood or body fluids.

The major illnesses addressed are Hepatitis B and AIDS, both of which can be fatal. Barrier protection with gloves, masks and gowns seem to be the best methods of protection. Special clean-up procedures of contaminated areas and equipment are essential. When handling blood or contaminated equipment, universal precautions are in order; this means that the originator of this material is considered to be positive for a blood borne illness.

If you want to learn more about blood borne illness and the OSHA regulations, plan to attend the presentation given by Dr. F. Wayne Heggan on February 15 at 2 p.m. in the H.J.E. Reid Conference Center.

## First 1994 Birth in Hampton Roads

Gerry Pardue of the Facilities Project Branch, is the proud grandmother of Justin Fenn, born 10 seconds after midnight on January 1. His mother, Crystal Fenn, formerly of Langley's Materials Division, is Gerry's daughter. Derek Fenn and brother Zachary, age 5, are thrilled with the new arrival, even though Justin surprised the whole family with his one-week-early arrival.

## Tidewater Classical Guitar Program

The Tidewater Classical Guitar Society will present David Leisner on Friday, February 11, at Chrysler Museum Theater, 245 West Olney Road, Norfolk, and on Saturday, February 12, at the Williamsburg Regional Library Arts Center, 515 Scotland Street, Williamsburg. Both concerts will be at 8 p.m. Best known in recent years as a composer and teacher, Leisner's return to the concert stage has been met with highest praise. A "meet the artist" reception will follow the concert.

Individual tickets are $7-$10. They will be available at the door the evening of the concert or may be purchased at the Theater Connection, Festival Marketplace, 264-J McLaws Circle, Williamsburg. For additional information or ticket reservations, call 255-2304, Southside, or 566-3304, Peninsula.

## Jamestown -Yorktown Foundation Observes Two Landmark Events

The 375th anniversaries of the first representative legislative assembly in English America, which convened in the church at Jamestown in 1619, and the arrival in August 1619 of the first Africans in Virginia were defining moments in American history. To honor these landmarks, the Jamestown-Yorktown Foundation is presenting a special lecture series, entitled "1619: Its Colonial Legacy."

The series will explore the evolution of representative government in America and the experience of African Americans in Colonial America. All lectures are free and open to the public and begin at 7:30 p.m. at alternating locations: the Yorktown Victory Center and Williamsburg Regional Library.

On February 11 at the library, Dr. Anthony Parent of Wake Forest University will present "Struggles for Liberty in Virginia."

"From Colony to Commonwealth: The Virginia Legislature Before and After the Revolution," will be presented on March 18 by Dr. Thaddeus Tate of the College of William and Mary.

For more information, call the Foundation at 253-4939.

## "Sunshine Too" Coming in February

Sunshine Too, a professional touring theatre group sponsored by the National Technical Institute for the Deaf, a college of Rochester Institute of Technology, will perform February 9 at the H.J.E. Reid Conference Center. There will be three performances: a children's show at 10 a.m., a 1 p.m. adult show and a family show at 7 p.m.

Founded in 1980, the theater company is comprised of three deaf and three hearing performers who offer quality theatrical programs that both entertain and educate. Performance themes range from deaf awareness and deaf pride to social issues and environmental concerns. The company also serves as a positive role model for deaf and hearing interaction as well as being fun.

Each year the group develops new programs that can be played for audiences of all ages. These programs consist of performances and workshops presented in sign language and spoken English simultaneously. They are designed to provide an enjoyable and positive introduction to deafness; dispel fears and misconceptions about deafness; improve communication skills through the use of body language and facial expression; and reinforce a sense of pride in one's deafness.

Sunshine Too has toured extensively, performing at colleges, public schools, schools for the deaf, civic groups and conventions. They have provided more than 7,500 performances and workshops to around 800,000 people. The troupe has performed in 47 states, Canada, England, Denmark and Israel and has been featured in numerous publications and television shows. Sunshine Too was recently honored with an award from the Environmental Protection Agency for their shows "Louie the Litterbug" and "We Make Our World."

Time may be charged to Job Order A1619.

**Top, David S. Prince, middle, left to right, Kay Oldfather, Kimberly Stafani, Jon Wolfe Nelson and Melissa Westlake, and bottom, Matthew W. Daigle, make up "Sunshine Too," an acting troupe that will give three performances at Langley February 9.**

## Administrator's Announcement . . .

*Continued from Page 1*

Bridwell served most recently as deputy manager of the Space Station Redesign Team and as a leader of the U.S.-Russian Space Station feasibility study this past summer. He has had a distinguished career with NASA since 1962. He managed the performance of Marshall industry contractors in the planning, design, engineering, integration, development, production testing, delivery and operations of Space Shuttle elements furnished to the center, ensuring that cost, schedule and performance goals were met. "Under Mr. Bridwell's direction," Goldin said, "Marshall's major role will be as the Center of Excellence for propulsion and providing access to space for the nation. The restoration of an active and vital launch capability is essential to the nation's future activities in space."

### Lewis Research Center

Donald J. Campbell has been appointed director of the Lewis Research Center, Cleveland, Ohio. Campbell served as director of Science and Technology in the office of the assistant secretary of the Air Force for Acquisition, Washington, D.C., since April 1992. He was responsible for monitoring the Air Force science and technology program and other selected research, development, technology and engineering programs.

"Under Mr. Campbell's direction, the Lewis Research Center will fulfill a vital need as the nation's Center of Excellence for advanced air breathing propulsion systems in support of America's aeronautics industry," Goldin said.

### Key Appointments at NASA Headquarters

**Associate Deputy Administrator (Technical):** Michael I. Mott has been appointed Associate Deputy Administrator (Technical). He will report to the Administrator and provide independent technical analyses in the conceptual and formative stages of programs. He will also support on-going reviews of major programmatic and institutional issues.

**Special Assistant for Access to Space:** Thomas J. (Jack) Lee has been appointed Special Assistant for Access to Space. Making the appointment, Goldin said that Lee "will be responsible for leading NASA efforts to help define a technology program for the future that will help the United States retain its leadership in space. This technology is critical to ensuring the retention of the nation's continuing access to space."

**Associate Administrator for Mission to Planet Earth:** Dr. Charles F. Kennel, from the University of California at Los Angeles, has been appointed the Associate Administrator for Mission to Planet Earth. Kennel has a long and distinguished career in space science and was most recently an associate director of UCLA's Institute for Plasma Physics and Fusion Research.

**Chief Scientist for Mission to Planet Earth:** Dr. Mark Abbott has been named Chief Scientist of the Office of Mission to Planet Earth. Abbott has served as a professor of the College of Oceanic and Atmospheric Sciences at Oregon State University with an active role in the Earth Observing System.

**Director, Wind Tunnel Program Office:** Lawrence J. Ross, formerly director of the Lewis Research Center, has been appointed Director of the Wind Tunnel Program Office, reporting to the Office of the Administrator. Goldin said NASA's test facilities "are critical to the country's aeronautics research program and the retention of America's leadership in aeronautics. The aeronautics industry accounts for a million high-quality jobs throughout the United States." Ross, he said, "will be responsible for laying out a bold and innovative facility program to support the research needed for the next two decades.

### Space Station Program Announcements

Noting that the Space Station Program has been expanded to include Phase I Shuttle-Mir missions, Phase II United States-Russian activities and the Phase III International Space Station, the Administrator announced several key appointments in the program.

**Deputy Associate Administrator for Space Station:** Wilbur C. Trafton has been appointed Deputy Associate Administrator for Space Station. Before joining NASA, Trafton was president of Micro Research Industries, a computer systems integration and software development company in Virginia.

**Space Station Program Manager:** Goldin stated that the increase in the responsibilities of the Deputy Associate Administrator for Space Station has required a corresponding increase in the duties of the Program Office at the Johnson Space Center. As a result, Randy Brinkley has been assigned as the Space Station Program Manager, with responsibilities for management of all United States-Russian activities. He will work with Russia and other international partners "to ensure implementation of the International Space Program," Goldin said. Brinkley was mission director for the recent Hubble Space Telescope Servicing Mission, STS-61.

**Manager of Technical Activities:** Capt. William Shepherd, USN, will continue in his current capacity as the manager for all technical activities related to the International Space Station, reporting to Brinkley. "This management structure will enable Captain Shepherd to focus his expertise on the continued design, development and assembly of the Space Station," Goldin said.

**Deputy Program Manager for Business:** Daniel C. Tam has been assigned as the Deputy Program Manager for Business in the Space Station Program Office. Serving in this capacity he will be responsible for all the business management operations for the Space Station Program.

### New Leadership for NASA Advisory Council

The NASA Advisory Council and its related committees provide advice and counsel to the Administrator relating to NASA's programs and policies. Dr. Bradford W. Parkinson has been appointed head of the NASA Advisory Council. He was the original program director of the Defense Department's Global Positioning Satellite System and has most recently served as a member of the advisory committee on the Redesign of the Space Station and the Hubble Space Telescope Review Committee.

Anne L. Accola has been appointed staff director of the council. She has extensive NASA experience, serving in a number of key technical and management positions since joining NASA in 1967.

"I am extremely pleased with the quality of these appointments," Goldin said. "Their willingness to serve clearly shows that outstanding scientists, engineers and managers, as in the early days of our Nation's space program, are willing to join NASA to help ensure America's leadership in space and aeronautics, and to help NASA return to the future."

## *Mission Earthbound* Series Airs on Live Television

Students are in for an intergalactic field trip this semester on live network television thanks to the hard work and creativity of some Langley employees. "Mission Earthbound" has hit the Spring '94 television line-up.

With environmental issues on the world's collective conscience, this timely series features a duo of extraterrestrial students, actually two Hampton students, who come to Earth in search of information about its atmospheric blanket.

### An Overview

Participating viewers will examine the Earth's complex balance of atmosphere, oceans, chemistry and temperature. Issues relating to how the human quest for advanced technology has altered the global environment will be debated along with their economic, social and political implications.

Each show, introduced by Camille Jennings of Langley's Office of Education, features Dr. Joel S. Levine, Atmospheric Sciences Division, offering insights into global change issues and problem-based learning teacher William Orton assembling atmospheric information into an educator's context. Orton is a teacher at Rawls Byrd Elementary School in Williamsburg. "Mission Earthbound" viewers will have the opportunity to call and FAX in questions during the live broadcasts and post E-mail questions on an Internet mailbox from January through June.

### The Series' Origin

In May 1993, the Mission to Planet Earth (MTPE) Program Office and the Office of Education at NASA Headquarters issued an announcement of opportunities to develop educational materials for the MTPE program.

In response, Langley submitted a proposal written by Levine and Shelley Canright of the Office of Education. They proposed a series of television programs dealing with global atmospheric change. Levine was responsible for the scientific content of the series and Canright for the educational aspects. The proposal also included a special resource guide for teachers to be written for the series. Langley's proposal was selected for funding. The series involves six one-hour television programs. The first, "Mission Earthbound," aired January 14.

According to Dr. Samuel Massenberg, Langley's Director for Education, "The series will help participants see the world from a different perspective and to better understand the role each person plays in affecting the future of Earth."

### Airtime Schedule

Series dates and topics for the 2-3 p.m. Eastern Standard Time live broadcasts are:

January 28, "The Earth's Atmosphere — A Cosmic Perspective"

February 25, "Atmospheric Ozone — What Is It & What Is Happening to It?"

March 25, "Greenhouse Gases and Climate Change"

April 29, "The Climate System and Climate Modeling"

May 27, "Challenges and Solutions to Global Atmospheric Change"

Local broadcasters include Fairfax Network, Fairfax, Va.; WHCS, Hampton; WHRO, Norfolk; and VSEN (Virginia secondary schools). Also, NASA Select will reach viewers across the country via satellite and cable.

For information, please contact: Camille Jennings, Mail Stop 400, ext. 48770. The *Mission Earthbound Teacher's Guide* is NASA Pub. EP-308.

**Camille Jennings, left, of the Office of Education helps introduce each show presented by Dr. Joel S. Levine of the Atmospheric Sciences Division and William Orton, a teacher in Williamsburg.**

# Happenings

**SPACE COMMERCE EXPO '94:** On April 5 and 6, in Colorado Springs, Colo., the Expo will highlight technology transfer and business opportunities. Space Commerce is sponsored by NASA, Business Week magazine, KPMG Peat Marwick and the U.S. Space Foundation.

**THE 10TH NATIONAL SPACE SYMPOSIUM** will be held April 6-8 in Colorado Springs, Colo. The symposium stimulates dialogue among space professionals, civil, military and commercial, to explore policy alternatives and focus national space policy. The theme for this year's symposium is Windows of Opportunity. For more information on these events, call the U.S. Space Foundation at (719) 576-8000.

**HOUSE FOR SALE:** Denbigh/Stoney Brook, brick with large porch, 3 BR, 1-1/2 baths, fenced yard, new carpet and paint, attached garage. Asking $74,900. Call 249-2246.

**LOST:** Silver Cross pen at the hangar during TOPS last October. If found, please call ext. 46121.

**RETIREMENT SOCIAL:** A retirement social will be held for Blanche H. Fout on February 15 from 5:30 to 8 p.m. in the H.J.E. Reid Conference Center. There will be a cash bar and heavy hors d'oeuvres will be served. The cost is $10 per person including gift. Gift only contributions of $2 will also be appreciated. Please send cash or check to Sandra Glenn, Mail Stop 126, by February 1. For more information, call Glenn at ext. 42413.

**GULF-FRONT CONDO FOR RENT:** Sanibel Island, FL, one BR, full kitchen, screened lanai, pool, tennis, on-site management, $1,125/week, Feb.–Apr.; $600/week, May – Dec. Call 565-1849.

**BRIDGE/CHESS CLUB:** Foreign female scientist wants to form a friendly club for bridge and chess aficionados. If you work at NASA and live in the area, call evenings, 827-5052, Rm. 405. Ask for Dr. Shiva Thacker.

**LOST:** Gray men's gloves near Building 1148. Call Fichter, ext. 43120.

**WIA MEETING:** Charles Blankenship, Director for the Technology Applications Group, will be the luncheon speaker for the Hampton Roads Section of Women In Aerospace business meeting on Tuesday, February 10, from 12:30 to 1:30 p.m. in the Executive Dining Room. His presentation will include an overview of the organization and goals of the new Group as well as plans for accomplishing those goals. For more information, call 864-2505.

**NATIONAL SPACE SOCIETY:** The Langley Chapter of the National Space Society will have a dinner meeting at 5:30 p.m., Monday, January 31, at Anna's Italian Restaurant, 2845 North Armistead Ave., Hampton. Cathy Watson, an aerospace engineer at Langley, will discuss the Mission to Planet Earth Program to study the Earth's atmosphere and model global climate change. For information about the meeting or the society, call 864-4518.

**LOST:** Krohn-Hite Wideband Power Amplifier ECN G073623, last seen at Building 1221A. Call Dr. Ping Tcheng at ext. 44717.

**NEEDED:** Patches, decals, insignias of NASA ATOPS 737. They are being collected to prepare camera-ready artwork and graphics to support the 737 history book to be published by the NASA history office. Call ext. 46121.

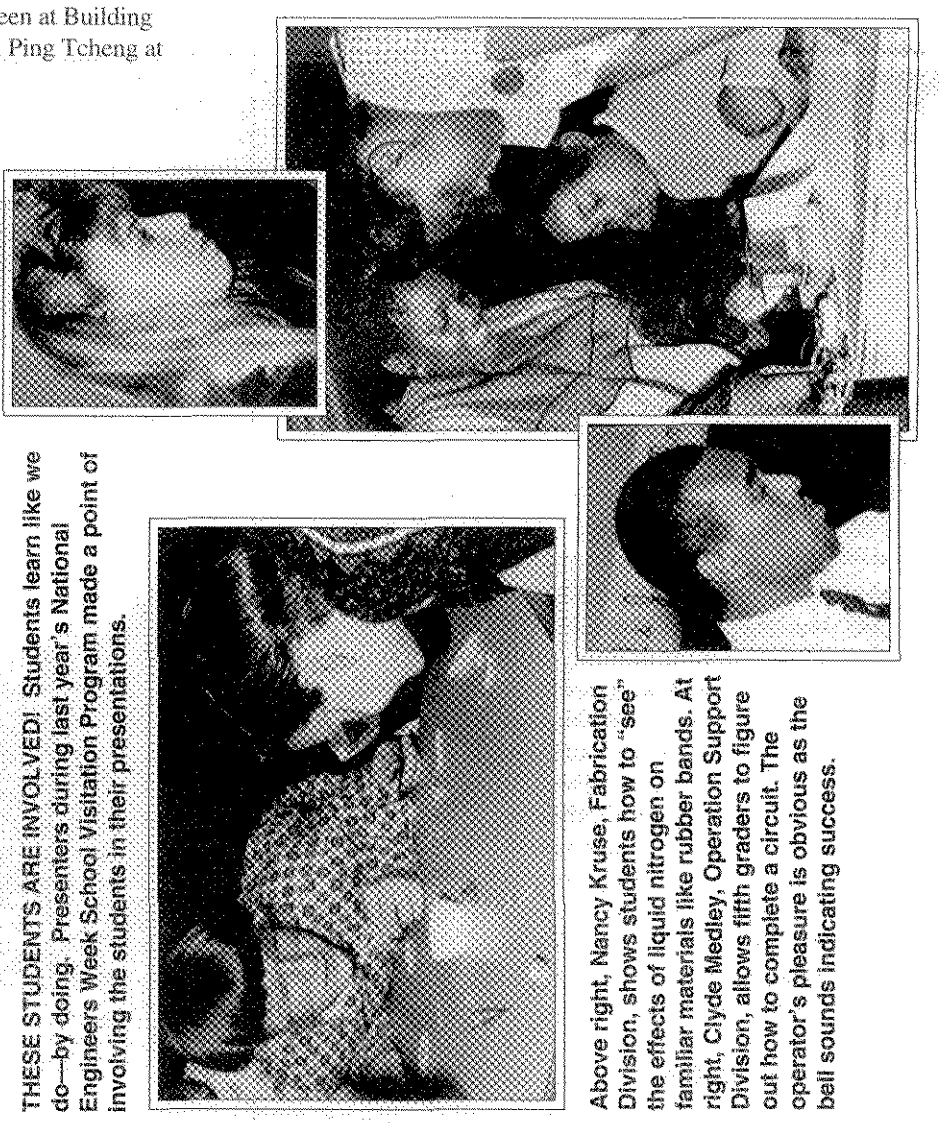
**LCDC OPEN HOUSE:** The annual Langley Child Development Center Open House will be held Thursdays, February 10, and February 17, from 9:15-10:30 a.m. Children eligible for kindergarten in 1994-95 and their parents are invited to observe a class in session. To make reservations, call 864-4402.

**HOUSE FOR RENT:** Beechmont, Georgian Colonial, 4-5 BR, 2-1/2 baths, living, dining and family rooms, close to schools, pool membership available. Rent is $850/month. Call 868-6427.

**INCOME TAX PREP:** Member of National Association of Enrolled Agents. Call and leave name and phone number for appointment with Nancy Taylor, E.A., 723-5227.

**RETIREMENT SOCIAL:** Friends and associates of David Chestnutt are cordially invited to a retirement social in his honor on Tuesday, February 8, at the H.J.E. Reid Conference Center from 5-7 p.m. Cost is $10 per person. There will be heavy hors d'oeuvres and a cash bar. Anyone wishing to contribute to the gift only should forward a contribution to Linda Sutherland, M.S. 462. Please have all reservations to Sutherland by February 1. For information, call ext. 43640.

**SYMPHONY TICKETS** are on sale for 20 percent off at the Langley Exchange Shop for Classical Masterworks concerts February 11 and 12. Performances are at Chrysler Hall, featuring Chopin's *Piano Concerto No. 1 in E Minor*, Beethoven's *Symphony No. 6* and Rossini's *Overture to La Scala di seta*. For more information, call the Exchange Shop at ext. 41585 or the Virginia Symphony Ticket Store at 380-0040.









THESE STUDENTS ARE INVOLVED! Students learn like we do—by doing. Presenters during last year's National Engineers Week School Visitation Program made a point of involving the students in their presentations.

Above right, Nancy Kruse, Fabrication Division, shows students how to "see" the effects of liquid nitrogen on familiar materials like rubber bands. At right, Clyde Medley, Operation Support Division, allows fifth graders to figure out how to complete a circuit. The operator's pleasure is obvious as the bell sounds indicating success.

## Engineers Week Workshop

February 1 at 1:30 p.m. February 2 at 10 a.m. Workshops will be held at the H.J.E. Reid Conference Center, 14 Langley Blvd. Call ext. 43293 or 43297 for reservations. Let us help you prepare your classroom presentation. Workshops are sponsored by NASA Langley Office of Public Services and the Hampton Roads Section of Women in Aerospace.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Researcher News

National Aeronautics and
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**Langley Research Center**
Hampton, Virginia 23681-0001

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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 3 ❖ February 11, 1994

## Garrido Joins Langley to Head SEMAO

Humberto T. (Bert) Garrido has joined Langley to lead the Safety, Environmental and Mission Assurance Office (SEMAO), pending Office of Personnel Management approval. Formerly the Systems, Safety, Quality and Reliability Division, SEMAO has been elevated to an office reporting directly to the Center Director.

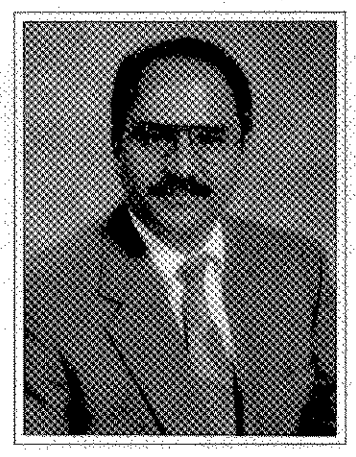
Garrido came to Langley in January. Prior to that, he was the director at the Division of Safety for Florida's Department of Labor and Employment Security. There he directed activities for preventing and controlling injuries and illnesses in the workplace. He was also employed for many years at the Florida Power and Light Company.

As head of SEMAO, Garrido is concerned with safety, reliability, maintainability, quality assurance, environmental health, protection and program compliance, and hazardous waste management functions for operations and activities related to the Center. "Quality and safety should be built in at the front end; correcting errors at the end can be very costly," Garrido said.

The scope of SEMAO responsibilities include ground-based facilities such as wind tunnels and simulators, aircraft/flight research; flight projects/payloads, research equipment and wind tunnel models; metrology and calibration; and facility construction projects. The Office oversees the safety and reliability assessment for the same areas and serves as the technical review authority in safety, quality and reliability specialties with involvement in research and development activities and work environment evaluations.

SEMAO, under Garrido's direction, also advises the Center Director on all systems safety, quality, reliability and environmental matters.

Garrido received his bachelor of science degree in electrical engineering from the University of Miami and a master of business administration from Florida International University. He also completed the Program for Management Development at Harvard University and the Advanced School in Power System Engineering from the Westinghouse Electric Corporation.

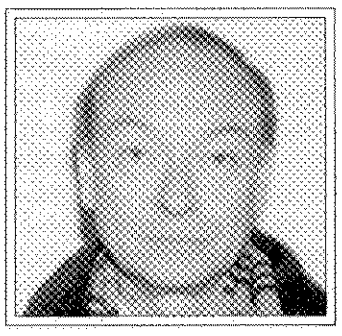

Humberto T. (Bert) Garrido

He has a wide range of experience in management of people as well as technical expertise in state environmental programs, systems reliability, protection and analysis and all aspects of occupational safety. He has successfully used Total Quality Management teams in the workplace and integrated functional plans recommended by the teams throughout the division he supervised. Garrido said, "We will meet the needs of our customers at the Center."

"I am very fortunate to be joining a world-class organization at Langley," he said, "and a highly professional division dedicated to excellence."

## *Energy, Security, Environment Are Colloquium Topics*

Langley's February 14 colloquium features Henry E. Thomas, formerly President Ronald Reagan's Assistant Secretary for International Affairs and Emergencies, speaking on "Global Energy, Security and Environmental Realities." The colloquium begins at 2 p.m. at the H.J.E. Reid Conference Center.


Henry E. Thomas

According to Thomas, "Perhaps the greatest challenge that we in the world face today is 'Is there (will there be) an energy crisis?'" Thomas says he will address the issue through "fiction, fact and the fine art of crystal balling." His discussion includes price and politics in the Middle East and strategic reserves, the automobile and pump prices, natural gas and coal, and other issues like the case for global climate change and the environment and energy.

During his government service under Presidents Gerald Ford and Reagan, he was responsible for environmental regulation and harmony and for the development, coordination and implementation of the nation's international energy policy. He is currently a consultant for private and government clients on world energy markets through the Americas, Europe, and the Far and Middle East and Africa, and the Director of Special Programs for A.T. Kearney, Inc.

Thomas earned degrees from the Virginia Military Institute, University of New Mexico, George Washington University and the Defense Intelligence College.

He will present the same lecture at 7:30 p.m. on February 14 at the Virginia Air and Space Center's IMAX theatre 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.

## *NCCJ Honors Dr. Christine Darden*

The National Conference of Christians and Jews recently honored Dr. Christine M. Darden and four other Peninsula residents for "true volunteerism." She was cited for her work on the math and computer science advisory board at Norfolk State University and her membership on the Board of Visitors of North Carolina State University.

Darden was also honored during the "Celebration of Heroes" sponsored by the Virginia Heroes Organization, co-chaired by former Governor Douglas Wilder and Jean Ashe, widow of the late tennis star Arthur Ashe. The group tries to enhance relationships between positive and highly visible role models and students.

Darden was one of 90 people so honored at a ceremony attended by 600 middle school students. She and other fellow "heroes" such as Katie Couric of *The Today Show* and former Virginia Supreme Court Justice John Charles Thomas, shared their personal and professional experiences with the students.

Dr. Christine M. Darden

Darden is an aerospace engineer in the Aerospace Vehicle Design and Mission Analysis Branch where she serves as technical leader for the sonic boom element of NASA's High-Speed Research (HSR) Program. Most recently, she completed the Simmons College Program for Developing Executives, a management program that encompasses all the functional areas of business.

## NASA Declares Hubble Servicing Mission Successful

**by SARAH KEEGAN, NASA Headquarters, Washington, D.C., and JIM ELLIOT, Goddard Space Flight Center, Greenbelt, Md.**

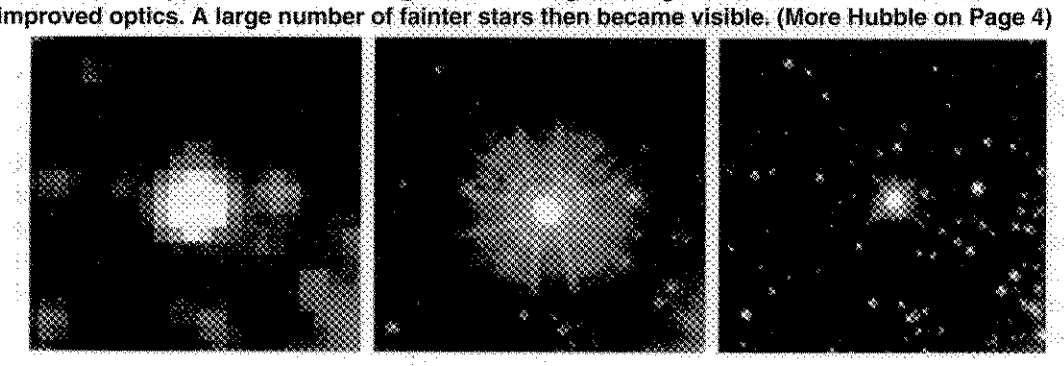
NASA Administrator Daniel S. Goldin declared that December's Space Shuttle mission to service the Hubble Space Telescope (HST) had been fully successful in correcting the vision of the telescope's optical components. The announcement followed the initial five weeks of engineering check-out, optical alignment and instrument calibration.

Goldin was joined in making the initial announcement at a press conference at Goddard Space Flight Center, Greenbelt, Md., by Dr. John H. Gibbons, assistant to the President for Science and Technology, and Senator Barbara A. Mukulski (Md.), chair, Appropriations Subcommittee on Veterans Administration, HUD and Independent Agencies. "This is phase two of a fabulous two-part success story," Goldin said. "The world watched in wonder as the astronauts performed an unprecedented and incredibly smooth series of space walks. Now, we see the real fruits of their work and that of the entire NASA team.

"Men and women all across the agency committed themselves to this effort. They never wavered in their belief that the Hubble Space Telescope is a true international treasure," Goldin said.

Mikulski, who unveiled two new HST pictures at the press conference, said, "I am absolutely delighted that Hubble is fixed and can see better than ever. This is tremendous news. Now we are going to look at the origins of our universe," Mikulski said. "This is a wonderful victory for the Hubble team of astronauts, astronomers, scientists and engineers. Together they are moving American science and technology into the 21st century with exciting new opportunities for scientific and economic progress."

**The three panels show images of a very bright (Wolf-Rayet) star, Melnick 34. In the background are a number of fainter stars that are comparable to our Sun. Image 1, at left, was taken by a groundbased instrument under ideal conditions. Image 2 was taken by the Wide Field Planetary Camera (WFPC) prior to the servicing mission. Image 3 at right was made with WFPC-2's improved optics. A large number of fainter stars then became visible. (More Hubble on Page 4)**



# News Briefs

## Around the Agency

**NASA DEVELOPS ENHANCED RUNWAY VIEWS FOR SUPERSONIC PILOTS –** NASA is testing a new optical system that would let pilots see the runway during nose-high landings without relying on complex mechanical structures or computer-generated views. The Research External Vision Display (REVD) is a system of lenses and mirrors that reflects the view of the runway under the nose of the aircraft to a pilot in the cockpit. It needs no electronics or video cameras and has no moving parts. Flight tests began on Dec. 23 using a modified F-104 aircraft at Ames Research Facility, Edwards, Calif. "Pilots of supersonic aircraft usually land at a high angle-of-attack to maintain the descent rate at low speeds. This may block runway visibility at a crucial time during landing," said NASA project pilot Steve Ishmael. "The REVD system, which is basically an upside down periscope, could be an effective solution."

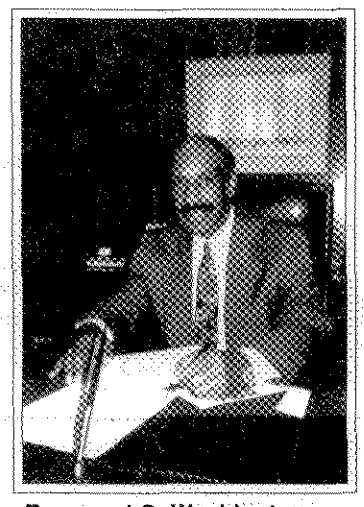
**SATELLITE FINDS IMPRINT OF UNIVERSE ON GAMMA-RAY EXPLOSIONS –** Astronomers have uncovered new evidence that huge explosions, known as gamma-ray bursts, occurred in the far reaches of the universe and bear an imprint of the universe's expansion. Analysis of data from NASA's Compton Gamma Ray Observatory satellite by a team led by Dr. Jay Norris of Goddard Space Flight Center, Greenbelt, Md., now indicates that gamma-ray bursts show relative "time-dilation." This is an effect that would be created by many of the bursts occurring so far away in the universe that time is seen to be running noticeably slower there. "This is a great result, one of the most spectacular astrophysical discoveries of the decade," said Prof. Bohdan Paczynski of Princeton University.

## *Making a Difference* Program Highlights Black History Month

Raymond G. Washington, superintendent of Hampton City Schools, will be the guest speaker at the Black History Month Program scheduled for Tuesday, February 22. Washington will address the theme "Making a Difference" at 9 a.m. at the H.J.E. Reid Center auditorium.

Also featured during this celebration will be a solo singing performance by Fernandus Rattcliff, an electrical engineering technician in the Operation Support Division.

All employees are invited to attend and should charge their time to Job Order A1619.



**Raymond G. Washington, superintendent of Hampton City Schools.**

## CEBAF Science Series Resumes

Interactive evening seminars for science-minded students will again be conducted this Winter and Spring, CEBAF announced. The series is for students who like science, from grades six through 12, as well as for their parents and teachers. Presentations are from 7-8 p.m. at CEBAF Center Auditorium. The schedule is as follows:

February 15, *Oysters: A Chesapeake Controversy*, by Dr. Mary C. Gibbons, McMullen Associates, Hampton

March 8, *Light – It's a Matter of Gravity*, by Dr. Arlene P. Maclin, Hampton University

April 19, *The World in a Glass of Soda Pop*, by Dr. Charles Hyde-Wright, Old Dominion University

May 25, *Exploring Submarine Volcanoes – A New Frontier*, by Dr. John Delaney, University of Washington.

All presenters are scientists and/or engineers who make their topics fun and informative. For more information, call the Sciences Series coordinator Teresa Beatty at 249-7560.

## *Researcher News Advertising Policy*

**The privilege of advertising in the *Researcher News* is restricted to employees, contractors and retirees of Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing. Notices should contain the name of a contact person and a telephone number. Telephone numbers listed should be home numbers for contact after work hours. Exceptions to this requirement are:**

**– Individuals seeking to organize a carpool or needing a carpool or carpool information may list a work extension.**

**– Listing of lost or found items in Langley facilities should have a work extension.**

**– Clubs and organizations sanctioned by the Langley Activities Association (LAA) may list work extensions to offer additional information.**

**– Work-related professional organizations, such as the AIAA, may list work extensions for the contact person of that organization.**

## Letters

### Retirement Party For Swain

A retirement party for Robert L. Swain will be held on Saturday, March 19, at the H.J.E. Reid Conference Center. The social begins at 6 p.m. with dinner at 6:45 p.m. and an 8 p.m. program. Cost is $12.50 per person, including gift. Gift-only contributions are welcome. Remit to Jackie Kallick, Mail Stop 114, by March 8.

### Retirement Party For Ketchum

Come say farewell to one of the Acquisition Division's finest at a retirement party for Steelman Ketchum on March 8, from 5:30 to 8:30 p.m. at the H.J.E. Reid Conference Center. There will be a cash bar and light snacks at 5:30 p.m., dinner at 6:30 and a program at 7:30. The cost is $13.50 per person, including gift. Gift-only contributions of $2 are also appreciated. Please send cash or check payable to Richard Shisler, Mail Stop 126, by February 18.

### Thank You for the Retirement Party

From Charlie and Mary Alice Woerner: "We send our thanks to all of you who attended our retirement party or contributed to our wonderful travel gift certificate. We will miss the mission of NASA and its outstanding work, but most of all, we will miss the friends and working associates of the NASA team."

## Fitness Center Begins New Phase on April 1

New Federal regulations now require that all fitness centers at Federal agencies be self-sustaining. They can no longer be supported with appropriated funds. Therefore, the Fitness Center will be transitioned from its current contract to operating with paid membership under the auspices of the NASA Exchange Council, according to Council President Jeff Parker.

The Fitness Center is gearing up for an April 1 opening with its new and expanded programs. Membership will be available to all NASA employees, contractors, retired employees and their spouses. The new roster will include professional programs and services designed to help each person meet his or her health and fitness goals, including aerobics classes, fitness assessments, nutritional analysis and body fat composition testing. The fitness center has also recently expanded its equipment collection to include more than 70 pieces of the latest in cardiovascular and strength machinery in the Hampton Roads area.

The Exchange Council is meeting the challenge to open the Fitness Center doors to serve a larger population and appreciates the continued support of all employees.

Look for more information about the new Fitness Center in upcoming issues of the *Researcher News*.

## *FEW Regional Training Is March 4-5*

The sponsoring chapters of Federally Employed Women (FEW) of Langley, Old Point and Tidewater, are joining forces to provide speakers to present informative seminars for federal women and men at the FEW regional training program on March 4 and 5 at the Radisson Hotel in Hampton.

The theme for the mid-Atlantic regional training program is "Visions of the FEWture." Seminars will include topics such as "changing roles of women, military and civilian," "leadership and women," "cultural diversity," "elder care," "reduction in force" and "where do we go from here" among others. Assistant Director Dr. Belinda Adams will be a participant on the "Leadership and Women" panel.

For more information about the two-day program, call Beverly Thomas-Burse at ext. 42418 or Patsy Campbell at ext. 43291.

## In Memoriam

### Clarence Brown Jr.

Clarence Tandy Brown Jr., 72, a native of Hampton, died Monday, January 24.

Brown retired in 1979 after more than 36 years as an engineer at Langley.

### William H. White

William Houston White, 90, a native of Decatur, Ala., and Peninsula resident for 40 years, died Tuesday, January 25.

White retired in 1972 after 25 years at Langley as an instrument maker.

### Thomas H. Redding

Thomas H. "Tom" Redding, 76, a Peninsula resident since 1943, died Sunday, January 23.

Redding was employed as an engineering technician supervisor. He retired in 1982 after 28 years of service at Langley.

## Symphony Tickets

Virginia Symphony tickets are on sale for 20-percent off at the Langley Exchange Shop. Classical Masterworks concerts are February 11 and 12 at Chrysler Hall, featuring Chopin's *Piano Concerto No. 1 in E minor*, Beethoven's *Symphony No. 6* and Rossini's *Overture to La Scala di seta*. A gala, featuring violinist Itzhak Perlman, will be held on February 26. For information, call the Exchange Shop at ext. 41585.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, 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 the Tuesday following the date of this issue.

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Assistant Editor ..... *Susan A Smigielski, The Bionetics Corporation*

Photojournalist *Carole Petrachenko Chapman, The Bionetics Corporation*

Photographer ..... *Fred Jones*

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.

# Spacemobile Visits Newport News

Stanley P. Jones, one of Langley's Office of Education aerospace education specialists, wheeled the Langley Spacemobile into Newport News' Booker T. Washington School recently. He was joined by Congressman Bobby Scott (D – 3rd District) who planned a trip there to see the Spacemobile. Scott attended the science and technology presentation in the same halls he walked in his elementary school days.

Scott seemed as enthralled by Jones' performance as the middle school students Jones was addressing. Scott is a member of the House of Representatives Science, Space and Technology Committee.

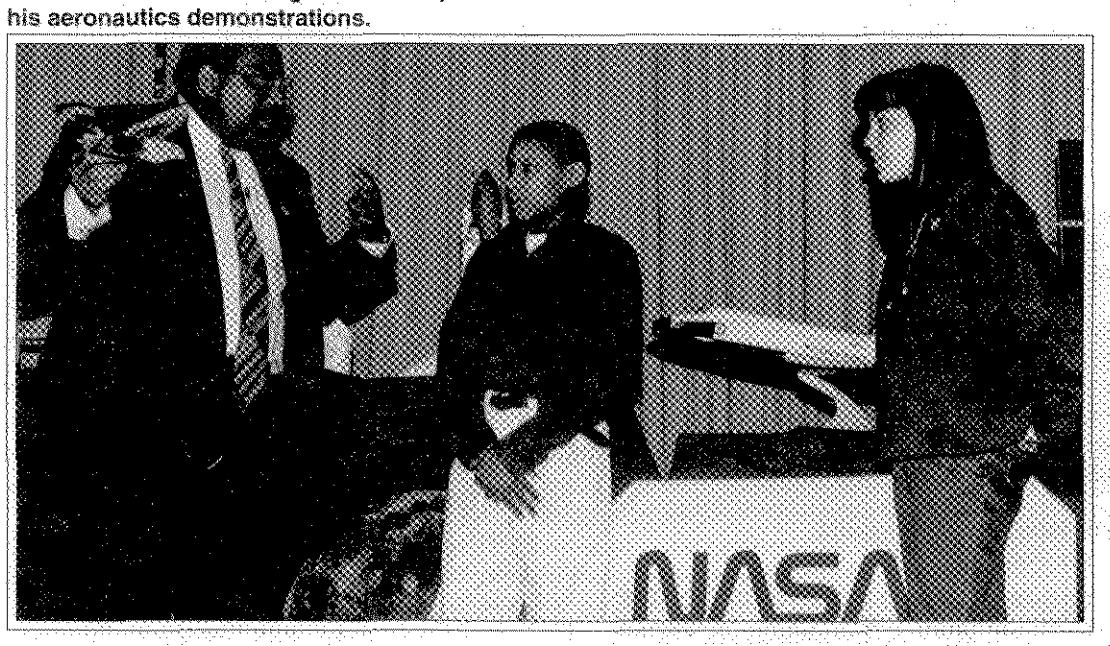
Jones involves the students, asking for "helpers" as he demonstrates things such as the heat-resistant properties of shuttle tiles or the theory of flight. He literally touches the lives of thousands of children each year with his mobile NASA exhibit, introducing students to space and technology.

*Photos by Fred Jones*

**Above, Roger Hathaway, left, of Langley's Office of Education, sits with Congressman Bobby Scott during Jones' presentation at Booker T. Washington School in Newport News.**

**Student Adam Brooks touches a shuttle tile after its has been heated by Jones to demonstrate to his audience how the heat is dissipated and other the special properties of the tile.**

**Stanley Jones (left), gives students Donielle Sanders and Dana Cavole some basic instructions before asking for their help in one of his aeronautics demonstrations.**




# Workshops Help Prepare Langley "Teachers" to Meet Students

**BY MARNY SKORA**

"Always carry something into the classroom to grab the students' attention," advised Joyce Weeks as she handed a closed vial to Patsy Campbell of the Equal Employment Opportunities Office.

"Can you make a tornado in this bottle?" challenged Weeks, math and science curriculum leader for Hampton Public Schools. As Campbell shook the bottle in a circular motion, a tiny tornado formed inside. Participants at Langley's Engineers Week Workshops were hooked.

What's in the bottle? What causes the storm to rage inside? How does this compare to weather conditions we have observed? Questions abounded.

Answers to these questions are not nearly as important as the process skills the tiny tornado stirs in the minds of the students, insisted Weeks. Her demonstration graphically illustrated a Chinese proverb that set the tone for the workshops: *I see and I forget; I hear and I remember; I do and I understand.*

In addition to Weeks, a dozen Langley employees who have mounted success as volunteer "teachers" during former Engineers Week school visitation programs presented tips and techniques they have used in the classroom. One bit of advice permeated all presentations—involve the students in the lesson.

The workshops, attended by nearly 150 Langley Engineers Week volunteers, were co-sponsored by the Hampton Roads Section of Women in Aerospace (WIA) and the Office of Public Services.

"These sessions gave volunteers the opportunity to talk one-on-one with successful presenters who could share tips about what works and, perhaps more importantly, what to avoid when planning a school lesson," explained Diana Freeman, WIA education chairperson.

The annual Engineers Week school visitation program is Langley's most visible and most widely supported community service outreach effort. This year over 220 Langley employees and contractors will "teach" close to 800 classes in the Tidewater Virginia area.

*Photos by Fred Jones*

**Joyce Weeks, Hampton math and science curriculum coordinator, uses a pyramid to illustrate learning retention. Students retain about 10 percent when a lesson is read silently as opposed to 90 percent retention when students are involved in a dynamic presentation.**

**Langley Research scientist Cheri Tanner of the Acoustics Division challenges a workshop participant to remove the lid off a jar. To illustrate the properties of friction, Tanner coated the rim of the lid with dish soap to make the seemingly easy task impossible.**

# Virginia Aerospace Business Roundtable and Virginia Space Grant Consortium Present Programs

A videoconference, "A New Era of Discovery: Plans for Research on Space Station," will be presented on February 17 from 12:30 to 3:30 p.m. Co-sponsored by the Virginia Aerospace Business Roundtable (VABR) and the Virginia Space Grant Consortium, the two-hour videoconference at the Old Dominion University Peninsula Center, 2713-D Magruder Blvd., Hampton, features scientists, astronauts and NASA officials. They will appear live via satellite to explore the possibilities for research on space station. The station is expected to be operational in the latter half of this decade and will provide scientists and engineers with a unique, state-of-the-art research laboratory in space.

To register for this free broadcast or for more information, call the Virginia Space Grant Consortium at 865-0726. Registration begins at 12:30 and the broadcast begins at 1 p.m. Registrants will receive background material relating to the broadcast.

The VABR will have former Governor Gerald L. Baliles at its February 16 dinner meeting. His topic "Change, Challenge and Competition" will report the findings of the national review of the U.S. airline industry. The meeting begins at 6 p.m. and reservations are required. Call Jo Anne Phillips at 825-2958 by February 14. Cost is $20 per person.

# General Speaks on Quality at Facilitator's Forum

BY ALLISON BALLEW

Lt. Gen. Thad A. Wolfe, vice commander of Air Combat Command (ACC), visited the Center's monthly TQM Facilitator's Forum in January and gave an overview of quality at ACC.

"ACC's Commander General Mike Loh has been a supporter of quality for 10 years," said Wolfe. "Those people who want to prosper in the organization understand that quality is a condition of employment."

Last year, in a speech at Langley Air Force Base, Vice President Al Gore said, "I was very impressed with what has taken place (in ACC) since 1978.... I don't think it is an accident that so many ... experts on quality come here to see how they can translate what ACC is doing ... into improvements in other organizations."

ACC's leaders are changing the work environment to promote trust, teamwork and continuous improvement. The basic TQM principles of empowerment and self-motivated work groups are being ingrained into the culture, paving the way for better communications. As Wolfe put it, "No one in ACC is more or less important than anyone else."

For example, Wolfe explained, the Gold Flag Program empowers the smart, young repair technicians to find better ways to perform repairs, therefore saving money.

Recently, one technician chose to see the difficulty of removing certain rivets from airplane's canopies as an opportunity for improvement. He was empowered to design and fashion an instrument to make the removal easier, and he ended up saving the Government a significant amount of time and money.

Quality at ACC gained momentum in 1991 with a "Quality Schoolhouse" training program and a climate survey of all personnel, much like the one conducted here at NASA Langley in April 1993. It has since grown to provide a framework for continuous improvement which focuses on individual training and education. ACC puts action behind their quality goals. Their "style" includes:

– Creating a working climate to inspire trust, teamwork, quality, and pride

– Delegating authority and responsibility

– Setting goals, measuring progress, and rewarding performance

– Delivering quality products to all customers

– Striving for a culture of continuous improvement

Attendees, totalling about 50 people, included the Center director, deputy director, assistant director, senior staff members, and facilitators.

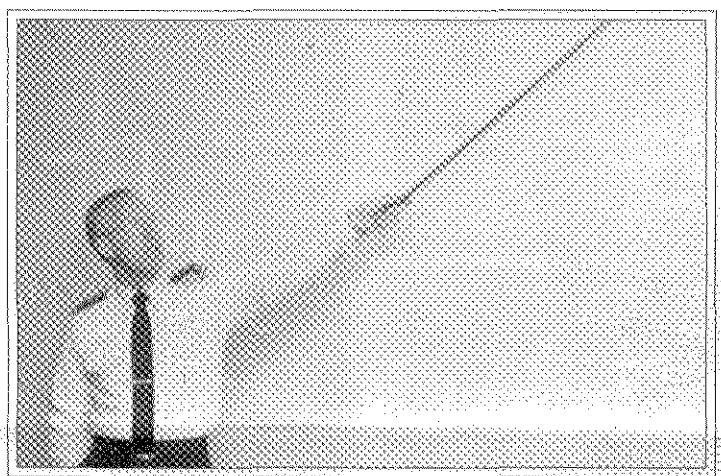


*Photo by Fred Jones*

**Lt. Gen. Thad A. Wolfe of Air Combat Command (ACC), addresses Langley's TQM facilitators with an overview of quality at ACC, at a meeting in January. ACC was cited by Vice President Al Gore as an excellent example of TQM principles in action.**

# More Hubble . . .

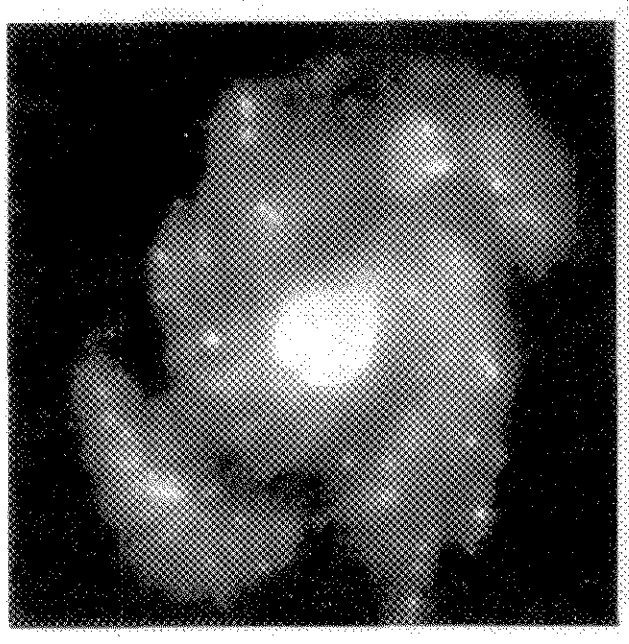
*Continued from Page 1*

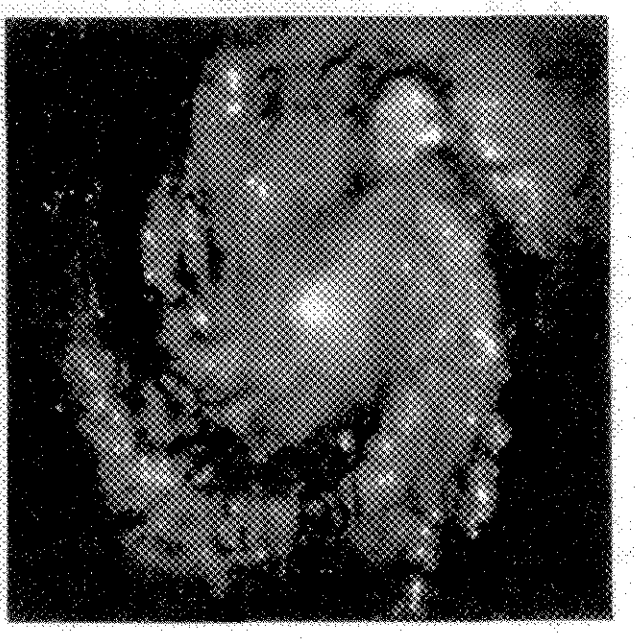
**Hubble's New Improved Optics Probe the Core of a Distant Galaxy . . .**

**These comparison images of the core of the galaxy M100 show the dramatic improvement in the Hubble Space Telescope's view of the universe. The new camera will allow Hubble to probe the universe with unprecedented clarity and to fulfill many of the scientific objectives for which it was built.**

**The core of the grand design spiral galaxy M100, at right, was taken by WFPC-2 (Wide Field Planetary Camera) on December 31, 1993. For comparison, a picture taken with the WFPC-1, at left, a few days before the STS-61 servicing mission. The effects of optical aberration in HST's 2.4-meter primary mirror blur starlight, smear fine detail and limit the telescope's ability to see faint structure. Both images are "raw;" they have not been subjected to computer image reconstruction techniques commonly used in aberrated images made before the servicing mission.**

**The galaxy M100 is one of the brightest members of the Virgo Cluster of galaxies. It is spiral-shaped and has two prominent arms of bright stars and several fainter arms.**





# *Legislative Update*

## Guidelines for Federal Employees Covered Under the Hatch Act Amendments

Guidelines have been issued by the Office of Special Counsel, an independent federal agency responsible for investigating reports or complaints concerning Hatch Act violations. The new amendments have been effective since February 3, 1994.

The following list contains examples of both permissible and prohibited activities for covered employees.* Telephone 1-800-854-2824 for more information on the Hatch Act or call Langley Chief Counsel David Caplan at ext. 43221. For information on other Congressional matters, call Congressional Affairs Officer Lee Rich at ext. 46529.

### MAY

– May be candidates for public office in non-partisan elections

– May register and vote as they choose

– May assist in voter registration drives

– May express opinions about candidates and issues

– May contribute money to political organizations

– May attend political fundraising functions

– May attend and be active at political rallies and meetings

– May join and be an active member of a political party or club

– May sign nominating petitions

– May campaign for or against referendum questions, constitutional amendments or municipal ordinances

– May campaign for or against candidates in partisan elections

– May make campaign speeches for candidates in partisan elections

– May distribute campaign literature in partisan elections

– May hold office in political clubs or parties

### MAY NOT

– May not use their official authority or influence to interfere with an election

– May not collect political contributions unless both individuals are members of the same federal labor organization or employee organization and the one solicited is not a subordinate employee

– May not knowingly solicit or discourage the political activity of any person who has business before the agency

– May not engage in political activity while on duty

– May not engage in political activity in any government office

– May not engage in political activity while wearing an official uniform

– May not engage in political activity while using a government vehicle

– May not solicit political contributions from the general public

– May not be candidates for public office in partisan elections

– May not wear political buttons while on duty

** Employees of the following agencies or divisions within an agency continue to be covered under the old law: Federal Election Commission, Federal Bureau of Investigation, Secret Service, Central Intelligence Agency, National Security Council, National Security Agency, Defense Intelligence Agency, Merit Systems Protection Board, Office of Special Counsel, Office of Criminal Investigations of the Internal Revenue Service, Office of Investigative Programs of BATFA, Criminal Division of the Department of Justice, career members of the senior executive service, Administrative Law judges and contract appeals board members.*

# Retirement Social for Taylor

Friends and associates of Leon V. Taylor are cordially invited to a retirement social in his honor on Wednesday, March 2, from 6 to 8:30 p.m., in the H.J.E. Reid Conference Center. Heavy hors d'oeuvres will be served and a cash bar will be available. For reservations and/or gift donations, please contact Angela Davis at ext. 43784 or Carolyn Carey at ext. 43783 by February 21. Both are located at Mail Stop 356. Make checks payable to either Davis or Carey.

## SAIC-Hampton Seeks Students

Science Applications International Corporation (SAIC)-Hampton is seeking highly qualified and motivated upper level undergraduate and graduate students to participate in a Summer Intern Program from May 31 to early September, in affiliation with an on-going contract at Langley.

Candidates may have experience or a degree, or be seeking a degree, in any of the following fields: earth sciences, physics, engineering, mathematics and scientific computer programming. To request an application form or obtain additional information, call Bob Turner, at SAIC, at 825-0001 or FAX 825-9129.

# Virginia Air and Space Center News

BY KIM HINSON

## What Is New at the Center?

Virginia Air and Space Center
Hampton Roads History Center

Two new exhibits are on display at the center. A permanent addition to the center's collections is *Slice of Life Aboard Space Station Freedom*. Also on display is a temporary exhibition entitled *Space Scapes*.

*Slice of Life Aboard Space Station Freedom*, donated to the center by the Boeing Company, is a cross-section of a 42-foot-long space station module which shows what living in space would be like for its future residents. Although there have been several space station configurations, the basic module depicted in the exhibit is consistent with the proposed U.S. habitat module that will be part of the international space station.

*Space Scapes* is an exhibition by eight artists featuring 17 paintings and one sculpture. The paintings illustrate the planetary environments of space. This exhibition will be on display at the center through the end of February.

Basic admission to the center is $4 for adults and $2 for children four through 12 years old. For more information, call 727-0800 or 1-800-296-0800.

## World War II Corsair Makes Another Journey

A fully-restored Chance Vought F4U-1D Corsair, which has not flown in about 30 years, made another historic journey as it traveled to the center from the Paul E. Garber Preservation, Restoration and Storage Facility during the first week in February. The vintage aircraft, on loan from the Smithsonian National Air and Space Museum, will be suspended from the 94-foot ceiling of the center as part of its permanent collection.

The World War II aircraft traveled more than 200 miles by flatbed truck down Interstate 95 from Sultland, Md., to Hampton, Va. With outer portions of its wings removed for the journey, the aircraft still measured 33 feet long and more than 16 feet wide.

Restoration began at the Paul E. Garber Facility, the official restoration and storage facility for the Smithsonian National Air and Space Museum in Washington, D.C., in October 1978 and was completed in 1980. Restoration consumed 9,315 hours, more than 1,000 of which were spent on detailing the cockpit interior.

The Chance Vought is of great historic importance. Many believe it was the most effective Navy fighter aircraft to emerge from World War II. Some hold that more than any other aircraft, it was responsible for winning the war in the Pacific theater during World War II.

When Pappy Boyington's Black Sheep Squadron shot down 47 enemy aircraft in their first month of combat, they knew the Chance Vought was a fighter that could survive the worst. It was described as being "all engine," with an oversized prop that fanned an arc of 13 feet. Its most distinctive feature, however, was its inverted gull wings that allowed the large propeller to clear the carrier decks.

Corsairs were credited with destroying 2,140 enemy planes with a loss of only 189 American lives in combat. The Japanese referred to the aircraft as "whistling death." Distinctly marked by its wing design, Corsairs were a familiar sight over Guadalcanal, Bougainville, Pelellu, Okinawa and Japan. They were designed as carrier-based fighters but served initially on base facilities on many of the Pacific Islands. They became synonymous with Marine Corps aviation. Corsairs were also the first Navy fighters capable of carrying a bombload like those hauled by two-man dive bombers. Because of this capability, they accelerated the termination of the dive bomber.

The Chance Vought Corsair will join more than 100 exhibits at the center that tell the story of history, adventure and space exploration. Permanent collections at the center include Samuel P. Langley's Great Aerodrome, Apollo 12 Command Capsule and 15 air and space craft suspended from the center's ceiling.

## Meet an Astronaut

Charles D. Walker, who has flown on several space shuttle missions as a payload specialist, will be at the center at 1 p.m. on Sunday, February 19. Walker will discuss his 1984 and 1985 space journeys.

On those flights, Walker operated equipment designed by McDonnell Douglas Astronautics Company for its electrophoresis biotechnology commercialization program (EOS). He accumulated 20 days and 8.2 million miles of space flight experience. As chief test engineer for EOS, he was involved with the laboratory development and space flight test of the EOS device and trained other NASA astronauts to use the EOS device.

Walker currently supports McDonnell Douglas in technical marketing and policy issues in Washington, D. C. Call 727-0800 or 1-800-296-0800 for more information.

# Abbott and Rogers Cited for Paper

Terence S. Abbott, Vehicle Operations Research Branch, and William H. Rogers, Thermal Analysis Section, received certificates of appreciation from the 12th Annual Avionics Systems Conference. The conference was co-sponsored by the International Electronic and Electrical Engineers (IEEE) and the American Institute of Aeronautics and Astronautics (AIAA) and was held this past year in Fort Worth, Texas.

Their paper, entitled "Functional Categories for Human-Centered Flight Deck Design," was selected as the best paper in the Pilot-Automation Interface Session at the conference.

Terence S. Abbott

# *Health Corner*

## *Langley January Bloodmobile Visit a Success*

The January 26 bloodmobile visit was a great success according to Karen Ridlon of Occupational Health Services (OHS). OHS thanks all donors and looks forward to seeing more people at each blood drive in 1994.

Number of donors totaled 314 people according to coordinators Ridlon and Peter J. Edgette from Langley and Red Cross' Kitti Schatz.

A special thanks goes to multiple donors, especially the following: For 13 gallons, Brickey Hughes; 11 gallons, Robert S. Davis; 8 gallons, Richard J. Churray; 7 gallons, Philip L. Brown and Charles P. Shore; 6 gallons, Steven X.S. Bauer, Richard I. Kreis and Jennifer Allen; 5 gallons, Augustus D. Scott Jr. and Jimmy Cass; 4 gallons, Franklin Mayhew and Michael Harrell; 3 gallons, Ronald D. Joslin, Sam Pollard and Samuel James; 2 gallons, Michael G. Houseknecht, Frank L. Novak, Lloyd L. Smith, Marian L. Jones, Jeffrey C. Hyle and James C. Young; and 1 gallon, Elizabeth Plentovich, Michael K. Chambers, Karen H. Sage, Dave Breen and Richard A. Morgan. First time donors were Daniel Liden, Tran T. Khan, Mark Vaughan, Marcus Sanchez, Mary Kosanke, Chris Peck, Jean Trueblood, James F. Casey Jr., Antoine White, Susan Stoneberg and Andrea Kowalchik.

## *Langley Bloodmobile Dates for 1994*

All NASA employees, retirees and contractors are invited to participate in the 1994 blood drives. The Langley Bloodmobile will be at the H.J.E. Reid Conference Center from 9 a.m. to 3 p.m. on March 23, May 25, July 27, September 28 and November 23.

The Coleman Commuter CONNECTION

# Coleman Closings Cause Concern

Plans to widen the Coleman Bridge are causing concern on both sides of the York River.

Two two-week closures in late 1995 will impact both Langley employees who live on the Gloucester side of the river and Williamsburg residents who will face increased traffic on I-64 as motorists are detoured through West Point.

Langley's Community Services Program will sponsor a briefing on the Coleman Bridge project at 10 a.m. Tuesday, February 15, in the H.J.E. Reid Conference Center. Bill Cannell, Suffolk District Office of the Virginia Department of Transportation, Carol Russell, Tidewater Transportation District Commuter Coordinator, and Barbara Zimmerman, Middle Peninsula Rideshare Coordinator, will be the featured speakers. A question-and-answer period will follow the brief presentation.

The proposed bridge closures are required to install the new, widened bridge center sections. The February 15 briefing will detail services available to those affected and give advanced notice of expected delays so that employees can plan ahead.

Civil servants should charge their time to J.O. A 3092.

# AIAA Paper Airplane Contest

The American Institute of Aeronautics and Astronautics will sponsor a Paper Airplane Contest on Saturday, February 26, from 11 a.m. to 2 p.m. in Hecht's Court at the Coliseum Mall. There are three categories in which children may compete, from kindergarten to Grade 8. Prizes will be awarded in each category and there is no entry fee.

# NASA Alumni Association Meeting

The Outer Banks Chapter of the NASA Alumni Association will hold their next meeting in mid-March. The chapter plans to begin meeting quarterly or more frequently. Transitional officers have been elected: Charlie Nixon, president; Francis Rogallo, vice president; and Anita Karns, secretary/treasurer. For more information, call Nixon at (919) 473-1656 or write him at P.O. Box 970, Manteo, N.C. 27954.

# Happenings

**CONTACT PENINSULA INC.** is seeking volunteers for their 24-hour crisis intervention hotline. The 10-week training course will begin February 26 and end May 7. CONTACT's services are recognized by the United Way, area mental health agencies, local schools, sexual assault support services and church and civic groups as a valuable asset to our community. To sign up for training or get more information, call the CONTACT office at 244-0594.

**LCDC OPEN HOUSE:** The Langley Child Development Center Kindergarten open house will be held on Thursday, February 17, from 9:15-10:30 a.m. If your child is eligible for kindergarten in 1994-95 and you would like to observe a class in session, call ext. 44402 for a reservation.

**CALL FOR UMPIRES:** Anyone interested in umpiring boys or girls baseball and softball (some experience is preferred), please call Neele Steele for baseball, 877-9395; Don Robertson for softball, 877-6268. For more information, call Nick Nichols at ext. 45765.

**AGA:** The Association of Government Accountants will be meeting jointly with the American Society of Military Comptrollers, February 24 at 11:30 a.m. at the Fort Monroe Officers Club. The speaker will be John Murphy, Chief Civil Law Division, TRADOC. The topic is "The Hatch Act and Ethic Rule Changes." Arrive early for a good seat. For reservations, call Pat Link at ext. 48102.

**NUTRITION GUIDANCE** includes exercise for fat loss. Join the LAA Aerobics Club for a fat loss program designed by personal trainers and aerobics instructors. Progress measured with body composition analysis and cardio fitness assessment. Low-impact, bench, body-sculpting and circuit training classes held on Tuesday and Thursday, 5-6 p.m. in the LAA gym and 9:30 a.m. in the H.J.E. Reid Conference Center. Call ext. 42295 for more information.

**ORLANDO, FLA:** Travel to the world's most magical resort for two days, three nights. Motel, transportation and tickets included. Call for details, 245-3915.

**SHOPPING TRIP:** To Reading, Pa., a one-night stay, Saturday, May 21-22, just in time for spring and summer bargains. Price is $70 per person, double occupancy, $61 for a triple and $55 for a quad and includes hotel accommodations and transportation via ACE Bus Service. First deposit of $25 due Feb. 18. For more information, call 245-3915 (leave message) or 365-0511.

**CHILD CARE NEEDED** in my Grafton home for a six-year-old, from 3:45-5:15 p.m., Monday through Friday. Need transportation, non-smoker. Call 898-5188 after 6 p.m.

**ROOMMATE WANTED:** Hampton, seeking responsible, quiet non-smoker to share townhouse, 10 min. from NASA. Two BR w/ phone and cable hook-ups, closets, washer/dryer, $270/month plus 1/2 utilities. Need deposit, references. Call 838-7509, leave message.

**INCOME TAX PREP:** Member of National Association of Enrolled Agents. Please call Nancy Taylor, E.A., 723-5227 and leave name and phone number for appointment.

**FREE ELECTRONIC FILING:** Have us prepare your tax return. We will file it electronically at no extra cost; three-day refunds also available. We will come to you. Call 838-6394.

**INCOME TAX PREP:** Member of National Association of Tax Practitioners; electronic filing and direct deposit offered; small business bookkeeping. We travel to you, by appointment. Call 874-3121.

**FOR SALE:** Refrigerator, Amana, 18 cu. ft., almond, two years old, runs great, $325. Call 826-9549.

**HOUSE FOR RENT:** Hampton Terrace, 3 BR, 2 baths, central air and heat, stove, refrigerator, fenced-in yard, $625/month plus deposit. Available May 1. Call 826-9549.

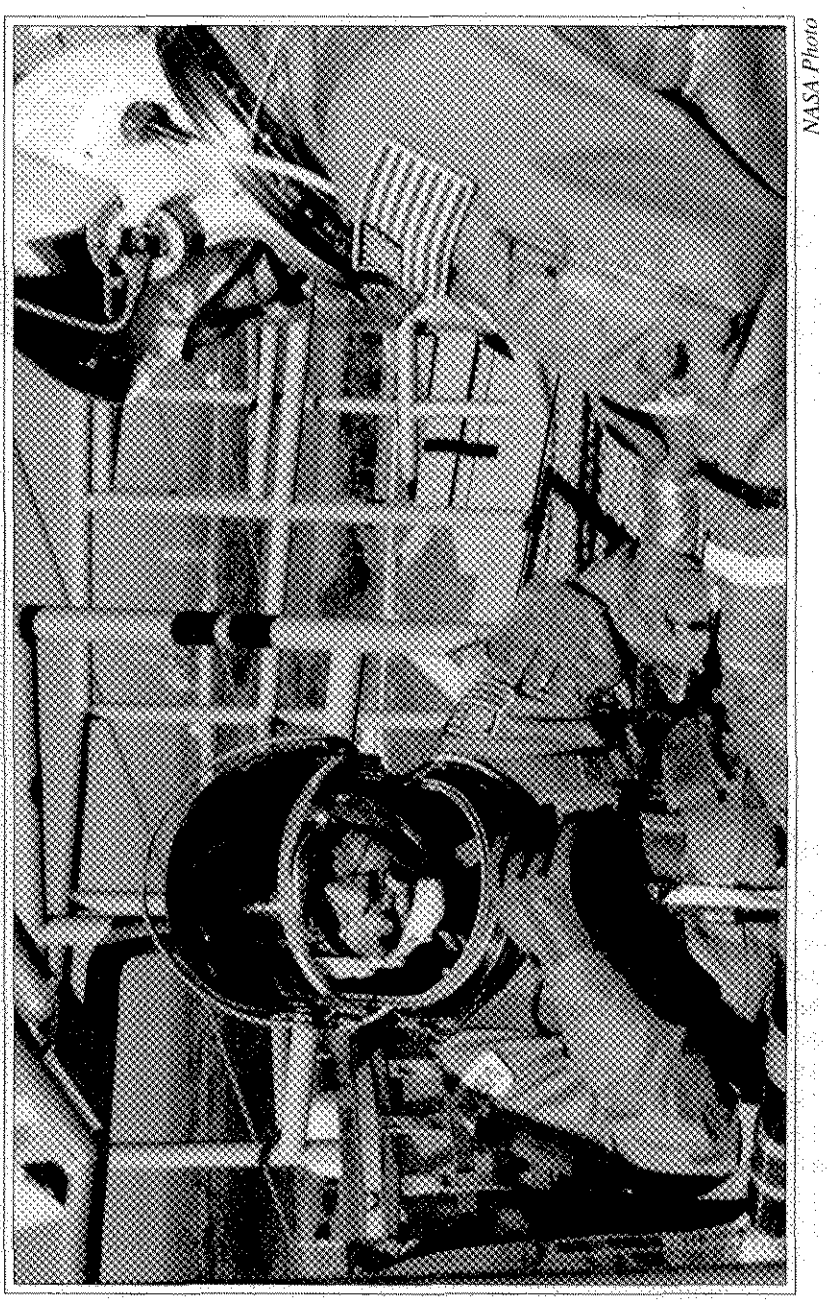
**TOWNHOUSES FOR SALE:** Denbigh, two 2 BR, 1-1/2 bath townhouses, heat pump, fenced yard, all appliances. Asking $49,000 each or both for $97,000. Good investment opportunity, both currently tenanted. Call 253-1831.

**LANGLEY TOASTMASTERS CLUB:** The Langley Toastmasters Club will meet February 23 and March 9 from 11:30 a.m. to 1 p.m. in the H.J.E. Reid Conference Center. For more information, call John Lin at ext. 45556.

**ITEMS FOR SALE:** Camelback sofa, $200; rattan rocker, $30; antique radio w/78 record player, $40; dining room set w/china cabinet, $400; two entertainment centers, $25 and $20; rowing machine, $25; exercise bike, $20; Craftsman lawnmower w/bag, $125; used lawnmower, $30; all prices negotiable. Call Debbie at 875-0066.

**FOR RENT:** Powhatan Plantation, Williamsburg, 2 BR condo, living and dining rooms, 2 baths, porch, fireplace, fully-equipped, sleeps 6, $500 from Feb. 26 to March 5. Call 722-7045.

**CAMPSITE FOR SALE:** Virginia Landing campsite on Eastern Shore, can be reached from Hwy 13 at Painter or Quimby, Va. On the ocean, good beach and marina, easy access from Washington, D.C., Norfolk, etc. Asking $6,500 or b/o. Call 722-7045.



NASA Photo

**At Launch Pad 39A, STS-60 Commander Charles Bolden, left, and Pilot Ken Reightler are completing the final phase of the Terminal Countdown Demonstration Test, a dress rehearsal for launch. STS-60 was successfully launched from Kennedy Space Center on February 3.**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# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 4 ❖ February 25, 1994

## MODE Makes Reflight on STS-62

Langley's Middeck 0-Gravity Dynamics Experiment (MODE), a reusable space shuttle middeck facility, will fly its second mission aboard STS-62, scheduled for early March.

MODE is specifically designed to identify and characterize the complex, nonlinear dynamic behavior of jointed truss structures in 0-gravity.

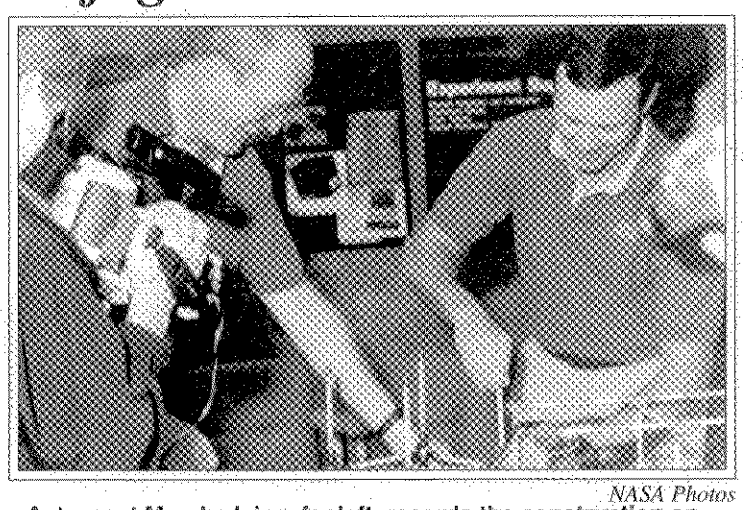
The flight hardware has two primary components: the Experiment Support Module (ESM), a miniaturized structural dynamics laboratory compressed to fit within a middeck locker, and the Structural Test Article (STA), an instrumented, scale model, reconfigurable truss containing erectable and deployable sections and rotary modules.

MODE first flew in September 1991 on the STS-48 mission and returned approximately 300-million high-quality measurements on fluid motion and structural dynamics. The structural dynamics results contained a number of surprises that pointed to the inadequacies of computer models and ground- based testing methods to predict the performance of a structure in low gravity. For the MODE/STS-62 mission, an array of seventy-five sets of tests will be employed to investigate the unpredicted behavior of the STA observed during the STS-48 mission and to improve science's fundamental understanding of how the absence of gravity changes the dynamic characteristics of complex space structures.

The MODE ESM will also be used in an experiment to measure crew push-off forces exerted on the vehicle during their normal routine. This information will help assess the potential impact of crew movement on the proposed space station microgravity specification and the degree to which such disturbances can be eliminated.

### The Mode Team

The MODE team consists of NASA MODE Project Manager Sherwin Beck, of Langley's Systems Engineering and Analysis Office, scientists and engineers from the Massachusetts Institute of Technology, Payload Systems, Inc. and McDonnell Douglas Aerospace, as well as Robert N. Stuckey from the Johnson Space Center, the payload integration manager.



*NASA Photos*

**Astronaut Marsha Ivins, far left, records the construction on videotape while Astronauts Charles D. "Sam" Gemar and Pierre J. Thout assemble the erectable "bay" of STA during a practice session.**

MODE/STS-62 will be one of the principal user of astronaut time, with about 40 hours dedicated to the STA tests and approximately 67 hours dedicated to crew motion force measurements.

### The MODE STA

The erectable and deployable sections and rotary modules of the MODE Structural Test Article (STA) will be arranged to produce three different configurations of increasing complexity. The simplest arrangement, or 'baseline-configuration,' is formed from two four-bay deployable modules connected in the center with erectable hardware components to form a straight truss. A slightly more complicated configuration, the 'alpha-configuration,' is formed by replacing the erectable hardware of the center bay of the baseline structure with a rotary joint modeled after the Alpha Joint of the proposed U.S. Space Station. Although this configuration still forms a straight truss, the additional mass and internal dynamics of the articulating joint substantially change the behavior of the system. The most complex configuration includes both deployable modules, erectable hardware, and the rotary joint to form a planar truss designated as the 'L-configuration.' Due to its shape and mass distribution, the L-configuration is the most difficult to test in a 1-gravity field and provides the greatest challenge to predict its dynamic characteristics.

### Reflight for More Tests

NASA Headquarters Office of Advance Concepts and Technology approved reflight of MODE to investigate the underlying causes for the unexpectedly large changes in the resonance frequencies of the 'L-configuration' and the strongly nonlinear behavior of the rotary joint. In addition, a second, a more sophisticated, rotary joint, closely modeled after the proposed U.S. Space Station Alpha Joint, will replace the original joint in a series of duplicate tests. This new module employs a miniature version of the Alpha-Joint's T-ring, race-ring and trundle bearing assembly to duplicate the structural load transfer path of that joint A set of torsional

*Continued on Page 5*

**STS-62 flight crew members at the Massachusetts Institute of Technology training session hold a copy of the MODE hardware with their trainer, Project Manager Sherwin Beck, center. They are, left to right, John H. Casper, commander; Andrew M. Allen; Beck; mission specialists Marsha Ivins, Charles D. "Sam" Gemar and Pierre J. Thout.**

## Langley Experiment Piggybacks on Clementine

A Langley experiment, the "Orbiting Meteoroid and Debris Counter" (OMDC) which was built in-house and completed in five months, is getting the ride of its life while piggybacking on the Ballistic Missile Defense Organization's Clementine satellite.

The one-pound experiment cost $200,000 and is representative of NASA's goal to conduct faster, better and less costly research. "The most fruitful intersection of NASA's mandates for change," said NASA Administrator Daniel S. Goldin, "will likely be in the area of small scientific satellites, and I am tremendously excited by the possibilities."

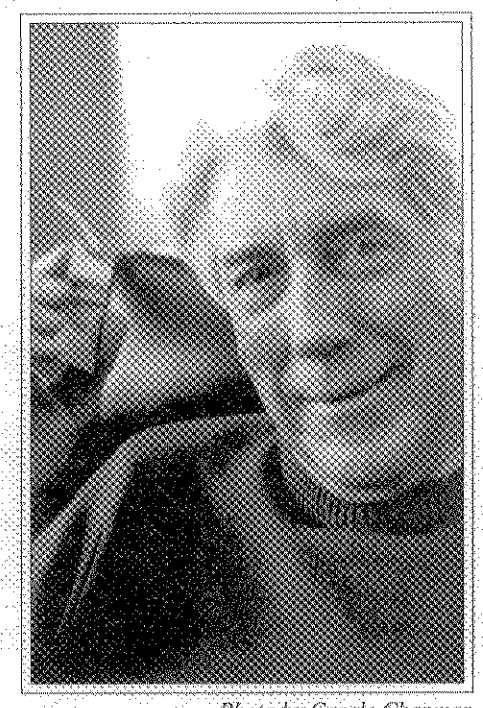


*Photo by Carole Chapman*

**William Kinard, of the LDEF Science Office and Langley's principal investigator for this project, holds a sensor like those of the "counter," which detects impacts in space for the Orbiting Meteoroid and Debris Counter experiment. A total of 48 sensors are used in the experiment.**

The OMDC experiment, which separated from the Clementine spacecraft on Feb. 3, will help establish the number of very small man-made debris and natural meteoroids at altitudes up to 150,000 kilometers (or approximately 81,000 nautical miles) between the Earth and the Moon. The data will help NASA to better understand the space environment and its effects on spacecraft, including the space station. The first data was received Feb. 5, followed by data received Feb. 13.

The project is named Clementine because, like the miner's daughter in the old ballad, she will be "lost and gone forever" once her mission is accomplished.

Clementine is primarily intended as a space-traveling platform to demonstrate advanced lightweight space technologies for the Department of Defense (DOD) while conducting investigations for NASA of both an asteroid and the Moon. Its design uses commercial parts in addition to military standard components. The advanced technologies incorporated into the sensor suite and the spacecraft subsystems are designed to operate in space for one year.

"Conducting a joint DOD/NASA mission and forming a NASA-selected team to enhance the mission's scientific value will allow DOD technologies to be transferred to civilian applications, bringing true meaning to the words 'dual use'," said Lt. Col. Pedro L. Rustan, Clementine program manager for the Ballistic Missile Defense Organization.

## Colloquium Announcement:

**Mark your calendars for the March Colloquium.**
**On Tuesday, March 15, at 2 p.m. when Marc Rotenberg will discuss "Privacy and Crime in a Computerized Society" at the H.J.E Reid Conference Center.**
**Please note: Future Colloquia dates have been changed to Tuesdays.**

# News Briefs

## Around the Agency

**ULYSSES REACHES UNEXPLORED REACHES OF SUN** – The Ulysses spacecraft, on its way to explore the polar regions of the sun, has become the first spacecraft to reach further south than the most southerly dip of the sun's magnetic equator. In this previously unexplored region, Ulysses observed that the fast-moving stream of charged particles, called the solar wind, is twice as fast, but less dense, than near the sun's equator. Measurements from the Ulysses' solar wind plasma experiment showed wind speeds of about two million miles per hour (800 kilometers per second) in this previously uncharted region of space, twice the speed at which the solar wind is known to flow in lower altitudes. "This change in speed coincided with the spacecraft's passage south of a sheet of electrical current," said Dr. Edward J. Smith, NASA project scientist on the joint NASA-European Space Agency (ESA) mission. "This current sheet separates the solar wind that originates in the northern solar hemisphere from that originating in the southern hemisphere."

**NASA TESTS NOISE-REDUCING NOZZLE FOR SUPERSONIC AIRLINERS** – NASA is evaluating an advanced exhaust nozzle concept that could reduce noise made by 21st century supersonic jet airliners to the level of today's new subsonic jets without affecting takeoff performance. Wind tunnel tests at Ames Research Center, Mountain View, Calif., used an experimental nozzle attached to the rear of a one-tenth scale model of a jet engine. The subscale engine simulates the exhaust of a future supersonic airliner under takeoff conditions. Jet engine noise comes from a plane's exhaust or "plume" of turbulent air in its wake. "This future supersonic airliner undoubtedly will have to comply with Federal Aviation Administration regulations, so we're trying to make it as quiet as future subsonic airliners," said Ames Project Manager Paul Soderman.

**NASA FOSTERS AEROSPACE RESEARCH IN STATES** – NASA announced a new initiative that will strengthen the research capability of six states and increase their competitiveness in space and aeronautics research activities. The NASA Experimental Program to Stimulate Competitive Research (EPSCoR) will provide funding to enable the states to develop an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capability in space science and applications and aeronautical and space research and technology programs. This capability will contribute to the state's economic viability. The six states selected for the three-year, $500,000 annual award are Alabama, Arkansas, Kentucky, Louisiana, Montana and the Commonwealth of Puerto Rico.

## Post Graduate Education Presentation

In the increasingly competitive aerospace job market, more engineers and scientists are viewing post-graduate education as a valuable asset. What type of education would be most beneficial for a successful career in aerospace? Is an MBA just as lucrative as a Ph.D. in engineering? Does it matter from what institution one receives one's degree?

There will be a presentation to answer these and other questions about post-graduate education on March 9, from 5-6:15 p.m. in the Hampton Room of the H.J.E. Reid Conference Center sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics. A representative from the placement office at Old Dominion University will provide information on engineering hiring trends and discuss possible engineering fields to explore with a newly acquired degree.

Following the presentation, David Chestnutt, director of the Virginia Consortium of Engineering and Science Universities will present a description of what the consortium has to offer. The consortium provides programs for students to earn graduate degrees from the Virginia Polytechnic Institute and State University, the University of Virginia, the College of William and Mary and Old Dominion University and still attend all classes on the Peninsula. No reservations are required. Refreshments will be provided. For more information, call Odilyn Santa Maria at 864-5104.

## King Street Bridge Proposals Welcomed

This past Fall, Langley Air Force Base (LAFB) started restricting cyclists to walking their bikes across the King Street Bridge, in compliance with LAFB Regulation-125-22. A proposed revision to the regulation is being prepared to be presented to the LAFB's Safety Office and Traffic Office. A study of sidewalk traffic is being conducted as are state and city codes pertaining to bicycle use on sidewalks. Any persons interested in bicycle use of the King Street Bridge, contact Gale Harvey at 723-7148.

## Speakers Bureau Report for January

The following people have represented Langley as part of the Speakers Bureau Program in the past few months:

**Thayer R. Sheets** made a Small Business Innovative Research Program presentation to both the Virginia Space Grant Consortium and the Virginia Aerospace Business Roundtable.

**Richard Davis** was a judge for the Science Fair Programs of Gildersleeve Middle School, Dozier Middle School, Warwick High School, Hines Middle School and Newsome Park Middle School.

**Dr. Joel S. Levine** spoke to the Tidewater Section of the American Welding Society about "A Planet at Risk."

**Dr. Allen Larar** participated as a judge in the Hampton City-wide Science Fair Program.

**Dr. Patrick McCormick** spoke about "Ozone, Greenhouse Warming and Volcanic Impact" during the Rochester Museum of Science's Distinguished Scholar Lecture Series in Rochester, N.Y.

**Tony Arviola** spoke at Computer Dynamics, Inc., about "Computer Networking."

## Letters

### Thank You for Your Sympathy

From Ray, Craig and Kevin Gentry: "We would like to express our heartfelt gratitude for the overwhelming support that was expressed to us during our time of need. Your presence and the many acts of kindness that were extended to us will never be forgotten."

### Thank You For Retirement Social

From John Garren: "I want to thank my friends and associates who contributed to and participated in my retirement social. It was the perfect culmination for a highly satisfying career. I will forever cherish the visits, the gifts and the events of my last day with NASA, as well as the happy remembrances that I have from working with you."

## Retirement Party for Robert L. Swain

There will be a retirement party for Robert L. Swain on Saturday night, March 19. Social begins at 6 p.m., with dinner at 6:45 p.m. and an 8 p.m. program at the H.J.E. Reid Conference Center. The cost is $12.50 per person, including gift. Gift-only contributions are welcome. Please remit to Jackie Kallick, Mail Stop 114, by March 8.

## The Freedom of Information Act and the Privacy Act Update

**BY MARGARET HUNT**

The Freedom of Information Act (FOIA) provides the public and industry a means of acquiring information about Federal government activities. It is the primary Federal law on openness in government and applies to documents held by agencies under the Executive Branch of the Federal government. Passed in 1966, the FOIA has been amended three times, (in 1974, 1976, and 1986) to strengthen procedures and redefine exemptions.

The original intent of Congress in passing the act was to provide information on government activities to journalists, students, educators, scientists and the general public. A typical FOIA request today, however, involves a corporation seeking the business secrets of its competitors. Approximately 90 percent of the requests received at this Center are in the business/commercial category.

The number of FOIA requests received annually at Langley has increased 40 percent over the past 10 years for a total of 219 in Calendar Year 1993 and requires approximately two years worth of effort. The Agency received 3,771 requests in 1993. While the number of requests remained stable in 1993, the amount of work required to respond to each has grown significantly. This increase in work is a result of the changes in law -- changes which allow the public access to a broader range of material.

Langley's FOIA implementation cost per year is approaching $100,000. Initially, Congress estimated that it would cost the entire Federal government approximately $100,000 a year to implement the FOIA. The latest figures show that number is approaching $100,000,000 a year.

In acquiring information from the Federal government, FOIA is interrelated with the Privacy Act. While the general purpose of FOIA is to strengthen the public's right to know, the Privacy Act is intended to give the individual better control over the gathering, disseminating and accuracy of agency information about him/herself. An individual may use either the Privacy Act or FOIA or both to seek access to information about her/himself in agency records and is entitled to all the benefits of access rights under the two acts.

The two acts differ in scope: all agency records are covered under the FOIA. However, only records from which information is retrieved by the individual's name, social security number or other individual identifier are subject to the Privacy Act. The Center has not received any Privacy Act requests in recent years.

For questions concerning FOIA, contact Margaret Hunt at ext. 46125.

Information on the Privacy Act can be obtained from Jim Meyers at ext. 42555.

### *Five Kilometer Interdirectorate Team Race Results*

The Management Operations Division was the top team in both the five-kilometer Open and Mixed Team divisions with 29 points and 36 points, respectively, at the races held on December 8. Team members were Carl Weih, Todd Lacks, Earl Arrowood, Jerry Hoerger and Allison Ballew.

Lockheed placed second in both categories with 55 points. Team members were Don Brown, Alan Dare, Mahyar Malekpour and Bernice Becher. Fastest runner was Chris Slominski of Computer Sciences Corporation, with a time of 18:52. Fastest woman runner was Dianne DeTurris of National Research Council, with a time of 24:49.

## In Memoriam

### William P. Lake IV

In memory of William Perry Lake IV, Lockheed Engineering, who died on February 4, the family has requested that friends donate blood in his memory. The NASA Bloodmobile will be at the H.J.E. Reid Conference Center on March 23 and a poster will be available for donees' signatures. The poster will be presented to the Lake family. Lake was employed with Lockheed for 20 years as an electrical technician.


News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor ..... *Mamy Skora*

Editor..... *Ann C. Gaudreaux*
*The Bionetics Corporation*

Assistant Editor ..... *Susan A Smigielski*
*The Bionetics Corporation*

Photojournalist *Carole Petrachenko Chapman*
*The Bionetics Corporation*

Photographer ..... *Fred Jones*

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.

# Fifth Graders Tackle an Integrated Mission to Space Station

BY MARNY SKORA

More than 100 fifth graders travelled recently to "Space Station Nelson." It was an imaginary trip but the journey was certainly not without real challenges.

Under the direction of a team of Langley engineers, the students tackled launch and on-orbit exercises. "This is fun" was the message written all over the faces of the R. O. Nelson Elementary students.

Dr. Carl Gerhold, senior research scientist in the Applied Acoustics Branch, sensed the collective enthusiasm. "If you are curious about how things work, engineering is the kind of discipline where you can ask those questions and find creative answers," he explained.

The first challenge was to learn how the space shuttle is launched. Alan Stockwell, Lockheed engineering supervisor, and Michelle Martuccio, of George Washington University, talked about the amount of force needed to counteract gravity to attain lift-off.

To illustrate, the duo challenged each group of students to launch a paper cup rocket using an inflated balloon to provide thrust. The problem was further complicated when the young "engineers" were asked to add progressively heavier payloads—from one to ten pennies.

Lift-off, however, was just the beginning of the adventure. Again using balloons, Gerhold challenged his groups to launch their "vehicles" through a large hula hoop. "Why don't the balloons go where you want them to?" he asked after several students tried unsuccessfully to hit the mark. Engineering minds primed, the fifth graders began to realize the balloon provided thrust but no steering mechanism.

Next Gerhold allowed the curious to launch rockets—this time with stabilizers to control and direct the thrust. With all the power usually associated with blowing out birthday candles, student after student propelled the small rockets using a straw and hitting the mark nearly every time.

"Engineering is fun. But it's a lot of hard work too," he cautioned. "You have to take some pretty difficult courses and you need to start preparing now by studying your math and science."

Once in orbit, students pretended they were in the shuttle and could float freely. Cheri Tanner, Acoustics Division, and Lynda Foernsler, Guidance and Control Division, discussed why astronauts don't experience gravity aboard the shuttle. To help the group understand the phenomenon, Tanner talked about the concept of free fall and why astronauts experience weightlessness in space.

Student volunteers helped the group visualize the effects of gravity and free fall by demonstrating simple experiments.

A mini-lesson on gravity challenged teams of students to determine how high they could throw a ball toward the gym's ceiling. Armed with balls of various sizes, stop watches, and a formula, each team determined both the average of their three attempts and the height of their best throw. Without even realizing it, group after group was absorbed in math calculations. In the "old days" it was called a math exercise; this day it was fun!

Finally, students were given their mission assignment—to construct a structure in space. While the problem appeared to be construction-oriented, it soon became clear that the challenge was really one of effective communications. Anna-Maria McGowan, Structural Dynamics Division, and Rosemary Baize, Experimental Flow Physics Branch, divided the group into teams of mission controllers and astronauts seated back to back.

The Earth-based team was tasked to describe a lego-type structure in such detail that the "astronauts" could construct an identical model. Generalities soon gave way to discussions of size and shape, color and texture, left and right, up and down. "Being an engineer is more than studying math and science. An engineer needs good communication skills," concluded McGowan.

Mission accomplished, the students were returned to Earth in time for the dismissal bell. The demonstration at R.O. Nelson Elementary, planned and executed by the pre-college education committee of the AIAA Hampton Roads Section, was just one of over 800 classes taught in local schools in celebration of National Engineers Week.

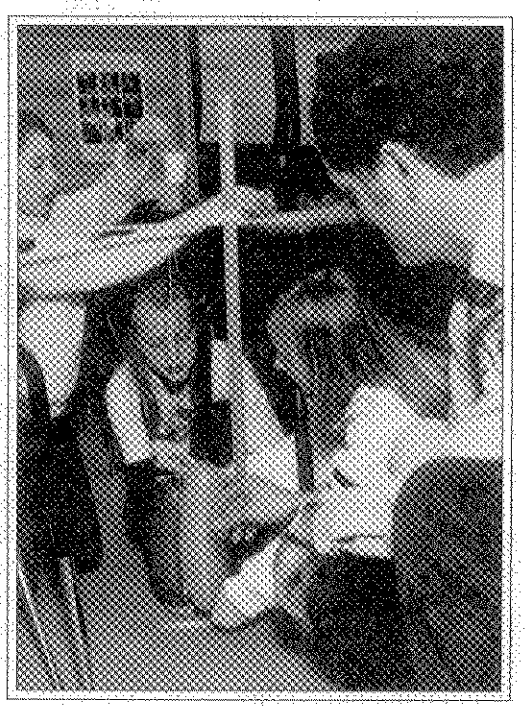
*All photos by Fred Jones*

It's purely scientific . . . no magic involved. Stacey Gaines, left, verifies that there is a hole in the cup as Cheri Tanner fills it with water. Later, Stacey blocks the hole with her finger while the cup is filled to the brim. When she drops the cup into the plastic bag, no water leaks out--the water and cup fall together demonstrating the concept of free fall.

Fifth grader Sheena Mayo takes a deep breath and launches her rocket right through the target.

Parrish Ralston, right, holds a space station-type structure as Anna-Marie McGowan explains the need to build models on Earth before trying construction in space.

As students ready their balloons, Dr. Carl Gerhold demonstrates to a captivated audience how the power of thrust is used efficiently when guidance and control have been added.



Try and try again is the experimenter's credo. The challenge is to determine how to counteract added weight. Simple, increase thrust. Alan Stockwell helps this group of fifth graders launch an even heavier payload using two balloons to increase lift.

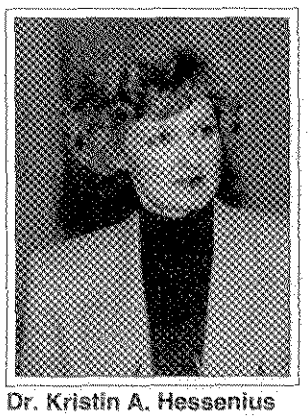
# *Federal Women's Program Hosts Outstanding Female Achievers*

The Langley Research Center is fortunate to have on its staff a number of women who have excelled in their careers. To commemorate March as Women's History Month, the Federal Women's Program Committee has selected a few of these women to participate on a Female Achievers Panel.

The program will be held Thursday, March 3, from 1 to 3 p.m. in the H.J.E. Reid Conference Center. Linda F. Sampson, Federal Women's Program Manager at NASA Headquarters, has been invited to facilitate the panel discussion.

Participating on the panel of outstanding female achievers are: Dr. Kristin A. Hessenius, director, Internal Operations Group; Junilla I. Applin, aerospace engineer, Aerospace Mechanical Systems Division; Donna M. Speller, program analyst, Information Systems Division; Elizabeth C. Napier, secretary to the director of the National Aero-Space Plane Office; and Stella V. Harrison, aerospace engineering technician, Flight Operations and Support Division.

Refreshments will be served following the program. Time should be charged to Job Order A2987.

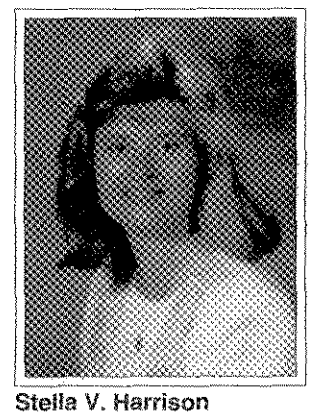


**Dr. Kristin A. Hessenius**

**Junilla I. Applin**

**Donna M. Speller**

**Elizabeth C. Napier**



**Stella V. Harrison**

# Security, Mail and Property Awareness Week Is March 7-11

The Logistics Management Division is presenting a Week of Awareness for the services provided by the Security, Mail and Property organizations. Road signs will be posted and property custodians will receive phonemail messages as awareness reminders during the week. Displays and discussions will be presented in the H.J.E. Reid Conference Center on Tuesday March 8. A variety of other activities have been planned to address how these organizations can better serve your needs.

The schedule of activities is:

**Monday, March 7**

Each employee will receive informative brochures with answers to frequently asked questions about security, mail and property.

**Tuesday, March 8**:

Mail awareness display, 8 a.m. - 3 p.m. Langley's Mail Manager Margaret Hall and Norman Kravitz, U.S. Postal Service Customer Account Representative, will be available to answer questions. Learn more about selection of mailing supplies and proper addressing during the day. From 8:30 - 10:00 a.m., there will be security exhibits and discussions-in-the-round on marking and classification, access/after-hours procedures, foreign nationals, access control, investigations, security clearances, computer security plans, and much more. From 1-3 p.m., there will be demonstrations of the new Property Custodian Module, discussions-in-the-round on contract property, equipment loans, and equipment use and control. The winner of the Property Awareness Contest will be announced.

**Wednesday, March 9**

Property Custodians who have phonemail will receive a phonemail message everyday this week with special reminders on property issues.

**Thursday, March 10**

Security will conduct "Identa-a-Kid" and provide fingerprints and photographs of children in the NASA Langley Child Development Center.

**Friday, March 11**

Friday will be declared a Center-wide Clean-up Day. All NASA Langley employees are encouraged to use this day to reduce classified documents, update their mailing lists and turn in used government equipment. All government and contractor employees are invited to participate. Charge time to Job Order A1619.

**The Logistics Management Division sponsors Security, Mail and Property Awareness Week. Coordinators for the events are, standing, left to right, Howard Puckett, Fabiola Martin, Ron Krodel. Seated are Margaret Hall and Rebecca Bales. All of the coordinators are from the Logistics Management Division.**

## Virginia Air and Space Center News

### Meet Astronaut Frederick Gregory

Astronaut Frederick Gregory, who has logged 455 hours in space, will present "Space — A Learning Experience," at 1 p.m. on Saturday, March 19.

Gregory's presentation couples the ideals of space exploration with the tangible benefits of advances in human knowledge. By relating his own experiences as a three-time shuttle astronaut, Gregory brings the reality of space travel to the audience, and challenges them with a vision for the future. He will outline the technological and educational achievements of the past, explain notable space activities of the present and discuss future space opportunities for mankind. The lecture is for all age groups and features a 15-minute film.

*Virginia Air and Space Center*
*Hampton Roads History Center*

Gregory was selected as an astronaut in January 1978. On his first mission, he was pilot of STS-51-B/SpaceLab 3, which launched in April 1985. He was spacecraft commander of the STS-33 mission in November 1989 and STS-44 in November 1991. In April 1992, Gregory was appointed Associate Administrator for the Office of Safety and Mission Assurance at NASA Headquarters.

The general public can meet Gregory. Basic admission to the center of $4 for adults and $2 for children. Members are free. The center is open noon to 5 p.m. on Sunday and 10 a.m. to 5 p.m. Monday through Saturday. For more information, call 727-0800, ext. 707 or 1-800-296-0800.

### Family Discovery Weekends During March

During March, the center will offer Family Discovery Weekends. This program provides families with an opportunity to have fun and explore the wonders of "discovery." Programs will be held March 5, 6, 12, 13, 19, 20, 26 and 27. Saturday demonstrations will be from 10 a.m. to 3 p.m. and Sunday programs from noon to 4 p.m.

As visitors tour the center, they can stop at different locations where they will find informal demonstrations on a variety of subjects. The following is a schedule of programs: March 5 and 6, "Lighter and Lighter: What is Lighter Than Air?;" March 12 and 13, "Unpowered Flight: Flight without Engines;" March 19 and 20, "Powered Flight: Learn about Flight with Engines;" March 26 and 27, "Flight Beyond the Atmosphere: Discover Space." For more information about these programs, call 727-0800, ext. 709.

## The Langley Karate Club

The Langley Karate Club invites you to discover Cuong-Nhu Oriental Martial Arts. Classes are held in the Langley Gym on Mondays and Wednesdays from 5-7 p.m. All Langley employees and their immediate family members, ages 12 and above, are welcome. Beginner class starts March 7; new students will be accepted until March 30. For more information, stop by the Gym during class or call Roy Albang at ext. 46160 or 596-7736 between 7 and 10 p.m.

# First Schlieren Photo of In-Flight Aircraft Shock Waves

BY ALLISON BALLEW

A new photographic technique, developed by Langley's Dr. Leonard Weinstein, has obtained new and dramatic photos of shock waves produced by a supersonic aircraft.

Test results of a new NASA-developed imaging system demonstrated that shock waves and other disturbances in the otherwise still air, known as the "flow field," can now be seen for aircraft in flight. The photo taken shows the shock waves, very strong sound waves, being generated by a plane traveling at Mach 1.1.

"The design of prototype aircraft and future high-speed aircraft will be enhanced by this technology," Weinstein said. "Sonic boom studies can also benefit from the use of this imaging system."

A mask placed inside an eight-inch diameter telescope allowed only a thin edge of the sun to be seen. An aircraft, flying between the telescope and the sun, crossed this strip of light, causing the image of the shock waves to be captured.

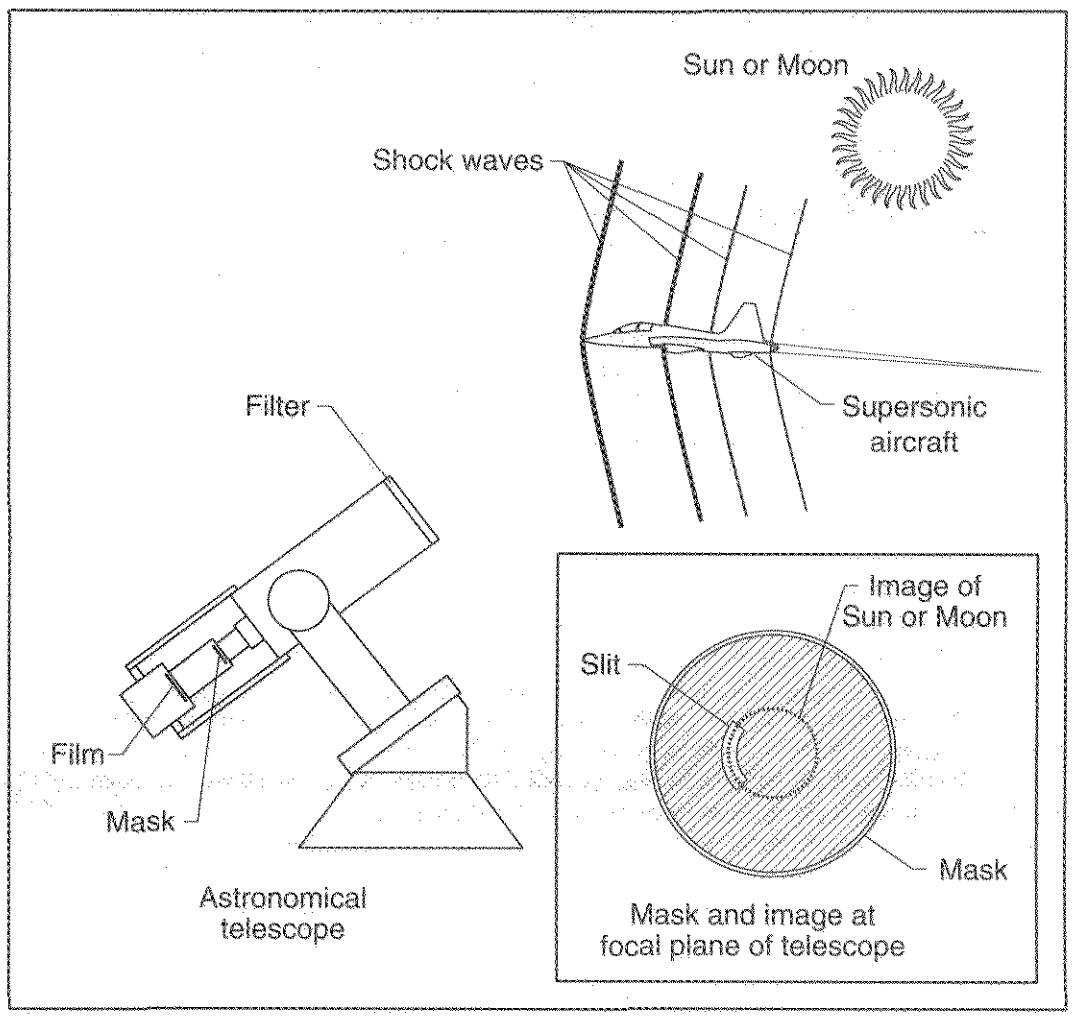
This is the first time Schlieren photos have revealed the shock waves of an aircraft in flight. Schlieren photographs of wind tunnel models are commonly used to view small-scale shock waves which approximate the full-scale phenomenon.

Existing in-flight imaging techniques include smoke or vapor condensation and refraction of sunlight to produce "shadowgraph" images. However, these techniques are limited in sensitivity and field of view for in-flight tests and do not give quantitative information, like the strength of the shock.

This new system, using Schlieren imaging, produces photos showing subtle details of the flow field. Weinstein's method incorporates a number of techniques: astronomical, or telescope, photography; streak camera photography, where the camera is stationary but the camera film moves along with the target's image; and the Schlieren method, where the optical density variations can be seen and measured.

The initial test result for this technique, which clearly proved the concept's validity, was made by using prototype equipment. Future tests using refined hardware should produce sharper photography. Additional tests are planned for the near future.

The test was conducted as a joint effort of Langley and Wallops Flight Facility, Wallops Island, Va. The T-38 Talon was flown out of Langley to the test site on December 13. The plane, flying offshore at about 800 mph (1,280 kph), a little faster than the speed of sound, was filmed at a distance of six miles from the imaging system.




**The illustration (above), demonstrates how the astronomical telescope captures the shock waves using a mask placed inside the telescope. At right, Dr. Leonard Weinstein of the Experimental Methods Branch, poses with the actual astronomical telescope used in capturing the flow field images. Below is the photo of the shock waves from the supersonic aircraft as seen through the special camera mounted on the telescope.**

*Photo by Karl Williamson*

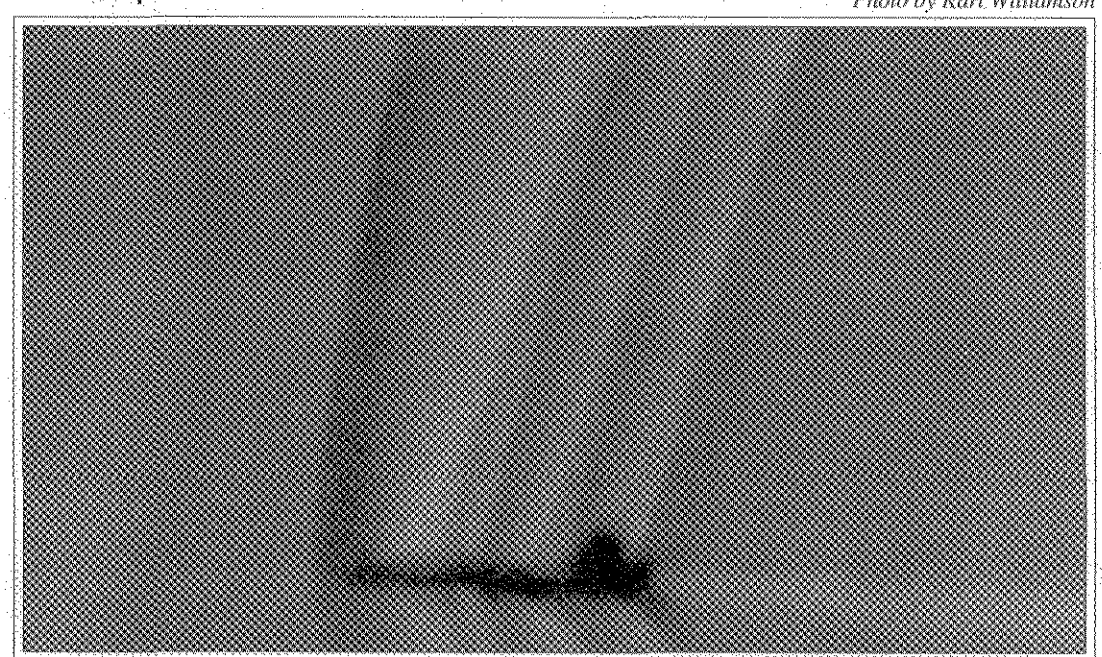


*Photo by Leonard Weinstein*

## MODE

*Continued from Page 1*

rods are employed to more accurately simulate the gear/motor drive train of the space station joint. Test protocols have been designed to capture the joint's dynamic modes over a wide frequency response range. The results from these measurements should be more directly applicable to the full-scale mechanism. The reflight will provide the MODE team with data to complete and verify an analytical modeling capability for a reliable prediction of linear and nonlinear structural characteristics of space structures in low gravity.

### Beck- MODE Project Manager

Beck participated in the first crew training session on MODE held at MIT in September 1993. All five members of the STS-62 crew were there: Col. John H. Casper, mission commander; Maj. Andrew M. Allen, pilot; Cdr. Pierre J. Thout, Lt.C. Charles D. "Sam" Gemar and Marsha Ivins, mission specialists.

MODE has received three awards and citations from NASA Headquarters: the NASA Group Achievement Award, the Office of Aeronautics and Space Technology Commendation for Technology Excellence and the Office of Aeronautics, Exploration and Technology "First to Fly" Award.

"This project is an excellent example of the 'faster, better, cheaper approach to obtaining information important to major NASA programs," Beck said. "Maximum use is made of the flight opportunity by conducting two different experiments with one high-performance controller and mass storage data system. The ancillary experiment on crew motion force measurements will provide needed information at less than one-tenth the cost of a dedicated experiment. Even thought the work is funded by NASA's Office of Space Systems Development in direct support of the space station program, the information obtained will also be used in programs and flight projects sponsored by NASA's Office of Life and Microgravity Science and Applications.

## Call For Papers — Technology 2004

Papers are solicited for presentation at Technology 2004 in Washington, D.C., November 8-10, 1994.

Abstracts will be judged on technical merit and potential commercial or industrial applications. Abstracts are due in the Technology Utilization Office (TUO) by April 25.

Papers are sought in the following categories: advanced manufacturing; biotechnology; computer software and hardware; environmental technology; material science; simulation/virtual reality; video imaging; robotics; artificial intelligence; CAD/CAE/CASE; electronics; life sciences; medical technology; power and energy; and test and measurement.

Contact TUO at ext. 42482 for the abstract form or for more information.

# Training Opportunities Announced

BY ANN W. HEATH

**RAPID LEARNING-RAPID IMPROVEMENT** video seminar will be hosted by Dr. Brian Joiner, a leading consultant to corporate executives on managing for rapid, continuous improvement.

Topics Include:

- Common ways that increase costs, and how to do better
- Limitations of borrowing ideas from other companies
- How to leverage your own uniqueness by learning in your own context
- Creating the environment for rapid improvement
- The key role of soft and hard data, and where most organizations go wrong

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, March 1, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business February 25, 1994.

**FIRST THINGS FIRST-PERSONAL TOTAL QUALITY MANAGEMENT** video seminar will be hosted by A. Roger Merrill, Vice President for Program Development at Stephen R. Covey & Associates. His research has indicated that highly effective people share common principles.

These people:

- Know what is important to them
- Have a sense of mission about their life
- Derive their roles and goals from their mission
- Build strong character by making value-based decisions

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, March 8, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business March 1, 1994.

**BEYOND PRINCIPLE-CENTERED LEADERSHIP-EMPOWERMENT** video seminar will be hosted by Dr. Stephen R. Covey, founder of the Covey Leadership Center.

Empowerment is the key ingredient to creating quality. In this seminar you will learn:

- How to manage your boss
- How to negotiate clear expectations so your interpersonal agreements do the managing, instead of you
- How moving decision-making authority to the lowest levels can affect quality and productivity
- Why letting go of control actually increases your ability to influence the outcomes of situations

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, April 5, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business March 22, 1994.

**THINKING ABOUT QUALITY-THE DEMING PHILOSOPHY** video seminar hosted by Clare Crawford-Mason and Lloyd Dobyns will draw from their new book, *Thinking About Quality: Progress, Wisdom and the Deming Philosophy*, that explains what western managers need to unlearn and learn to implement successful quality programs.

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, April 19, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business April 5, 1994.

**BUILDING A CUSTOMER-FOCUSED, QUALITY-BASED ORGANIZATION** video seminar will be hosted by James Belasco, a professor of Management at San Diego State University, where he directs several executive education programs.

In this seminar, you will delve into "Performance Interlock" and "Scoreboarding" processes for implementing a new customer-based quality initiative.

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, May 17, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business May 3, 1994.

**QUALITY AT THE CROSSROADS** video seminar will be hosted by Jeremy Main, a former member of *Fortune* magazine's board of editors, and G. Howland Blackiston, President of Juran Institute which has become recognized as a leading international source of research, consulting and training in managing for quality.

This first-of-its-kind program will report on the struggles from all levels inside the organizations that have undertaken quality efforts.

This Quality Learning Series is being offered by the Employee Development Branch, Tuesday, May 24, 1-3 p.m., in Building 1194A, Rooms 203/204, and 206.

If interested, please send a NASA Langley Form 24 (Request for On-Site Training) to DeAnna L. Wooster at Mail Stop 309 by close of business May 10, 1994.

For further information, contact Ann W. Heath, Mail Stop 309, ext. 42599.

## Space Station on Foundation's Symposium Agenda

The future of the international space station and Russian involvement in the program will be a topic of discussion at the U.S. Space Foundation's 10th National Space Symposium, April 5-8 in Colorado Springs, Colo.

The opening speaker will be Jean-Marie Luton, the European Space Agency's (ESA) director general. He will examine ESA's participation in the space station project and the invitation extended to Russia to join the international space partners committed to space station construction.

The National Space Symposium is the premier gathering of top space professional to discuss and debate changing space policies, programs and strategies. Participants come from the military, civil and commercial space professions throughout the world. Concurrent with the symposium is Space Commerce which includes discussions of remote sensing/environmental sensing, biotechnology, dual-use technologies, robotics, materials processing, technology transfer and joint ventures. NASA is a co-sponsor. For more information, contact the U.S. Space Foundation at (719) 576-8000.

# *Astronauts Thagard and Dunbar To Train for Flight on Mir*

NASA announced that astronauts Norman E. Thagard, M.D., and Bonnie J. Dunbar, Ph.D., have been selected as the prime and backup crew members for a three-month flight on the Russian space station Mir in 1995. The two veteran astronauts will begin training in Star City, Russia, this month.

Bonnie J. Dunbar, Ph.D.

Norman E. Thagard, M.D.

Thagard will fly onboard Soyuz 18 with two Russian cosmonauts in March 1995. They will spend approximately 90 days aboard the space station. In June 1995, the Space Shuttle Atlantis is scheduled to dock with Mir. The Shuttle crew will include two Russian cosmonauts, who will replace Thagard and the Soyuz 18 crew. That three person crew will return to Earth at the conclusion of Atlantis' mission.

Thagard and Dunbar's assignments are a response to the rapidly expanding U.S./Russia human space flight cooperation. This cooperation consists of a three-phased program. Phase I involves up to 10 space shuttle-Mir missions between 1995 and 1997, including rendezvous, docking and crew transfers. The space shuttle will assist with crew exchange, re-supply and payload activities for Mir.

A Russian cosmonaut flew aboard STS-60 this month. Another cosmonaut will fly on STS-63, scheduled for January 1995. Four or more U.S. astronaut stays on the Mir station are planned, totaling more than two years of on-orbit time.

Phase II is the joint development of the core international space station program. Phase III is the expansion of the space station to include all of the international partners.

As backup, Dunbar will undergo the same training as Thagard to be ready to serve on the flight crew should that become necessary. The training will also allow her to be eligible to serve on a later shuttle flight that docks with the Mir station.

Thagard, 50, served as mission specialist of four shuttle flights. He has a variety of experience in space, having deployed a number of spacecraft, including the Magellan planetary probe to Venus. He has performed numerous multidisciplinary scientific experiments in the pressurized Spacelab module housed in the orbiter's payload bay. He was selected as an astronaut in 1978.

Dunbar, 44, has flown three times on the shuttle. Her first flight, STS-61A, was the first Spacelab mission with experiment work controlled from outside the United States. Her second flight was as a mission specialist on STS-32 to deploy a satellite and retrieve Langley's Long Duration Exposure Facility. Her most recent flight was as Payload Commander on the 13-day U.S. Microgravity Laboratory mission. For the last year, she has served as the Deputy Associate Administrator for Microgravity Research at NASA Headquarters.

As the U.S./Russia cooperative activities progress, it is anticipated that additional NASA personnel will be assigned to support Agency activities in Russia.

## 31st Space Congress Opens April 26

In keeping with this year's theme: "Space Exploration and Utilization for the Good of the World," the Space Congress has assembled an array of technical experts representing all areas of space activity to examine what is being developed in space and how these developments will benefit those on Earth.

The 31st Space Congress is a non-profit organization sponsored by the Canaveral Council of Technical Societies. Its purpose is to facilitate the exchange of space science and engineering information among the government, industry and educational communities.

# Langley Scientists Contribute to Book on Satellite Observations

Langley atmospheric scientists are prominently featured in a new book that chronicles the use of satellites in the study of global atmospheric change.

### The New Book

The *Atlas of Satellite Observations Related to Global Change*, recently published by Cambridge University Press, publicizes the works of a broad array of Earth Science disciplines that are centrally involved in the study of global change. This book provides an illustration of the variety of satellite-derived global data sets now available, their uses, advantages and limitations, and the range of variation that has already been observed with these data. A team of contributors has provided a highly illustrated and accessible account suitable for the general scientific reader.

### Key Chapters from Langley

Two key chapters in this book were written by scientists from Langley's Atmospheric Sciences Division (ASD). One chapter, "Radiation Budget at the Top of the Atmosphere," was written by ASD's Edwin Harrison, Patrick Minnis and Bruce Barkstrom, along with Gary Gibson of Lockheed Engineering and Sciences Company. It presents a historical perspective of radiation budget measurements, results from Langley's successful Earth Radiation Budget Experiment (ERBE) and numerous examples of scientific applications of the ERBE data including the radiative effects of clouds on our climate and use of data in validating climate models

The chapter on "Stratospheric Aerosols" by Dr. M. Patrick McCormick of ASD reviews our understanding of stratospheric aerosols and polar stratospheric polar clouds and their importance to climate and chemistry studies. Using data from Langley's satellite missions involving Stratospheric Aerosol Measurement (SAM II), and the Stratospheric Aerosol and Gas Experiment (SAGE) and SAGE II, the chapter illustrates the global distribution of aerosols and discusses a number of scientific applications.

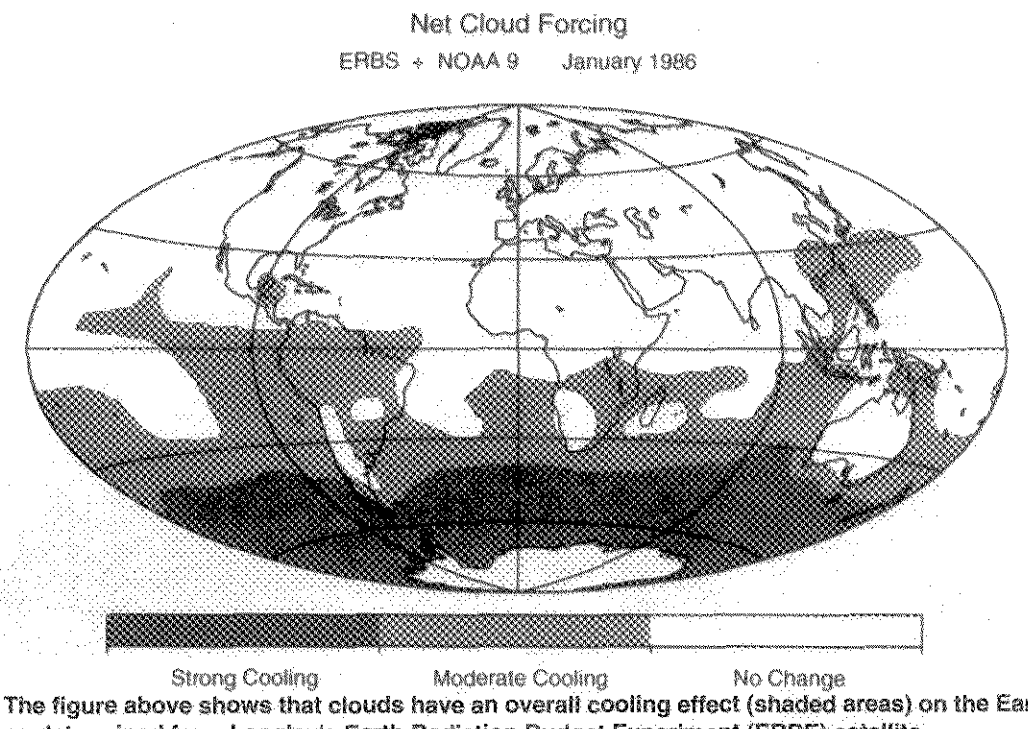
### Other Langley Experiments Featured

Atmospheric measurements from several other Langley experiments are also featured. The chapter on "Stratospheric Chemistry, Temperature and Dynamics" contains Limb Infrared Monitor of the Stratosphere (LIMS) data. The chapter on "Tropospheric Chemistry" shows results from the Measurement of Air Pollution from Satellites (MAPS) and Global Tropospheric Experiment (GTE).

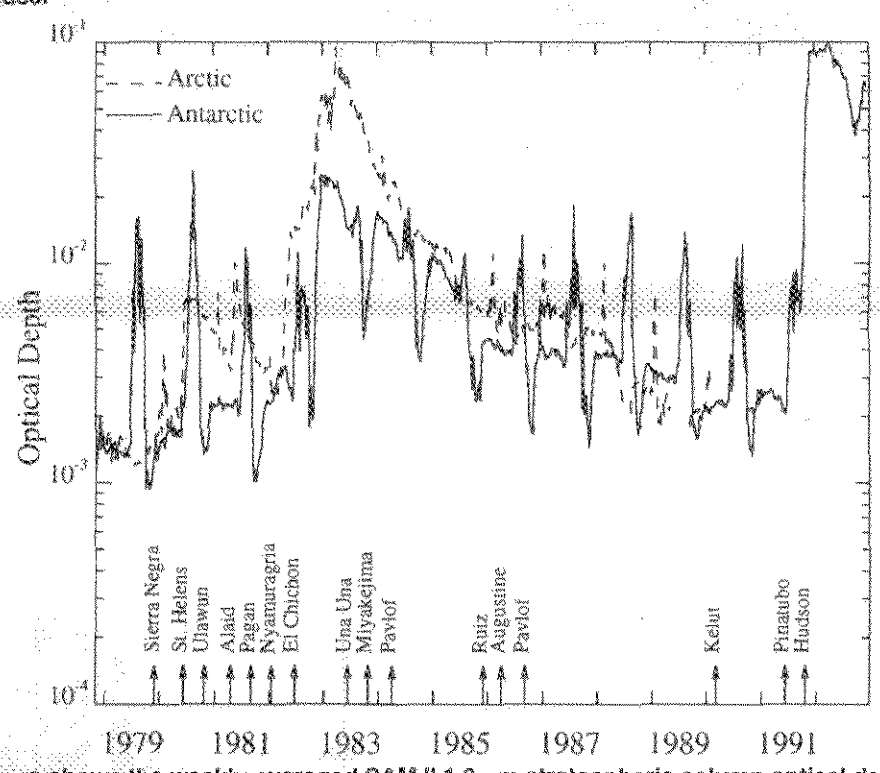
Global climate change is one of the most pressing environmental issues facing the world community. There is a need to monitor the Earth's vital signs, from atmospheric ozone and radiation to tropical deforestation to sea level change. Satellite observations are essential in understanding these global change issues, in determining natural variability, and in establishing the effect of human activities on global and regional changes.

To paraphrase NASA Astronaut Kathryn Sullivan in the foreword of the book: This volume will be useful to specialists in the various Earth science disciplines as well as the general public and government decision makers. It will contribute greatly to the growing understanding of the Earth's complex systems that are being attained through scientific analysis of satellite observations.

"The object of the book," Harrison said, "was to write short chapters to describe data sets from various satellite experiments. In each chapter, it was our aim to give examples of those data sets, identify the applications and limitations of the data sets and to present them in such a way that the information would reach students from high school through their post graduate professors."




**The figure above shows that clouds have an overall cooling effect (shaded areas) on the Earth as determined from Langley's Earth Radiation Budget Experiment (ERBE) satellite measurements for January 1986. In the Tropics and over much of the Northern Hemisphere, the shortwave cooling and longwave warming contributions to cloud-radiative forcing nearly cancel, resulting in an net cloud forcing near zero (unshaded areas). These results are being used to validate and improve climate models. These and other results from ERBE are presented in the chapter "Radiation Budget at the Top of the Atmosphere," by Harrison and his Langley colleagues.**




**This figure shows the weekly-averaged SAM II 1.0-μm stratospheric column optical depth record due to aerosols from October 1978 through December 1992. The Arctic optical depth record is indicated by the dashed line and the Antarctic optical depth record is indicated by the solid line. Volcanic eruptions can inject material into the stratosphere which will produce very small aerosol particles which increase the stratospheric optical depth. Some of the major volcanoes which impacted the stratospheric aerosol content are indicated in the figure.**
**Two eruptions that injected significant amounts of material into the stratosphere are El Chichon in 1982 and Pinatubo in 1991. Another interesting feature in the optical depth record are the narrow peaks apparent in the winter months of most years in both hemispheres. These peaks are signatures of polar stratospheric clouds (PSCs) which form at the very cold temperatures within the polar vortex and are necessary for creating the ozone hole. PSCs were discovered by McCormick and named using SAM II data. Sam II was launched aboard Nimbus 7 in October 1978 and has provided critical data to greatly increase our understanding of the radiative and chemical effects of stratospheric aerosols.**

## College Scholarships Available to Dependents of NASA Employees

March 31 is the deadline for submitting scholarship applications to the NASA College Scholarship Fund, a nonprofit organization established to award scholarships to qualified dependents of NASA and former NASA employees, Agencywide.

To be eligible for consideration, 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.

Four scholarships will be awarded in the amount of $1,500 each for the 1994-95 academic year. The renewable scholarship cannot exceed $6,000 over six calendar years.

Applications should be submitted directly to the Johnson Space Center (JSC) in Houston, Texas, and must be received at JSC no later than March 31. Late applications will be returned unopened.

For more information on eligibility requirements and selection criteria, or to receive application forms, contact Kate Spruill of the Employee Relations Office at ext. 42606.

The scholarship fund was established 12 years ago as a result of a substantial, unsolicited gift by the noted Pulitzer Prize-winning author James Michener. Many NASA employees have also contributed to the NASA College Scholarship Fund, primarily through the Combined Federal Campaign.

One of the 1993 scholarship winners was Jason R. Hess, son of Richard W. Hess of Langley's Office of the Inspector General. Jason attends Virginia Polytechnic Institute and State University.

# Happenings

**AEROBICS ON SUNDAY:** Take part in low-impact, bench, body-sculpting and circuit training classes three times a week, Tuesday and Thursday at 5-6 p.m., and now on Sunday afternoon from 2-3 p.m., in the LAA Gym. Sunday classes begin in March. Progress is measured with body composition analysis and cardio fitness assessment given by certified personal trainers. Evaluation of your present diet in terms of fitness and fat loss goals is also provided. Call ext. 42295 for more information.

**FOR SALE :** Troy State textbooks for "Understanding the Culturally Different" course. They include *Multicultural Issues in Counseling* and *Racial/Ethnic Minority Counseling Research*. Like new; best reasonable. Call 898-8463 after 6 p.m.

**LOST:** The bottom part of a silver and turquoise earring was lost between Building 1219 and the cafeteria. If found, call Carol D. Wieseman at ext. 42824.

**INCOME TAX PREP:** Member National Assoc. of Tax Practitioners, by appointment. Call 874-3121.

**SYMPHONY TICKETS** are on sale for 20-percent off at the Langley Exchange Shop. World-renowned violinist Itzhak Perlman will perform Tchaikovsky's *Violin Concerto* with the Virginia Symphony, February 26 at Chrysler Hall, Norfolk. Tickets including a reception with Perlman are $125; others are $40-$75. The Virginia Symphony Pops will perform with Roberta Flack, March 5 at Chrysler Hall. For more information, call the Exchange Shop at ext. 41585, TicketMaster, or the Virginia Symphony Ticket Store at 380-0040.

**FT. MONROE CHAMBER MUSIC:** Ft. Monroe announces upcoming chamber music concerts by the U.S. Continental Army Band's Brass Quintet. Concerts are free and open to the public. Scheduled are: March 22, Chamber Music, Band Hall, Building 9, Ft. Monroe, 7:30 p.m.; March 29, Chamber Music, Chamberlin Hotel, Merrimac Room, 7:30 p.m.; April 12, Chamber Music, Band Hall, Building 9, Ft. Monroe, 7:30 p.m.; and May 15, Chamber Music, Centenary Methodist Church, Portsmouth, 3 p.m.

**POWERSOFT:** On Wednesday, March 2, at the Officers Club at Langley Air Force Base, Powersoft and Rapid Systems Solutions, Inc. will present "Enterprise-Wide Client Server Strategies and Tactics for the Federal Government." The free seminars will run continuously from 8 a.m. to 11:30 p.m. To register, call (703) 749-6955. For more information, call Eva Neumann at (703) 845-8264.

**VOLUNTEERS NEEDED**: The Food Bank of Southeastern Virginia, located in Norfolk, is in need of volunteers. Anyone interested in this program, please contact Tony Maturo at ext. 42590.

**BENEFIT DANCE:** James Pointe Care Center, Newport News, announces a "Dance Down Memory Lane," sock hop to be held March 6, from 1 to 5 p.m. at the Hampton YMCA. It will benefit the Alzheimer's Association-Hampton Roads Chapter and features "The Rondells." It is open to the whole family. Tickets are $15 each for ages 13 and above, $5 for ages six to 13 and free for ages five and under. For tickets, call the center at 244-1734.

**MISSING:** A 14-inch IDEK monitor ECN# G73952. If you have borrowed or know the location of this monitor, please contact Don Davis at ext. 47296.

**CONDO FOR SALE:** Denbigh, Lee's Mill, two-story condo, 2 BR, 2-1/2 baths, living and dining rooms, kitchen w/ breakfast bar, fenced patio, carpeted, appliances. Must sell; asking $4,700 below assessed value; owner will help with closing costs. Call Sharon Ellis, 887-2597 after 5:30 p.m. or leave message.

**CONDO FOR SALE:** Sea Scape Beach and Golf Villas, Kitty Hawk, N.C., 2 BR, sleeps 6, week 20, $5,500. Call 867-8940.

**SKI TRIP:** Canaan Valley, W.V., March 12 and 13, $179 per person, includes lifts, lodging, most meals. For information and reservations, call Richard Bennett, 599-5585.

**TOWNHOUSE FOR RENT:** King St. near Langley Air Force Base gate, 2 BR, 2-1/2 baths, fireplace, Back River view off deck. Available immediately; rent is $700/ month. Call 890-0674.

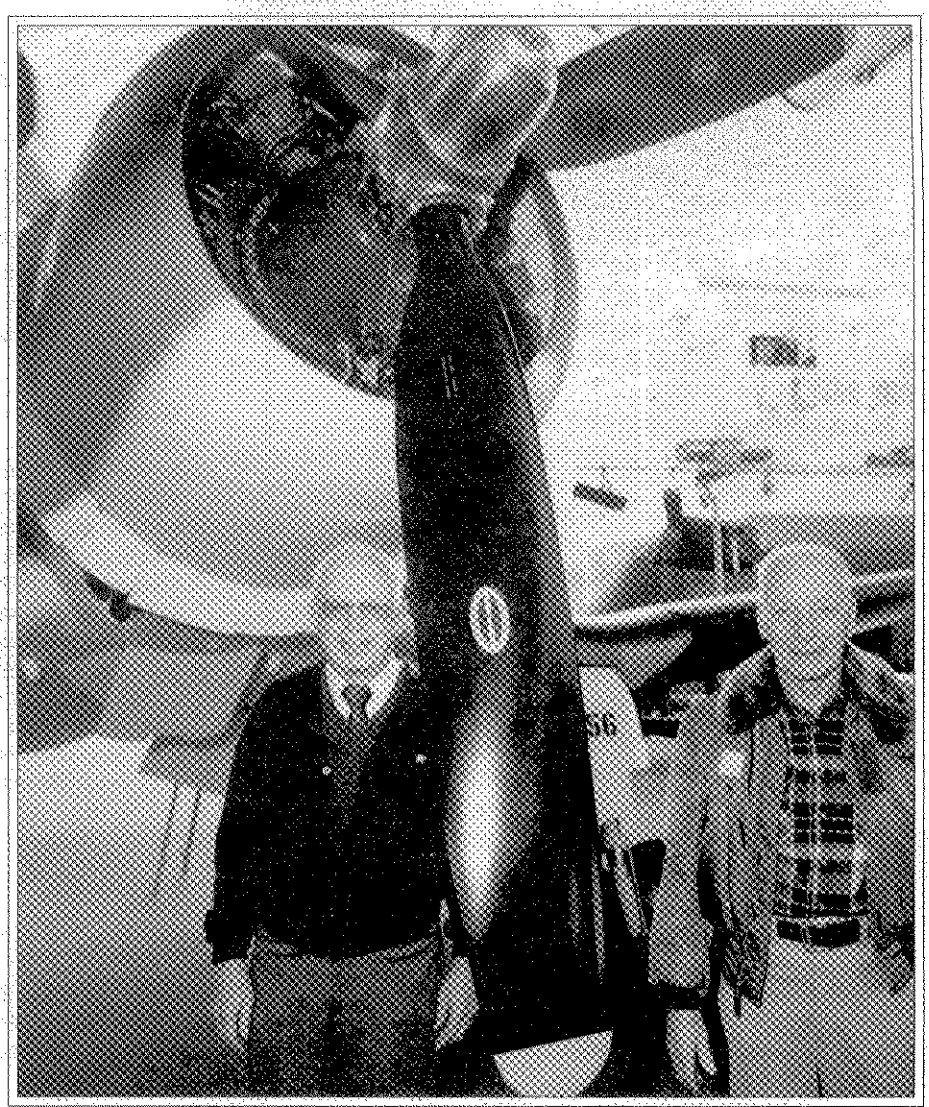
**FOR SALE:** Electronic keyboard Casio CT 650-465 soundbank with stand, hardly used. Paid $300, will sell for $200. Call 850-2859.

**BABYSITTER NEEDED:** Child care needed in my Grafton home, 3:45 to 5:15 p.m., Monday-Friday, non-smoker, need own transportation. Call 898-5188, after 6 p.m.

**FOR RENT:** Old Nags Head Cove, 3 BR furnished cottages, use of clubhouse and facilities; May and Sept., $300/ week; June/July/Aug., $395/ week. Call Ernie Greene, 838-0567.

**HOUSE FOR SALE:** Todds Lane area, 4 BR, 2-1/2 baths, den w/fireplace, living and dining rooms, eat-in kitchen, two car garage, gas heat, $110,000. Call 838-1797.

**FREE ELECTRONIC FILING:** Have us prepare your tax return and we will file it electronically at no extra cost. Three-day refunds available; we will come to you. Call 838-6394.



**At the Virginia Air and Space Center** *Photo by Fred Jones*

**In front of the newly-arrived Chance Vought F4U-1D Corsair stand two of its biggest champions. At left is Capt. Steven T. Corneliussen, USN Ret., who flew the Corsair during wartime service in the Pacific and was commander of a 20-plane Corsair squadron. At right, is John P. (Jack) Reeder, who retired from Langley in 1980 as head of the former Flight Division. Reeder began as a test pilot during World War II and was known as one of the best engineering test pilots in the world. The World War II fighter is now on permanent display at the center.**

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Researcher News

National Aeronautics and
Space Administration
**Langley Research Center**
Hampton, Virginia 23681-0001

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National Aeronautics and
Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 5 ❖ March 11, 1994

# *A Message from the Director*

**Paul F. Holloway**

Reminiscent of the title of our 75th Anniversary book, the "winds of change" continue to blow across Langley Research Center. Both the Agency and the Center itself have been confronted by challenges from the NASA Administrator, from President Clinton and his Administration, as well as from Congress and from the American people. The federal government is in the midst of a reassessment and has been asked to make changes. Change is what Langley is all about. I believe that NASA should lead governmental change; and I want Langley to lead NASA.

To support this thrust, I outlined three basic goals for a new Center organization. To match today's changing policies, I wanted the organization to be flexible; to take an aggressive approach to technology transfer; and to contain continuous improvement activities as part of its foundation. Quite simply, I believe that we need long-term capabilities that can be easily adapted to the dynamics we can expect from Washington.

To complement the new structure, I knew we also needed the support of our employees. The redesign team, headed by Dr. Belinda Adams, focused on your comments gathered from earlier polls and surveys. Your ideas were very good. You touched on essential problems that we are facing. And the organization that is in effect today reflects your proposed solutions.

Our reorganization was also influenced by other factors. Under the Clinton Administration and Dan Goldin's leadership, we have very strong support for aeronautics, support unparalleled in NASA's history. President Clinton asserts that the future of the country depends on government-industry partnerships. In fact, the economic situation in the United States demands that these partnerships continue. Langley is ideally suited to support this direction—our aeronautics program has been pushing technology transfer and government-industry partnerships since its inception. That's why NACA was created 77 years ago.

And, Langley is well postured to continue to lead the Agency in aeronautics research. We have the lead role in high-speed research and in 6 of the 10 areas which make up the advanced subsonic technology program. Also, we continue to lead the Agency's participation in the joint hypersonics program with the U.S. Air Force and we took the initiative to bring new life to general aviation.

Further, there is a move to reduce the operational cost of NASA. To that end, we have begun to cut our operational costs this year to help face the required 15-percent cut in Fiscal Year 1995. But, fiscal responsibility is just one reason to implement the new organization.

Langley is unique in the depth and breadth of its capabilities. While we intend to preserve the disciplines the Agency has come to expect from us, everything we are being asked to do is increasingly interdisciplinary and multidisciplinary. The Research and Technology Group (RTG) has been formed to strengthen the discipline capabilities of the Center by allowing, for example, the controls, the structures and the analysis people to work with each other and begin speaking the same language. The Internal Operations Group (IOG) can then support the chosen directions in multidisciplinary pursuits. Langley should now be able to quickly form teams and to get the job done even more efficiently. In addition, our Aeronautics Program Group (APG) and Space and Atmospheric Sciences Group (SASPG) have allowed us to narrow our interactions with both Headquarters and industry. In this way, we have established single points of contact for programs of the future.

Finally, the Technology Applications Group (TAG) was formed to provide a help station for external customers as well as for people on Center who have an interest or a problem we can help solve. TAG will also serve as a vehicle to track how well we are doing in the technology transfer area. In the past, we frequently licensed patents to industry but seldom followed through to their applications. We have been unsure how industry used our technology, what size market was formed, if jobs were created, or if exports were derived to help the balance of trade. These are very important metrics that we must have and TAG will measure the results.

In implementing the new organization, I have heard nothing but positive comments both here at Langley and at Headquarters. The Town Meetings have been successful in communicating the proposed plans and allowing for your comments. Additionally, Headquarters reaction to our new structure has been phenomenally positive. When the reorganization package left Dr. Wesley Harris' office to be circulated, it met with almost instantaneous approval.

This reaction confirms our vision for the Center. First and foremost, we want Langley to be firmly entrenched as the lead research center for aeronautics in the country. Second, we want Langley to be recognized nationally and globally for the work we've been doing in atmospheric sciences. Third, we intend Langley to play a continuing and sizable role in space technology. Finally, we are the lead in the Agency for independent systems analyses.

In the next five years, we want to try to do some pioneering work—to initiate some pilot programs. We want Langley to lead NASA in technology transfer. Additionally, we would like to create a small, very advanced concepts group, with emphasis on non-linear thinking. And, we want Langley to initiate innovative pilot programs in the personnel area. As people begin to retire, we are facing a potential crisis in replacing our critical skills across the board because of hiring constraints.

I envision Langley being acknowledged as the leader in innovation within NASA and for NASA to be recognized as the leader in innovation within the government. I believe that each of us is vital to the success of this new endeavor and, as always, together we will meet the challenge.

*— Paul F. Holloway*
*Center Director*

# Langley Announces New Organization

Langley has implemented a major reorganization of its management and operating structure to better reflect the needs of its customers and to respond to changing national priorities. The changes were approved Feb. 15 by NASA associate administrator for aeronautics, Dr. Wesley Harris. All employees were reassigned effective Feb. 20.

## *Why Change Now?*

In making the announcement, Center Director Paul F. Holloway said, "Our rationale for change is a reflection of the changes in the roles and mission of NASA as an Agency and the evolving program at Langley. They are also a direct result of the changes occurring in the Federal government due to the findings of the National Performance Review conducted by Vice President Al Gore."

These changes are not expected to affect the Center's overall budget nor the number of employees working at the Center.

According to Dr. Belinda Adams, Langley assistant director and leader of the center redesign team, Langley is increasing its support of non-traditional customers, i.e., non-aerospace companies looking for new technology with potential for commercial profit. Langley's 77-year history of direct partnerships with industry readily fits the Administration's goal of capitalizing on federal laboratories to enhance the nation's economic competitiveness.

## *Meeting NASA Goals*

Dr. Adams also cited the "need to do more with less," in response to continuing Federal budget pressures, as motivation for moving to a customer-focused and process-oriented organization in which continuous improvement and process redesign can thrive. She said this will aid Langley's quest for the NASA administrator's goal of a "better, faster, cheaper" NASA.

Langley's new organization chart lays out the Center's commitment to both traditional and non-traditional customers. *(See Page 3.)*

## *New Organizational Elements*

• **AERONAUTICS PROGRAM GROUP** is responsible for aeronautics programs. The group, with about 75 members, consists of one division and four offices:

—**Aeronautics Systems Analysis Division**– studies total aircraft systems interactions for various vehicle classes to help define and conduct the center's aeronautics programs.
—**Transport Office**
—**High-Performance and High-Speed Aircraft Office**
—**Hypersonics Office**
—**Critical Disciplines, Facilities and High-Performance Computing and Communications Program Office**

The Aeronautics Program Group is responsible for planning and guiding aeronautics programs for the Center. The group will lead the Center's strategic planning for aeronautics and will be the single point of contact for committing the Center to aeronautics programs. It will interact with customers and perform aircraft vehicle studies to obtain an integrated set of research objectives. It will also provide program management for focused programs when the implementation is distributed across several organizations at Langley. The vehicle class leaders in the group will work with external customers and the other Langley groups to define specific programs to accomplish the objectives. The group is responsible for resource allocation and for reporting aeronautics

*Continued on Page 3*

# News Briefs

## Around the Agency

**NASA SELECTS SMALL BUSINESS INNOVATION RESEARCH PROJECTS –** NASA announced the selection of 42 additional proposals for negotiation of Phase II contract awards in NASA's Small Business Innovation Research Program (SBIR). These selections are in addition to the 130 announced in December 1993, making a total of 172 Phase II selections in the current program. The additional 42 Phase II projects are expected to have a total contract value of about $21 million. They will be conducted by 38 small, high-technology firms located in 16 states. SBIR goals are to stimulate technological innovation, increase the use of small business, including minority and disadvantaged firms, in meeting federal research and development needs and increase private sector commercialization of the results of federally-funded research. Phase II projects continue the development of the most promising of SBIR's Phase I projects.

**NASA TRACKS LAND-SURFACE MOVEMENT IN JANUARY EARTHQUAKE –** Oat Mountain in the Santa Susana range, just north of the San Fernando Valley, jumped several inches during the 6.6 earthquake that struck Los Angeles on Jan. 17, said a scientist at NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif. Other locations, including some communities, also were jerked into new positions, said Dr. Andrea Donnellan, a JPL geophysicist. The 3,618-foot-high mountain jumped up 14.8 inches and moved north 6.2 inches and west 5.5 inches. "This is mountain building in progress," Donnellan said. She and her colleagues measured the movements of the mountain and several other Southern California locations following the earthquake using Global Positioning System (GPS) instruments — ground receivers that track orbiting navigation satellites.

**NASA/INDUSTRY PIONEER TECHNOLOGY REINVESTMENT PROGRAM –** NASA and Hi-Shear Technology Corp. Torrance, Calif., have teamed together in a cooperative agreement as part of the Technology Reinvestment Program (TRP) to develop a new generation of portable rescue emergency equipment. This is the first such government/industry TRP partnership. The equipment will use NASA-developed pyrotechnical technology to modernize current hydraulic-powered cutters used by fire and rescue teams to free accident victims from wreckages. The $1.6 million program will be developed with the assistance of the Torrance fire department. The new generation of equipment will be cost-effective for smaller fire departments and rescue squads as well as portable enough for military and civil search and rescue helicopter operations.

## Upgraded Video Capabilities at the H.J.E. Reid Conference Center

A major renovation of the lighting system at the H.J.E. Reid Conference Center will enhance live video telecasts to be broadcast from the Center.

New fluorescent fixtures and video track lighting have been installed. The new system will provide the proper lighting for programs to be video taped as well as for live broadcast on the internal LaRC Cablevision and on the NASA TV network. Programs can originate and be received at the Reid Conference Center via satellite uplink and downlink.

Langley internal Cablevision is a cable television system that extends from the central distribution center in Building 1201 to approximately 76 buildings in the West Area, Building 1300, and eight buildings in the East Area. The NASA TV network is a TV service of the NASA Headquarters. NASA TV is available free of charge to people with satellite receiving systems and to commercial cable TV systems. For more information, call Pam Verniel, Conference Manager at the Reid Conference Center, at 46362.

## Leiss Honored by ECVP

Abraham Leiss was elected as the newest Honorary Life Member by the Engineers Club of the Virginia Peninsula (ECVP). Honorary Life Members are limited to 15 people who have performed noteworthy or lengthy service in a field of engineering. Leiss replaces Kitty O'Brien Joyner, a retired executive engineer from Langley who died in 1993.

Leiss retired from Langley in 1980 after 36 years of government service. He worked with the original space division called Pilotless Aircraft Research that pioneered space research at Langley. When he retired, Leiss was deputy head of the Scout Project Office (Scientific Orbital Utility Test). That project launched 101 Scout launch vehicles and the Scout holds the best success record for launch vehicles, 98-percent.

Leiss is past president of the ECVP, the Peninsula Engineers Council and the Peninsula Council of Veterans Organizations. He is also on the Board of Directors for NASA Langley's Alumni Association. He was the recipient of the 1993 Volunteer Award for the city of Newport News.

"It is an honor to be a member of an organization that does so much to influence young people to follow a career in science and engineering," Leiss said. "And I am proud to be a member of a group that is involved in technical education in schools throughout the area."

Fellow Honorary Life Members from Langley are: William J. Alford Jr., and retirees Charles J. Donlan, Dr. John E. Duberg, John P. (Jack) Reeder, Dominic Maglieri, Norman Silsby, Robert L. Girouard and Eugene E. Lundquist.

## 1994 Contractors Excellence Award

Langley Director Paul F. Holloway recently announced that Wyle Laboratories is the recipient of the 1994 Langley Contractors Award for Quality and Productivity.

The purpose of this award is to recognize model Langley contractors that practice continuous improvement, constantly strive to exceed customer expectations and are willing to share their methods of achievement with other U.S. industries.

In addition, Langley is pleased to announce that Sverdrup Technology, Inc., was named as a finalist for the award. Sverdrup also demonstrated true dedication to excellence and is eagerly pursuing continuous improvement initiatives.

The 1994 Langley Contractors Award will be presented to Wyle Laboratories and Sverdrup Technology will be recognized as an award finalist during the Center's Annual Awards Ceremony to be held April 21.

## Letters

### Thank You for the Retirement Social

From Wanola and Reggie Rose: "Wanola and I would like to thank all our friends who attended and contributed to my retirement social on February 14. You made it a very special night for us. I enjoyed working with everyone over the years and will surely miss seeing you. Let's keep in touch."

## *March Colloquium: Is Crime a Concern in the Information Society?*

**BY CATHARINE G. SCHAUER**

**Marc Rotenberg**

Do we punish to protect and punish to preserve? This and other issues will be addressed at Langley's March 15 colloquium on "Crime and the Information Society."

Marc Rotenberg, director of Computer Professionals for Social Responsibility, a national organization of professionals in the computing field and a professor of law at Georgetown University, believes that what people choose to protect and preserve in the information society may be very different from what was safeguarded in the past. "Is access to a database a criminal act and should people who copy electronic information be punished?" he asks.

Rotenberg believes that in some cases traditional legal principles provide guidance, although, in others, citizens may have to ask more fundamental questions about the values that must be preserved in the information society.

The colloquium begins at **10 a.m** at the H.J.E. Reid Conference Center, 14 Langley Blvd. This month Langley's colloquium is scheduled for a Tuesday. Please be alert for the scheduling of future programs.

Rotenberg will also present a similar lecture at 7:30 p.m. Monday, March 14, at the Virginia Air and Space Center's IMAX® theatre 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.

## GREAT NEWS! Additional Scholarships Will Be Granted

**The NASA College Scholarship Fund, Inc., recently announced that 25 new scholarships will be awarded this year in addition to the four scholarships previously announced. A total of 29 $1,500 scholarships will be awarded for the 1994-1995 school year to qualified dependents of NASA and former NASA employees.**

**The additional scholarships are the result of a substantial gift awarded by the Freedom Forum to honor the crew of the Hubble repair mission (STS-61) and to celebrate the 25th anniversary of the Apollo moon landing.**

**For additional information or to request an application package, please contact Kate Spruill of the Employee Relations Office, ext. 42606.**

## In Memoriam

### George Adamowski

George Adamowski, 74, a resident of Grafton and a Peninsula resident since 1942, died Monday, February 14.

Adamowski retired in 1980 after 30 years at Langley. He was an Army veteran of World War II.

### Walter L. Leigh

Walter L. Leigh, 77, a lifelong Peninsula resident, died Sunday, February 13.

Leigh retired as an aerospace technician in 1977 after 31 years at Langley.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor. . . . . Marny Skora

Editor. . . . . Ann C. Gaudreaux

Assistant Editor. . . . . Susan A. Smigielski

Photojournalist . . Carole Petrachenko Chapman

Photographer . . . . . Fred Jones

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 Reorganizes

*Continued from Page 1*

program results. The Group's director is Dr. Jeremiah F. Creedon with Wallace C. Sawyer as deputy.

• **SPACE AND ATMOSPHERIC SCIENCES PROGRAM GROUP** is responsible for space-related programs and is expected consist of about 200 people. The group will be made up of:

—**Space Systems and Concepts Division:** Mission and systems study areas include space transportation, spacecraft and platforms, remote sensing and space flight utilization.

—**Technology thrust areas:** Space Transportation, Spacecraft, Remote Sensing

—**Atmospheric Sciences Division:** Responsible to sustain a world-class atmospheric sciences program focused on understanding global change.

—**Space Flight Projects Office**

The Space and Atmospheric Sciences Program Group will guide and support space programs for the center. It will lead space strategic planning, including identification and integration of customer-driven high-payoff goals, technology requirements and science objectives. It will also conduct the atmospheric sciences program and, in partnership with the Internal Operations Group, will lead space flight project management. Additionally, this group will conduct systems analyses in concert with Langley technology efforts and in support of NASA Headquarters program offices. The space technology thrust office leaders interact with external customers, NASA Headquarters, other centers, other organizations at Langley and other agencies to form partnerships, to plan and to manage focused technology programs. The Group director is Dartell R. Branscome with Joseph B. Talbot as deputy.

• **TECHNOLOGY APPLICATIONS GROUP** leads the Center's technology transfer effort, with the emphasis on non-aerospace industry. It is expected to have about 50 people assigned. Responsibilities include planning and implementation of the Center's programs in:

—**Small Business Innovative Research**

—**Patent and Licensing**

—**Technology Applications and Commercialization**

Technology Applications Group will lead the transfer of Langley-sponsored technology to commercial customers, both aerospace and non-aerospace. This group greatly expands the Center's mission to transfer technology to non-aerospace U.S. companies for creation of commercial opportunities. Examples of non-aerospace industries include automotive, materials, software and instrument businesses. They will also represent the Center to the aerospace industry's second tier contractors such as those with commercial and/or military applications. Plans are to double the size of the Small Business Innovative Research team to accommodate the growth in this program. Also, the Group plans to form a technology council to help identify the industries Langley should pursue, and what patents and technologies are most viable for commercial applications. The Group director is Charles P. Blankenship and Dr. Joseph S. Heyman is the deputy.

• **RESEARCH AND TECHNOLOGY GROUP** is responsible for basic research and technology and for implementing aeronautics and space technology programs. It will consist of about 800 people and has seven research divisions:

—**Gas Dynamics Division:** High-speed, high-temperature gas dynamics for hypersonic flight.

—**Fluid Mechanics Division:** Advanced flow control, acoustics and aerodynamic design methods.

—**Aerodynamics Division:** Aircraft aerodynamics and propulsion integration from subsonic to supersonic speeds.

—**Structures Division:** Aircraft and spacecraft structures.

—**Materials Division:** Structural materials development for aircraft and spacecraft.

—**Flight Dynamics and Control Division:** Aircraft flight dynamics and aeronautical and space guidance and control.

—**Information and Electromagnetic Technology Division:** Information technology for airborne and spaceborne applications.

The Research and Technology Group is responsible for basic research and technology development in a broad range of aeronautical and selected space disciplines. Through an interdisciplinary approach, the group will produce proven and usable technology for aerospace and non-aerospace industry customers. It will seek new technology opportunities for aeronautics and space and support Langley's Aeronautics and Space and Atmospheric Sciences Program Groups in program planning, development and advocacy. It will implement Langley's research and technology program in partnership with the Internal Operations Group and work cooperatively with the Technology Applications Group to transfer research and technology program products to non-aerospace customers. The group will use self-directed work teams drawing people across organizational lines. The Group director is Dr. Douglas L. Dwoyer with Dr. John B. Malone serving as deputy.

• **INTERNAL OPERATIONS GROUP** provides technical and administrative services to Langley. It is expected to have approximately 1,600 people assigned to it. The group consists of:

—Planning & Resources Management Office

***Administrative Services:***

—Acquisition Division

—Logistics Management Division

—Scientific and Technical Information Division

***Facilities Engineering and Operations:***

—Facilities Program Development Office

—Facility Systems Engineering Division

—Experimental Testing Technology Division

—Operations Support Division

—8-Foot High-Temperature Tunnel Shakedown Project Office

***Engineering and Information Systems:***

—Fabrication Division.

—Aerospace Mechanical Systems Division

—Information Systems Division

—Aerospace Electronic Systems Division

—Flight Operations and Support Division

The Internal Operations Group is responsible for providing a broad range of technical and administrative services to Langley. It will be involved in the planning of new and revised Center programs and team with the other groups to implement the Center's research and technology program. This group also provides all services for the operation of "the city of Langley." The Internal Operations Group, in close cooperation with Center customers, will lead the development of an operational strategy to ensure the long-term health of Langley through "revolutionary versus evolutionary" process improvements. The Group director is Dr. Kristin A. Hessenius, with deputies Sammie D. Joplin, John F. Stokes and Dr. Robert T. Wingate.

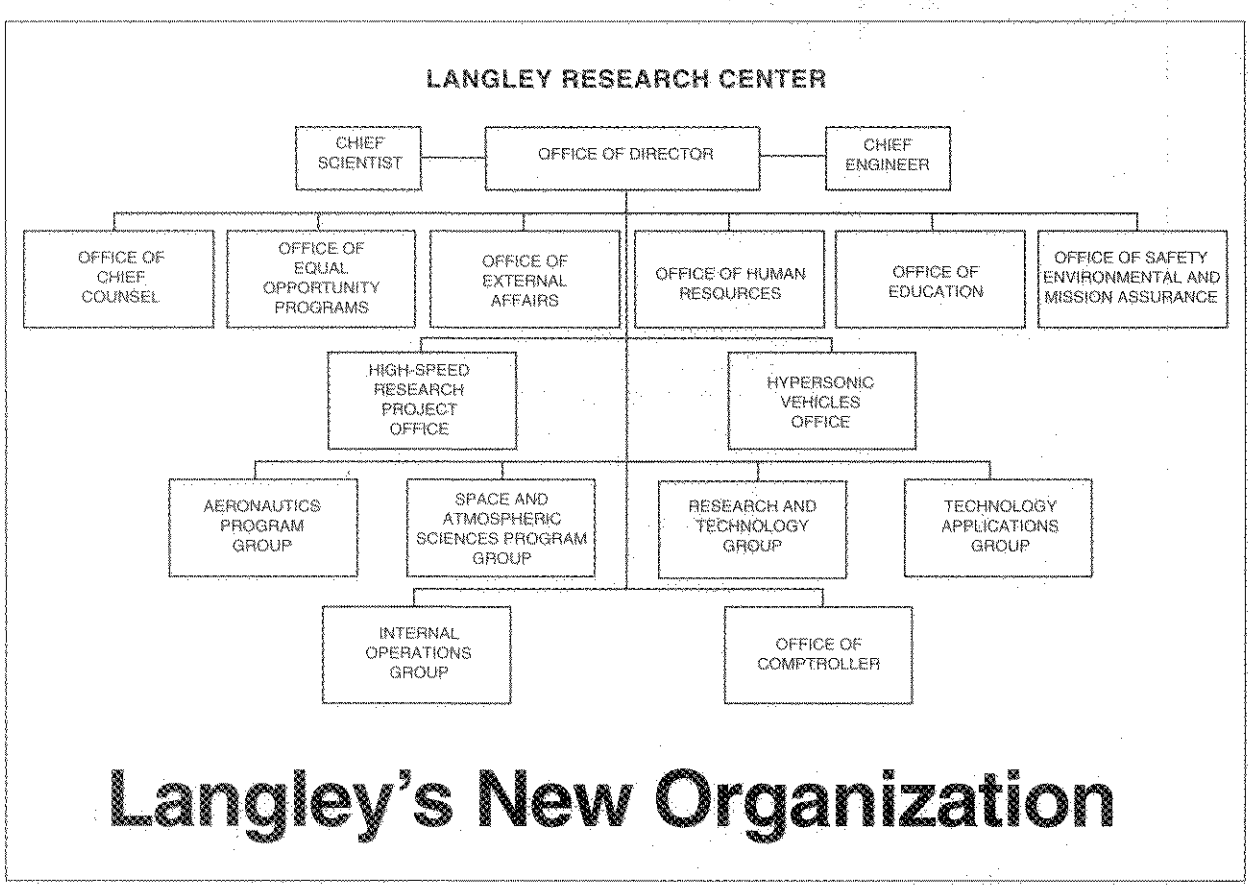
The following organizational elements remain the same or nearly so:

• **OFFICE OF THE DIRECTOR:** In addition to the Offices of External Affairs, Equal Opportunity and Education, it now includes three offices previously located elsewhere: the Office of Chief Counsel; the Safety, Environmental and Mission Assurance Office; and the Office of Human Resources.

• **HIGH-SPEED RESEARCH PROJECT OFFICE:** The lead agency office for development of supersonic technologies leading to a second-generation high-speed civil transport.

• **HYPERSONIC VEHICLE OFFICE:** Formerly the National Aerospace Plane Program Office, it continues to serve as the lead agency office for development of hypersonic technologies.

• **OFFICE OF THE COMPTROLLER**




**Langley's New Organization**

***"Our rationale for change is a reflection of the changes in the roles and mission of NASA as an Agency and the evolving program at Langley."***

*– Paul F. Holloway*
*Center Director*

Many thanks to the following employees who volunteered to "teach" classes during National Engineers Week:

National Engineers Week

William F. Adkins
Elvin L. Ah Jr.
George Allison
Ruth Amundsen
Rich Antcliff
John Austin
Raj Bagga
Rosemary Baize
Robert W. Bakewell
Allison Ballew
David Banks
Danny A. Barrows
Steven X.S. Bauer
Willard Bauserman Jr.
H. Lee Beach Jr.
Sheri Beam
Harold Beazley
Laurence J. Bement
Ted Biess
Kelly Binkley
Jay Brandon
Darrell Branscome
Frances Brice
Philip W. Brown
Donald Cahoon Jr.
Michelle Calloway
Robert L. Calloway
Chuck Carpenter
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Marc Cimolino
Brian J. Connor
Bruce Conway
Stuart A. Cooke Jr.
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Audrey Coppedge
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Karen Credeur
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John B. Deaton Jr.
Victor Delnore
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Glenn Diskin
Ben Divito
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Scott Dorsey
David Dress
Kenneth L. Dudley
Dana Dunham
Bill Dziedzic
William Edwards
Marco A. Egoavil
Robin C. Elder
Bob Fairbairn
Duncan Fairlie
Catharine Fay
Gerome Fife
Gary A. Fleming
Lynda Foernsler
Jerome T. Foughner Jr.
Archie Fripp
Henri Fuhrmann
Richard L. Garfield
Greg Gatlin
Carl Gerhold
Terence A. Ghee
Dona C. Gibbs
Michael G. Gilbert
Larry Gordley
Gretchen Gottlich
William H. Gough
Teresa Graham
Kenny Green
Donald W. Grigsby
John Grubb
David E. Guthrie Jr.
Richard Hanna
Karen Harrington
Stephen Harvin
Roger Hathaway
Walter Heard
Vaughn P. Hendricks
Jeff L. Herrin
Lana Hicks
Glenn Hines
Keith D. Hoffler
Edward F. Hogge
Michael Holloway
S.E. Holloway III
Bruce Holmes
William R. Hood
John Hoppe
Garnett Horner
C. Michael Hudson
Lawrence D. Huebner
Linda Hunt
Craig A. Hunter
Mark Hutchinson
Rick Irby
Karen E. Jackson
Christyl Johnson
W. Steven Johnson
Patrick H. Johnston
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Greg Jones
Lisa E. Jones
Jerry Kegelman
Guy T. Kemmerly
Mary G. Kennedy
William H. Kinard
Steve Klausmeyer
Bill Kluge
Roberta Knight
Grady Koch
John J. Korte
Nancy Kruse
John E. Lamar
Allen Larar
John Lee
Beth Lee-Rausch
Carlos A. Liceaga
Mike Logan
Lt. John Lussier
Ian O. MacConochie
Michael Mann
Cam Martin
John G. Martin
Michelle Martuccio
Angela Mason
Tony Maturo
Janice L. McCollum
M. Patrick McCormick
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Brian McGrath
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Keith Norwood
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Matt O'Rourke
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Wendy Pennington
William C. Phaup
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Lamont R. Poole
Joe Posey
Frank S. Preston
Dan Pritchard
P. Frank Quinto
Fernandus Rattliff
William E. Rew
John A. Ritter
Jim Rogers
Courtney Rollins
David Rosenbaum
Stephen L. Ruggles
Christopher L. Rumsey
Jim Russell
Mike Scott
Jeff Seaton
Bill Shinn
Mark J. Shuart
David D. Shuster
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Joycelyn Simpson
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Bob Stuever
Sherry Sullivan
P. Daniel Sydow
Sharon Tanner
Lawrence Taylor III
Darrel R. Tenney
Geoff Tennille
Kelly Topp
James C. Townsend
Clayton P. Turner
Dave Turnock
Michael D. Uenking
William M. Vance
Harry Verstynen
Dan Vicroy
Richard A. Walker
Robert J. Wallis
Myra Walton
Marty Waszak
Catherine E. Watson
Pete Weilard
Sharon S. Welch
Noel West
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Richard White
Woodrow Whitlow Jr.
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Scott Willard
Norman F. Willey Jr.
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Tom Yager
Steven F. Yaros
Julie Young
W. Robert Young
Otto Youngbluth Jr.
Glenn Yue
Sandra G. Zumbrun

# Their Challenge: Teacher for a Day

**BY MARNY SKORA**

The approaches were many; the results were clearly singular – to stress the importance of studying math and science to succeed in today's increasingly technological world and to improve communication skills.

The **235 volunteers** listed here taught over **800 classes** in **154 schools** in **12 local school districts** during this year's National Engineers Week school visitation program. Tremendous thanks go to these civil servants and contractors – many of whom participated on their own time. Thanks, too, to their managers and supervisors for helping to make this effort so very successful.

## How did it go?

Local educators are applauding the outstanding presentations. They say their students have been:

- entertained
- mystified
- involved
- educated
- amused
- startled
- captivated, and
- motivated.

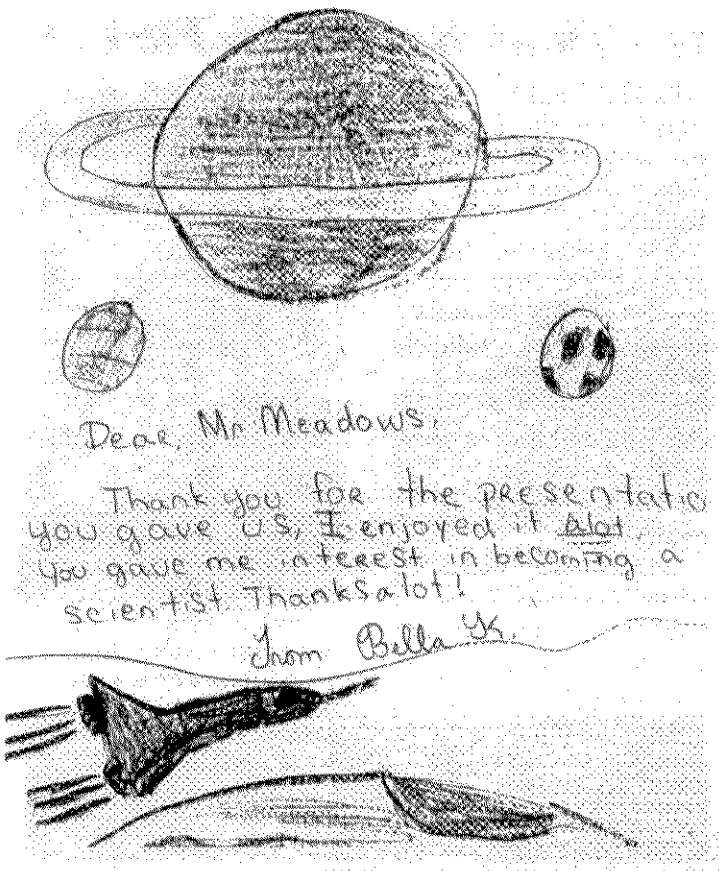
Karen Upton, teacher at Norfolk Christian, complimented James Miller's presentation on satellites, "We ALL learned a great deal!" And the first grade team teachers at Epes Elementary in Newport News were delighted when Steve Ruggles brought in *Hero I* to show how a robot functions.

## How can the program be improved?

Wendy Keller, Pembroke Meadows Elementary in Virginia Beach, summed up the feeling of most teachers when she responded, "Do this more than once a year!" Barbara Gibson, Lindsay Middle School in Hampton, echoed the request. "Make it possible for the speakers to return for a follow-up visit."

## Would you do it again?

Both volunteers and teachers have been enthusiastic. Barbara Spencer, Booker Elementary in Hampton, says "absolutely!" Robert Warren, Lake Taylor High in Norfolk, responded "definitely." Evaluations received indicate they speak for their fellow teachers.



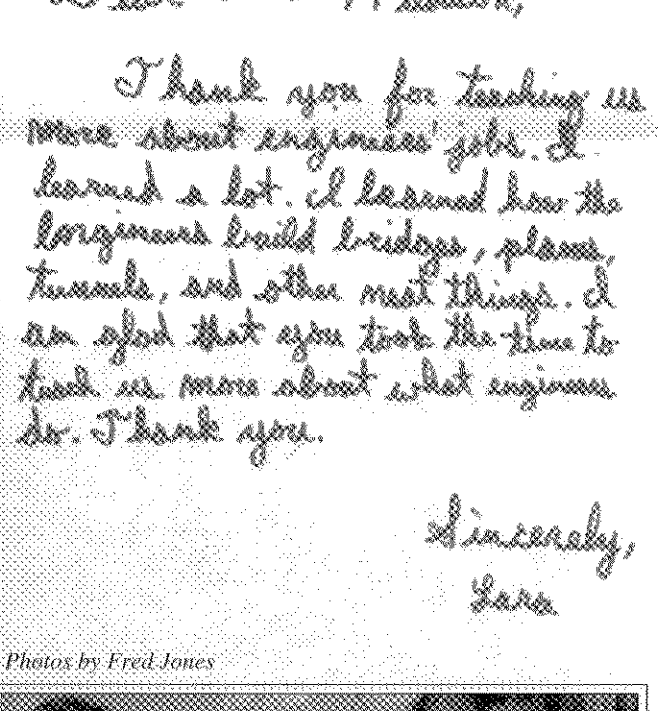
Fernandus Rattliff spoke with Woodrow Wilson High School students about the complex engineering challenges posed by space transportation. After his first day of classes, Rattliff was invited back to the Portsmouth school to do a repeat performance.

## We get letters!

One of the most rewarding aspects of the school visitation program are the letters--the MANY thank you letters--that follow the presentations.

Above left, Byron Meadows made a hit with both students and teachers at White Oaks Elementary in Virginia Beach.

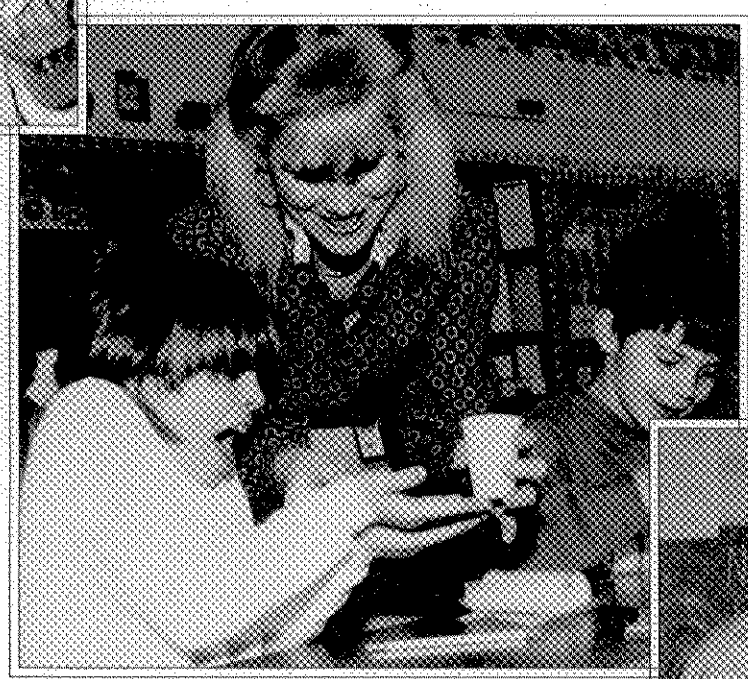
Right, Michael Hudson "taught" a fifth grade class at Jenkins Elementary in Newport News.


Dear Mr. Hudson,

Thank you for teaching us more about engineers' jobs. I learned a lot. I learned how the longineers build bridges, plane, tunnels, and other neat things. I am glad that you took the time to teach us more about what engineers do. Thank you.

Sincerely,
Sara

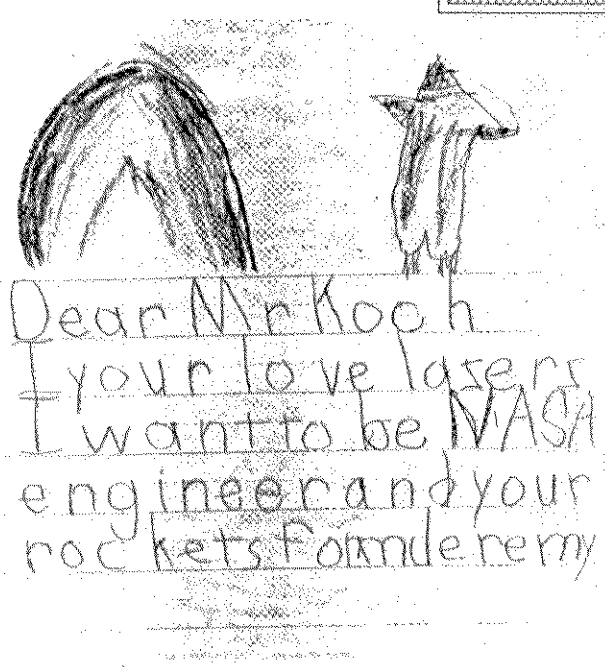
Deputy Director H. Lee Beach preceded his discussion of the forces of flight with a little history. Eighth graders at Syms Middle School in Hampton recognized the Wright Flyer as the first airplane to successfully achieve controlled powered flight.



Photos by Fred Jones

Special thanks to Bionetics employees Nancy Grabiner, Audrey Coppedge and Susan Smigielski for their help in coordinating this program.

Karen Harrington helps second graders at Riverside Elementary in Newport News mix up some "slime." Each demonstration of chemistry "magic" brought about excitement first, followed by understanding.




Left, Grady Koch amazed Chesapeake's Western Branch Primary students with a laser show. Teacher Linda Fisher predicts some engineering careers are now budding.

It took both Willard Bauserman, left, and Lt. John Lussier to get Marques Blackwell, Langley Elementary third grader, suited up for a make-believe shuttle mission.

# LDEF Disassembly Is Nearly Completed

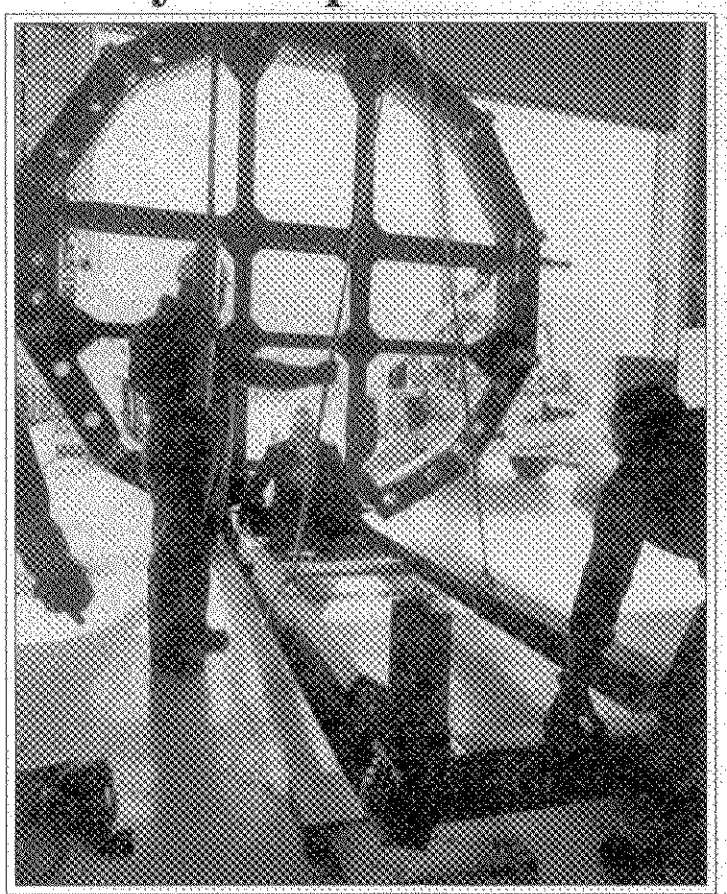


*Photo by Carole Chapman*

**With the rotating ring upright, workers remove the double longerons from Long Duration Exposure Facility (LDEF). Each part will be crated in specially-designed boxes that will fit on a special low-bed trailer. The height and width of the final product is such that it can be transported to Kennedy Space Center without special permits.**

# A Small Business Aerodynamic Testing Resource for Langley

BY BARBARA KRAFT

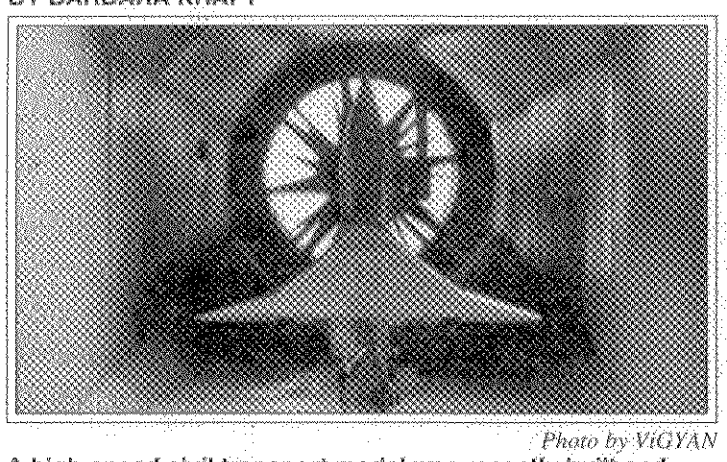


*Photo by ViGYAN*

**A high-speed civil transport model was recently built and tested for Langley in ViGYAN's low-speed wind tunnel.**

In the shadow of one of Langley's giant wind tunnels exists a private-venture facility that, in a small but significant way, has been providing test support to NASA aerospace technology programs.

Designed, owned and operated since 1988 by ViGYAN, Inc., one of Langley's small business contractors located on Research Drive, this low-speed diagnostic wind tunnel has been employed in several NASA and Department of Defense-sponsored projects exploring a variety of innovative aerodynamic concepts for high-performance flight vehicles. Most recently, this tunnel was used by Langley researchers to generate a preliminary data base in preparation for their upcoming test program on low-speed flight control characteristics of High-Speed Civil Transport (HSCT) project. The test model that provides for various canard configurations was built by ViGYAN and tested over a three-week period for balance, pressure and flow visualization experiments.

ViGYAN's small-scale aerodynamic facility, offers a quick-response test service performed and managed by research-oriented professionals. It helps provide a resource for exploration of new concepts and a means to streamline the test plan for expansive large-scale wind tunnel test projects undertaken by Langley. As NASA's new aeronautics initiatives gather momentum, the availability of such support services will grow in value.

# *Parking Awareness – Think Before You Park*

BY BELLE WOOD

### The Problem:

Vehicles of all kinds, personal, government and contractor, are frequently parked on sidewalks, across curb cuts, in front of ramps and in parking places designated for the disabled. The Accessibility Subcommittee and the Parking and Exterior Mobility Task Group operating under the Satellite Committee for People with Disabilities says the situation creates a potential hazard for people with disabilities.

### The Solution:

**Designated Parking Places:** These spaces are reserved for people with authorized disability parking permits. Permits are issued to the person with a disability and it is intended for his or her use only. Using another person's parking permit is a violation of the law.

**Sidewalks, Curb Cuts and Ramps:** Langley Management Instruction 1700.7 states "non-moving offenses with point assessment for parking by non-disabled persons in a space reserved for disabled persons earn five points; parking in a crosswalk, on a sidewalk or blocking a driveway earns three points; parking in other 'no parking' areas will earn two points; and other non-moving violations earn a motorist two to five points against his/her driver's license."

Parking in these areas creates mobility problems for people with disabilities. Persons in wheelchairs need a curb cut to wheel themselves off the sidewalk to cross the street. Blocking a ramp blocks the entry and exit for a wheelchair user. In the event of fire, this constitutes a serious danger to the lives of disabled people.

### Violations Not Tolerated

Langley's Security Office must comply with the laws of the State of Virginia. When someone is in violation of those laws, it is the duty of security officers to issue citations.

The Satellite Committee for People with Disabilities provided parking awareness training for Center employees during Security Awareness Week, March 7-11. Accessibility Subcommittee members are available for safety briefings and other group meetings.

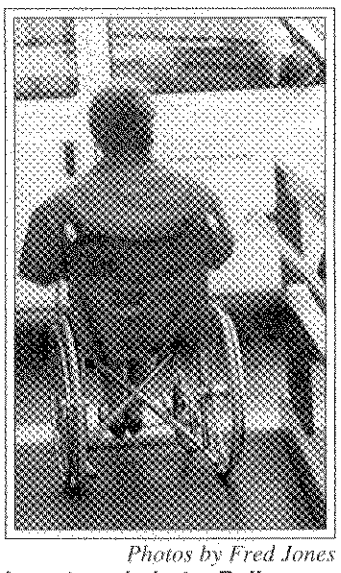
Since Tuesday, March 8, parking awareness notices have been issued as a friendly reminder of parking violations. The notices will be issued for three weeks in the hope that Center personnel will become more sensitive to the mobility needs of their disabled co-workers. The parking awareness notices will **not** prevent violators from receiving an actual citation.

Since the passage of the Americans with Disabilities Act, more and more people with disabilities have become part of the work force. On Center, there are more employees with disabilities and an increasing number of visitors as well that must be accommodated.

### Raising Consciousness

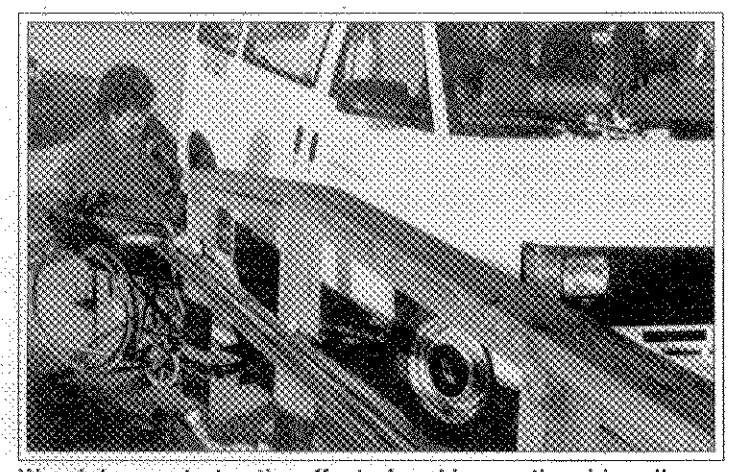
The Structural Mechanics Division's Karen Bibb is the chairperson for the Accessibility Subcommittee. Bibb also uses a wheelchair to travel around the Center. "We hope that by issuing these awareness notices and conducting training, we can make people more conscious of the impact that their parking habits have on those with mobility problems," she said.

"We want people to wake up. The best way to get people to do that is to become aware of their co-workers. Once my co-workers became aware of me and how their parking on the sidewalks, for example, affected me, they began using proper parking spaces. I think we are just asking people to personalize it."



*Photos by Fred Jones*

**In a staged photo, Belle Wood shows how a van blocking a ramp can be hazardous for a person in a wheelchair. Parking awareness notices will be issued for violations but motorists can be ticketed for blocking the access of disabled people.**



**Wood demonstrates the effect of parking on the sidewalk — both the ramp and the sidewalk are blocked.**

**In this photo, a van blocks a curb cut, which makes travel from one side of the street to another or passage into the parking lot difficult or inaccessible.**

## A Touch of Class

An **Organ and Choral Concert** will be performed at St. John's Church, Hampton, on March 19 at 2 p.m. Music is from Bach's *Little Organ Book*. Call John Siderius at 722-2587 for information.

The **Virginia Symphony** will perform with the Moody Blues at the Hampton Coliseum March 15. The Symphony will join forces with the National Symphony Brass for concerts March 18 and 19 at Chrysler Hall. Tickets are 20-percent off at the Langley Exchange Shop, ext. 41585.

## MATHCOUNTS Program Is Competition for Middle Schoolers

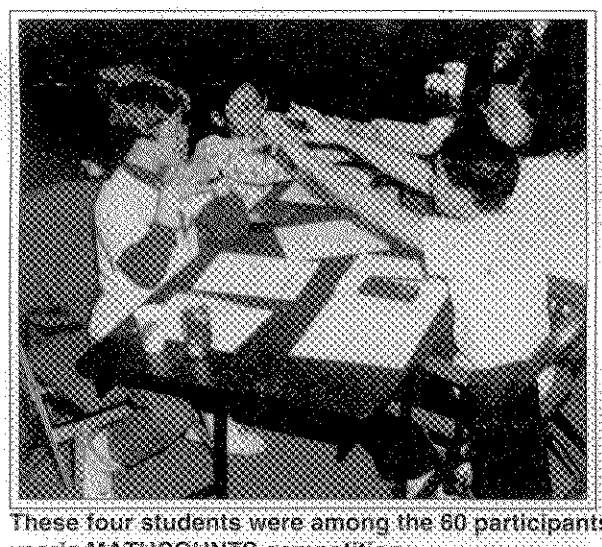
MATHCOUNTS is a nationwide coaching program and series of competitions designed to stimulate student interest and achievement in mathematics.

MATHCOUNTS is committed to helping develop a technically literate population essential to U.S. global competitiveness. Co-sponsored in this area by the Peninsula Chapter of the Virginia Society of Professional Engineers, the February event was hosted by Langley at the H.J.E. Reid Conference Center.

Cary Spitzer of the ATOPS Program Office spoke to the 60 students from 15 local middle schools at the competition about the role math played in his life and career.

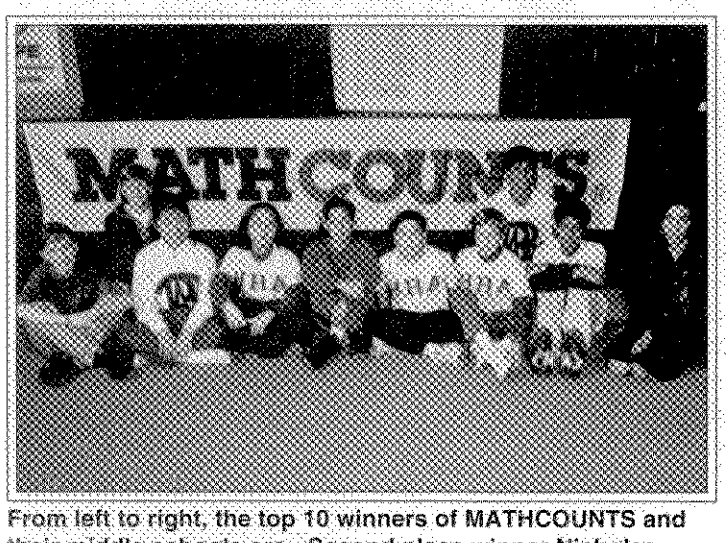
Pete Thomas of the Office of Education and organizer of the event said, "This program is an excellent one. Students are willing to give up a day off to demonstrate their math skills. One doesn't appreciate how eager and bright they are until you see them in action."

**Collaborating or wracking their brains? This team of middle school students hams it up with their teacher/coach before the competition begins.**



*Photos by Fred Jones*

**These four students were among the 60 participants of this year's MATHCOUNTS competition.**




**From left to right, the top 10 winners of MATHCOUNTS and their middle schools are: Second place winner Nicholas Paavola of Dozier; first place winner Jason Ross from Gildersleeve; third place winner Linda Bi, Tabb; Clara Kim, Hampton Roads Academy; Kenneth Cheung, Gildersleeve; Walt Lin, Hampton Roads Academy; James Lawrence, Hampton Roads Academy; Vivek Ivar, Tabb; Sanjay Venkateswara, Tabb; and Hina Ayub, Simms. The first place school team was from Gildersleeve, with Tabb in second place and Peasley Middle School in third place.**

## *Career Days at Langley Draw Hundreds of Students*

More than 600 students were on hand for Career Days, Feb. 23 and 24, sponsored by Langley and the Peninsula Engineers Council.

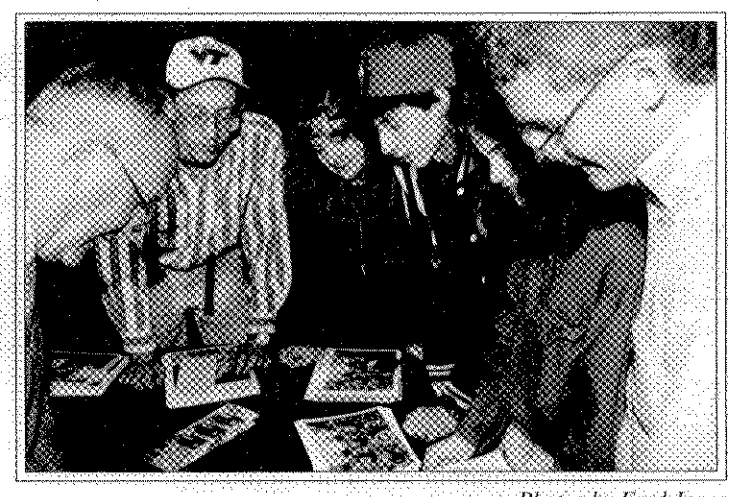
High school students from 10th, 11th and 12th grades representing 26 public and private high schools and home-schooled students listened to speakers and viewed more than 40 exhibit booths during the program.

Lynn Showalter, president of the Peninsula Engineers Council, and Dr. Belinda Adams, assistant director at Langley welcomed the students to the Center. Edwin J. Prior of the Office of Education gave an overview of Langley, its mission and work. Cary Spitzer of the ATOPS Program Office was the keynote speaker. Spitzer was 1993 Engineer of the Year and the topic of his talk to the students was "Baby Boulders and Basket Balls."

A panel discussion followed during which Nancy Kruse and Terry Morris shared their cooperative education experiences with attendees.

Finally, students were encouraged to visit the exhibit booths, where they were asked to solve interactive problems at many of the exhibits.

Exhibitor Lee Ketchum of the Society of Logistic Engineers said, "I was surprised the first day when students approached me and just started talking logistics.



*Photos by Fred Jones*

**Southampton High School students, left to right, Richard Hobson, Beth Curtright, Daryl Cox, Kristy Salyers and Drew Blythe huddle with Ian "Mac" MacConochie, far left, of Lockheed Engineering, as he outlines some ideas for them.**

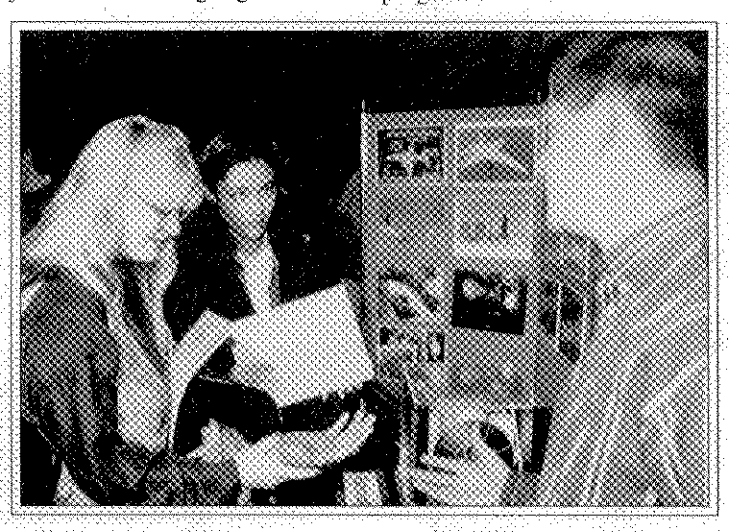
The idea was for us to encourage them in the technical areas; to tell them 'Hey! You need math!'"

Many exhibitors found the students to be open and inquisitive and the scene was alive with the exchange of ideas, according to the event's organizer Pete Thomas of Langley's Office of Education. Thomas also said that feedback from teachers indicated that this year's Career Days were the most meaningful in terms of career presentations and potential careers they had seen for their students.

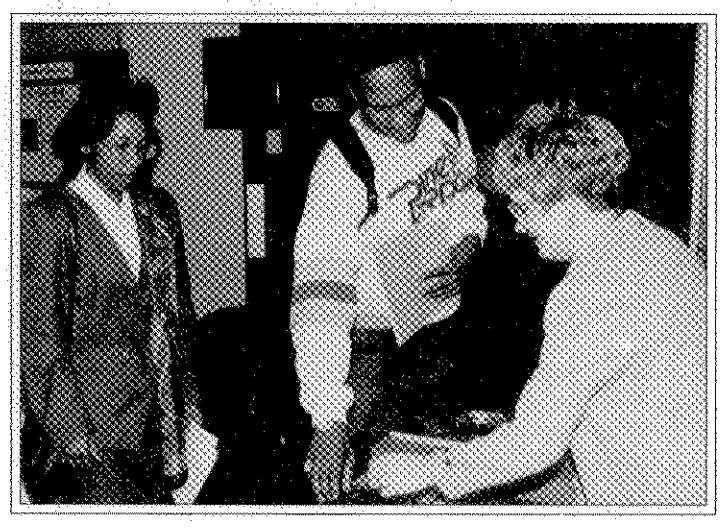
Thomas said, "I was surprised at the number of students who really wanted to know about science, technology and engineering careers. They asked some very intelligent and insightful questions. It was our best Career Days program ever."

**The Nonintrusive Diagnostic Branch's Tony Humphreys shows students a holographic velocimeter that is being developed to measure air velocities in three dimensions.**

Many Langley branches had exhibits during the two-day program as did a number of professional societies such as the American Society of Naval Engineers, American Society of Civil Engineers, Society of Women Engineers, Women in Aerospace and the Engineers Club of the Virginia Peninsula.



**At left, Stefanie Judas and Lisa Bell from Bethel High School hold a cast model of a hand as Gary Wainwright of the Fabrication Division tells them about casting techniques used in the Composite Models Development Section's foundry.**



**At right, Laura Eure of the Acoustics Division shows Nansemond River High School students Tarsha Sherrod and Bergina Brickhouse some of the information that was distributed at the Federal Women's Program booth.**

# Happenings

**WANTED:** Female roommate to share Hampton townhouse. Furnished 2 BR, 1-1/2 bath, three miles from NASA. Available April 1, $260/month plus one-half utilities. Call 868-6557.

**MISSING:** High-speed motion picture camera from the Photo Lab, ECN 0472445. Please call ext. 43526.

**RENT PARADISE:** Gulf-front condo, Sanibel Island, Fla., one BR, full kitchen, screened lanai, pool, tennis, on-site management, $600/week, April-Dec. Call 565-1849.

**FURNITURE FOR SALE:** Beige sleeper sofa and recliner, coffee and two end tables. Sleeper only used twice! Moving, must sell: $300 for all or may split up set (sofa/ $200, recliner/$75, tables/$30). Call 850-4122.

**TAX RETURNS:** Computerized tax returns prepared by highly experienced, degreed accountant. Bookkeeping service also provided for small businesses. Confidential and very reasonable. Call 825-0669.

**ORLANDO, FLA:** Travel and see the world's most magical resort, four days and three nights. Motel, transportation and tickets included. Call for details, 245-3915.

**FOR SALE:** Troy State textbooks: *Multicultural Issues in Counseling*, *Racial/ Ethnic Minority Counseling Research* and for the Labor and Law course, *Labor and Employment, Text and Cases*, ninth edition. Like new, best reasonable offer, Call 898-8463, after 6 p.m.

**FOR RENT:** Old Nags Head Cove, 3 BR furnished cottages, use of clubhouse and facilities. May and Sept., $300/week; June, July, Aug., $395/week. Call Ernie Greene, 838-0567.

**INCOME TAX PREP:** Member of National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra cost. Small business bookkeeping available; we come to you, by appointment. Call 874-3121.

**INCOME TAX PREP:** Call Nancy Taylor at 723-5227.

**LFCU:** Langley Federal Credit Union (LFCU) will hold its annual meeting April 16 at the Hampton Holiday Inn. Irving R. Levine, NBC Chief Economics reporter, will be the keynote speaker. He will address the issues of changing world and national economies and their possible effects on LFCU members. The meeting is open exclusively to LFCU members, age 18 and above. Doors will open at 8:30 a.m. and the business meeting will begin at 10 a.m.. An insurance Expo featuring information from LFCU insurance providers will be open from 8:30 -9:45 a.m. Reservations are required and forms may be picked up at any LFCU branch office.

**VPPSA:** The Virginia Peninsulas Public Service Authority Board will meet Friday, April 1, at 10 a.m. in York County's Human Services Building, 301 Goodwin Neck Road. For information, call 728-2062 or 1-800-683-0922. VPPSA is a regional solid waste management public agency that serves 11 member communities.

**AMERICAN RED CROSS REP:** On Wednesday, March 16, a representative from the American Red Cross Blood Services, Mid-Atlantic Region, will be in the cafeteria from 11 a.m.-1 p.m. Stop by the display for current information on the status of the community's blood supply, to ask questions about donating blood and about the blood service programs. Langley's next blood drive will be on Wednesday, March 23, from 9 a.m. to 3 p.m. at the H.J.E. Reid Conference Center.

**BALLROOM DANCING:** For beginners or new students at the Langley Air Force Base Officers Club every Monday, 5:30-6:30 p.m., $5 per person. Instructor is Fred Duffy. For more information, call 496-3760 or 874-2039.

**CONDO FOR RENT:** Kissimmee, Fla., near Disney, Sept. 17-24, 2 BR, living and dining rooms, full kitchen, etc. Pools, tennis, lake, all free, $500/week. Call 868-9709.

**ATTENTION RUNNERS:** The musicians of the Virginia Symphony will host a Five-kilometer Run and a One-Mile Walk on Saturday, April 9, at the Great Bridge Civic Center, Chesapeake. Chamber music ensembles will perform along the race course and prizes include symphony tickets and hotel packages. All proceeds will be donated to the symphony's annual fund. Entry forms are available at the Exchange Shop, ext. 41585.

**MISSING:** Tektronix Oscilloscope, model 475, S/N B207137, inventory #527493, has been misplaced. Please check all areas and cabinets; may have been borrowed during TOPS. Call Robert Peterson, ext. 43909.

**VIRGINIA CHORAL SOCIETY** (VCS) will sing *Songs of the Earth* in a concert about our planet and VCS will premier Andrew Carter's *Benedicite* accompanied by the ODU Children's Chorus. The two concerts will be held March 19 and 21 at 8 p.m. For tickets and information, call 1-800-400-4VCS.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Researcher News

National Aeronautics and
Space Administration
**Langley Research Center**
Hampton, Virginia 23681-0001

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# SEDS Rides Again!

Langley engineers and scientists will participate in the Small Expendable Deployer System (SEDS) Mission on a launch targeted for March 9. This is the second of the SEDS missions. SEDS is a small tethered satellite launched as a secondary payload on the DELTA II expendable launch vehicle from Cape Canaveral, Fla.

This mission (SEDS-2) will be similar to SEDS-1, according to Project Manager Kenneth H. Crumbly of Langley's SEDS/EM Project Office, but the experiment will build on the knowledge obtained from the March 1993 SEDS mission. That was the first time a mother-daughter satellite was tethered from space with a 12.5-mile tether. The SEDS-2 experiment's time will be quadrupled and a tether deployment and braking control law will be implemented to deploy and stabilize the tethered system.

The two missions also differ in objectives in that SEDS-2 will attempt a more controlled deployment. The final phase of the experiment will continue for 30 days before it reenters Earth's atmosphere.

**Ken Crumbly, SEDS Project manager, at right, and Jim Price, Mechanical Systems Section, check out the Small Expendable Deployer System (SEDS) payload at Langley. SEDS second voyage is slated for a March 9 launch aboard the DELTA II.**

National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Biweekly Employee Information

Volume 8 ❖ Issue 6 ❖ March 25, 1994

## *CERES: A Priority for Mission to Planet Earth*

Langley's Clouds and the Earth's Radiant Energy System (CERES) experiment is one of the highest priority scientific satellite instruments being developed for NASA's Mission to Planet Earth program. This observation program is critical for providing a scientific understanding of ongoing natural and human-induced global change and providing a sound scientific basis for developing global environmental policies. The Earth Observing System (EOS) payload panel has stated that "CERES is so important that it is one of only two EOS instruments that the mission would not fly without."

### *CERES – Key Observer*

NASA will use its unique vantage point of space to obtain critical information about the Earth – its land, atmosphere and oceans. One of the key observation systems, CERES will measure both solar-reflected and Earth-emitted radiation from the top of the atmosphere to the surface. It will also determine cloud properties, including the amount, height, thickness, particle size and phase of clouds, using simultaneous measurements by other instruments. These measurements are critical for understanding cloud-radiation interactions and climate changes as well as for improving the prediction of global warming using climate models.

Earth radiation fields and clouds strongly influence our weather and climate. Clouds can cause either cooling or heating of Earth. For example, low, thick clouds reflect incoming solar radiation back to space, causing cooling. High clouds trap outgoing infrared radiation and produce greenhouse warming. The Langley Earth Radiation Budget Experiment (ERBE), which has been flying on three satellites during the past nine years, has provided critical data that indicate that clouds have an overall net cooling effect on the Earth.

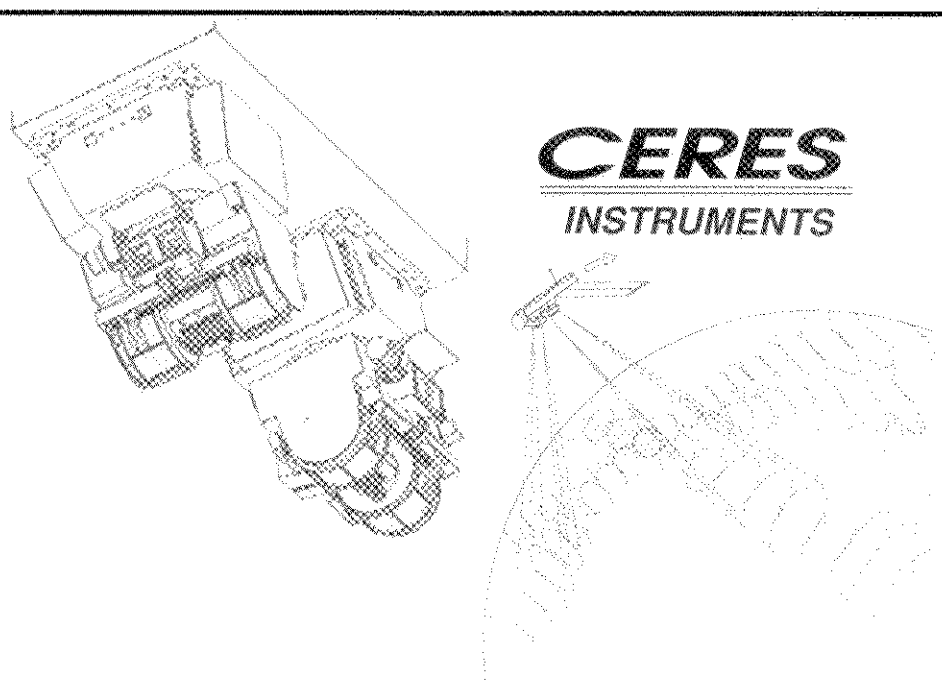
"ERBE satellite measurements have provided new information on Earth's radiation balance at the top of the atmosphere including the radiative effect of clouds on our climate," said Ed Harrison, head of the Radiation Sciences Branch. "CERES will extend these important measurements to include the top of the atmosphere, in the atmosphere, and global surface radiation, which are critical for advancing our understanding of the total climate system and improving climate prediction models."

### *The Role of Clouds*

Much more information is needed about clouds and radiation and their role in climate change. The largest uncertainty in climate prediction models is how to characterize and express in terms of parameters the radiative and physical properties of clouds. Because of the importance and uncertainties of clouds and radiation fields, they have become the top scientific priority in the U.S. Global Change Research Program. CERES will provide these critical measurements.

CERES is being developed based on Langley's highly successful ERBE instruments. In comparison, CERES will have twice the spatial resolution and improved instrument calibration. It will also obtain better angular models for converting radiance to flux and provide improved sampling analyses to obtain higher accuracy results for climate studies. To improve the time and space sampling capability and meet the accuracy for the scientific objectives of the mission, CERES will be flown on multiple satellites starting with a launch on the Tropical Rainfall Measuring Mission in 1997, followed by a launch on the Earth Observing System (EOS-AM) satellite in 1998 and the EOS-PM satellite in 2000.

*Continued on Page 3*




**CERES will fly two scanner instruments simultaneously on the Earth Observing System (EOS) satellites. One scanner operates in a cross-track mode to cover the Earth between orbital tracks, and the other scanner is in a rotating azimuth (horizontal) mode to provide information on the angular distribution of Earth's radiation.**

## State of the Center Address

### *Langley: National Resource, National Relevance*

Paul F. Holloway
H.J.E. Reid Conference Center
14 Langley Boulevard

Four sessions have been scheduled to permit as many employees, retirees and contractors as possible to attend. You are invited to a specific session based on your last name. If that conflicts with another activity, you are welcome to attend one of the other three sessions.

| **Tuesday, April 19** | **Wednesday, April 20** |
|---|---|
| 9:30-10:15 a.m., A to E | 9:30-10:15 a.m., L to R |
| 1:30-2:15 p.m., F to K | 1:30-2:15 p.m., S to Z |

## Langley Hosts National Aerospace Educators Conference

**BY CATHARINE G. SCHAUER**

NASA, in cooperation with the Civil Air Patrol and Federal Aviation Administration, will host the nation's premier conference for educators in the fields of aviation and space April 6-9 in Norfolk, Va. More than 1,000 educators, in addition to aerospace leaders from industry, are expected to attend the 27th annual National Congress on Aviation and Space Education (NCASE). This year's theme is "Aviation and Space Education: America's Leading Edge."

Individual sessions are developed to challenge, guide and stimulate the abilities of the educators and their students in the fields of aviation, science, and advanced technology.

NCASE provides attendees with an opportunity to hear expert speakers from the aerospace industry and to meet with their peers and share what they are doing in the classroom. Sessions are geared to cover grade levels from kindergarten through college.

"NCASE strives to educate the public and students to better understand the scope of aerospace and its impact on society," Dr. Sam Massenberg, head of Langley's Office of Education, explains.

"Science and new technology move forward years before the material appears in textbooks. Conferences like this play a vital role in keeping education in the classroom current with the real world. They also provide master educators with an opportunity to present demonstration units that will benefit students nationwide," according to Massenberg.

Director Paul Holloway will officially open the conference proceedings April 7. Keynote speaker is NASA astronaut Capt. Robert L. "Hoot" Gibson. Other NASA speakers include Dr. Wesley L. Harris, associate administrator for aeronautics, and Frederick D. Gregory, associate administrator for safety and mission assurance.

Other speakers from government and industry include Brig. Gen. Marcelite J. Harris, USAF; James W. Kohlmoos, U.S. Department of Education; Lt. Gen. Jay W. Kelly, USAF; Scott Slansburg, mathematician; Dr. Guion S. Bluford, a former NASA astronaut who is currently vice president and general manager of Engineering Services Division at Nyma, Inc.; Dr. William C. Bosher Jr., superintendent for the Virginia Department of Public Instruction; Ed Fitzsimmons, Office of Science and Technology Policy at The White House; and William M. Bower, USAF (Ret.).

The conference will be held at the Norfolk Waterside Convention Center, 215 E. Main St., Norfolk, 1-800-789-7887. For more information, call Catharine Schauer at ext. 46122.

# News Briefs

## Around the Agency

**NASA BEGINS DEVELOPMENT OF NEW MARS EXPLORATION PROGRAM –** NASA will continue to explore Mars with a new exploration strategy in fiscal year 1995. The Mars Surveyor program calls for the development of a small orbiter that will be launched in November 1996 to study the surface of the red planet. The Mars Surveyor orbiter will lay the foundation for a series of missions to Mars in a decade-long program of Mars exploration. The missions will take advantage of launch opportunities about every two years as Mars comes into alignment with Earth. The orbiter will be small enough to be launched on a Delta expendable launch vehicle and will carry roughly half of the science payload that flew on the Mars Observer.

**NASA-ARMY RESEARCH PAVES WAY FOR BETTER HELICOPTERS –** Future helicopters will be quieter and more efficient thanks to data from hundreds of hours of test flights during a 10-year NASA-Army research program. Launched in 1984, the UH-60 Airloads Program at Ames Research Center, Mountain View, Calif., studied helicopter rotor vibration, noise, motion and airflows. The project, which concluded in February, gave engineers information needed to develop new helicopters and improve existing designs more quickly and cheaply. "We've gathered a huge data base for the helicopter industry and the academic world to help refine the ability to design helicopters and predict their performance," said Ames Project Manager Paul Loschke. "Industry is always pleased to have the support of NASA research — it's the wave of the future," said Rhett Flater, executive director of the American Helicopter Society, Alexandria, Va. "The transfer of data will be extremely useful to the rotorcraft community."

### DPAC and SCPD Notice

**The Disability Program Advisory Committee and the Satellite Committee for People with Disabilities are looking for volunteers to be points of contact for particular disabilities. These include, for example, mobility disabilities, hearing and sight impairments, orthopedic problems, cancer and aging parents. Volunteers are needed who are willing to obtain and coordinate information, so that when employees need help for themselves or a family member, a co-worker will be able to provide them with information. For information or to volunteer, call Diane Forrest at ext. 47718.**

## Additional Scholarships Will Be Granted

GREAT NEWS! The NASA College Scholarship Fund, Inc., announced in late February that 25 new scholarships will be awarded this year in addition to the four scholarships previously announced. A total of 29 $1,500 scholarships will be awarded for the 1994-1995 school year to qualified dependents of NASA and former NASA employees.

The additional scholarships are the result of a substantial gift awarded by the Freedom Forum to honor the crew of the Hubble repair mission (STS-61) and to celebrate the 25th anniversary of the Apollo moon landing.

For additional information or to request an application package, please contact Kate Spruill of the Employee Relations Office, ext. 42606.

# *Langley Honored By Red Cross*

Langley was awarded the 1993 Choice Award February 14 by the Hampton Roads Chapter of the American Red Cross. The award, accepted by Center Director Paul F. Holloway, is given to a sponsoring organization that exhibits commitment and understanding of the American Red Cross mission, a group that consistently meets and exceeds its goals.

In 1993, Langley collected 1,851 units of blood in six visits. Pete Edgette, head of the Office of Occupational Health Services said, "Without the support of the civil service and contractor employees and their managements, this award would not have been achieved." Edgette added that Langley's community spirit exhibited at every blood drive is "outstanding." The 1993 Choice Award will be displayed at the H.J.E. Reid Conference Center.

*Photo by Sandy Gibb*

**Pete Edgette, Karen Ridlon and Octavia Judge, left to right, of the Office of Occupational Health Services present the American Red Cross 1993 Choice Award to Center Director Paul F. Holloway, center.**

## McCormick on Weather Channel

Dr. M. Patrick McCormick, head of the Aerosol Research Branch, will be interviewed on The Weather Channel's documentary presentation *The Year the Sky Fell*. It will be aired on Sunday, March 27, at 8 p.m.

## Technical Library Open House

The Second Annual Technical Library Open House is Thursday, April 21, from 10 a.m-3 p.m. All attendees (NASA employees and contractors) will be able to participate in hands-on demonstrations of the library's resources. The library is also planning other activities around National Library Week. More details will be announced in the next issue of the *Researcher News*.

## Awareness Training

Two sessions of the awareness training, *Working Together: Deaf and Hearing People*, will be held next month. The first is Monday, April 18, from 1-4:30 p.m. and the second is Tuesday, April 19, from 8:30 a.m. to noon. Both sessions will be in Building 1209, Room 180.

The workshop will cover topics such as understanding deafness and deaf employees; communication on the job; strategies for integrating deaf employees into the workplace; and accommodations for deaf employees. This is a good opportunity for supervisors, managers and safety coordinators to gain insight into the deaf culture.

**Note:** There will be only 20-25 persons per session. Mail the Application for On-site Training form (NASA Langley form 24) to Kim Dobbs, Mail Stop 309. Time may be charged to A1619.

# *Jones Family Named "Black Family of the Year"*

Ida P. Jones of Freeman, Va., and her family were honored recently as the Black Family of the Year at the National Black Family Summit held in North Charleston, S.C.

**Stanley P. Jones**

Among her nine children is Stanley P. Jones, an aerospace education specialist in Langley's Office of Education. The family was selected because of their outstanding community achievements, according to Brandolyn Pinkston, chairperson of the summit awards committee.

"They have always put stress on education and on family loyalty," said Johnnye Thompson, the Brunswick County teacher who nominated the Jones family for the award. Thompson taught several of the Jones children at Russell Solomon Senior High School.

The Jones family has established two scholarship funds at St. Paul's College in Lawrenceville, Va. Also, working with a restaurant run by son Earl Jones, the family prepares 100 food baskets for the needy every Thanksgiving and plans and organizes an annual community conference. Six of the siblings are educators in the Richmond area: Ella Jones Richardson teaches at George Washington Carver Elementary; Roy Jones teaches at Mosby Middle; Dr. Lloyd Jones is principal at Patrick Henry High in Hanover County; Eula Jones teaches at Thomas Boushall Middle; and Marvin Jones teaches at Huguenot High where Earl Jones is assistant principal. Stanley, the youngest, is a Langley Spacemobile lecturer and has his own local TV program, "Science Bits with Stanley"; Milton Jones is an emergency services dispatcher for the Chesterfield Police Dept. and Melvin Jones is a contractor in New Jersey.

The Jones children helped their mother tend the family farm while their father, the late Howard P. Jones, worked in a Maryland steel mill. As they grew up, the children helped each other through college. Stanley said, "When my father died in 1986 of leukemia, he had a chance to see eight of his children finish college. And I think that made him very happy. We just try to be deserving of the award. What we would like to do is just keep trying to serve our community, to keep trying to grow both spiritually and professionally, and to just keep trying always to be good people." In the past, Stanley has been named Outstanding Teacher of the Year; Outstanding Man of America and Virginia State Science Teacher of the Year. He received his bachelor of science degree from Virginia State University and a master's degree from Oklahoma State University.

## Letters

### Thank You for the Retirement Party

From Blanche H. Fout: "I wish to thank all of my many friends who attended and contributed to my retirement party. The albums and other mementos representing my years at NASA are appreciated and will serve as a reminder of the many good friends and good times I enjoyed.

The gift of a desk was a wonderful surprise.

A special thank you to Sandra Glenn for all the work she did in organizing and arranging my party and to Nancy Sessoms, Nancy Shields and Diana Kusmira who assisted her."


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor. . . . . Marny Skora

Editor. . . . . Ann C. Gaudreaux

Assistant Editor. . . . . Susan A. Smigielski

Photojournalist . . Carole Petrachenko Chapman

Photographer . . . . . Fred Jones



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.

## CERES . . .

*Continued from Page 1*

Follow-on CERES satellite missions are planned to create a continuous 15-year history of highly accurate radiation and cloud data for climate analyses. Thus, CERES is a high priority, long-term approved program for the 1990s and beyond.

### *Special Data Analysis*

Key to the success of CERES, beyond the development of an excellent instrument, is the development of data analysis and interpretation techniques for producing radiation and cloud products that meet the scientific objectives of the project. This development requires scientists to define the mathematical relationships that represent the physics of radiation and cloud properties of the atmosphere.

Then, engineers and computer programmers must implement the necessary algorithms into a Data Management System, which will operate on Langley's EOS Distributed Active Archive Center. The system will produce CERES science data products to be used worldwide for atmospheric and climate studies. The Radiation Sciences Branch in the Atmospheric Sciences Division (ASD), along with an international CERES Science Team, is responsible for defining the mathematical relationships and algorithms. The Data Management Office in ASD is responsible for implementing the algorithms and developing the Data Management System.

Long term goals for NASA's Mission to Planet Earth include providing leadership in studying the Earth as a system and in acquiring credible scientific information for environmental decision makers. It will provide a basis for a viable partnership with educators and education policy organizations, making them aware of the key components of science, education and the study of the natural environment.

Dr. James D. Lawrence Jr., chief of the Atmospheric Sciences Division, stated, "CERES is the most important experiment ever done by the Earth observation community because it is fundamental to our ability to understand and detect global change."

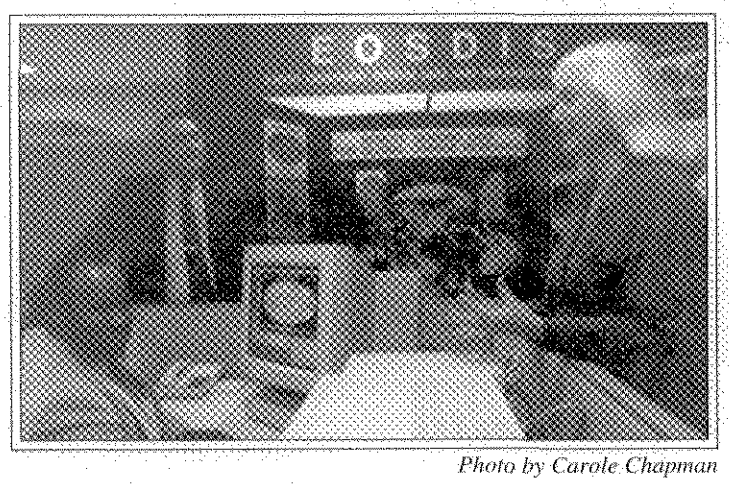
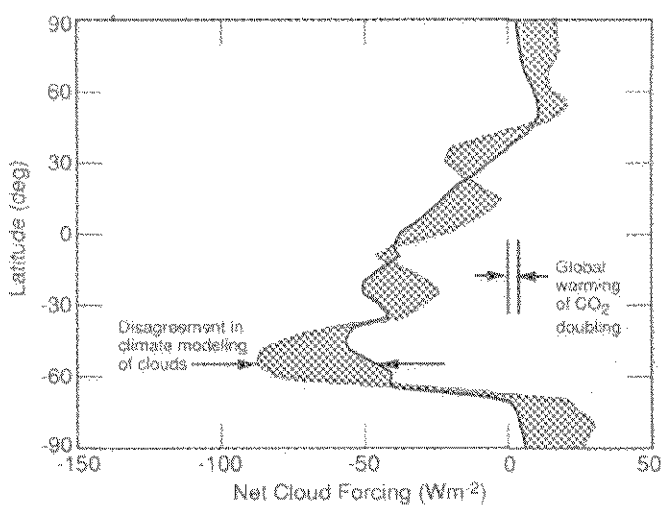


*Photo by Carole Chapman*

**Shown here at Langley's EOS Distributed Active Archive Center (DAAC) discussing the processing of ERBE data, precursor to CERES, are, left standing, Dr. Bruce Barkstrom of the Radiation Sciences Branch, CERES Instrument Principal Investigator; Chris Harris, seated, of the DAAC Operations Group with Computer Sciences Corp.; and Peg Snyder of the Data Management Office. The Langley DAAC, in the Information Systems Division, will be responsible for processing and archiving data from CERES and several other EOS instruments. Currently, the DAAC is distributing NASA science data in the areas of radiation budget, clouds, aerosols and tropospheric chemistry.**

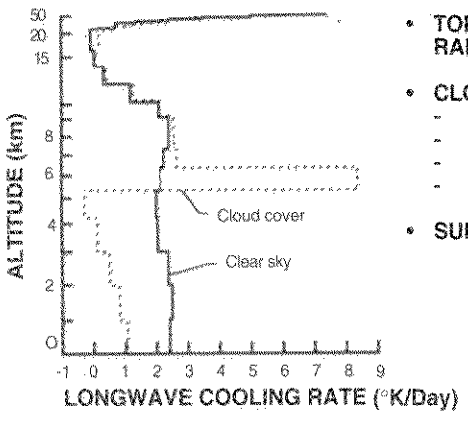
**Significant disagreements exist in current climate models due to uncertainties in cloud-radiative parameterizations in the models. The difference in the models' results is significantly greater than the effect of global warming predicted by the doubling of carbon dioxide. CERES measurements will be used to resolve the disagreements and improve the climate prediction models.**

**Variations in Climate Models**




**CERES SCIENCE**

**MODELS**




**MEASUREMENTS**

- TOP-OF-ATMOSPHERE RADIATION
- CLOUD
  - Amount
  - Height
  - Depth
  - Phase
- SURFACE RADIATION

**CERES scientific investigations involve the analysis of measurements of top-of-the-atmosphere radiation and cloud properties. The CERES data will be used in radiative transfer models to compute the vertical distribution of radiation in the atmosphere and at the surface for climate studies.**

**As the figure indicates, clouds have a significant effect on the cooling rate of the atmosphere and the surface.**

## Global Environmental Measures: A Must for Earth's Future Survival

In the next century, the Earth faces the potential hazard of rapid environmental change. The magnitude, regional distribution and timing of global environmental change will have a profound societal impact, but it is not yet possible to provide policy makers with unequivocal answers to vexing questions about those effects, due in large part to lack of knowledge of the processes that affect regional and global climate.

Among those problems that have received increased attention in recent years are global warming, polar ice and sea level changes, deforestation, desertification and reduction in biodiversity, ozone depletion, ocean processes, volcanic eruptions and changes in cloud radiative effects resulting from greenhouse warming and increases in human-caused or man-made aerosols. Such environmental changes are expected to have a profound impact on many nations, yet many questions about the impact of human activities on the climate system remain unanswered.

NASA is working with international scientific communities to establish a sound basis for addressing these scientific issues through research efforts coordinated under the U.S. Global Change Research Program (USGCRP). NASA's contribution to the USGCRP is the Mission to Planet Earth, which consists of a series of space-based remote sensing platforms, the largest of which is the Earth Observing System (EOS). This system of research satellites, computing facilities and scientific research investigations will aid in developing a more complete understanding of the consequences of human activities on the global environment. EOS involves a series of Earth-orbiting satellites that will carry an array of advanced, well-calibrated instruments designed to provide critical global observations of the Earth's oceans, land and atmosphere.

The first satellite in the series, EOS AM, is scheduled for launch in 1998, with the primary focus on observing the Earth's surface, clouds, aerosols and radiation balance. Prior to the launch of EOS AM in 1998, the Tropical Rainfall Measuring Mission (TRMM) will be launched in 1997. This satellite, an earth probe in the Mission to Planet Earth program, will also include a Clouds and the Earth's Radiant Energy System (CERES) scanner similar to the ones to be flown on the EOS AM and EOS PM series of satellites beginning in 1998 and 2000, respectively.

*The above is excerpted from the draft of an article to be published in the* ***Bulletin of the American Meteorological Society****, entitled* ***Mission to Planet Earth; Role of Clouds, Radiation and Climate,*** *by Dr. Bruce A. Wielicki et al. Wielicki is a member of the Radiation Sciences Branch.*

## CERES Presents Critical Need

CLOUDS AND THE EARTH'S RADIANT ENERGY SYSTEM
CERES
NASA

**There is currently a critical need for scientists, data analysts and engineers to commit to the exciting long-term CERES investigation. Qualified candidates are being sought for detail or reassignment to these positions.**

**On April 4, a Job Information Forum will be held to discuss the various opportunities and challenges of the CERES program. The forum will begin with an overview presentation at 9 a.m. in the H.J.E. Reid Conference Center. Discussion and questions will follow.**

**All resumes and any questions related to these opportunities should be directed to Edwin F. Harrison, head of the Radiation Sciences Branch, Mail Stop 420, e-mail: e.f.harrison@LaRC.NASA.GOV, ext. 45663; or James F. Kibler, head of the Data Management Office, Mail Stop 423, e-mail: j.f.kibler@LaRC.NASA.GOV, ext. 45386.**

# *Virginia Air and Space Center News*

### *Letter of Thanks*

Dear Editor: The Board and staff of the Virginia Air and Space Center and Hampton Roads History Center wish to acknowledge the assistance of NASA Langley Research Center for its involvement with the acquisition and suspension of the center's new FYU-1D Corsair. The airplane, which is on loan from the National Air and Space Museum, could not have been brought to our center without Langley's help.

When the center first began discussions about the loan of this aircraft, Langley friends were quick to lend assistance by writing the Smithsonian in the support of the loan. Langley's Aeronautical Systems Engineering Branch, under William Fernald and Allen Royal, provided expert engineering help. Additionally, Robert McKinley and Wendy Pennington made several trips to Smithsonian's Paul Garber Facility, where the Corsair was in storage, to inspect the aircraft. Measurements were taken and old documents from Smithsonian's Archives were pulled to gather information necessary to suspend the aircraft from the center's ceiling. After the trips to the Smithsonian, Wendy and Bob worked up all the engineering analysis needed for this project.

Even the Fabrication Division got involved with hanging the Corsair. Gene Fullerton and Jimmy Johnson fabricated duplicate sections of the engine cowling. These new cowling sections were then modified to allow for the suspension cables to be attached to the hoist points on the aircraft. The original coil sections were then returned unharmed to the Smithsonian.

Without the help of these special friends from Langley, the Corsair never would have come to Hampton.

Sincerely,

***Jeannette B. Petrolia, Acting Executive Director***

### *Take Flight Into Aviation Weekends*

During April, join the center for Aviation Discovery Weekends. These programs provide families with an opportunity to have fun and learn about aviation. Activities will be held April 2, 3, 9, 10, 16, 17, 23 and 24. Saturday programs will be held from 10 a.m. to 3 p.m. and Sunday programs from noon to 4 p.m.

The schedule follows: April 2 and 3, *Lighter Than Air*: Learn how early pioneers of flight conquered the air in balloons and blimps by building your own lighter-than-air vehicle.

April 9 and 10, *Soaring*: Soar with the eagles and learn how to fly without an engine by building kites and gliders.

April 16 and 17, *Contact!*: Learn how to build a powered flying machine. Special display of radio-controlled airplanes from the Southern Virginia Radio Control Air Show team.

April 23 and 24, *Countdown!*: Blast off to space by seeing how rockets work and learn how to make a simple missile.

The center is open 10 a.m. to 5 p.m., Monday through Saturday and noon to 5 p.m. on Sunday. Discovery Weekends are included with basic admission, $2 for children, $4 for adults, and free for members. For more information, call 727-0800, ext. 709.

### *Discover the Titanic in a New Light*

*Titanica*, which takes audiences on a once-in-a-lifetime adventure of discovery to the site of the world's most famous shipwreck, opens at the center March 25. The film will be shown through Fall 1994 (except for some showings in April). In its day, the *Titanic*, the largest and most luxurious ocean liner ever built, was described as unsinkable. On April 14, 1912, on its maiden voyage, it collided with an iceberg and sank the next day; 1,302 people lost their lives.

For the first time, the world can experience the *Titanic* life-size on the IMAX® screen. The 90-minute feature-length film was shot during the expedition of the *Akademik Keldysh* to the North Atlantic by award-winning filmmaker Stephen Low.

Nearly 80 years later, in the summer of 1991, a high-risk Canadian/American/Russian expedition set out to explore the shipwreck and to conduct important scientific research. Low weaves a dramatic story of the expedition. Eerie images of the *Titanic*, as she lies on the ocean floor, are contrasted with exquisitely-preserved archival photographs of the ship in all its splendor. The film highlights the comments of Eva Hart who, as a girl, survived that tragic night, but lost her father.

Admission to *Titanica* is $8 for the general public, $7 for students and seniors and $6.50 for members. Seating is limited and credit card orders may be placed by calling 727-0588.

*Virginia Air and Space Center*
*Hampton Roads History Center*

### *Wanted: Driver/Guide*

The center is recruiting for a temporary part-time driver/guide. The position is open immediately and it is anticipated to last through October 1994.

**Responsibilities include** driving center visitors in a 15-passenger van while delivering a windshield tour of Langley Research Center. Other responsibilities are to memorize the tour script, welcome visitors and take tour tickets, answer questions and effectively communicate with visitors; fueling the van and promptly reporting any vehicle problems.

**Minimum Job Requirements:** Must possess a valid State of Virginia motor vehicle operator's license, a satisfactory driving record verified by the Virginia Department of Motor Vehicles; willingness to work a flexible schedule, 8:30 a.m. to 3:30 or 4:30 p.m., two to five days per week, including some weekends. Must be comfortable working and talking with people. Knowledge of NASA, Hampton history and the Virginia Air and Space Center is helpful, but not required.

Please submit an application or letter and resume to the Van Tour Coordinator on or before April 8.

## AIAA Presents Short Course in Advanced Aeroelasticity

The Hampton Roads Section of the American Institute of Aeronautics and Astronautics will present "Advanced Aeroelasticity," a short course. The presenter will be Dr. Morti Karpel of Technion in Israel.

The course will be given from April 13-15 at the Peninsula Graduate Engineering Center in Hampton.

The three-day course will include such topics as general concepts; the use of fictitious masses; unsteady aerodynamics and flutter; and aeroelastic optimization.

Pre-registration is required by April 4. Fee includes registration, printed notes and refreshments at breaks. For more information, call Dr. Paul Vijgen at ext. 43942.

## Langley Acquires Boeing 757 for Aeronautical Flight Research

**BY KEITH HENRY**

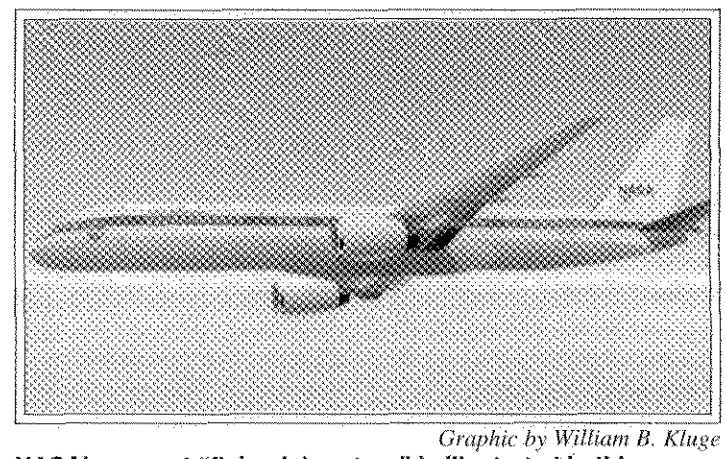
Langley is scheduled to take delivery March 24 of a Boeing 757-200 aircraft that will serve as a "flying laboratory" for aeronautical research. The 757 will be maintained and flown by Langley. It will be modified extensively for a broad range of flight research programs to benefit the U.S. aviation industry and commercial airline customers.

The aircraft will be used to conduct research to increase aircraft safety, operating efficiency and compatibility with future air traffic control systems. It will serve as a vital research tool in support of the Agency's Advanced Subsonic Transport and High-Speed Research programs.

The 757 will continue the work begun by the NASA 737-100 in state-of-the-art technologies like electronic cockpit displays, flight management systems and flight safety devices such as airborne wind shear detection sensors. Current and projected research needs greatly exceed the capabilities of the 737.

The NASA 757 was located after an extensive survey of the jet airliner market. It was used by Boeing for Federal Aviation Administration certification of the 757 class of jet airliners. The digitally-equipped transport, designated N501EA, will be obtained from the Eastern Airline bankruptcy estate.

NASA is acquiring the aircraft for $24 million, to be paid over two fiscal years.



*Graphic by William B. Kluge*

**NASA's newest "flying laboratory" is illustrated in this artist's concept. The NASA 757 will replace Langley's aging Boeing 737, used in pioneering airborne technologies.**

## *Take Our Daughters to Work* Program

The Federal Women's Program Committee and the Hampton Roads Section of Women In Aerospace are co-sponsoring a "Take Our Daughters to Work" program at the H.J.E. Reid Conference Center, April 28. The program will introduce girls, ages 9-12, to the technical community where their parents work.

"Take Our Daughters to Work" is a day for a parent to take his/her daughter to the work place and introduces her to the working world. The program was developed to address the issue of gender-bias education and it hopes to encourage more girls to develop math and science skills.

The Langley program will be a half-day structured event, from 8:30 a.m. to 12:30 p.m., with the afternoon spent at the parent's workplace. The first 50 registrants, ages 9 through 12, will be accepted. The deadline for registration is April 8.

The day will include introductory remarks by Dr. H. Lee Beach followed by a hands-on activity for the students and a briefing for parents by an education specialist. The morning program will conclude with the video "She's an Engineer" and a tour of Langley experimental facilities.

Return completed forms, available in *LaRC This Week*, to Patsy Campbell, FOP Manager at Mail Stop 178. For more information call Campbell at ext. 43291 and/or Gaudy M. Bezos-O'Connor at ext. 45083. Civil servant employees can charge their time to Job Order A2987.

## Brassington to Be FWP Speaker

Lt. Cmdr. Charlene D. Brassington, commanding officer of the Naval Safety School in Norfolk, will speak at the Federal Women's Program Committee celebration of Women's History Month March 31, from 1-2:30 p.m. at the H.J.E. Reid Conference Center. Brassington spent four years as director of an environmental engineering laboratory and was commissioned from Officers Training School in 1978. She was selected as one of the first women slated for duty aboard ship and was the first woman to graduate from Surface Warfare Officer School.

# Dwoyer Speaks About New RTG

Dr. Douglas L. Dwoyer was recently named director of Langley's new Research and Technology Group.

*Researcher News* asked Dwoyer to comment on his group: its structure, his vision for it and the reaction of external customers to the newly formed group. Here are his comments.

**RN:** ***Please tell me about the structure of your organization.***

**DD:** The Research and Technology Group (RTG) is built around the traditional disciplines of Langley. We have organized into seven divisions that encompass those disciplines. The Gas Dynamics Division is focused on high-speed, high-temperature gas dynamics for both aeronautics and space hypersonics. That division chief position has not been filled and will be advertised nationally. The Fluid Mechanics and Acoustics Division, led by Dave Stephens, will study basic fluid mechanics, flow control, computational fluid dynamics, other design methods, acoustics and noise reduction. The Aerodynamics Division, headed by Bill Henderson, has two major functions. First is the traditional aerodynamics research program for the vehicle classes that Langley leads. Second, it also operates most of our major wind tunnels. The Structures Division, with Irving Abel as chief, does all our structural mechanics and structural dynamics research for both aeronautics and space. The Materials Division, led by Darrel Tenney, is focused on structural materials development for aeronautics and space applications. The Flight Dynamics and Control Division, headed by Bill Anderson, is concerned with both aircraft and spacecraft guidance and control and flight dynamics. The division also works in flight management and flight research. Finally, the Information and Electromagnetic Technology Division, with Milt Holt as chief, is focused on the application of information technology to both aeronautics and space, primarily on-board computing and antenna research.

**RN:** ***What is your vision for the Research and Technology Group?***

**DD:** Our vision has several major points that I would like to emphasize. First, we are going to be a total quality and a third generation research organization that focuses on aeronautics and selected space disciplines. What I mean by a total quality organization is that we are focused on delivering to our customers what they want in the way of research and technology products. By third generation, I mean that we take a long-term strategic view of our research programs and try to align them with the overall long-range business strategy of our customers. We don't want to conduct our research in isolation, away from the directions that our business customers or the Nation are headed.

**RN:** ***In what ways can Langley ensure its future?***

**DD:** I want to emphasize that our survival as a laboratory depends totally on our delivery of proven and usable technology to our customers. The judge of what is proven and usable is the customer, not us. I also envision us to be a learning organization, that is, one that is in tune with the rapidly changing environment in which we exist. We must constantly adapt ourselves to the environment rather than expecting our environment to adapt to us. Two major components are contributing to the rapid change in our environment: First, the technological environment is changing at a more rapid pace than it ever has so we have to respond that much faster to remain at the forefront. Secondly, with the end of the Cold War and the restructuring of American industry, the environment in which the laboratory exists, both political and economical, has also changed dramatically. We must constantly reinvent ourselves in order to remain relevant to the political and economic environment.

We are going to be measured by the contributions that we make to the American economy. That's the only measure that matters for our long-term future. So we must become an instrument of enhanced economic competitiveness both in aeronautics and in space. I think it's easier for people to envision competitiveness in aeronautics where we provide technology to industry. Ultimately, though, the reason this nation is going to pursue a space program, now that the Cold War is over, is an economic one. So our space program must also contribute to the nation's bottom line or it will not be funded. That's the role that I see Langley playing.

**RN:** ***What has been the external customer response?***

**DD:** External customer response to our new organization within NASA, especially at Headquarters, has been very positive. They view Langley's new organization with its emphasis on technology transfer, strategic program planning and efficient program execution at the forefront of changes that NASA must adopt in order to remain successful. This is, in fact, what the Administration expects of the Agency.

Dr. Douglas L. Dwoyer

From the perspective of our technology customers – the aircraft industry and the space industry – the response has been positive, but they are waiting to see if we remain the important source of technology that we have been. And a lot of our non-aerospace customers haven't gotten the word about the new organization yet, because it is so new. The Group directors are planning to carry the message out to our customers about the reorganization and the changes that are happening within the laboratory.

**RN:** ***Are there other thoughts you would like to share with* Researcher News *readers?***

**DD:** We are in the process of completing the reorganization through to the branch level. The new organization will rely very strongly on teaming for execution of programs. These will be empowered teams. They will be given a job to do and the resources to get the job done and then be expected to do it. We intend, over time, to have those teams evolve into self-directed units. We recognize that in order for them to be successful, all managers and team members will need training. We will identify a group of people very early for training as facilitators for the self-directed teams. Although initially teams will operate in a more traditional vein, we hope in the near future to have our first self-directed teams.

### Biographical Notes

Dwoyer has been at Langley since 1977 where he began as an aerospace technologist working in the former Theoretical Aerodynamics Branch of the Transonic Aerodynamics Division. He became head of the Computational Methods Branch of the High-Speed Aerodynamics Division in 1981. That branch concentrated on computational fluid dynamics for high-speed aircraft and scramjet engines. In 1987, he was named manager of the Hypersonic Technology Office as the National Aero-Space Plane (NASP) office was then called. In 1989, Dwoyer became chief of the Fluid Mechanics Division, a position he held until his recent appointment as director, Research and Technology Group.

## Expanded Desktop Publishing Services in TEB

The Technical Editing Branch (TEB) offers a complimentary desktop publishing service for Langley authors who wish to publish journal articles, meeting papers, theses, etc. We will prepare a camera-ready copy matching journal specifications and will accept your papers for publication in the following formats: handwritten, ASCii files on floppy disks or electronic file transfers via e-mail and anonymous file transfer protocol (ftp).

For the past five years, we have been preparing these technical papers using TeX electronic typesetting software. Effective immediately, we will create, revise or finalize your documents using Microsoft Word on the Macintosh as well as continue our TeX service. We will return an updated disk to you and will also store the file electronically.

These services can make the document production process more efficient for you. The staff in TEB can prepare professional-looking manuscripts that complement your research and meet your deadlines. We can produce a final manuscript consisting of highly technical material, including equations and tables, within 10 working days.

Take advantage of the TEB Technical Documentation Section services. This service is for informal reports only. NASA formal reports will continue to be prepared with TeX software. For further information, contact Technical Documentation Section head, Cheryl Winstead at ext. 42497.

## National Technical Association Call for Conference Papers

The National Technical Association, Inc., announces its 66th Annual Conference to be held at the Omni Shoreham Hotel in Washington, D.C., July 20-23. Papers on topics directly related to the conference theme, *Reinventing America Through Science, Technology and Education*, are especially invited. Papers in all areas of science and technology, including education and public policy related to these areas, will be considered.

The major conference themes are: National Information Infrastructure; Technology Education Issues; Energy; Advances in Science and Technology; and The Human Resource Crisis.

The deadline for abstracts is April 15. Contact Robert B. Lee III, ext. 45679, or Michael Chapman, ext. 44687, for information on submitting an abstract.

## Langley Runners Club

The Langley Runners Club intercenter spring competition schedule follows: 10-K races on April 4, 14, 18 and 28; and two-mile races on April 7, 11, 21 and 25. Races start at 5 p.m on Doolittle Road. All NASA employees, retirees, on-site contractors and co-ops earn points for Langley by participating in this NASA-wide competition. Walkers are welcome, too. For information about the races or the Runners Club, call Richard Shearer at ext. 47036.

## Tennis Club Social

A "Get Acquainted" social for members and guests of the Langley Tennis Club will be held at the Activities Association picnic shelter Friday, April 15, from 4:30-7 p.m. Light snacks and drinks will be served while club officers and committee chairpersons describe club activities and schedules for lessons, tournaments and leagues. Bring tennis gear and play if the weather is good. The Tennis Club hopes to increase its active membership this year. For more information, call Don Petrine, ext. 42575, or Tom Yager, ext. 41304.

# Happenings

**LAA EASTER EGG HUNT:** The Langley Activities Association will sponsor an egg hunt for children ages one through 10 on April 2 from noon to 2 p.m. There will be a magic show after the hunt and light refreshments will be served. Free tickets must be obtained prior to the event and they are available to the LAA office, Building 1222, Rm. 112, ext. 46369.

**VOLLEYBALL:** The Spring volleyball season is starting and all Langley personnel, contractors and their immediate families are eligible to play. There are six leagues and the contact persons are: Advanced, Dave Carey, ext. 47385; advanced / intermediate, Jennifer Heeg, ext. 42795; intermediate, Laura Hall, ext. 44897; beginner, Dianne Snyder, 827-4876; men's open, Dave Knuteson, ext. 41509; and women's open, Anna Trujillo, ext. 48047. Call the representative for the league or the volleyball hotline at ext. 44100 for more information.

**INCOME TAX PREP:** Call Nancy Taylor at 723-5227.

**NATIONAL SPACE SOCIETY:** The Langley Chapter of the National Space Society (NSS) will hold its monthly meeting March 28, at 6 p.m. at Burrito Haven, 1312 E. Pembroke Ave., Hampton. Joe Beaufait, a CEBAF engineer, will discuss high-power model rocketry and the status of Langley NSS high-power model rocket project. For more information, call ext. 41233.

**RUNNERS:** The musicians of the Virginia Symphony will host a five-kilometer run and one-mile walk on Saturday, April 9, at the Great Bridge Civic Center, Chesapeake. Chamber music ensembles will perform along the race course and prizes include symphony tickets and hotel packages. Proceeds go to the symphony's annual fund. Entry forms are available at the Exchange Shop, ext. 41585.

**TOUR THE SOUTH PACIFIC:** A 21-day tour is planned for Australia, New Zealand and Fiji, Oct. 23-Nov. 12. For itinerary and information, call Ernie Greene, 838-0567, or Dan Crawford, 247-5815.

**WIA MEETINGS:** Cam Martin, head of Public Affairs at Langley, will be the luncheon speaker for the Hampton Roads Section of Women in Aerospace business meeting Thursday, April 7, from 12:30 to 1:30 in the Executive Dining Room of the cafeteria. Martin's talk is entitled "How to Visually Communicate the NASA Langley Message—Get the Picture?" For information, contact Donna Roper at ext. 42505.

**HOW TO WIN SBIR/ STTR PROPOSALS** will be the topic of a joint luncheon meeting sponsored by the Virginia Aerospace Business Roundtable and WIA. Speakers will be Thayer Sheets from Langley's Small Business Innovative Research (SBIR) program and Connie Jacobs of the DoD Advanced Projects Research Agency. The meeting will be held on Friday, April 8, beginning at noon at the Holiday Inn in Hampton. Reservations must be made by April 6 and the cost is $8 for members, $12 for non-members. Call Donna Roper at ext. 42505 for information and reservations.

**CONDO FOR SALE:** Outer Banks Beach Club II, Mile Post 9, week 18 (May), sleeps 6, oceanfront, $7,500. Call (804) 851-1057.

**INCOME TAX PREP:** By member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping available. We travel to you by appointment. Call 874-3121.

**FOUND:** Set of Chrysler car keys in trailer 1247T5. Contact Pete Toth, ext. 49068.

**HOUSE FOR SALE:** Hampton, 3 BR, 1-1/2 baths, laundry, large kitchen, great room w/fireplace, large corner lot, excellent schools. Can assume mortgage at seven percent. Call 827-0734, leave message.

**TAX RETURNS:** Prepared on computer by experienced, degreed accountant. Will also provide small business bookkeeping reasonably. Call 825-0669.

**CONDO FOR SALE:** Lee's Mill, 2-story, 2 BR, 2-1/2 baths, living room w/ fireplace, dining room, large kitchen, many pluses. Priced $4,700 below assessed value. Owner helps with closing costs. Call Sharon Ellis, 887-2597 after 5:30 p.m.

**LAA SOCIAL HOUR/ CW DANCE:** "Let Spring Begin," March 25, from 4-8 p.m. the Buddy Parker Blues Band will entertain. A Country/Western Dance will be held Saturday, March 26; lessons begin at 7 p.m., dance at 8 p.m. Cost is $3 per person. For details, call Andrea Lewis, ext. 46369.

**ROOMMATE WANTED:** In Hampton, near NASA, 2 BR, 2 bath townhouse. Includes washer/ dryer, cable. Non-smoker, $270/month, 1/2 utilities + $270 security. Call 838-7509, leave message.

**RENT CONDO:** Furnished condo near NASA, one week minimum, utilities included, 2 BR, 2-1/2 baths, jacuzzi, good rates. Call 599-3513.

## *A Letter from Caroline Herschel (1750-1848)*

*In celebration of National Women's History Month, the Federal Women's Program offers this "Letter from Caroline Herschel," the daughter of Sir William Herschel, founder of sidereal astronomy for the systematic observation of the heavens. He discovered the planet Uranus, hypothesized that nebulae are composed of stars and developed a theory of stellar evolution. Both Caroline and Herschel's son, Frederick, expanded on their father's work. The letter is reprinted from* ***Letters from the Floating World*** *by Siv Cedering, University of Pittsburgh Press.*

"William is away, and I am minding the heavens,

I have discovered eight new comets and three nebulae never seen before by man, and I am preparing an Index to Flamsteed's observations, together with a catalogue of 860 stars omitted from the British Catalogue, plus a list of errata in that publication. William says I have a way with numbers, so I handle the necessary reductions and calculations. I also plan every night's observation schedule, for he says my intuition helps me turn the telescope to discover star cluster after star cluster.

I have helped him polish the mirrors and lenses of our new telescope. It is the largest in existence. Can you imagine the thrill of turning it to some new corner of the heavens to see something never before seen from earth? I actually like that he is busy with the Royal Society and with his club, for when I finish my other work I can spend all night sweeping the heavens.

Sometimes when I am alone in the dark, and the universe reveals another secret, I say the names of my long lost sisters, forgotten in the books that record our science — Aglaonice of Thessaly, Hypatia, Hildegard, Catherine Hevelius, Maria Agnesi — as if the stars themselves could remember. Did you know that Hildegard proposed a heliocentric universe 300 years before Copernicus and that she wrote of universal gravitation 500 years before Newton? But who would listen to her ? She was just a nun, a woman. What is our age, if that age was dark?

As for my name, it will also be forgotten, but I am not accused of being a sorceress, like Algaonice, and the Christians do not threaten to drag me to church, to murder me, like they did Hypatia of Alexandria, the eloquent young woman who devised the instruments used to accurately measure the position and motion of heavenly bodies.

However long we live, life is short, so I work. And however important man becomes, he is nothing compared to the stars. There are secrets, dear sister and it is for us to reveal them. Your name, like mine, is a song. Write soon, ***Caroline***"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News Researcher

National Aeronautics and
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**Langley Research Center**
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Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

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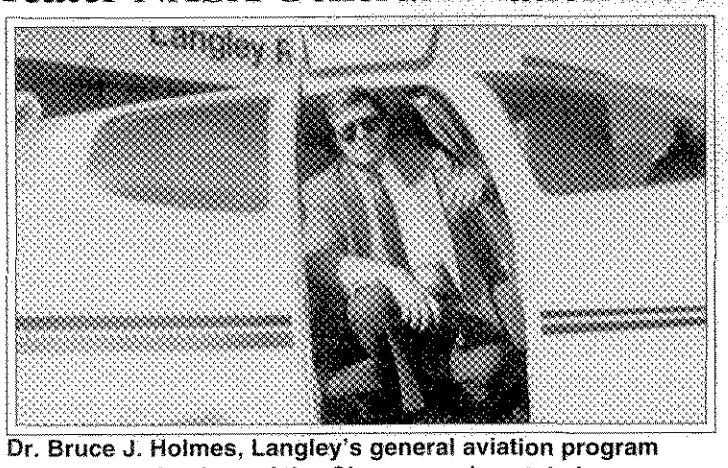
## Report Calls for Greater NASA General Aviation Role

BY KEITH HENRY



Dr. Bruce J. Holmes, Langley's general aviation program manager, at the door of the *Cirrus* experimental plane.

In a recent report, an industry-led task force calls on NASA to revitalize its general aviation program, make its wind tunnels, laboratories and simulators more accessible to the general aviation community and better balance its technology program to meet general aviation needs.

"This report will help us shape our general aviation research for the rest of the decade," said NASA Administrator Daniel S. Goldin. "We are determined to focus on technologies that will be useful to our partners in industry."

General aviation covers a wide range of aircraft and services as a vital part of the national air transportation system serving some 17,800 airports. It provides the only air transportation for millions of people to many communities throughout the United States and the world, provides some 540,000 U.S. jobs and is a potentially significant contributor to the U.S. balance of trade.

The report by the General Aviation Task Force of NASA's Aeronautics Advisory Committee, citing the serious decline in general aviation aircraft deliveries since the early 1980s, highlights four technology research areas that it characterizes as "most important and potentially the most productive" for increasing market share.

They are:

— Propulsion, noise and emissions work to let U.S. aircraft meet world environmental standards and be more reliable, fuel-efficient and easier to fly;

— Aeronautical systems research that would put new technology in the cockpit to expand the use of general aviation and increase safety;

— Structure and materials development that would transfer data on advanced metals and composites to the general aviation industry; and

— Aerodynamics research that would increase aircraft speed, passenger capacity and fuel efficiency.

The report also calls for NASA and the Federal Aviation Administration (FAA) to disseminate research information to the general aviation industry and develop closer ties among NASA, industry and universities.

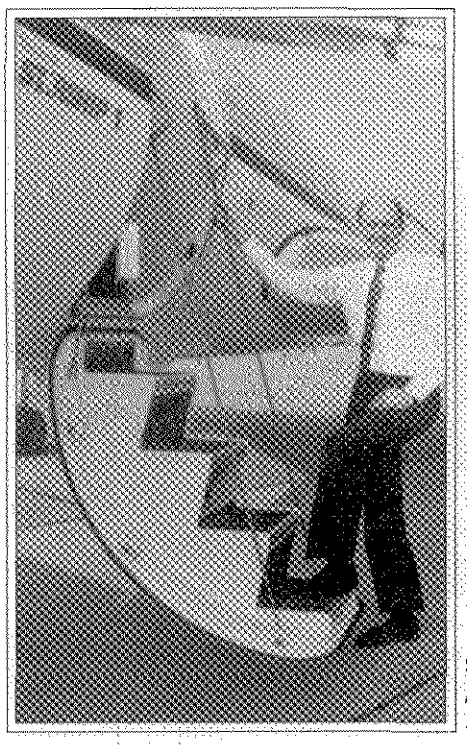
NASA already has initiated and expanded its general aviation effort that is developing technology to improve the safety, utility, environmental compatibility and affordability of general aviation aircraft. Research activities headed by Langley and supported by Lewis Research Center, Cleveland, Ohio, and Ames Research Center, Mountain View, Calif., focus on three key areas:

— Cockpit systems such as displays, controls and software that are more "user-friendly" and cut the time needed to learn and maintain piloting skills;

— Low-cost design and manufacturing methods and ways to make general aviation aircraft more affordable to operate; and

— Quieter propulsion systems producing less exhaust emissions and cabins with better pilot and passenger comfort.

The General Aviation Task Force includes representatives from the General Aviation Manufacturers Association, Textron Lycoming, Allied-Signal, Honeywell, Small Aircraft Manufacturers Association, Allison, Gulfstream Aerospace, Beech Aircraft, Cirrus Design, National Business Aircraft Association, Cessna Aircraft Company, Embry-Riddle Aeronautical University, Wichita State University, FAA, National Transportation Safety Board and NASA.



Ken Johnson, left, is owner, builder and pilot of the *Glasair III-LP* (lightning protected). The Glasair III-LP was developed with the help of Langley's Small Business Innovation Research program.

*Photos by Carole Chapman*

Stephen Harvey, vice president, Beech Aircraft, prepares to board Beech's *Starship*, another experimental model.

## Sergei Sikorsky Speaks on "The Concept of the Helicopter" at April Colloquium

Sergei Sikorsky

Sergei Sikorsky presents a first-hand tracing of his famous father Igor's early days in aviation and the development of the first practical helicopter on Tuesday, April 12. His colloquium talk is entitled "The Concept of the Helicopter."

The program includes descriptions of some of the earliest projects to create a vertical take-off and landing machine and addresses the challenge of helicopter technology. He will focus on his father's work and fascination with the helicopter, which led him to design, build and test-fly the first practical helicopter, the VS-300, in 1939. This machine ultimately transformed the idea of a single main lifting rotor from being a much criticized concept into being the basis for production aircraft.

Sikorsky is a member of numerous aviation-oriented associations and the recipient of the Italian Institute of Navigation's medal, Sweden's Royal Aeronautical Society Thulin Bronze Medal and a honorary doctorate of aviation management from Embry Riddle Aeronautical University.

The colloquium begins at 10 a.m. at the H.J.E. Reid Conference Center. Sikorsky will also present "A Pioneer's Perspective on Helicopters" at 7:30 p.m. on April 11 at the Virginia Air and Space Center's IMAX® theatre 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.

## MAPS Experiment Flies on STS-59

BY CATHARINE G. SCHAUER

Langley's Measurement of Air Pollution from Satellite (MAPS) instrument was slated for lift off April 7 on STS-59 Endeavour to begin a nine-day mission to study the changing global environment.

The primary goal of the MAPS experiment is to measure the distribution of carbon monoxide in the atmosphere between the altitudes of 4-km (2 miles) and 15-km (10 miles). Real-time data will be received from the shuttle during the mission. Approximately four or five days into the flight, the MAPS team expects to have a global image for public release and to have astronauts who have been working on the experiment available to comment on their first-hand observations.

Carbon monoxide is a natural part of the atmosphere; however humans are now adding an amount that is about equal to the natural amount. As a result, the chemistry of the atmosphere has changed. These human-caused emissions of carbon monoxide reduce the ability of the atmosphere to clean itself of other chemicals,

*Continued on Page 5*

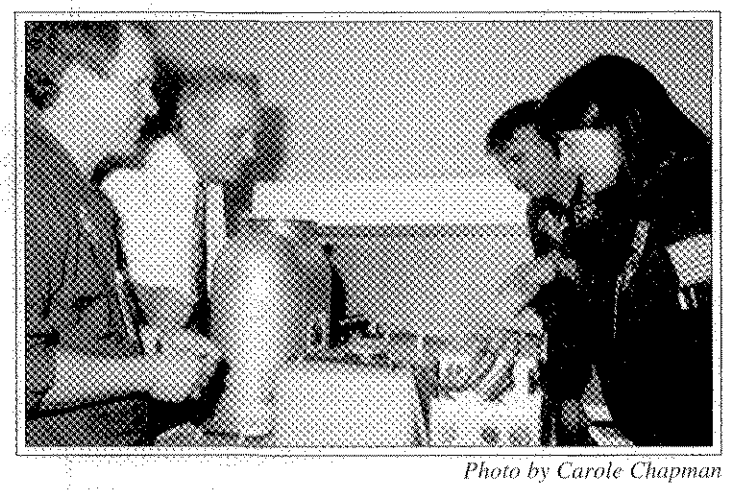


*Photo by Carole Chapman*

Shown in the photo are (left to right) Mission Specialist Dr. Thomas Jones, Langley's Principal Investigator for MAPS Dr. Henry Reichle, Commander Col. Sidney Gutierrez, and Payload Commander Dr. Linda Godwin. They are discussing the functions of the MAPS instrument (center).

# News Briefs

## Around the Agency

**HIGH-SPEED AIRCRAFT RESEARCH COMBUSTOR TESTS EXCEED GOALS –** NASA-industry research experiments to reduce exhaust emissions to environmentally compatible levels for future supersonic airliners have yielded results that substantially exceeded program goals. The tests, which used an engine fuel combustion chamber sector, beat NASA's goal of generating no more than five grams of oxides of nitrogen (NOx) per kilogram of fuel burned at supersonic flight speed. Studies suggest that a fleet of supersonic airliners, equipped with these ultra-low NOx engine combustors, possibly would have relatively small effects on stratospheric ozone. "Protecting Earth's stratospheric ozone layer is our highest priority," said Louis J. Williams, director of the High-Speed Research Program at NASA Headquarters, Washington, D.C., "so developing the technology to assure environmental compatibility for future supersonic airliners is the most important goal of our program. The results of these ultra-low emissions combustor tests make us more confident that we'll achieve that goal."

**REFLIGHT OF TETHERED SATELLITE SYSTEM CONFIRMED** – NASA Administrator Daniel Goldin and Italian Space Agency (ASI) Special Administrator Professor Giampietro Puppi have confirmed the reflight of the Tethered Satellite System (TSS). Target date for the mission is February 1996. NASA and ASI had long planned this reflight but a formal commitment awaited Congressional approval. TSS was originally flown on STS-46, launched in July 1992. TSS deployment was curtailed when mechanical interference in the deployer reel assembly prevented full deployment of the satellite. The TSS reflight will focus on science objectives not accomplished on the STS-46 mission.

## Speakers Bureau Report

The following people have participated in the Speakers Bureau so far in 1994:

**Elijah Kent** was a science fair judge at Ferguson and Warwick High Schools, Newport News and Bruton High School, Williamsburg. Kent also spoke to students at Toano Middle School about "NASA Careers."

**Dr. Greg Jones** spoke to the Boy Scouts at Williamsburg Methodist Church about "Space Exploration."

**Dr. Christine Darden** spoke to members of the Federal Aviation Administration, Washington, D.C., and Lawrence Berkley Labs at the University of California at Berkley about "My Career in Aerospace." Darden also addressed attendees at the Exploratorium of San Francisco, the Public Form Exploratorium and the High School Exploratorium on the topic "Lowering the Boom."

**Stan Ward** addressed the Hampton Roads Chapter of the National Contracts Management Association on "Obtaining Your Certified Professional Contracts Manager Certificate."

**David Glass** spoke about "NASA Aeronautics" at Brevard Middle School, Brevard, N.C.

**E. Brian Pritchard** spoke at the King Fork Ruritan Club in Suffolk about "Space Exploration Beyond Space Station."

**M. Leroy Spearman** was a speaker for the Aerospace Engineering Department seminar, Auburn University, Alabama, on the topic "The Evolution of Civil Transport Aircraft."

**Dr. Karen Jackson** spoke to students at Oceans Lake Elementary School in Virginia Beach about "Impact Dynamics and Facility Research."

**Dr. Roland Bowles** spoke to the Richmond Joint Engineers Council on the topic "Making the Skies Safer – Wind Shear Problems Solved."

**Bob Miserentino** spoke about "Large Space Structures" at the Engineering Open House for Old Dominion University.

**Irwin Schauer** was a member of the Hampton Roads Quality Council Leadership Forum and spoke on "Quality Communications Systems."

## NASA Strategic Management

***From General John R. Dailey, NASA's Acting Deputy Administrator:***

"Reinventing Government" has been a major theme of President Clinton and his Administration. The National Performance Review (NPR) laid the cornerstone for the President's reform program. The goal of the Administration is to make government simultaneously work better and cost less. The objectives presented in the NPR Report are to "Cut Red Tape, Put Customers First, Empower Employees to Get Results, and Cut Back to Basics." In addition, Congress has recently passed the Government Performance and Results Act (GPRA) of 1993 that establishes new requirements for Federal agencies to undertake strategic planning, to plan and measure program performance, and to report the outcomes of their activities to the White House and Congress.

Upon first review, these requirements might appear to be quite imposing. However, NASA is actually well positioned to take in these new challenges. Over the past 18 months, the Agency has undertaken internal management improvement initiatives synergistic with the new requirements developed by the Administration and Congress. The new NASA Strategic Plan represents a significant step toward the reinvention of NASA. It underlines our commitment to strategic management and establishes a framework for making key management decisions.

As the Administration, Congress and NASA move forward with the reinvention of government, it is essential that the men and women of NASA participate in our own internal management improvement activities. To keep you informed, we will begin including a "Strategic Management" section in the Headquarters and Center news publications on a periodic basis. In future issues of these publications, this new section will include further details on NPR, GPRA, the NASA Strategic Plan, the strategic management process and other key NASA management improvement initiatives. In addition, we will use the existing Strategic Planning and TQM networks to further facilitate Agencywide communication of federal and NASA management improvement initiatives.

We all recognize that the reinvention process is a challenge; however, the Federal Government and our Agency will benefit from our current investment in change. With our ongoing initiatives, we are ideally postured to take a leadership role in this process.

## In Memoriam

### Melvin N. Gough

Melvin N. Gough, 87, a test pilot and first NASA director of Cape Canaveral, died Sunday, March 6.

Gough, a former Hampton resident, was an engineer for the National Advisory Committee for Aeronautics (NACA), NASA's predecessor organization, and became their chief test pilot. He later became chief of the Flight Research Division. It was during the reorganization of NACA in 1958 that Gough became the first director of NASA at Cape Canaveral.

Gough subsequently served as director of the development bureau of the Federal Aviation Agency, directing the supersonic transport program in Washington, D.C.

He was a fellow of the Society of Experimental Test Pilots, a fellow of the American Institute of Aeronautics and Astronautics, a charter member of the Society of Air Safety Investigators and the Aerospace Medical Association.

For a number of years, he served as a member of the Advisory Group for Aeronautical Research and Development of the North Atlantic Treaty Organization (NATO). Gough was inducted into the Virginia Aviation Hall of Fame in 1978.

*NACA Archive Photo*

**Mel Gough, at left, and his NACA pilot staff in 1948, were Herbert Hoover, Bob Champine, Bill Elliot, Jim Whitten, Jack Reeder, John Harper and Bud Ross.**

### Martin J. Gross Jr.

Martin J. Gross Jr., 67, died Saturday, March 19. Gross retired in 1990 as an electrical engineer technician after 27 years at Langley.

### Myrtle S. Braslow

Myrtle Shoaf Braslow, 72, a Peninsula resident for 50 years, died Wednesday, March 16. Braslow was an engineer with NASA's Project Mercury.

### Robert M. Henry

Robert Malcolm Henry, 70, a native of Florida, died January 15 in Ruston, Louisiana. Henry retired in 1978 as a research scientist from Langley. He was a nationally recognized authority on planetary surface and atmospheric properties of Earth, Mars and Venus and their relationship with aerospace vehicles. Henry was a member of the Mars Viking Project atmospheric team.

## Letters

### Retirement Party Thanks:

From Robert L. Swain: "My family and I would like to sincerely thank the Langley Research Center community for the fantastic retirement party given for me on March 19. The food was great, the fellowship with those attending was very meaningful to us, and the many gifts and mementos are very much appreciated. Our deepest thanks for a very memorable experience."


News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# Hessenius Discusses IOG

*This interview is the second of a series designed to introduce Langley employees to the new group directors.*

Dr. Kristin A. Hessenius, who came to Langley from NASA Headquarters last November, is the director of the Internal Operations Group. The *Researcher News* asked Hessenius for comments on her group, Langley's largest, her vision for its future and its interaction with customers.

Dr. Kristin A. Hessenius

**RN:** ***Please talk about the structure of your group.***

**KH:** The Internal Operations Group (IOG) consists of 11 divisions and three offices. The products and services that these organizational entities provide are varied. They include administrative services, i.e., acquisition, logistics, scientific and technical information, and technical services, for example, engineering, facility operations and Center technical support, facility planning and design, testing technology, scientific and business computing, fabrication and flight operations. The structure of our divisions and offices is unique to the type of product and/or service that each produces.

**RN:** ***What is your vision for IOG?***

**KH:** As I said in our previous interview (*Researcher News*, January 14 issue), NASA is facing some very uncertain times. There are several elements that I think are key to our survival as an Agency. One is the ability to produce a quality product for a lot less money and with fewer human resources. The Agency's budget was reduced this year for the first time in 21 years and all of the signals from Capitol Hill indicate that it could fall even further. There are even discussions about descoping NASA's mission to be consistent with decreased budgetary levels.

The entities within IOG represent the cost basis for Langley Research Center, since we provide the administrative and the technical services necessary to produce the product. So, a cost-effective, streamlined IOG will be critical to Langley's competitiveness and, therefore, ultimately, to NASA's competitiveness. But we're playing catch-up somewhat. The IOG budget is being cut significantly, and this part of the budget has always been tight. People have been doing more with less for years and years. But in Fiscal Year '95, we will see the program support budget, or the budget which IOG primarily manages, fall by nearly 15 percent. We expect additional changes in our budget, so the cuts could amount to more than that in the final analysis. Yet we have made commitments as a Center to produce certain products, to deliver on highly visible projects and technology milestones. And we, at Langley, must do so with fewer fiscal resources and fewer human resources.

Needless to say, we cannot continue to do everything. We need to complete projects that have been planned in a quality way, and say no to lower priority activities. That's traditionally been very hard for NASA to do, but this is a new culture. To deliver a quality product in today's environment is a big, big challenge, and it requires very close interaction between Langley's external customers, internal customers and the providers within IOG. Everyone must understand what resources we have available, and we in IOG must get a clear set of priorities from our internal customers. That way, we can all deliver with excellence.

**RN:** ***What has been the customer response to the new IOG?***

**KH:** We have gotten a great deal of customer input on how the IOG organization ought to be structured. What I mean by customer input is that IOG supports internal customers, Langley customers. All of the IOG division and office transition teams who are working their organizations have been in touch with their internal customers to get feedback about the way in which we are organizing to do the job.

IOG is primarily focused on internal customers, but I would consider NASA Headquarters an external customer for IOG. We have many functional relationships with the organizations at Headquarters. I think Langley is considered by Headquarters as a pioneer in many respects. We are out in front of the agency in terms of the goals that we set for ourselves in the reorganization. We are anticipating where the agency needs to go to survive and thrive in this very threatening environment.

# Property Awareness Week Winner

**Fabiola Martin of the Equipment Management Section, presents a $100 U.S. Savings Bond to Scott M. Bartram. Bartram is the winner of the Property Awareness Winning Number Contest. He found a linear actuator, ECN 0020896, valued at $1,625.**

## Letters

### Thank You for Donated Leave

From Geraldine Tucker, Flight Dynamics Branch: "My sincere thanks to all who donated their leave so I could spend some of the most precious moments of my life with my mother during her time of pain and suffering. Though this was a hurting and sorrowful time, the burden was lightened because of your thoughtfulness. Thanks again."

# *Health Corner*

## *Thanks to Our Blood Donors*

For the March 23 Bloodmobile at Langley, there were 307 donors, five of them first-time donors, according to coordinators Peter J. Edgette and Karen Ridlon of the Occupational Health Services Office and Kitti Schatz of the American Red Cross.

A big "thank you" goes to these donors: 20 gallons, Billy Dancy; nine gallons, Danny Barrows; eight gallons, Edward Medford and Joseph Jackson; seven gallons, Ralph Angel, Steven Yaros and James Ellison; six gallons, Fred Beissner and Alan Scheidegger; five gallons, Lynn Seals and John Hopkins; four gallons, Robert Caldwell, Daniel Carey, Randy Simons and Mark Trybe; three gallons, Tim Murray, Arthur Hayhurst, Robin Freeman and Carl Ande; two gallons, Michael Moore, Donald Kepley, Rex Current, Annabelle Durand, Levi D. Mewborne, Jerome Foughner and Vanessa Butler; and one gallon, Shashi Gupta and Richard Moore.

First time donors were Kathy Needleman, Henry Huckes, Stephen Bolloman, James Keller and Donna Roper.

The next Bloodmobile visit will be May 25 at the H.J.E.Reid Conference Center from 9 a.m. to 3 p.m.

## *Hospice Presentation*

The Virginia Natural Death Act recognizes the right of any competent adult to direct that life-sustaining procedures be withheld or withdrawn in the event of a terminal condition. The act also provides for a person to designate another person to make treatment decisions if the declarant is diagnosed as suffering from a terminal condition. To hear more about this subject, there will be a brown bag lunch on April 14, from noon to 12:45 p.m. in the Executive Dining Room. The guest speaker is Ms. M. Floyd, director of Hospice at the Veterans Administration Medical Center in Hampton.

## 28th Aerospace Mechanisms Symposium

The 28th Aerospace Mechanisms Symposium (AMS) will be held at the NASA Lewis Research Center in Cleveland, Ohio, on May 18-20. The symposium is sponsored by NASA and the Lockheed Missiles and Space Company.

The AMS is the only symposium in the United States devoted to aerospace mechanisms, and it promotes discussions of problems related to the design, fabrication, test and operational use of these mechanisms. Twenty-five papers will be presented from all over the world. Specific topics of discussion will include solar array deployments, robotics, release mechanisms, space lubricants and bearings, deployment actuators and ground test mechanisms. Hardware will be displayed and discussed in a poster session of several papers. A tour of Lewis Research Center facilities is planned. For information, contact Ed Boesiger at: boesiger_ed@mm.ssd.lmsc.lockheed.com

# Binkley Receives Company Honors

**Kelly Binkley, center, an engineer with Science Applications International Corporation (SAIC), was honored with an Environmental Achievement Award. The award, presented by Peter Wise, left, SAIC's group manager, recognizes Binkley's continued superior performance. Binkley is working with Langley's Office of Environmental Engineering to implement a Center-wide pollution prevention program. Also on hand for the honors was Sylvia Lawrence, a U.S. Environmental Protection Agency administrator for the Office of Solid Waste and Emergency Response.**

## Retirement Social Planned for Muraca

A retirement social for Ralph J. Muraca will be held on April 29, 1994, from 5 to 7:30 p.m., at the H.J.E. Reid Conference Center. There will be an open bar. Heavy hors d'oeuvres will be served. Cost per person is $12. For reservations or gift donations, please contact Joann Belsches at ext. 47004, or Harriett Coombs at ext. 47010, Mail Stop 430, by April 19, 1994. Please make checks payable to Joann Belsches.

# *Technical Library Prepares for Second Annual Open House*

BY SUSAN L. ADKINS

The Second Annual Technical Library Open House will be held on International Special Librarians Day, Thursday, April 21. All NASA employees and contractors are invited to visit the library between 10 a.m and 3 p.m., and participate in hands-on demonstrations of the many available services.

Highlighting the theme, "Building a Better World Through Information," the staff will showcase a variety of electronic resources including the STILAS Online Catalog and Internet Navigator, Faxon Finder, Current Contents update services and CD-ROM full text and bibliographic databases. As an added attraction, the Photographics Section will be exhibiting their award-winning photographs in the first-floor lobby of the library.

As in the past, the open house will feature light refreshments as well as a drawing for free gifts. Prizes include T-shirts, mugs, duffle bags and other items.

**George Roncaglia, head of the Technical Library Branch, right, presents Center Director Paul F. Holloway with his STILAS request card. It can be used to place electronic requests for information through the Technical Library's online catalog. All Langley employees may pick up their credit card-size STILAS request cards at the Technical Library Open House April 21.**

The open house is only one of several activities that will highlight Langley's participation in National Library Week. The STILAS Online Catalog will be demonstrated in the cafeteria on Thursday, April 14, from 11 a.m. to 1 p.m. Brown bag lunch tutorials will be given in the library throughout the week of April 18-22 from noon to 12:45 p.m. These sessions will include hands-on instruction in STILAS, the Aerospace Database, Engineering Index and Computer Select databases. Due to limited space, reservations for the brown bag lunch tutorials are required by calling ext. 42356.

## Langley Speakers Bureau Recognition Ceremony

**During the Langley Speakers Bureau Recognition ceremony, held, March 10, Dr. Christine Darden of the Vehicle Integration Branch, was named "Speaker of the Year" for 1993. Darden gave 20 talks during the year. Myra Walton, Materials Processing and Development Section, and Bob Miserentino, Spacecraft Dynamics Branch, addressed the group on "How to Judge your Audience and other Tips for Giving Talks." All other award winners were runners up to Speaker of the Year. The winners are, left to right, Dr. Joel Levine, Dr. M. Patrick McCormick, Myra Walton, Bruce Fisher, Nancy Kruse, William Hood, Darden, Pamela Davis, Bob Miserentino, Dr. Mary Ann Smith and Leroy Spearman.**

## Wagner Receives Commendation

H. Scott Wagner received a Letter of Commendation from Langley's Contractors Steering Committee for his outstanding leadership in the development and implementation of the Council's Middle School Education Initiative.

Wagner led a team that defined and developed a local program to capture students' interest in aerospace careers at an early age. Materials were developed after the team met with five local public school systems to determine their needs and to solicit ideas. As a result, one private and 17 public schools were visited and more than 5,000 students were reached during the 1992-93 school year. Feedback from the students and faculties was overwhelmingly supportive. As a result, the Council has agreed to institutionalize the program.

**Dr. David Peake and Dr. Belinda H. Adams, co-chairpersons for the Langley Contractors Steering Council, present a Letter of Commendation to H. Scott Wagner, right, for his outstanding leadership in the Council's Middle School Education Initiative.**

## Spearman Celebrates 50 Years with NASA

**M. Leroy Spearman**

M. Leroy Spearman, an aerospace technologist in the Aeronautical Systems Analysis Division at Langley, recently celebrated 50 years in government service, all of them at NACA (the National Advisory Committee for Aeronautics)/ NASA Langley.

Spearman was recently honored by his alma mater, Auburn University, with the Aerospace Engineering Outstanding Alumnus Award for 1994. The University presented the award to him in February "in recognition of your half-century contribution to the field of aerodynamics at NASA's Langley Research Center."

"We are extremely proud," said John E. Cochran Jr., professor and head of the Department of Aerospace Engineering, "to have one of our alumni make such significant contributions."

Spearman's recognition by Auburn is just the latest in a string of achievements and honors during his career. He is currently assigned as a senior technical specialist in the Mission Analysis Branch involved in assessing advanced vehicles including civil transports, hypersonic vehicles, various types of missiles and new innovations. He is recognized as an authority in the fields of aerodynamics, stability and control, and performance of aircraft, spacecraft and missiles. Spearman has conducted wind tunnel research investigations throughout the subsonic, transonic and supersonic speed ranges.

Spearman began his career in 1944 with NACA, NASA's predecessor organization, in the Atmospheric Wind Tunnel where he made some of the first tests of swept wings in the United States. In 1945, he wrote his first paper which was to be followed by more than 250 throughout his career. He was transferred to the new 7- X 10-Foot tunnel in 1946 where he continued his study of swept wings and went on to conduct some of the earliest transonic tests using the transonic-bump technique.

In 1948, he was transferred to the new 4- X 4-Foot supersonic pressure tunnel, where he extended his aerodynamic studies to supersonic speeds. There he was responsible for stability and control studies that had an impact on essentially every supersonic aircraft built in the United States. He made the first supersonic tests of the variable sweep wing concept; the first supersonic tests of canard configurations; the first supersonic tests of missiles; and some of the earliest tests of supersonic transport concepts.

During this period, he became a section head, then head of the Large Supersonic Tunnels Branch, which combined the 4- X 4-Foot Tunnel with the Unitary Plan Wind Tunnels in 1962. In 1963, he was assigned to assess the status of foreign technology and, over the years, this activity has had a significant effect on the direction taken by some U.S. programs.

In 1974, Spearman was assigned to the High-Speed Research Division Office as chief scientist for Military and Foreign Technology. He was reassigned from 1979 to 1993 to the Aeronautical Systems Division, the Aeronautical Systems Office and the Advanced Vehicles Division, where he has used his experience to develop and assess a variety of advanced vehicles.

In addition to his significant contributions to research, Spearman has participated as a mentor in the New Horizons Technical Center program for talented and gifted high school students. For the past four years, his work with the students has been to instruct, guide and encourage those who are looking toward a career in engineering. He also visits local schools each year during National Engineers Week as a guest teacher to promote interest in math and science.

A member of the American Institute of Aeronautics and Astronautics, the Air Force Association, the Auburn University Alumni Engineering Council and the Virginia Academy of Science, he has been honored by all of these groups through the years and received a number of NASA awards as well.

"My interest in aeronautical engineering began when I was about nine years old and has never waned," Spearman said, "The opportunity to pursue that interest at Langley has been very rewarding. I consider myself to be very fortunate to be at the right place at the right time as I progressed through a series of new facilities with assignments that enabled me to stay abreast of developments in aeronautics and space research. My career has been enriched by many of my associates, and it is important to me that I pass on any knowledge I may have gained to those who follow."

## MAPS Experiment . . .

Continued from Page 1

and that may have a long-term effect on the climate.

### Studying CO

The carbon monoxide added by humans, is, primarily, from the burning of forests and grasslands in the tropical regions and the burning of fossil fuels (mainly gasoline) in the northern mid-latitudes. The actual size of these sources, the changes that occur over the course of the year and the patterns of the movement of the gas away from the source regions are not now well known. The MAPS data are useful in studying these factors.

The presence of carbon monoxide in the atmosphere causes a small change in the heat being emitted by the Earth. The MAPS instrument detects this change. The change is unique to carbon monoxide almost as if the gas leaves a fingerprint. The instrument views Earth from the payload bay during essentially the entire mission.

### A "Quick Look"

Data are both recorded on a tape recorder that is part of the instrument and transmitted directly to the ground using the Space Shuttle telemetry system. The signals will be processed at the Payload Operations Control Center to produce "quick look" maps of the carbon monoxide distribution. This "quick look" data will be used to plan the exact periods of data acquisition during the flight. Following the flight, the data from the tape recorder will be processed using more refined techniques, and they will be combined with ground-based and aircraft-based data obtained by collaborating scientists from several countries. This will present a more detailed description of the distribution of the gas than can be obtained by any single technique. STS-59 is the first MAPS flight with real-time data and the third MAPS mission.

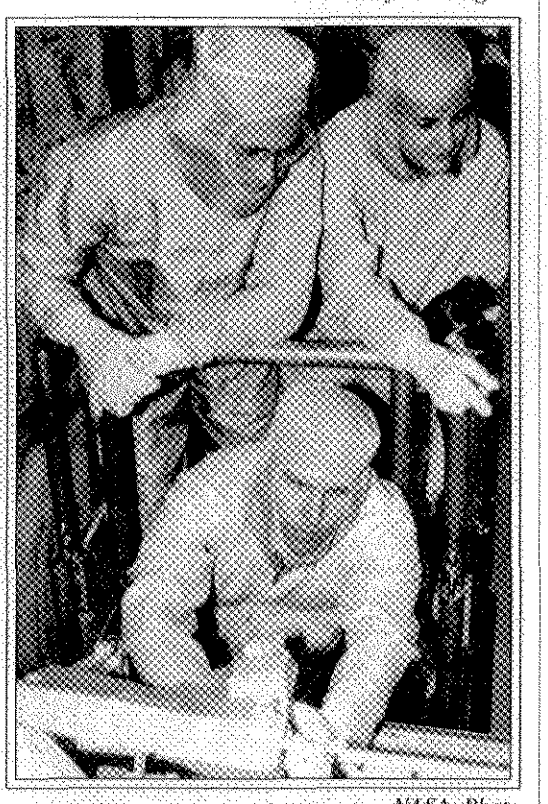
### MAPS First Flights

The MAPS instrument first flew on the second flight of the space shuttle during November 1981. During this flight, it obtained 12 hours of data that could be used to study the carbon monoxide distribution.

The MAPS experiment again flew on the Space Shuttle in October 1984. About 80 hours of data were obtained. These data clearly confirmed that burning in South America and southern Africa was a major source of carbon monoxide.

### MAPS Flies Again

The overall flight plan for the present mission is very similar to the 1984 mission. More data will be acquired on this flight because the tape recorder capacity has been increased. The availability of telemetry data will allow for improved planning during the flight, particularly in the areas of astronaut observations and photography of burning, and of coordination with ground-based and aircraft observations.



NASA Photo

**STS-59 mission specialist Tom Jones, reaching, and payload commander Linda Godwin, right, are examining the payload bay of the orbiter Endeavour and its cargo as part of the Crew Equipment Interface Test. Assisting them is Randy McDaniels of Johnson Space Center.**

According to Dr. Henry Reichle Jr. of Langley's Chemistry and Dynamics Branch, it is expected that the data will show relatively little biomass burning in the Southern Hemisphere, which will be reflected in low carbon monoxide concentrations. The Northern Hemisphere, however, is expected to show relatively high mixing ratios because its sources are mostly from man, such as cars and factories, and do not change much over time. This flight will provide data from the Northern Hemisphere in spring, as compared to data from previous flights in the fall. Seasonal changes in carbon monoxide distribution are a key area of study in climate change.

### The MAPS Instrument

The MAPS instrument is based on a technique called gas filter radiometry. Thermal energy from the Earth passes through the atmosphere and enters the viewport of the down-looking MAPS instrument. Carbon monoxide (CO) and nitrous oxide ($N_2O$) in the atmosphere produce unique absorption lines in the transmitted thermal energy. The energy which enters the MAPS instrument is split into three beams. One beam passes through a cell containing CO and falls onto a detector.

This CO gas cell acts as a filter for the effects of CO present in the middle troposphere. A second beam falls directly onto a detector without passing through any gas filter. The difference in the voltage of the signals from these two detectors can be used to determine the amount of CO present in the atmosphere at an altitude of 7-8 km. The global distribution of the $N_2O$ is well known, so the $N_2O$ signal can be used to detect the presence of clouds in the field of view and to correct the simultaneous CO measurement for systematic errors in the data. A third beam of the energy passes through a cell containing the $N_2O$ and falls onto a detector. The difference in the voltage of this detector and the second detector can be used to determine the amount of $N_2O$ in the atmosphere. This $N_2O$ gas cell acts as a filter for the effects of $N_2O$ present in the atmosphere.

Reichle is the principal investigator for MAPS, and the project manager is John Fedors, MAPS Project Office. The experiment is guided by an international science team whose members include Dr. Vickie Connors and H. Andrew Wallio, both of Langley's Chemistry and Dynamics Branch.

A payload partner on this mission is the Space Radar Laboratory (SRL). It will have the ability to make surface measurements over virtually any region on earth at any time, regardless of weather or sunlight conditions. In many cases, radar is the only way scientists can explore inaccessible regions on the Earth's surface.

## *Congressional Connection*

### Congress Linked to Virginia Polytechnic Institute and State University at Langley

The Hampton Roads Section of the American Institute of Aeronautics and Astronautics will sponsor a briefing by Congressman Rick Boucher (D-Va, 9th) on Monday, April 18. The briefing will be from 1 to 2 p.m. at the H.J.E. Reid Conference Center.

Boucher is the chairman of the Science Subcommittee of the House Committee on Science, Space and Technology. His district includes Blacksburg, location of Virginia Polytechnic Institute and State University (Va. Tech). At Langley, there are presently 350 employees who are graduates of Va. Tech.

Boucher's topic will be "The Role of Basic Research in Economic Competitiveness." He will cover several other topics important to Langley that are under the jurisdiction of his subcommittee, such as science and technology policy; science and engineering resources; international scientific cooperation; and math, science and engineering education.

Introducing Boucher will be Dr. Paul Torgersen, president of Va. Tech. Center Director Paul F. Holloway, another Va. Tech graduate, will host the event.

All Langley employees are invited to attend. Time should be charged to Job Order A1980.

## Annual Honor Awards Ceremony

The Annual Honor Awards Ceremony will be held on Thursday, April 21 at 1:30 p.m., in the H.J.E. Reid Conference Center. General John R. Dailey, NASA's Acting Deputy Administrator, will deliver the address.

NASA Honor Awards will be presented to 54 individuals and 14 teams. Other individuals who will be recognized include Langley's 1993 recipients of the H.J.E. Reid Award, recipients of the 1994 Contractor's Excellence Award for Quality and Productivity, two Space Act Awards and a 50-year Length of Service Award.

Seating in the auditorium is limited, therefore, the ceremony will be broadcast via the Center's video distribution system. Time should be charged to Job Order A2329. Questions regarding the ceremony should be directed to Kate Spruill at ext. 42606 or Lisa Allen at ext. 42610.

## *Astronomy Day*

The Skywatchers Astronomy Club will host telescopic viewing on Friday, April 15, from 8 p.m. to midnight at the club's observatory, Building 1232. A variety of telescopes will be set up for the event which is free and open to the public. Call Marilyn Ogden at ext. 41175 for more information.

## Langley Part of Success Celebration

The Virginia Peninsula Total Quality Institute sponsored the second annual team "Success Celebration" in February. Irwin Schauer moderated a session that included a presentation by Susan Voigt, Advanced Space Concepts Division, on the Space Directorate Work Force Effectiveness Quality Action Team (QAT) process and results. Chris Temper, Business Data Systems Division, also gave a presentation concerning his QAT process and the benefits of using an electronic purchase request system. About 300 people, involved in the continuous improvement process from universities, business and government, attended the institute.

## King Street Bridge to Be Repaired

Starting in mid-July, it is expected that the King Street Bridge will be closed to all traffic for 60 to 90 days while it undergoes major renovation. The 60-year old bridge will have its top superstructure replaced during work that will continue for 24-hours a day, five to seven days per week.

As one of three main entrances to Langley Air Force Base (LAFB), about 12,000 cars traverse the bridge each day. Without the needed repairs, the bridge would have to be closed permanently, according to base spokesperson Maj. Edward Worley. Residents, commuters or business owners with questions can call Langley AFB public affairs at 764-2018.

# The 1993 Volleyball Club

*The Board of Directors*

The 1993 Volleyball Club Board of Directors is pictured above. They are back row, left to right, Dave Rosenbaum, president; Lou Glaab, vice president; Laura Brewer, secretary; and Lynda Foernsler, treasurer; front row, Erik Olson, B League representative; Wayne Hollenbaugh, Men's League representative; Julie Young, C League representative; and David Cooke, D League representative. Board members not pictured are Trish Glaab, Women's League representative, and Scott Martinson, BB League representative.

*Aerospace Shots*

C-League Regular Season Champs are the "Aerospace Shots." Team members are, back row, left to right, Odilyn Santa Maria, Frank Peri and Brenda Gile; front row, Michael Marcolini, captain, Shelley Matlack and David Cox. Not pictured are team members Will Nuckolls, Mike Jones and Steve Williams.

*The Smashing Pumpkins*

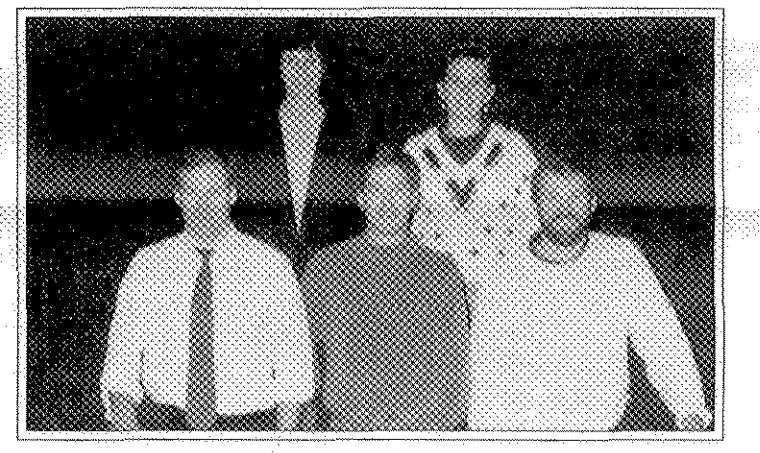
C-League Tournament Champs are "The Smashing Pumpkins." Team members are, left to right, Julie Young, Craig Watry, Tony Orlando and Lynda Foernsler.

*The 4th Victim*

The Women's League Champs are "The 4th Victim." Team members are, back row, left to right, Cheryl Rose, Jennifer Heeg and Paula Singleton; back row, Judi Hannon, Lin Hartung, captain, and Linda Black. Not pictured are team members Nancy Brinkley, Kathy Healy and Pam Hess.

*Just Do It*

The Men's League Champs team "Just Do It" are pictured, back row, left to right, Keith Furrow, Russ Rausch and Luther Jenkins; front row, Cary Butrill and Frank Quinto. Not pictured are team members Paul Bagby, Dwayne Melson, Joe Granger, Tom Brinkley and Pat Cosgrove.

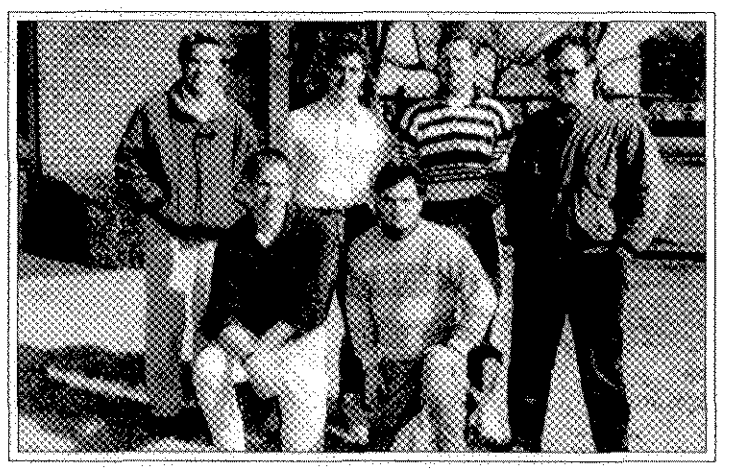


*JAH Children*

The BB Champs are the "JAH Children," left to right, David Dawicke, Cheryl Rose, Ran Cabell, Laura Brewer and Pat Cosgrove. Not pictured are team members Dave Carey, Cathy Perkins and Steve Sanford.

## *Langley's Football League Champs*

The "Boneheads" won the 1993 NASA Flag Football League Championship. They won the regular season title with a perfect 7-0 record and followed that up with a 19-7 victory over the "Hypersonics" in the tournament final.



Pictured are the Boneheads team members, from left to right, Erik Olson, Bill Tomek, Bill Stevens, Steve Young, Kevin Laferriere and Pete Hoge. Not pictured are Dave Rosenbaum, Keith Richards, Chuck Richards, Mike Koch, Carl Elks, Jeff Lyon, Bill Luck, and Bill Prosser.

## Bowler Hits First 300-Game in League

John B. Kovtun, an engineering technician in the Composites and Models Development Section of the Fabrications Division, bowled his first 300-game on the Tuesday night NASA Ten Pin Bowling League. It was also the first perfect game ever bowled in the 59-year history of the NASA League.

Kovtun has been a member of the "Odd Lot" bowling team for six years. On January 11, he completed his first game with nine strikes in a row. He continued to strike 12 more times for his first perfect game. His scratch set for the night was a score of 762, second only to his 770 set previously bowled in November 1993, another NASA league record.

Kovtun has also been a member of the American Bowling Congress for 23 years. For his outstanding accomplishment, he was given a watch from the bowling congress and a $300 check from Victory Lanes Bowling Center, Grafton.

## Langley Role in Space Station White Paper Available

The Office of External Affairs has prepared a brief white paper, approximately 70 pages, on the history of Langley's role in space station development, researched by Beverly McMillan and Dr. Jim Hansen. As they documented in this monograph, while Werner von Braun and other visionaries were popularizing notions of space travel and space stations, Langley was at work laying the foundation to turn ideas into reality. The first Agency Space Station office was created here in 1958. Ray Hook, Langley's former Director for Space, said, "We really thought, at the time, in the early sixties, we were going to build one", but the Langley team had to start from scratch. Everything had to be done," a mammoth amount of planning, science, and new technology," he added.

Anyone who is interested in reading the history of Langley's role in the U. S. space station effort, should contact Susan Smigielski in the Public Mail Center, Building 1153, Room 115, Mail Stop 146 or by calling ext. 43293.

# Community Service Extends Across Cultural Borders

BY DONNA G. ROPER

Many of us volunteer in our own neighborhoods, but we seldom consider venturing outside our own community. Last August, Allison Ballew, a contracting specialist in Acquisitions currently on temporary assignment in Public Affairs, spent two weeks in Honduras in support of the Friends of the Americas project.

While in Honduras, Ballew's life was far from glamorous. She slept on cement, bathed in the river, and dined on rice and beans. However, she helped build a water and irrigation system that ran through seven mountains. Each mountain was a home to a family who, as a result of her group's hard labor, now has clean, running water.

Ballew, who has participated in other such trips, became involved in Friends of the Americas because she wanted to leave something for the community. After hearing a friend's enthusiasm for the Honduras' project, Ballew decided that this was an opportunity to make a real difference.

*Photo by Henry Anglin*

**Allison Ballew digs into the dry Honduras terrain to help build a water and irrigation system.**

### Dangerous Travel

Despite travel advisories about guerrilla fighting along the Honduras border, Ballew decided to go anyway. Her group, consisting of 18 college students and young professionals, was organized by Mark Hinden, youth pastor for the Church of the Messiah, Fredericksburg. To choose a project for the group, Hinden worked with Daniel Dye, the director for the Friends of the Americas operation in Honduras. Dye accepts applications from villages in need of assistance and then assists volunteer groups in selecting a project and organizing their trip.

Each group member had to raise $726 to cover airfare, materials, transportation and food. Ballew said, "We could have gone to Florida for two weeks and had a great time, but we felt that this trip would be more rewarding. As the time to leave grew near, we all became very excited and a little nervous."

When the group finally arrived in Honduras, they spent the first night in the capital, Tegucigalpa. Expecting a busy metropolis, Ballew was shocked to find a dirty, poverty-stricken city filled with peddlers and people living in the streets or poorly constructed huts. The next morning, the group boarded a bus around 6:00 a.m. and started their journey to the village After an hour into their drive, the pavement turned into a winding dirt road filled with pot holes. After four hours, the mountainous road became too difficult for the bus to travel safely. To get to the village, the volunteers then had to walk 45 minutes down a steep incline while carrying their supplies on their backs. On the way down the mountain, one of the volunteers sprained his ankle.

### Villagers are Prepared

Before the group arrived, the Friends of the Americas office in Honduras had told the villagers about the volunteers and their expectations, which mainly consisted of being fed rice, beans, and occasionally meat. To fulfill their obligations, the villagers killed a cow to feed the volunteers during the second week of the trip.

Ballew spent most of the two weeks helping build a water tank. To make a flat level spot for the tank, she had to dig three feet into the mountain with a pick and shovel. Next, she helped mix cement and used it for a foundation. Then, she laid brick and mortar into a 15-foot-tall round tower.

*Photo by Fred Jones*

**Allison Ballew**

At first, Ballew and the other women in the group were frustrated because the village men kept trying to take their shovels. It was difficult, but Ballew convinced the village men that she wanted to do this work. The rest of the group dug ditches around the mountains for the water pipes. Ballew liked her project because she could measure her progress. Other group members who were digging ditches seemed to have no end in site.

Over the years, the villagers have damaged their ecological system. They have chopped down trees for corn fields; however, they often lose their crop because of the dryness. The villagers are used to hard work. The men spend their days in the fields, and the women spend their days caring for the children and preparing meals, which was no small feat. Without ovens, the village women must first build fires for cooking; they awake at 4 a.m. to make breakfast.

### The Daily Routine

Near the village was a river with a small waterfall. While the villagers took their daily siesta, the group headed down to the river and went swimming fully clothed so as not to offend the villagers, who were also not accustomed to seeing women swimming. After their swim, the volunteers would return to work. Although the work day ended at 5:00 p.m., the group members often worked late. "It was more important to see the job finished than to go to dinner," said Ballew. "However, I really enjoyed the time after dinner when the volunteers played guitars and the villagers taught us Spanish songs."

When it came time to leave, the volunteers climbed back up the mountain and played football while they waited for the bus. However, the bus never came. The group decided to camp overnight on top of the mountain so that they would not risk missing the bus. Because the villagers were in a feudal war with other families, the village leader had his sons guard the group with guns. Finally, the group managed to catch a ride on an old school bus filled with pigs and chickens headed to the capital.

### The Lessons Learned

According to Ballew, the trip was not without some frustrations. "I became frustrated with some members who weren't working hard," she said. "However, later I realized that those people really related to the villagers and that their contribution was also valuable."

Despite the dangers associated with the village feuding and the environment (one volunteer was bit by a scorpion), Ballew plans to go back next year. For more information, you can call her at ext. 48150.

Ballew has worked at NASA for five years. She has been a Total Quality Management facilitator since last August. She also sings and plays guitar in a local band.

# Community Corner

### Agency Needs Big Hearts for Little Hands

Our community—and its kids—need your help. Hundreds of children, most from single-parent households, need a stable adult role model in their lives. These children are from families where one parent has the awesome task of sole provider, disciplinarian and confidant.

### BACKGROUND

Big Brothers/Big Sisters serves boys, girls and the community. Volunteer "Bigs" do not replace an absent parent, but give their "Littles" a sense of belonging, of being special, and of having their very own best friend. By committing time and involvement, "Bigs" provide "Littles" much-needed self-esteem and incentive to grow into productive adults.

"Littles" come from low income, middle and wealthy families—the problem of loneliness spans socio-economic levels. Volunteers choose the age, race, religion, geographic location and comprehension level of their "Little." A three-stage orientation program helps the volunteer get started and allows the Agency to make the best "Big-Little" match.

### HERE'S HOW YOU CAN HELP

The community is urgently in need of **male volunteers** to be Big Brothers.

Almost 200 boys, between the ages of 6 and 12, need a match—and many have been waiting for up to two years.

These boys have no father, due to divorce, death or abandonment. They need help with their school work, they need someone to show them how to throw a ball, they need a friend of their very own.

Can you share four to five hours a week to make a difference in the life of a child? Contact Rosemary Burke at 827-0110 and say you are willing to help.

***If you know of a co-worker involved in an interesting volunteer activity or a health/human service agency with a pressing need, contact Marny Skora, Community Services officer, at ext. 43315.***

## Retirement Social

Friends and associates of Steve Devan are invited to a retirement social in his honor on Wednesday, April 27, from 6 to 8:30 p.m. The event will be in the H.J.E. Reid Conference Center. Hot hors d'oeuvres will be served and a cash bar will be available.

For reservations or gift donations, contact Carolyn Kurtz, at ext. 42563, Mail Stop 174, or Anna Jackson, at ext. 42573, Mail Stop 174, by April 15.

## Naval Aviation Materials Sought

The search is on for historical materials on Langley's contributions to Naval Aviation that can be loaned or donated to the Langley historical archives. Mark Chambers, an aerospace history graduate intern in the Office of External Affairs, is compiling a record of Langley's contributions for a new book on the subject. If anyone has any information or knows of anyone who has such information please contact Chambers at ext. 46525, Mail Stop 155. Chambers, who is doing extensive research in the Naval libraries, the National Archives, etc., is looking for photographs, reports, interviews, artifacts or any other pertinent material. All materials will be safeguarded and returned.

# Happenings

**WINDS OF CHANGE ON SALE:** *Winds of Change* is on sale for 40-percent-off at the Exchange Shop. For information, call ext. 41585.

**VA TECH ALUMNI TENNIS PARTY:** The 14th annual Virginia Polytechnic Institute and State University Alumni Tennis Party will be held Friday, April 15 at Centre Court. There will be competition for all levels of play. Fee is $10 per person. For information and reservations, call Joe Drewry at 722-4443.

**FWP HOSTS SALUTE TO SECRETARIES:** The Federal Women's Program Committee will host the annual Center Salute to Secretaries on April 27 from 7-9 a.m. in the H.J.E. Reid Conference Center. All Center and contractor secretaries should receive a personal invitation in the mail. RSVPs should be received by April 12. Please call Patsy Campbell at ext. 43291 or Gerri Rankin at ext. 43289 to respond.

**REMINDER:** Earth Day 1994 is April 21.

**FOR SALE:** Pine Cone Harbour condo and boat slip on Hampton River, 1,454 sq. ft., 3 BR, 2 baths, fireplace, pool , security and slip for $89,000. About $15,000 to assume 8.5 percent mortgage. Call 723-1005 for details.

**BOAT FOR SALE:** 1974 MFG Gypsy 17-ft. bow rider w/115hp Evinrude outboard, depth finder, compass, spotlight, walk-through windshield, new cover, 1989 tie down trailer, extras, $1,000 or best offer. Call 877-5748, after 6 p.m.

**WHEELCHAIR TENNIS:** Pete Kjeldsen is forming a tennis program for people in wheelchairs. Open House "Chairman of the Court" will be held on April 30 at Huntington Park in Newport News. If you are interested, call Kjeldsen at 930-1365.

**WORKSHOP:** On April 18 and 19, a "Working Together – Deaf and Hearing" workshop will be held in Building 1209. Mail the Application for On-Site Training (NASA Langley form 24) to Kim Dobbs, Mail Stop 309.

**DEGREE NOTICE:** If you have completed or will complete the requirements for your graduate degree program during Fiscal Year 1994, please call George Allison, Employee Development Branch, at ext. 42594.

**CEBAF OPEN HOUSE:** The Continuous Electron Beam Accelerator Facility (CEBAF) will host an open house on Saturday, April 30 from 9 a.m.-3 p.m. Visitors are required to park and use free bus service from the NationsBank parking lot next to the Patrick Henry Mall. For information, call 249-7100.

**FOR RENT:** N.C. cottage, 2 BR, $300/week, sleeps six. Available in May and June; part of August. Call 838-6000, evenings, for information.

**INCOME TAX PREP:** Call Nancy Taylor at 723-5227.

**NOTICE:** AIAA's Air and Space '94 International Business Forum and Exhibition in Arlington, Va., is on May 3-5. Langley will not provide bus service this year due to a policy change.

**FOUND:** Costume jewelry in parking lot across Langley Blvd. from the Conference Center. Earring pendant; one-inch diameter, opened flower set with tiny pearls, turquoise and rubies. Call Tom, ext. 47506.

**FOR RENT:** Old Nags Head Cove, 3 BR furnished cottages, use of clubhouse and facilities; May and Sept., $300/week; June, July, Aug., $395/week. Call Ernie Greene, 838-0567.

**SOUNDS OF THE SOUTH PACIFIC:** A 21-day tour is being planned to Australia, New Zealand and Fiji, Oct. 22 to Nov.11. For itinerary or more information, call Ernie Greene, 838-0567 or Dan Crawford, 247-5815.

**TAX RETURNS** prepared on computer by highly experienced, degreed accountant; confidential service and very reasonable rates. Call 825-0669.

**INCOME TAX PREP** by a member of National Association of Tax Practitioners; electronic filing and direct deposit. Call 874-3121.

**NO DUES IS GOOD NEWS:** Langley's Officers Club and Bayside Enlisted Club have another great reason to join. Get the first six- months of membership absolutely FREE when you retire. Federal employees, GS-07 and above, are eligible to join the Officers Club; all others are eligible for the Bayside Club. For information, call the Officers Club at 766-1361 or the Bayside Club at 766-1220.

**VIRGINIA SYMPHONY TICKETS:** Buy a ticket at for the April 14 Pops concert at Ogden Hall and get a free ticket to a May concert. Skitch Henderson will conduct Gershwin music at Ogden Hall and at concerts on April 16 and 17. For tickets, call the Langley Exchange Shop at ext. 41585.

**NATIONAL SPACE SOCIETY:** Next meeting is on April 25. Call ext. 44518 for more information

**NASA ALUMNI ASSOCIATION** Dance will be held on April 16 at 8p.m. All invited; free, Call A. Leiss at 877-2939.

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News Researcher

National Aeronautics and
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**Langley Research Center**
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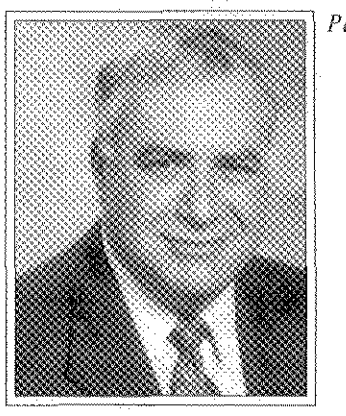


*Paul F. Holloway*

## *State of the Center*

Langley: National Resource, National Relevance

***H.J.E. Reid Conference Center • 14 Langley Boulevard***

*Four sessions have been scheduled to permit as many employees, retirees and support services contract personnel as possible to attend. You are invited to come to a specific session based on your last name. If that conflicts with another activity, you are welcome to attend one of the other three sessions.*

*Tuesday, April 19*

9:30 – 10:15 a.m.
A to E

1:30 – 2:15 p.m.
F to K

*Wednesday, April 20*

9:30 – 10:15 a.m.
L to R

1:30 – 2:15 p.m.
S to Z

National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

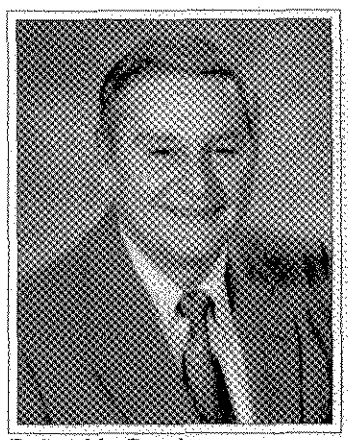
Volume 8 ❖ Issue 8 ❖ April 22, 1994

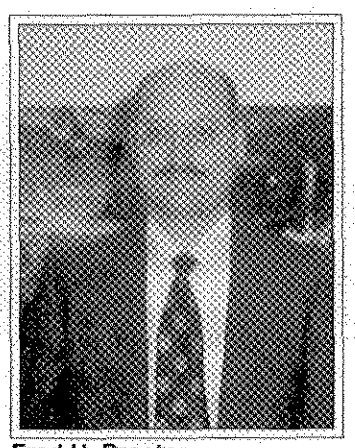
# *Employees Honored at Awards Ceremony*

## The H.J.E. Reid Award

The H.J.E. Reid Award recognizes the outstanding scientific or engineering paper first-authored by a Langley Research Center employee or group of employees.

The H.J.E. Reid Award this year is presented to four people: Roland L. Bowles and Fred H. Proctor for the outstanding paper entitled "Three-Dimensional Simulation of the Denver 11 July 1988 Microburst-Producing Storm" and to Donald J. Progar and Terry L. St. Clair for the outstanding paper entitled "A New Flexible Backbone Polyimide Adhesive."


Roland L. Bowles


Fred H. Proctor

Donald J. Progar

Terry L. St. Clair

## Space Act Awards

Space Act Awards are granted by NASA's Inventions and Contributions Board to recognize excellence for scientific and technological contributions that are significant to aeronautics and space activities.

Space Act Awards were presented to William P. Chu and M. Patrick McCormick for their contribution entitled "Long-Term Monitoring of Upper Atmospheric Aerosols and Ozone from Space."

William P. Chu

M. Patrick McCormick

# Scramjet Model Testing Has Begun

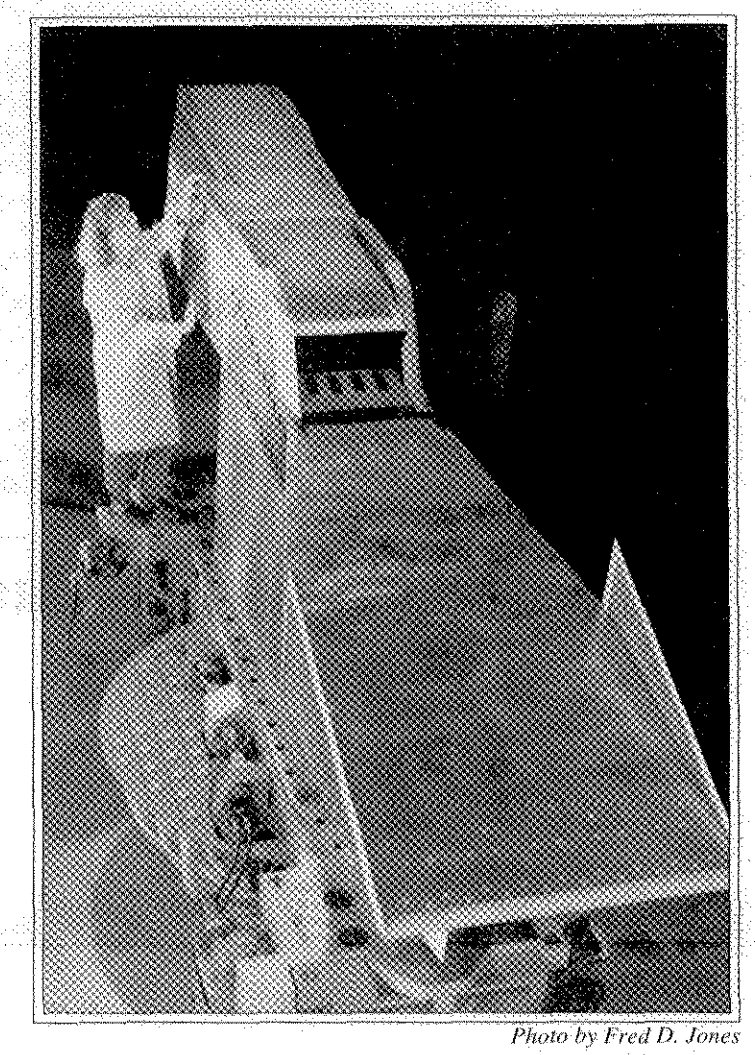


Photo by Fred D. Jones

**Langley engineer Laura O'Connor inspects a supersonic combustion ramjet (scramjet) engine model before wind tunnel tests at the Center. Designed and built by Pratt & Whitney, the Concept Demonstrator Engine (CDE) is the largest scramjet engine model built to date. Tests in the Langley 8-Foot High-Temperature Tunnel — extensively modified to accommodate realistic scramjet testing — have begun and are expected to continue into 1995. The CDE will be tested up to Mach 7, or approximately 4,700 mph (about 7,500 kph). The test article is designed to simulate the actual flow path of a flight-worthy engine three times its size. Langley is NASA's lead center for the Hypersonic Systems Technology Program (HySTP). NASA and the Air Force have recently developed HySTP, which builds on the accomplishments of the joint National Aero-Space Plane Program (NASP). The HySTP goal is to provide an affordable, lower-risk, hypersonic technology program that focuses on Mach 15 (approx. 10,000 mph/16,000 kph) flight tests of the scramjet propulsion system, considered the greatest technical challenge to hypersonic flight.**

# Local TV Personality "Volunteers" Job Advice

BY MARNY SKORA

Multi-talented WVEC-TV-13 news reporter Joe Flanagan has had more "jobs" than almost anyone in the area. His popular "Joe's Job" news feature brings him into homes all over Hampton Roads. On Thursday, April 28, Flanagan will have a special message for Langley employees. Joe says "community service is everybody's job!"

Flanagan will be the featured speaker at an event hosted by Center Director Paul F. Holloway honoring Langley's many volunteers. The program will be held at 2 p.m. in the H.J.E. Reid Conference Center. Langley employees involved in community volunteer activities and those who are interested in volunteering are invited to attend.

"I believe that service to the community is a vital part of our mission," says Holloway. "I congratulate our employees who are helping in our quest to be a good neighbor and who are actively telling the Langley story."

Langley's Community Service program has mobilized employee volunteers for two highly visible projects. Nearly 250 volunteers participated in the National Engineers Week school visitation program in February. Earlier, 60 employees took a day of leave to volunteer for the United Way's Day of Caring, a community-wide effort to showcase both the area's needs and the generosity of its people. Projects ranged from painting and landscaping to sorting clothes and distributing food to the needy. But these activities just scratch the surface of our employees' involvement outside the Center gates.

Joe Flanagan

A survey in December 1992 drew information from 579 civil servants. Results confirmed that of the respondents, 487 Langley employees volunteer more than 1,250 hours per month, most notably in education and serving area youth.

The federal population has long been considered a source of rich expertise. Started under the Bush administration and continued by President Clinton, public law and executive order have encouraged federal employees to volunteer in their home communities. As usual, Langley is ahead of the effort.

***Awards continued on Pages 4-7***

# News Briefs

## Around the Agency

**NASA OPENS GROUND STATION FOR COMPTON GAMMA-RAY OBSERVATORY** – NASA has opened a new, remote ground station in Tidbinbilla, Australia, called the GRO Remote Terminal System, to receive scientific data from the Compton Gamma-Ray Observatory (GRO) via Tracking and Data Relay Satellite (TDRS) that was moved into position over the Indian Ocean. The decision to build the ground station and devote a TDRS to the Compton GRO came after the observatory's tape recorders failed, restricting transmission of scientific data to real time only. Since Compton was compatible with TDRS, this ground station option was feasible. An on-orbit repair of Compton GRO was an alternative, but would have been much more costly. "While the new ground station is devoted to Compton at this time, it has the potential for use by other Earth-orbital spacecraft," said Charles Force, associate administrator, Office of Space Communications at NASA Headquarters. "The TDRS system was designed to operate with all the TDRS spacecraft in view of a single ground station. As a result, coverage could not be provided in a small region on Earth — the so-called Zone of Exclusion over the Indian Ocean. With activation of this ground facility, the TDRS system can, for the first time, provide global coverage."

**HIGH-SPEED ENGINE CYCLES TAPPED FOR FURTHER RESEARCH** – A NASA-industry team has chosen two engine cycle concepts on which to focus the next three years of propulsion research for a next-generation supersonic airliner. The "mixed flow turbofan" and "FLADE" (fan-on-blade) concepts were selected from six candidate engine cycles being considered in NASA's High-Speed Research Program, which is developing technology to make a future U.S. supersonic airliner environmentally compatible and economically practical. "Both concepts promise to meet the economic and environmental goals for a new supersonic airliner," said NASA Program Director Louis J. Williams. "Concentrating our propulsion research on these designs brings us one step closer to making this type of airplane a reality."

# Virginia Air and Space Center News

### Street Fair — *Life's a Breeze*

Join the center for its second street fair — *Life's a Breeze*. The celebration will be from 11 a.m. to 4 p.m. Saturday, April 30, and will feature Kitty Hawk Kites, a popular kite retailer .

Virginia Air and Space Center
Hampton Roads History Center

Kitty Hawk Kites will offer a history of kite display, kite demonstrations, kite ballet to music, stunt-flying demonstrations and kite-making workshops. There will be kite flying contests for professionals and amateurs.

The street fair will also include kite sales, face painting, food and beverages. Children accompanied by an adult will receive free basic admission to the center by presenting their homemade kite.

Inside the center, families can participate in the Aviation Discovery Program, *Lighter Than Air*. The program will demonstrate how early pioneers of flight conquered the air in balloons, dirigibles and blimps. Children can build their own lighter-than-air vehicle. Make plans to enjoy a day full of aviation fun.

This is the second of special outdoor events that will continue through the fall. Call 727-0900, ext. 717, for more information.

### Your Trash Could Be the Center's Treasure

Somewhere in your attic, garage or closet may be hidden treasures. As a Langley employee, you've probably collected memorabilia relating to your career or interests in aerospace. Your family keeps asking — "Can't we get rid of this junk?" Some day your heirs may ask, "What on Earth is this?" And out it will go.

Before that happens, why not let the center know what you have? That dusty old model, research instrument, photograph or what-have-you could make an interesting aeronautical or space artifact worthy of display at the center. For more information about donating items to the center, contact Dave Alberg at 727-0800, ext. 740.

## In Memoriam

### James C. Emery Sr.

James C. Emery Sr., 77, a Hampton resident for 49 years died Thursday, March 24.

Emery retired from Langley after 31 years as an aeronautical engineer.

### Theodore Perry Jr.

Theodore R. Perry Jr., 65, a native of Hampton, died Thursday, April 7.

Perry retired from Langley in 1979 after 24 years of service.

### James Youngblood

James W. Youngblood, 58, a long-time Tidewater resident, died Monday, April 4.

Youngblood retired in March 1993 after 36 years at Langley as an aeronautical engineer in the Radiation Sciences Branch.

## Letters

### Thank You for the Lake Tribute

*The following is a thank you letter from Mr. and Mrs. Herbert Lake. The letter is their response to the American Red Cross posters they received with signatures from Langley employees, retirees and contractors who donated blood at the recent Langley Bloodmobile in memory of their son, William Lake IV, who died February 4.*

"We deeply appreciate all the wonderful people at NASA who donated blood to the American Red Cross in memory of our son William. This tribute to William is an honor we shall not forget and shall always cherish. Thank you for sending us the posters, and a thank you to all the people who participated in this wonderful 'Gift of Life.'"

### Retirement Thanks

From Steelman Ketchum: "My family and I want to offer a very special thanks to our many friends who attended and contributed to my retirement farewell dinner on March 8.

"The many gifts were, of course, appreciated, but my most cherished memories will be of the fellowship of this occasion and of my association with the employees of Langley Research Center. God bless you all — and thanks again; thanks for the fine send-off."

# Manned Flight Awareness Awards

*NASA photo*

**Vance A. Overbay of the Test and Development Section, Lorelei S. Gibson of the Pressure and Flow Measurement Section, and Robert C. Blanchard of the Aerothermodynamics Branch, were Langley's Manned Flight Awareness Program honorees during the STS-62 mission at Kennedy Space Center last month.**

# Office of Environmental Engineering Hosts Public Meeting

**BY CATHARINE G. SCHAUER**

The Office of Environmental Engineering hosted an informal public meeting April 12 to update the community on the cleanup of contaminated areas at the Center.

The meeting, which was from 7 to 9 p.m., was held at the Poquoson Community Center. Langley's environmental staff described the Superfund process, provided an update on contaminated areas being studied at the Langley site and answered questions regarding site activities.

Representatives from the U.S. Environmental Protection Agency, the Commonwealth of Virginia and other agencies were also present to answer questions.

Langley has also set up four information repositories in accordance with the U.S. Environmental Protection Agency's Superfund program. Information repositories provide copies of finalized documents and information pertaining to the Langley proposed Superfund site. The materials are available for public inspection and copying.

Materials include a *Community Relations Plan* for the proposed Langley Superfund site which summarizes the history of the site, identifies current community issues and concerns regarding the site, summarizes site-specific activities to address those concerns, and describes ways to inform and involve the public throughout the Superfund process.

Information repositories for the proposed Langley Superfund site are located at the Poquoson Public Library, telephone 868-7931; the Hampton Central Library, telephone 727-1154; the York County Public Library, telephone 890-3377; and the Langley Research Center Technical Library at ext. 42366.

For further information, call Greg Sullivan of Langley's Office of Environmental Engineering, at ext. 43500.

# Call for Entries: AIP Awards

The American Institute of Physics (AIP) is calling for entries for its 1994 Science-Writing Award in Physics and Astronomy. Articles, booklets or books intended for the general public authored by physicists, astronomers or members of AIP member and affiliated societies are eligible.

Entries must have been published between May 1, 1993, and April 30, 1994. Deadline for submission is May 20.

For an entry blank and more information on eligibility, contact the Public Information Division of AIP at (301) 209-3090.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor..... Catharine G. Schauer

Editor..... Ann C. Gaudreaux, The Bionetics Corp.

Assistant Editor..... Susan A. Smigielski, The Bionetics Corp.

Photojournalist.. Carole Petrachenko Chapman, The Bionetics Corp.

Photographer..... Fred Jones

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.

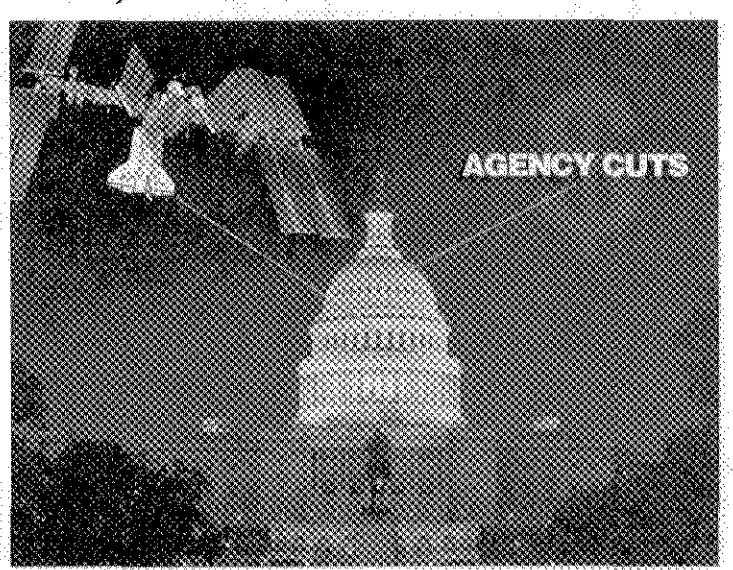
All materials are subject to editing.

# Langley: National Resource, National Relevance

BY MARNY SKORA

Conflict and its resolution have characteristically paved the way for change. World War I was the catalyst for the creation of an American agency -- the NACA -- in 1917 to research and solve the problems of flight. In 1958, NASA was established in response to the Soviet challenge in space. The realities of war--world war or cold war--are no longer a driving force in shaping the Agency's mission. Today, NASA is reconfiguring itself to meet the realities of the 1990s -- and so, too, is Langley.

Center Director Paul F. Holloway met with employees for the annual State-of-the-Center Address, Tuesday and Wednesday, April 19 and 20. His message was clear: Langley is a national resource; Langley has relevance to the nation. Summarized here is the thrust of that address.




**NASA and other government agencies** struggle to be constructive players in an era of national and global challenge, increasing congressional oversight and limited budgets.

Langley's reorganization was spearheaded by Holloway in response to evolving national and international priorities. Desired outcomes include:

- Better, faster technology transfer to both traditional and non-traditional customers;
- Aggressive response to the impact of economic realities; i.e., budget deficit;
- A goal to lead the Agency in partnerships with industry and universities.

*"It's time our government adjusted to the real world, tightened its belt, managed its affairs in the context of an economy that is information-based, rapidly changing and puts a premium on speed and function and service, not rules and regulations."*

President Clinton
National Performance Review

• **The Aeronautics Program Group (APG)** is organized to develop Langley's aeronautics research activities as a coordinated program.

Langley has the Agency responsibility for managing the High-Speed Research Program. The Center is readying technology options for new capabilities in future high-performance aircraft.

Major modifications to the 8-Ft. High-Temperature Tunnel give the Center the unique capability to test scramjet propulsion systems and aerothermal structures.

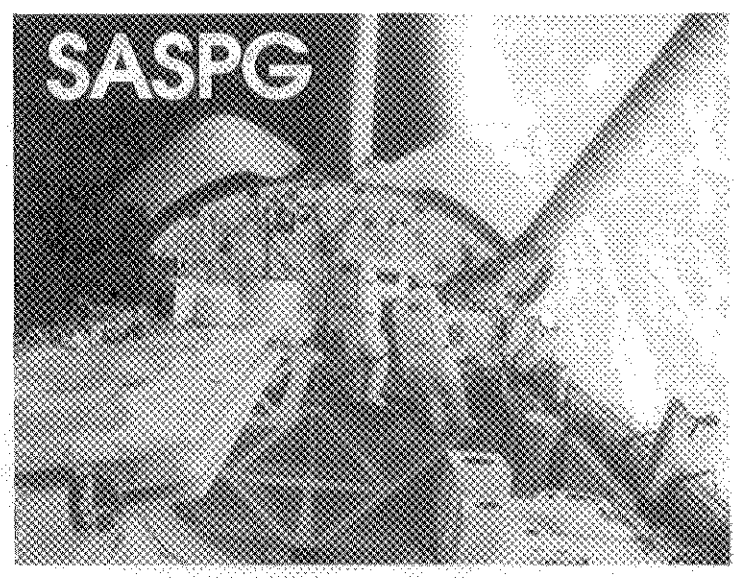
Langley has the lead in six of the 10 areas contained in the expanded Advanced Subsonic Technology program. And the Center is teaming with industry and universities to revitalize the threatened U.S. general aviation industry.

• **The Research and Technology Group (RTG)** is responsible for basic research and technology development in both aeronautical and selected space disciplines.

This total quality organization is focused on delivering to customers what *they* want and need. RTG will take a long-term view of research programs and align them with a long-range business strategy.

In the Advanced Concepts Program, the Center, industry and academia will compete and team to produce the best product.

Langley is also a key player in the national High-Performance Computing and Communication program.




• **The Space and Atmospheric Sciences Group (SASPG)** is organized to develop Langley's space-related research activities as a coordinated program.

Langley's Single-Stage-to-Orbit, winged rocket vehicle concept is considered leapfrog technology. And the HL-20/42 personnel/cargo carrier concept is a major element of current space planning.

The Center has the lead responsibility for configuration development and analysis for space station redesign and for Russian integration configuration. In addition, this is an unprecedented year for Langley in space flight experiments and in atmospheric sciences activity.

• **The Technology Applications Group (TAG)** is focused on accelerating technology partnerships with a goal of leading the Agency in technology transfer. Working as a facilitator, TAG will match the needs of industry with Center expertise. TAG will also track the Center's accomplishments in licenses and patents granted, jobs created and market share gained.

• **The Internal Operations Group (IOG)** is responsible for a broad range of technical and administrative services. IOG will be actively involved in planning new and revised Center programs and will team with other groups to implement the Center's research and technology programs. In short, IOG will provide all services to the "city of Langley."

For the first time, a single entity has total responsibility for Langley's facilities, allowing more flexibility for meeting critical needs.

# NASA Recognition: Employees Honored For Outstanding Achievements

Employees who have made outstanding contributions at Langley this past year were recognized for their efforts at the Annual Honors Awards Ceremony on Thursday, April 21, at the H.J.E. Reid Conference Center. Presenting the awards were Center Director Paul F. Holloway and General John R. Dailey, NASA Acting Deputy Administrator from NASA Headquarters in Washington, D.C.

### NASA Honor Awards

NASA bestows singular honor in recognition of achievements by the following groups and individuals.

### Public Service Group Achievement Award

**ICASE Fluid Mechanics Group**, accepted by M. Yousuff Hussaini, "for important contributions in fluid mechanics and theoretical analyses which have led to major advances in flow prediction and control, including laminar flow control."

### Group Achievement Awards

**Gas Permeable Polymer Materials (GPPM) Team**, accepted by Frederick O. Allamby, "for outstanding accomplishment of the GPPM design, integration and validation, flight operations, and retrieval."

**Human Response to Sonic Booms Research Team**, accepted by Kevin P. Shepherd, "for outstanding technical contributions to the understanding of human response to sonic booms in high-speed civil transport aircraft."

**Implementation Team for the Electronic Purchase Request System**, accepted by Christopher W. Tremper, "for outstanding achievement in implementing the Electronic Purchase Request System, one of Langley's first Centerwide administrative applications."

**Leaders of the Long Duration Exposure Facility (LDEF) Science Team**, accepted by William H. Kinard, "for extraordinary accomplishments in directing and coordinating the LDEF science data analyses and rapidly disseminating initial LDEF findings to the international scientific community."

**NASA Propulsion Downselect Team**, accepted by William C. Strack, "for outstanding contributions to the Agency's High-Speed Research Program by conducting the prime and alternate propulsion system downselect."

**NASP Subscale Scramjet Engine Test Team**, accepted by R. Wayne Guy, "for exceptional productivity in testing scramjet engine concepts for the National Aero-Space Plane and adding significantly to the national scramjet data base."

**National Aero-Space Plane High-Speed Powered Model Test Development Team**, accepted by David W. Witte, "for outstanding innovation and dedication in developing high-speed powered test techniques for small-scale airbreathing configurations."

**Supersonic Jet Noise Reduction Team**, accepted by John M. Seiner, "for exceptional effort in implementing a comprehensive jet noise reduction program for future high-speed civil aircraft."

**Technology Opportunities Showcase Organizing Team**, accepted by Carrie K. Walker, "for planning, developing, and executing the first Langley Research Center Technology Opportunities Showcase, a critical element in the strategy to highlight the potential for transfer of aerospace technologies to nonaerospace industries."

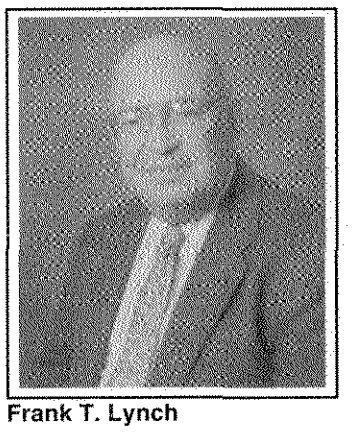
**Winged Entry Vehicle Computational Fluid Dynamics Team**, accepted by K. James Weilmuenster, "for exceptional technical contributions in developing computational techniques, validated with orbiter flight data, to define the aerodynamics and heat transfer for winged entry vehicles."

**8-Foot High-Temperature Tunnel Shakedown Operations Team**, accepted by Jon E. Thompson, "for significant accomplishments in the start-up and checkout of the 8-Foot High-Temperature Tunnel."

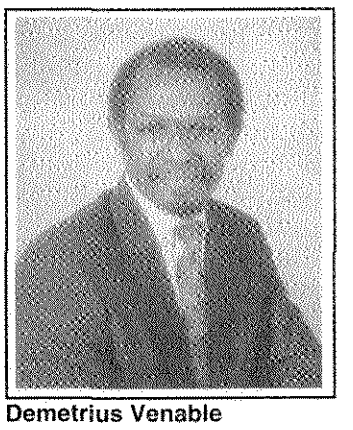
**8-Foot High-Temperature Tunnel Shakedown Support Team**, accepted by David C. Beals, "for outstanding accomplishments in support of the 8-Foot High-Temperature Tunnel shakedown."

**Small Expendable Deployer System (SEDS) End Mass Payload Team**, accepted by Kenneth H. Crumbly, "for management, design, development, integration and flight operations support of the SEDS End Mass Payload, NASA's first 20 kilometer tethered experiment."

## Distinguished Public Service Medal

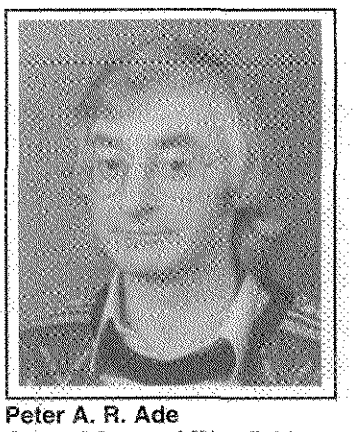


**Frank T. Lynch**
McDonnell Douglas Aerospace Transport Aircraft Co., *For outstanding technical leadership and advocacy in cooperative industry/NASA programs that have significantly advanced the state of the art and ensured the relevance of NASA research efforts*

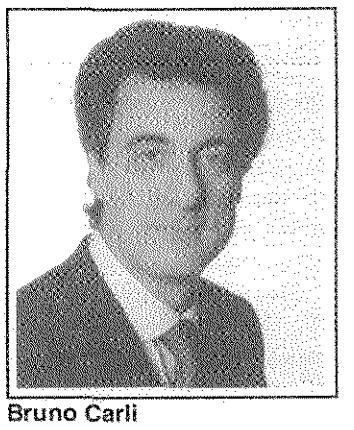


**Demetrius Venable**
Hampton University, *For outstanding contributions in the development of world-class optical research capability at Hampton University benefiting NASA aerospace programs*

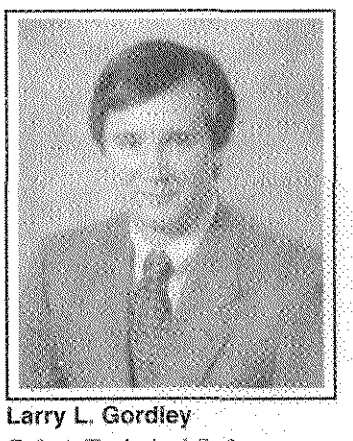
## Public Service Medal



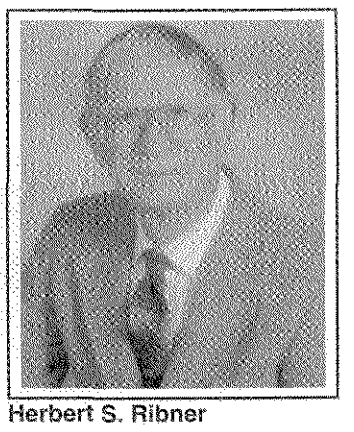
**Peter A. R. Ade**
Queen Mary and Westfield College, *For fundamental advances in far infrared detector and sensor systems which enable critical measurements of atmospheric ozone chemistry in support of international atmospheric science*



**Bruno Carli**
Institute for Research on Electromagnetic Waves, *For outstanding scientific leadership of the Italian team's contributions to the FIREX experiments*



**Larry L. Gordley**
G & A Technical Software, Inc., *for outstanding sustained contributions to satellite remote sensing of the atmosphere using the LIMS and HALOE experiments*



**Herbert S. Ribner**
Distinguished Research Associate at Langley, *for significant and lasting contributions to aeroacoustics and aerodynamics*

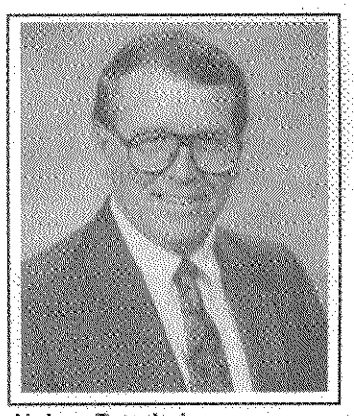
## Exceptional Scientific Achievement Medal

**Jay C. Hardin**
*For outstanding contributions to the development of computational aeroacoustics*

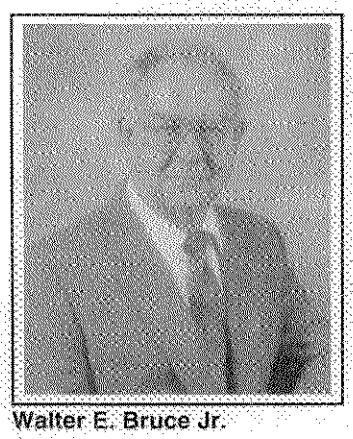
**Thomas A. Zang Jr.**
*For creative and innovative use of highly accurate computational methods in conducting many pioneering studies in boundary-layer transition physics*

# NASA Honor Awards

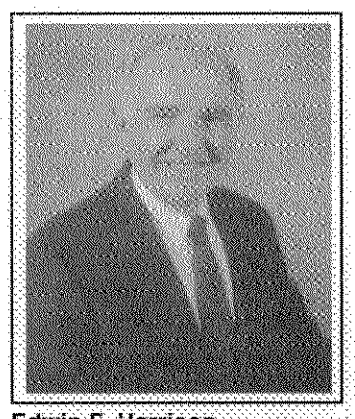
## Outstanding Leadership Medal



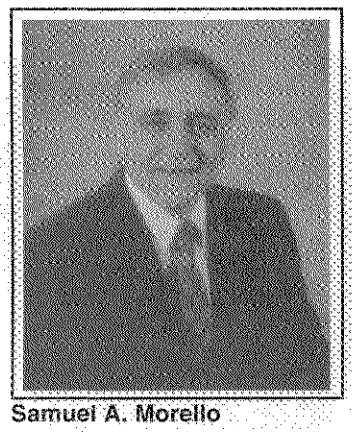
**H. Lee Beach Jr.**
*For outstanding leadership of Langley and NASA programs, including National Aeronautical Facilities, National Aero-Space Plane and Access to Space*



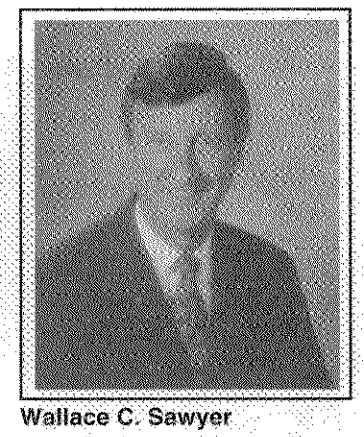
**Walter E. Bruce Jr.**
*For exemplary performance in leading the shakedown activities for the modifications to the 8-Foot High-Temperature Tunnel*



**Edwin F. Harrison**
*For outstanding leadership and sustained technical contributions in developing and implementing the highly successful NASA Earth Radiation Budget Experiment*



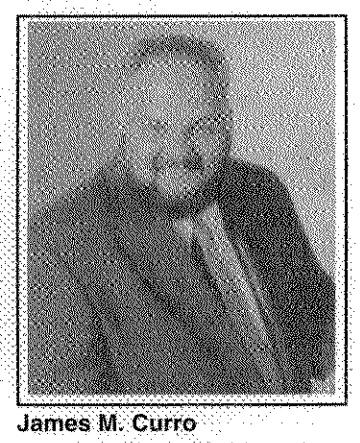
**Samuel A. Morello**
*For outstanding leadership and management of research programs that have significantly advanced aviation safety, operational capability and technology concepts*



**Wallace C. Sawyer**
*For outstanding leadership and management of research in advanced aircraft aerodynamics and multidisciplinary system studies which have advanced the state of the art of both civil and military aircraft*

## Exceptional Achievement Medal

**Linwood G. Burcher**
*For significant innovations in developing fabrication techniques which permitted rapid repairs and modifications to the 8-Foot High-Temperature Tunnel components during shakedown*

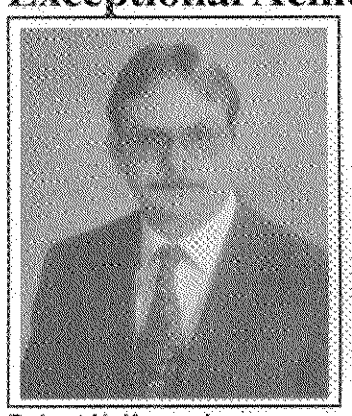


**James M. Curro**
*For outstanding contributions to shakedown activities conducted at the 8-Foot High-Temperature Tunnel*

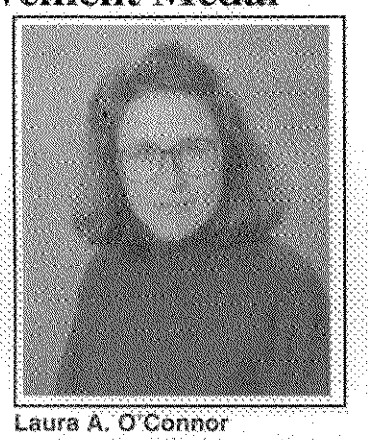
**Neal T. Frink**
*For development and application of advanced computational fluid dynamics methodology to reduce drag on current civil transport aircraft*

**George W. Ivey Jr.**
*For significant contributions to the design and development of internal components and systems in the 8-Foot High-Temperature Tunnel combustor*

## Exceptional Achievement Medal



**Robert V. Kerns Jr.**
*For exceptional achievement in providing fluid systems for the 8-Foot High-Temperature Tunnel Modification Project*

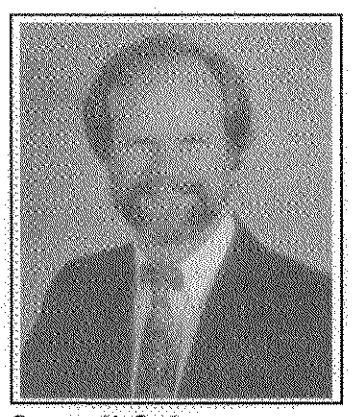


**Laura A. O'Connor**
*For exceptional service as Lead Test Director for the 8-Foot High-Temperature Tunnel Modification Project*

**Barbara A. Pasternak**
*For successfully managing the downsizing of the Langley Research Center Printing Plant*

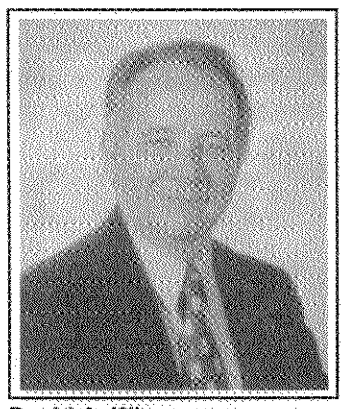
**Alan H. Phillips**
*For exceptional achievement in safety and facility assurance engineering in support of the modifications to the 8-Foot High-Temperature Tunnel*

**Frank M. Plott**
*For exceptional dedication and leadership in the refurbishment and modification of the 8-Foot High-Temperature Tunnel*



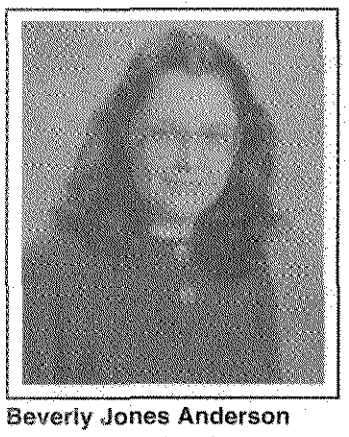
**George H. Sydnor**
*For exceptional achievement in the design and checkout of the 8-Foot High-Temperature Tunnel process controls*

**James W. West**
*For exceptional achievement in the implementation of unique instrumentation for the 8-Foot High-Temperature Tunnel Modification Project*



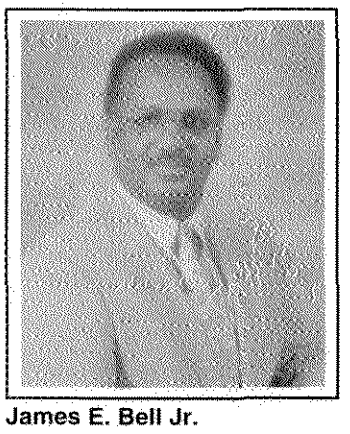
**David A. Wineman**
*For exceptional engineering achievement in the development of process controls for the 8-Foot High-Temperature Tunnel and for service as Operations Manager during shakedown*

# Exceptional Service Medal



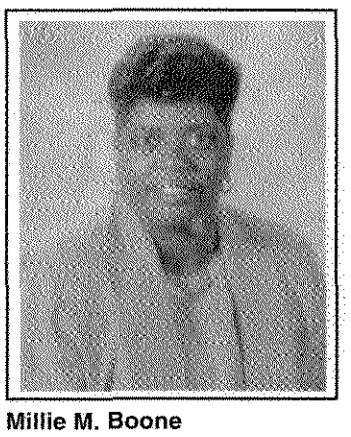
**Beverly Jones Anderson**

*For exceptional service in support of NASA's High-Speed Research Program conducted at the Supersonic Jet Noise Facility, Langley Research Center*



**James E. Bell Jr.**

*For outstanding technical contributions to the design and development of state-of-the-art electronics packaging methodologies*

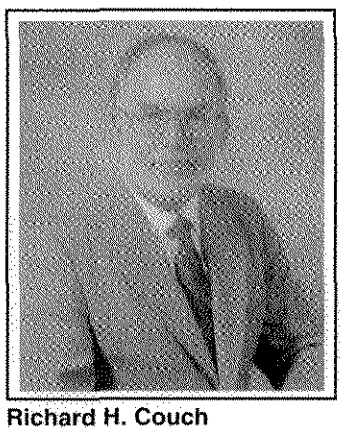


**Millie M. Boone**

*For sustained excellence in promoting mission accomplishment through the training, education and development of Langley Research Center personnel*

**Jean W. Clough**

*For outstanding contributions and personal commitment to NASA's Public Affairs Program*



**Richard H. Couch**

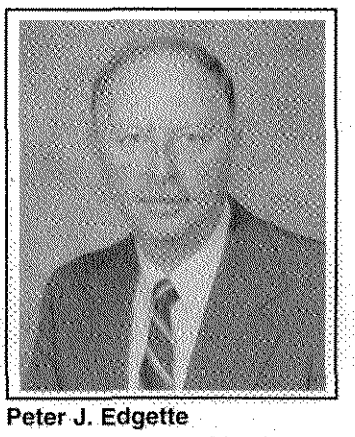
*For exceptional service to the Lidar In-Space Technology Experiment leading to successful instrument integration and ground-based testing*

**Patricia P. Davis**

*For outstanding contributions in the application of advanced chemical measurement technology to the 8-Foot High-Temperature Tunnel*

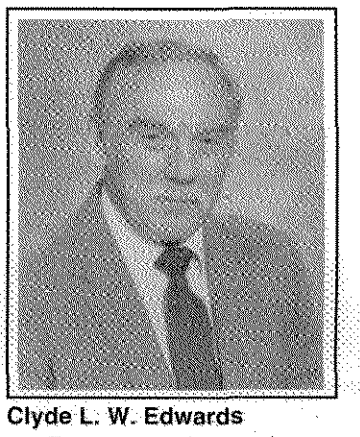
**Robert V. Doggett Jr.**

*For exceptional service in the planning and management of the aeroelasticity program within NASA*



**Peter J. Edgette**

*For exceptional leadership, initiative and creativity in the implementation of new health programs and the achievement of cost savings*



**Clyde L. W. Edwards**

*For sustained exemplary service as an analytical and experimental aerodynamicist, technology development manager and mentor*

**Sue B. Grafton**

*For outstanding technical contributions and personal dedication to the development of highly maneuverable advanced military aircraft*

**Anne D. Holland**

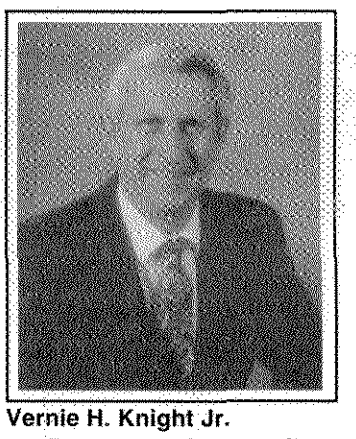
*For exceptional engineering service in the design, development and operation of research facilities at Langley Research Center*

**Kam W. Hom**

*For leading the development of computational electromagnetics and for aircraft concept and component research in support of the Agency's Advanced Aircraft Program*

**Judith W. Hoyle**

*For exceptional service as Secretary of the 8-Foot High-Temperature Tunnel Shakedown Project Office*



**Vernie H. Knight Jr.**

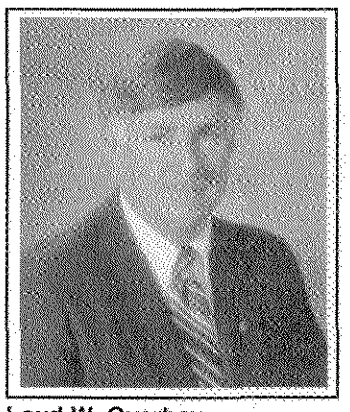
*For sustained outstanding achievements in research aircraft instrumentation contributing significantly to advancements in multidisciplinary flight research*

**Marna H. Mayo**

*For exceptional service in establishing and maintaining operations in the Flight Systems Directorate*

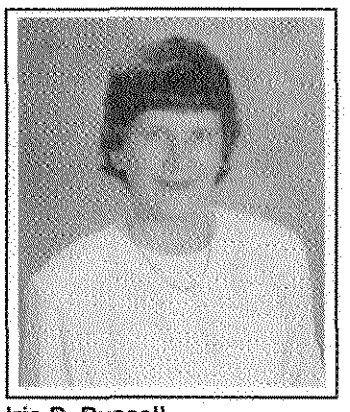
**Janice L. McCollum**

*For significant contributions in support of research conducted in the 0.3-Meter Transonic Cryogenic Tunnel*



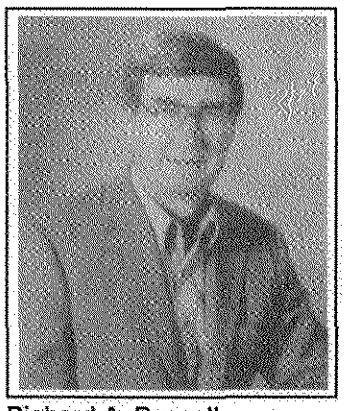
**Loyd W. Overbay**

*For exceptional service in support of NASA's Atmospheric Studies Program conducted at Langley Research Center*



**Iris B. Russell**

*For development and continuous improvement of administrative information systems in support of Langley Research Center and NASA's mission*



**Richard A. Russell**

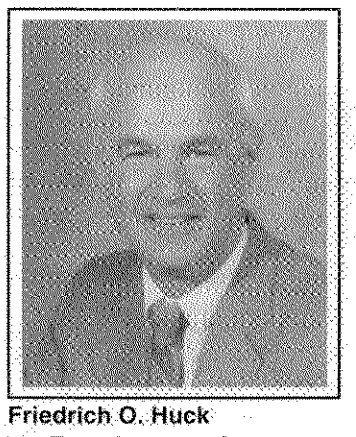
*For major contributions to the redesign of the Space Station*

**David A. Throckmorton**

*For exceptional, sustained contributions to the NASA Orbiter Experiments Program (OEX), from program inception to the successful flights of OEX experiments onboard the Orbiter Columbia*

# NASA Honor Awards

## Exceptional Engineering Achievement Medal



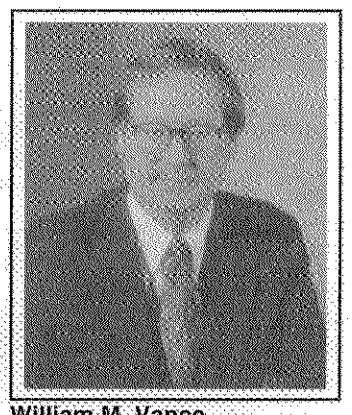
**Friedrich O. Huck**

*For advancing the scientific foundation and engineering application in the field of visual communication*

**Min Namkung**

*For advancing electromagnetic nondestructive evaluation for aerospace and commercial applications*

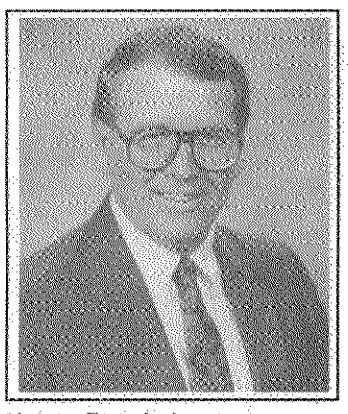
## Equal Employment Opportunity Medal



**William M. Vance**

*For outstanding contributions in the furtherance of Equal Employment Opportunity goals for hiring individuals with disabilities at Langley Research Center*

## NASA Headquarters Exceptional Achievement Medal



**H. Lee Beach Jr.**

*For your significant leadership, teamwork and outstanding contribution in support of the National Facility Study. You helped point the way toward a more effective national aerospace capability to meet today's and our future needs.*

**Ralph J. Muraca**

*For your significant contributions in support of the Space Station redesign. Your dedicated efforts have truly enhanced this Nation's human space flight program.*

**Joseph B. Talbot**

*For your enlightened and comprehensive analysis of the cost and schedule of this Nation's largest single human space flight program. Your analysis substantially contributed to the successful completion of the Space Station Redesign.*

## Langley Service Award

A 50-Year Service Award was presented to M. Leroy Spearman "in grateful recognition and appreciation for faithful service to the National Aeronautics and Space Administration and to the Government of the United States of America."

**M. Leroy Spearman**

## Contractors Excellence Award for Quality and Productivity

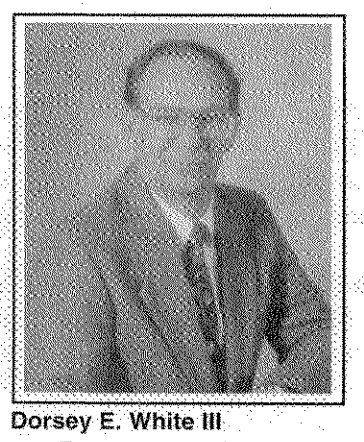
The Contractors Excellence Award for Quality and Productivity recognizes contractors who have demonstrated sustained excellence and outstanding achievements in quality and productivity for three or more years.

This year's awards were presented to **Sverdrup Technology, Inc.**, accepted by Paul E. Sensmier, and **Wyle Laboratories,** accepted by John J. Wood.

## Exceptional Service Medal

**Rosa C. Webster**

*For outstanding contributions to the strategic planning of Agency programs*

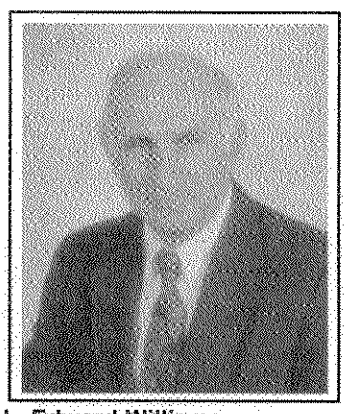


**Dorsey E. White III**

*For exceptional service in the design, fabrication and checkout of mechanical systems for the 8-Foot High-Temperature Tunnel*

**Marvin E. Whitney**

*For exceptional service in providing printing support to the Langley Research Center*



**L. Edward Williams**

*For exceptional service as Safety and Configuration Control Manager for the 8-Foot High-Temperature Tunnel Modification Project*

**John F. Wilson**

*For exceptional service as Construction Manager and Shakedown Mechanical Systems Manager in support of the 8-Foot High-Temperature Tunnel Modification Project*

# Happenings

**RETIREMENT SOCIAL:** A retirement social for Ralph J. Muraca will be held April 29, 1994, from 5 to 7:30 p.m., at the H.J.E. Reid Conference Center. There will be an open bar and heavy hors d'oeuvres. Cost per person is $12. For reservations or gift donations, please contact Joann Belsches, ext. 47004, or Harriett Coombs, 47010, Mail Stop 430. Please make checks payable to Joann Belsches.

**FOUND:** One pair of men's glasses in a case in the road across from Building 1268. To identify and claim them, call Security at ext. 43420.

**FOR SALE:** Panasonic word processor with printer, almost new condition. Asking $225 or best reasonable offer. Call 898-5877.

**FOUND:** Keys (GM and motorcycle) have been found in the parking lot entrance between Buildings 1146 and 1236 near the 1146 T trailer. Please contact Willie Moore at ext. 41002, so that they can be returned to you.

**SALUTE TO SECRETARIES:** The annual Center Salute to Secretaries, hosted by the Federal Women's Program Committee, will be April 27, from 7 to 9 a.m. in the H.J.E. Reid Conference Center.

**FOR RENT:** Townhouse in Denbigh, Brookside, 2 BR, 2-1/2 baths, 1,300 sq. ft. Has fireplace, fenced deck, utility room w/workbench, attic storage, $595/month and one month security deposit. One year lease, available May 1. Call 872-6722, between 6-9 p.m. or leave message.

**PUPPIES FOR SALE:** Deposits are being taken for miniature schnauzer puppies. The litter is due around May 2. Dam is silver and AKC registered. Call 898-5113.

**ROOM FOR RENT** in Armistead Heights, five minutes from Langley. Non-smoker, call 988-3162, leave message.

**CONDO FOR RENT:** Relax in Sanibel Island, Fla. One BR, full kitchen, pool, tennis, etc., $600/week, April-Dec. Call 565-1849.

**NATIONAL SPACE SOCIETY:** The Langley Chapter of the National Space Society (NSS) will hold its next program meeting April 25 at 6 p.m. at Sammy and Nick's, 2718 Mercury Blvd., Hampton. Ken Crumbly, SEDS project manager, will discuss the project and its recent mission. NSS is devoted to creating a space-faring civilization through political action and public outreach programs. For more information, call ext. 44518.

**CEBAF OPEN HOUSE:** The Continuous Electron Beam Accelerator Facility will hold an Open House Saturday, April 30, from 9 a.m. to 3 p.m. Visitors must park at NationsBank parking lot next to Patrick Henry Mall; bus service will be provided. Call 249-7100 for more information.

**SYMPHONY TICKETS:** For the Kingston Trio, April 22; *Mozart & More*, April 28 and 29; and the final Masterworks concert May 6 and 7 with works by Dvorak and Schuman. For 20 percent off tickets, call the Langley Exchange Shop at ext. 41585.

## AIAA Exhibition Notice

**The Center will not send buses to the American Institute of Aeronautics and Astronautics (AIAA) Air and Space '94 International Business Forum and Exhibition in Arlington, Va., May 3-5, due to a policy change that requires all NASA attendees to pay a registration fee.**

**FOR RENT:** Old Nags Head Cove, 3 BR furnished cottages, use of clubhouse. May-Sept., $300/week, June, July, Aug., $395/week. Call Ernie Greene, 838-0567.

**SOUTH PACIFIC TRIP:** See New Zealand, Australia and Fiji on a 21-day trip, Oct. 22 to Nov. 11. For information, call Ernie Greene, 838-0567, or Dan Crawford, 247-5815.

**WHEELCHAIR TENNIS:** Pete Kjeldsen is organizing a wheelchair tennis program for all ages. Interested? Call him at 930-1365.

**CONDO FOR RENT:** Myrtle Beach oceanfront condo, 2 BR, furnished, sauna, pool, cable TV, etc. In season, $960/week, $615/week pre- and post-season. Call Joe Drewry at 722-4443 for more information.

## Naval Aviation Materials Sought

The search is on for historical materials about Langley's contributions to Naval Aviation that can be loaned or donated to the Langley historical archives.

Mark Chambers, an aerospace history graduate intern in the Office of External Affairs, is compiling a record of Langley's contributions for a book on the subject. If anyone has any information or knows of anyone who has such information, please contact Chambers at ext. 46525, Mail Stop 115.

Chambers, who is doing extensive research in the Naval libraries, the National Archives, etc., is looking for photographs, reports, interviews, artifacts or any other pertinent material. All materials will be safeguarded and returned.

## Revisions to Langley Boulevard

**A year ago the City of Hampton's improvements to Wythe Creek Road signaled the coming modifications to Langley's Wythe Gate. Then, last fall, the clearing of trees and excavation outlined the two lanes to be added to the gate. This winter's exceptional cold and wetness stalled progress, but now work has resumed and the project is nearing completion.**

**John Mouring, Langley's Facilities Master Planner, points out that this on-Center work is an extension of the off-Center traffic system. The four-lane gate interface on Wythe Creek Road and new signalization is expected to improve overall safety as well as allow two-way traffic whenever the gate is open.**

**According to Mouring, the current modifications may fall short in the future with the probable increased traffic and congestion on the Wythe Creek Road. The concern is that continued growth in Poquoson and York County with a two-lane bridge bottleneck may produce sluggish evening peak traffic. This would necessitate signal cycles that could store longer lines of exit traffic on Langley Boulevard.**

**Therefore, a design is complete that would extend the four "gate" lanes of Langley Boulevard to the Dryden Street intersection. The added pavement for this planned four-lane segment would shift to the North side of present Langley Boulevard without a median to conserve land and the entrance to Building 1250.**

**Although the section of Langley Boulevard between Dryden and Wright Streets may become three lanes (the center lane for alternating left turns), Mouring does not envision the need for four lanes across the Center. "That would be an Interstate," he said.**

**Finishing details will include a landscaped "sign circle" outside the fence, as well as security and street lighting. Both the illuminated sign and the street light fixtures will be visually integrated with Langley's dark bronze and white signage.**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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 9 ❖ May 6, 1994

## *Langley Divisions Testing Composite Panels*

BY DAWN JEGLEY

Langley's Structures and Materials Divisions are involved in an effort to make lightweight composite materials, such as graphite-epoxy, practical for use as primary structure (wing and fuselage) in commercial transport aircraft.

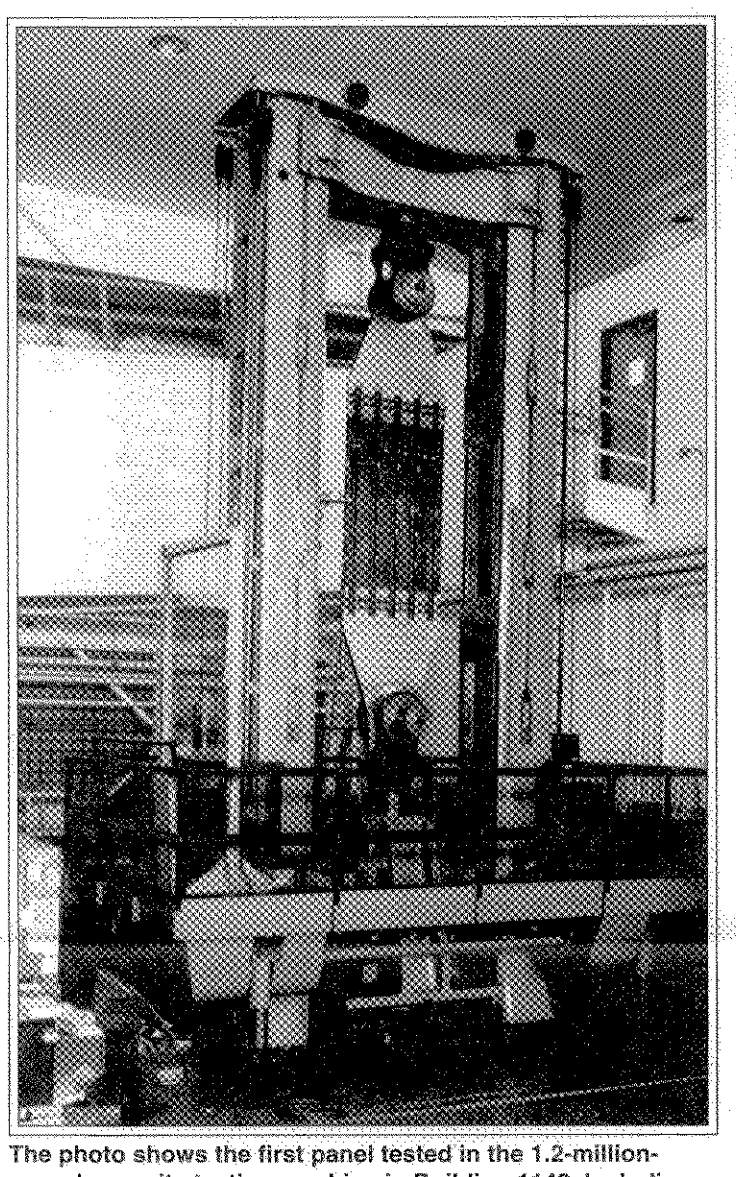
Employees are working with the major aircraft manufacturers to design, build and test aircraft components. McDonnell Douglas Aerospace is under contract to design, analyze and build wing structures and smaller parts to verify analytical results and manufacturing techniques as part of the Advanced Composites Technology (ACT) Program. Langley is testing some of these structures.

### Panel Testing Begins

In the Structures and Materials Laboratory in Building 1148, the first panel tested was subjected to impact damage of the type such as would be inflicted if a tool were dropped on the panel. First, the design limit load 543,000 pounds (of tensile load — that is, pulled in one direction) was applied to the panel. No damage growth was detected around the impact site. Then a 7-inch-long "sawcut" was added to the panel through the central stiffener and skin, similar to a cut that might be caused by a fan blade. The panel was then loaded with 380,000 pounds of tensile load to verify that it could still carry 70 percent of design limit load as required by Federal Aviation Administration regulations.

The final test was to load the panel to failure. The panel was able to carry 765,000 pounds before failure at 93 percent of the design ultimate load of an undamaged panel. This panel exceeded the design requirements for damaged aircraft structures despite a cut through the skin and one of the stiffeners.

The second panel being tested is also a tension panel and is presently in the 1.2-million pound capacity testing machine in Building 1148. This panel is being prepared for testing and has a 5-inch-wide and 9.5-inch-long oval cutout through the skin between two stiffeners with a metal plate bolted over the hole as a repair patch.



**The photo shows the first panel tested in the 1.2-million-pound capacity testing machine in Building 1148. Including the steel load introduction fittings on each end, the composite panel has an overall length of 80 inches. Nine-inch diameter steel pins attach the panel to the testing machine.**

### Six Panels to be Tested

In all, six wing cover panels are being tested. They are 60- to 80-inches long and 32- to 40-inches wide and each contains four or five blade stiffeners. These panels were made from graphite-epoxy using a resin film infusion process. The panels are also stitched through the thickness to reduce problems of delamination and separation of the stiffeners from the skin of the panels. Four of these panels are designed for loading in tension and two panels are to be loaded in compression.

"The goal of the ACT Program is to develop cost-effective, structurally efficient wings and fuselages," said Mark Shuart, assistant chief of the Structures Division.

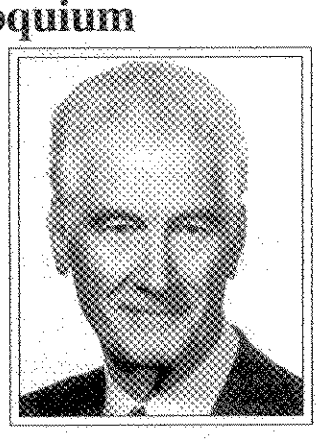
"These tests will verify the structural performance of cover panels that were fabricated using a very cost-effective process," Shuart added.

### Assessing Damage

Two issues that must be addressed, before commercial transport aircraft wings made from composite materials are considered practical, are what happens when they are damaged and how to repair damaged parts. Damage would include events like an engine fan blade breaking off and flying through a wing, or a tool being dropped on the panel during maintenance. To address damage concerns, each remaining panel will also be damaged in some way or have a repair bolted in place prior to testing.

The remaining panels will be arriving at Langley and tested during the next six months.

## "Pilot-Induced Oscillations" the Topic for May Colloquium



The classic relationship between human instincts and mechanical systems is no more apparent than when a pilot attempts to impose his/her will on an aircraft and its controls systems.

This fascinating and complex pilot-vehicle interaction — called pilot-induced oscillations (PIOs) — is the subject of the May Colloquium, Thursday, May 19. The speaker is Duane McRuer, chairman of Systems Technology, Inc., of Hawthorne and Mountain View, Calif., who will talk about "Pilot-Induced Oscillations — A Continuing Saga." The colloquium will be at 2 p.m. at the H.J.E. Reid Conference Center.

PIOs have been around since the Wright brothers. They can be both dramatic and, occasionally, catastrophic. PIOs have motivated research on pilot dynamics to better understand their causes and point out the direction for cures.

From the pilot's perspective, PIOs are a misnomer: they actually result from instabilities in the closed-loop feedback control system formed by the aircraft and its pilot. Several modes and patterns of pilot dynamics have now been discovered, modeled and quantified. These models and dynamic behavioral "laws" have been useful tools in pilot-vehicle system design and in treating specific PIOs. Part of McRuer's lecture is an overview of particular behavioral modes and "laws" pertinent to PIOs.

McRuer founded Systems Technology, Inc., which specializes in research and consulting on vehicle and human operator dynamics, vehicle guidance and control, and control system analysis software. He has published 125 technical papers and seven books covering many of these subjects. He has also participated in the development of some 50 aerospace vehicles and his patents include the first stability augmentation systems to fly in the United States.

## Stevenson Wydler Act Benefits Local Schools

The Stevenson Wydler Technology Innovation Act authorizes NASA center directors to donate excess research equipment to accredited educational institutions for conducting technical and scientific education and research activities. During a "kickoff" meeting held for interested school participants at the H.J.E. Reid Conference Center, Edwin Prior of Langley's Office of Education, and Fabiola C. Martin of the Equipment Management Section, explained both the purpose of the program and the logistical requirements to educators.

The staff of the Property and Transportation Branch sponsored two excess property screening sessions under the provisions of the Stevenson Wydler Act. Twenty-one representatives from schools within a 50-mile radius of the Center visited the warehouse to request items to be used in their respective schools. Some of the items requested include a vacuum pumping system, computers, printers, modems, a voltmeter, a microscope, a tape recorder, television monitors, pressure gauges, a fax machine, an oscilloscope and a power supply.

To provide more flexibility and convenience for the screeners, future screening dates have been revised and expanded to cover a 15-day period each month between the hours of 9 a.m. and 3 p.m. For more information about the program, contact Loretta Watkins at ext. 43564, or the Office of Education at ext. 49000.

**At right, educators explore the Langley warehouse for equipment that can be used in their schools as part of a program launched by the passage of the Stevenson Wydler Technology Innovation Act .**

# News Briefs

## Around the Agency

**NASA CONDUCTS SUCCESSFUL TEST OF SOUNDING ROCKET MOTOR** – NASA recently successfully conducted a flight test of an improved sounding rocket configuration from the Goddard Space Flight Center's Wallops Flight Facility at Wallops Island, Va. The "improved" Orion motor provides a 20-percent increase in thrust impulse over the current Orion motor used by NASA in its suborbital sounding rocket fleet, according to Ray Pless, associate chief of the Projects Division at Wallops. Both motors are surplus military motors. The improved Orion was launched as the second-stage of a 10.5-meter (35-foot-long) Terrier-Orion rocket. The rocket, launched in April, flew to an altitude of 78 miles (125 kilometers). The payload was recovered after impacting in the Atlantic Ocean 108 kilometers (67 miles) off the coast of Virginia. With the improved Orion motor, NASA can fly heavier payloads to similar altitudes or lighter payloads to higher altitudes than those achieved with sounding rockets using the previous Orion motor.

## *Health Corner*

### *Seminar on "Emotional and Cognitive Response to Change"*

Dr. Linda Sabonya, medical director of the Peninsula Psychiatric Hospital, will present a lecture titled "Emotional and Cognitive Response to Change" Wednesday, May 11, at 2 p.m. at the H.J.E. Reid Conference Center.

According to Pete Edgette, head of the Office of Occupational health services, even though communication during the entire planning and implementation phases of the Center reorganization has been superior, several employees have expressed concern about the potential impact of the reorganization on them personally. Since concern with change is normal, it is hoped that Dr. Sabonya will provide insight and helpful hints to assist employees in their acceptance of and adaptation to their personal responses to this organizational change. All employees are invited to attend and should charge their time to Job Order A1619.

### *Hypertension Month*

May is National Hypertension Month. To increase public awareness of this health condition, the clinic is sponsoring blood pressure screenings this month. On Wednesday, May 11, May 18 and May 25, blood pressure will be taken in the patio area of the cafeteria from 11:30 a.m. to 12:30 p.m. In case of inclement weather, blood pressure will be taken inside. Supervisors with 15 or more interested employees can request a nurse for blood pressure screening in their building any Tuesday or Thursday in May. These will be done from 1-2 p.m. The contact for scheduling is the dispensary emergency room nurse, ext. 43196.

### *Bloodmobile Reminder*

The next bloodmobile visit will be Wednesday, May 25, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center. For more information, call ext. 43194.

## "TNT" Wins Langley League Tournament

**The "three-peat" champions won the 1994 Langley Basketball Association A-League Championship. It was the fourth time in five years that "TNT" came in first place in the league. Team members are, back row, left to right, John Simmons, Clyde Medley, Paul Daspit, Sam James, Stuart Cooke and John Lawson. In front are Kendall Freeman, Bert Cano and Mike Powers. Not pictured is Coach Ricky Clark.**

## Asian Pacific American Heritage Remembered

Asian Pacific American Heritage Month is observed nationwide during May. The theme of this year's observance is "Pride, Partnership and Progress."

Asian Pacific Americans are a valued part of the ethnic diversity that enhances our culture and is so essential to America's strength and vitality. Through their talents and contributions, they have enriched the American experience. Today, 77 Asian Pacific Americans are employed at Langley, contributing their many talents.

During May, the Langley cafeteria will be serving special dishes, and several films are available for previewing by contacting ext. 43290.

## Talbott to Give Power Workshop

Gail Talbott, director of Operations Work Control for Lockheed Space Operations Company at Kennedy Space Center, will present a workshop, "Power and Leadership," on Thursday, May 12. The interactive session, co-hosted by the Hampton Roads Section of Women in Aerospace and the Federal Women's Program Committee, will be held from 10 a.m. to noon in the H.J.E. Reid Conference Center.

Participants will examine the relationships between two principal forms of power, positional and personal, and the qualities of an outstanding leader, identify their personal power profiles and learn how to use that information to meet Participants will also discuss the use of positive politics as a key element in career survival and advancement.

The workshop is free and open to the first 60 employees who preregister by May 10 by calling Donna Roper at ext. 42505 or Patsy Campbell at ext. 43291. Employee time can charged to J.O. A2987.

# Bergeron Selected as Langley's New FAA Head

Hugh Bergeron has been selected to replace Dr. Tom Walsh as manager, Federal Aviation Administration (FAA) R&D Field Office at Langley. The R&D Field Office is the principal element of the FAA Engineering, Research and Development Service for coordinating, conducting and administering FAA/NASA interagency research and development (R&D) projects at Langley.

In this position, Bergeron is responsible for advocating and coordinating FAA-assigned R&D efforts at Langley. This includes planning and managing assigned R&D efforts to ensure responsiveness to the FAA-wide requirements for improved standards and criteria-related operations within the National Airspace System (NAS). Bergeron directs and supervises the field office, including a staff of engineers who serve as project managers on specific R&D in areas related to FAA's charter to foster and promote the development of civil aviation.

Bergeron's previous assignment was as a project manager in the FAA R&D Field Office at NASA Ames Research Center. Prior to this assignment he worked as an engineer at Langley on various aeronautics programs, including: flight simulation, flight operations, cockpit man-machine interface, Air Traffic Control (ATC), aircraft-ATC integration, and Single Pilot IFR (SPIFR) operations. While at Langley, he was awarded the Thompson Fellowship to address issues and problems associated with the control of air traffic in high-density terminal areas. In that program, he spent four months at MIT and eight months at Ames Research Center, Mountain View, Calif., working on the Center-TRACON Automation System, where he was co-developer of the Final Approach Spacing Tool (FAST).

Bergeron also served on detail to the Office of Aeronautics, Exploration and Technology, at NASA Headquarters for 9 months as manager, Aviation Safety Research.

## In Memoriam

### John R. Bowles

John Roswell Bowles, 72, a Hampton resident, died on Sunday, March 27.

Bowles retired in 1977 as an engineering technician after 13 years at Langley.

### Willie Barnes

Willie Barnes, 67, a native of Liwalton, Va., and a Peninsula resident for 45 years, died Monday, April 11.

Barnes retired as a wind tunnel technician in 1986 after 31 years with Langley.

### R.M. Smith

Randolph Mabry Smith, 76, of Hampton, died Tuesday, April 12.

Smith was a Newport News native and worked at Langley until his retirement in 1977 after 33 years of civil service.

**Gail Talbott**


News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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.

# Branscome Talks about the Space and Atmospheric Sciences Group

*Darrell R. Branscome was named director of Langley's Space and Atmospheric Sciences Group when the Center's new organization was announced.*

*The **Researcher News**, in the third of a series of interviews, asked Branscome to comment on his group, his vision for the group, and the reaction of customers to the newly formed group. Here are his comments.*

### *RN: Please talk about the structure of your organization.*

***DB:*** The Space and Atmospheric Sciences Program Group (SASPG) consists of a group office, the Space Systems and Concepts Division, with three thrust offices: Space Transportation, Spacecraft and Remote Sensing, as well as the Atmospheric Sciences Division and the Space Projects Office.

The Space Systems and Concepts Division consolidates our systems analysis capabilities into a single division emphasizing three areas: space transportation, spacecraft and remote sensing, and space utilization. The thrust offices will provide the point of contact for customers of Langley space technology, including industry; other centers and agencies; and for our Headquarters funders. These offices will be devoted full-time to program development and program planning, feeding back to our customers and our funders the results of those activities. I think the value this thrust function will bring is a crisper customer focus and a better interaction with customers. We will be working closely with RTG (Research and Technology Group) and IOG (Internal Operations Group) to formulate the most relevant and effective technology proposals that we can generate at Langley.

The Atmospheric Sciences Division has a critical role in the Agency's Mission to Planet Earth. These activities are focused on providing an increased scientific understanding of growing national and international concerns including global warming trends, greenhouse gases, ozone hole and ozone depletion.

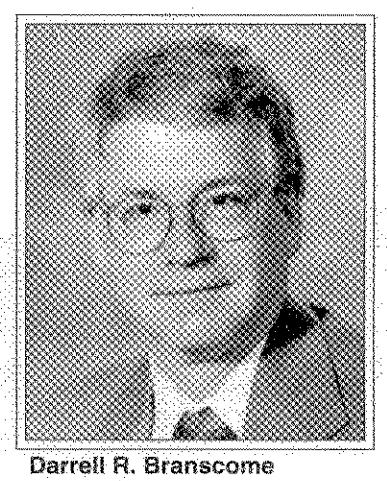
The Space Projects Office leads the development of remote sensing instruments and will be involved in planning and conducting technology flight demonstrations and experiments related to the thrust areas.

### *RN: How closely will the organizations within your group work?*

***DB:*** Our group will be a highly interactive organization internally within the group, with other LaRC organizations, as well as externally with customers and funders. I envision a continuing tie-in between the systems analysis organization and the thrust offices. We believe that our systems analysis capabilities will be a valuable tool in helping assess technology investment pay-offs and priorities. There is a heavy linkage between the Atmospheric Sciences Division and the Space Projects Office as well. The Space Projects Office leads the development of instruments that support the principal investigators who reside in the Atmospheric Sciences Division. The Space Projects Office will also work closely with the thrust offices in supporting technology flight demonstrations and experiments.

In the Remote Sensing technology area, we at Langley are developing technology that is used right here on Center. Sensor technology such as LITE (Lidar In-space Technology Experiment) and LASE (Lidar Atmospheric Sensing Experiment) represent future generation atmospheric science instruments.

Externally, the Space Systems and Concepts Division not only supports our technology planning at Langley, but also works directly with several program offices at Headquarters. For example, the Vehicle Analysis Branch has been very involved with the NASA Access to Space studies. As a result of working in the program planning stages, we get early insight into critical technology areas where our technology and expertise can contribute. The Spacecraft and Remote Sensing Branch support the Agency Space Station Program and the Mission to Planet Earth Program Office. The Utilization Analysis Branch is supporting the Office of Microgravity and Life Sciences and space station utilization planning.


Darrell R. Branscome

### *RN: What is your vision for the Space and Atmospheric Sciences Program Group?*

***DB:*** A primary role of SASPG in the new organization is to foster a multidisciplinary perspective to space program planning. If we look at successful outside organizations, industry and otherwise, those organizations are looking beyond breakthrough technologies in a single discipline area. They take a multidisciplinary approach. Rather than focusing on breakthrough improvements in single disciplines, we want to look across disciplines and get an incremental improvement in each of several disciplines. Then we will be able to achieve significant improvements at a systems level.

We want to foster continuous improvement in our products and processes. We will empower employees to get results and promote teamwork across Langley organizations and with external customers. Additionally, we want to rebuild our space technology program to be focused on customer requirements. We will do this through building partnerships with industry, other Centers, and other agencies to transfer relevant, cutting-edge technologies including those with dual-use potential. Finally, we want to sustain a world-class atmospheric sciences program focused on understanding global change and our world-class systems analysis capabilities.

In summary, I want Langley's space technology programs to be recognized for their contributions to U.S. industry competitiveness, for the creation of jobs in the aerospace and non-aerospace sectors, and for enhancing the Agency's ability to undertake new programs. I also want our Atmospheric Sciences programs to continue to be recognized for their scientific contributions to the Agency, national and international efforts in achieving an increased understanding of global climatic change.

### *RN: Tell us more about the thrust management role.*

***DB:*** The thrust management functions are a new role at Langley. We are depending on the thrust leaders to be knowledgeable about what our customers need. In my mind, Langley customers are industry, other flight centers and other agencies. In particular, industries that are working with flight centers and on the projects that those flight centers are leading are a key focus.

Our main business is technology transfer, not just conducting technology. Ultimately, the hardware associated with space projects is being built by industry, so our interaction is with both the flight centers and with the industries with whom they work. Hopefully, this new role will ensure that the technology efforts that we undertake at Langley are inserted into the hardware that is being built.

The thrust managers must also be conversant with our Headquarters funders and other agencies to keep abreast of national program activities. For example, both DoD (Department of Defense) and NASA play a major role in the nation's launch infrastructure. An understanding of where DoD is going is important so that we can better plan the strategy for our technology areas to support both NASA and the DoD. Finally, to be successful in any program area, we've got to make sure that we have a buy-in and the support by both RTG and IOG. And, I envision that the thrust leaders will be calling frequently on the systems analysis people and all the other Center groups to help guide our technology planning. That way, we can ensure that Langley can execute that program and deliver the products that we are proposing and live up to the commitments in terms of schedule milestones, technical performance and budget.

### *RN: What has been the external customer response?*

***DB:*** I believe we are getting a very positive response from the flight centers, industry and our funders. For example, we are working very closely with the Marshall Space Flight Center in Huntsville, Ala. They are leading the Agency's Advanced Launch Technologies activities and our ties with them have been strengthened.

We're also working in new ways, particularly in two areas. For both the advanced launch technology and the small spacecraft efforts, there have been recent NASA Research Announcements (NRAs) that invited industry to propose work in various technology areas and to propose how they would work with government organizations, NASA centers included, and use key expertise or facilities at those various sites. Of the companies that responded, several of them proposed working with Langley. We are looking forward to that collaboration.

On the spacecraft side, NASA is currently evaluating proposals from industry in response to the NRAs for the small spacecraft technology initiative. Again, industry is proposing how they would work with Langley. About six companies submitted proposals involving work with Langley in that area alone.

For the advanced launch technology effort, Langley is leading the composite structures and material work. We are supporting Marshall in the reusable cryogenic tank activity. We are working closely with Ames Research Center, Mountain View, Calif., on the thermal protection system technology (the hot metallic structures part of that activity will be worked at Langley). Our systems analysis organization will be a critical element in the Agency systems study effort for that launch technology.

Yes, I think we are getting a positive response to the new organization. I also believe we are getting a positive response from Headquarters on combining our systems analysis groups into a single division. This new organization makes it easier for our customers to "enter" Langley by providing them with a single point of contact as opposed to having to contact multiple programs areas.

### *RN: Any final comments?*

***DB:*** We want all Langley employees to understand the new organization and where we want to lead the Center. There is no better use of our time than to communicate what we are trying to do, both on Center to our employees and to our outside customers in NASA Headquarters, the other centers and industry. We are changing the way we do business and we need to let people know what is going on internally and externally.

# Happenings

**CONDO FOR RENT:** Myrtle Beach ocean front 2 BR condo with full kitchen, pool, cable TV and many extras. In season (May 28-Aug. 27), $960/week; $615/week, pre- and post-season. Call Joe Drewry at 722-4443 for more information.

**BALLROOM DANCING LESSONS:** for beginners at the Langley Officers Club every Monday, 5:30-6:30 p.m. Cost is $5 per person. Call instructor Fred Duffy at 874-2039 or 496-3760 for more information.

**HOUSE FOR SALE:** Denbigh, seller will pay closing cost on this 2-3 BR, 2-1/2 bath townhouse, or rent w/option to buy. Has fenced patio, living room w/fireplace, dining room, eat-in kitchen, community center w/pool and many extras. Asking $63,000. Near I-64, shops and schools. Call 887-2597.

**FOUND:** Lady's pin, near Building 1208. Owner may claim by describing item. Call Dave Swofford, ext. 47045.

**RETIREMENT SOCIAL:** A retirement social honoring Walter "Ed" Bruce will be held Tuesday, May 17, from 5-6:30 p.m. in the Langley Room of the H.J.E. Reid Conference Center. Please drop by and help Ed celebrate this special occasion. Light refreshments and a cash bar will be available.

**CAR FOR SALE:** '92 Oldsmobile Cutlass Ciera, 4-door, 22,000-miles, automatic, AC, cruise control, am/fm cassette, power windows and door, anti-lock brakes, $10,000. Call 596-5821.

**AEROBICS:** Low-impact, bench, body-sculpting and circuit training classes are offered by certified personal trainers, Tuesday and Thursday at 5-6 p.m. and Saturdays at 9:30-10:30 a.m. at the LAA Gym. Call ext. 42295 for more information.

**FREE KITTENS:** Healthy and litter-trained . Call 722-1124.

**FOUND:** One pair of women's bifocals. Call Security at ext. 43420.

**LOST:** Eyeglasses, purple and gold frames in a Pearle Vision case. Please call Sharyn Hilstrom at ext. 42528.

**FOR SALE:** '92 Ford Ranger XLT truck, extended cab, automatic, V-6, AC, tilt wheel, am/fm cassette stereo, cruise control, factory warranty, 19,000-miles. Asking $11,500. Call 596-5821.

**RETIREMENT SOCIAL:** James D. (Don) Lawrence Jr., chief of the Atmospheric Sciences Division, wants to say "so long" prior to his retirement. He invites all his Langley friends to join him for an informal gathering at Shelter #1 at the H.J.E. Reid Conference Center, Thursday, June 2, from 4:30-6 p.m. Call Nancy Holt at ext. 45381 or Emily Kornegay at ext. 45380, by May 23, if you will attend or need more information.

**SILENT PICNIC:** Make plans now to attend the Silent Picnic for the deaf and hearing on Friday, June 3, from 3 p.m. to ???, at the H.J.E. Reid Conference Center Shelter #1. Please sign up today with Becky at ext. 44534. The picnic is open to everyone.

## Center Fire Investigation Report Released

BY ALLISON T. BALLEW

A faulty window air conditioning and heating unit has been cited as the cause of a fire that destroyed a warehouse at Langley, December 30, 1993. The circumstances of the fire were recently released by an investigative board. The warehouse was the Center's environmentally controlled warehouse, Building 1249. There were no personal injuries but the facility was damaged beyond repair and its contents lost. Damage is estimated at $622,000. The investigative board concluded that the window unit overheated, ignited the control wiring, melted its plastic cover, and ignited a wooden window seal. The fire then spread through the building. Window units of the type which caused the fire have been reviewed centerwide and removed from service.

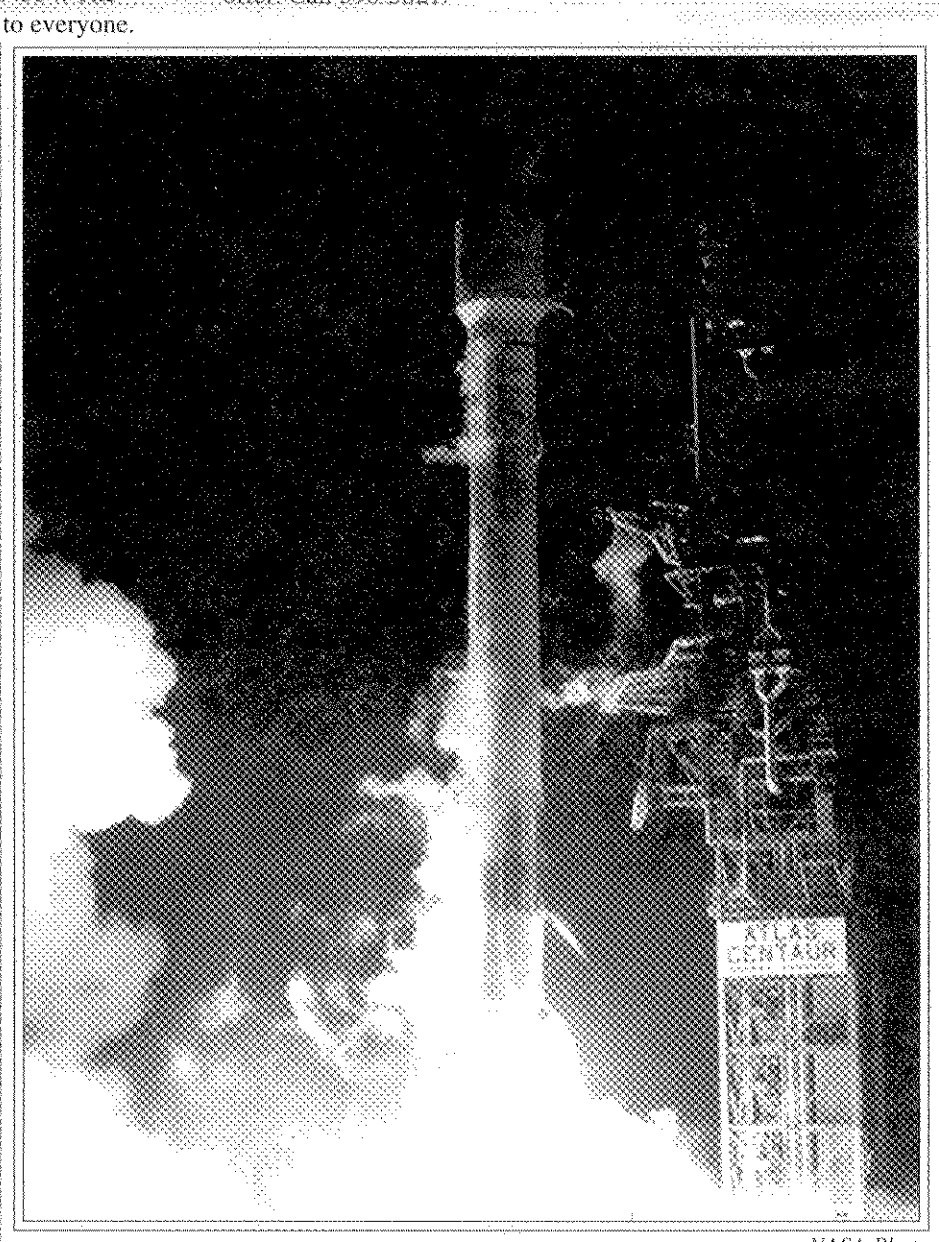
**RETIREMENT PARTY:** Friends and associates of Cary Spitzer are invited to a retirement dinner in his honor on May 18, in the H.J.E. Reid Conference Center. Social hour begins at 6 p.m. Steamship round will be served. Cost is $15 per person. For reservations and/or gift contributions, please contact Marcella Hogge, ext. 43844, Mail Stop 265, by Tuesday, May 10.

**FOR SALE:** Golf clubs, left-handed, True Form pro-player 1, 3, 5 woods; Spaulding irons 2 through sand wedge and pitching wedge; T.P. Mills putter; bag included. Asking $200 or best offer. Call 596-5821.

**FOR SALE:** Panasonic word processor with printer, almost new condition. Asking $225 or best reasonable offer. Call 898-5877.

**FOR SALE:** New living room set, sturdy, contemporary three pieces w/recliner, $875, tables negotiable. Call 881-5203.

**SPACE WEEK SOCIAL:** The NASA Alumni Social Committee will meet at the H.J.E. Reid Conference Center, May 17 at 1 p.m. All members should plan to attend the Space Week covered dish dinner. For information, call A. Leiss at 877-2939.



NASA Photo

**The Atlas 1 (AC-73) carrying the GOES-I, the first of five next-generation advanced weather satellites for the National Oceanic and Atmospheric Administration (NOAA), was launched from Launch Complex 36B at Cape Canaveral Air Force Station on April 13, at 2:04 a.m. EDT.**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Researcher News

National Aeronautics and
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**Langley Research Center**
Hampton, Virginia 23681-0001

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National Aeronautics and Space Administration
Langley Research Center

Apollo 11 25 1969-1994 The Eagle Has Landed

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 10 ❖ May 20, 1994

# 1994 Pacific Exploratory Mission Completes Phase B Data Gathering

Langley scientists have once again played a major role in assessing human impact on chemical processes in the atmosphere over the western Pacific Ocean.

As overall project manager, Jim Hoell, Atmospheric Sciences Division, headed a team of international scientists during a six-week expedition to conduct a wide range of measurements over the Pacific Ocean as part of the second phase of the NASA Pacific Exploratory Mission-West (PEM-West). The mission, which returned from the field in March, was a major component of the East Asia/North Pacific Regional Study (APARE), part of the International Global Atmospheric Chemistry (IGBP) Program. PEM-West expeditions are part of NASA's ongoing Global Tropospheric Experiment (GTE), which, since the early 1980s, has conducted similar field expeditions over many of the important ecosystems of the world. Program manager for the GTE is Dr. Robert McNeal of NASA Headquarters.

*Photo by NASA Wallops Flight Facility*

**Carolyn Butler, of Science Applications International Corp. (SAIC), is at the control panel of Langley's UV-Lidar System aboard the NASA DC-8 aircraft.**

### Why the Pacific?

Hoell noted that the Pacific Ocean is one of the few remaining regions of the world that, to date, is relatively clean. This region, however, is bordered upwind by Asia, a densely populated continent that is becoming increasingly industrialized. The impact of Asian human activity on the chemical processes over the western Pacific Ocean is the focus of studies by scientists from the western Pacific rim countries and the Unites States as part of the PEM-West expedition.

NASA, in cooperation with the National Oceanic and Atmospheric Administration (NOAA), universities and government agencies in Hong Kong, Taiwan, South Korea, the Peoples Republic of China and Japan, is leading this experiment as part of the Agency's continuing role in the assessment of global atmospheric chemistry. Langley participants include scientists, technicians and support personnel from the Atmospheric Sciences Division, the Flight Electronics Division, and the Operations Support Division as well as Science Applications International Corp., Lockheed Engineering and Sciences Co. and Science and Technology Corporation. This latest expedition was the second phase of a multi-year study. Phase A of PEM-West was conducted in September to October, 1991, a period of the year characterized by minimum outflow from the Asian continent and strong connective activity over the Pacific Ocean. The recent Phase B period of data gathering was during a period characterized by maximum outflow from the continent. The Phase A measurements will serve as a baseline to help gauge the relative contribution of natural versus human activities on the atmospheric budget of carbon, nitrogen, ozone, sulfur and aerosols.

### 1991 Results

The results from the 1991 expedition, to be published in the *Journal of Geophysical Research-Atmospheres*, show that transport of man-made pollutants from Asia is already having an impact on the atmosphere over the Pacific. One unexpected finding was the observation of elevated concentrations of sulfur dioxide and sulfate in upper tropospheric air that had been influenced by downward transport of stratospheric air. This finding may have a significant implication on the formation of aerosol and cloud condensation nuclei in the free troposphere.

Hoell noted that one of the "high" points of the 1991 mission was a flight into the upper regions of Mireille, one of the most intense typhoons to strike Japan in the past decade. Measurements during this unique opportunity have resulted in new estimates of the ability of typhoons to transport soluble trace gases, normally found only within one to two kilometers of the Earth's surface, into the upper troposhere.

During the 1991 and, particularly, the 1994 expedition, industrial emissions from as far away as Europe and, possibly, North America were detected in the middle of the Pacific Ocean, thousands of kilometers from their apparent source. Scientists aboard the NASA DC-8 during the most recent mission were surprised by measurements showing elevated concentrations of nitrogen oxides over the tropical Pacific Ocean.

Analysis of the measurements from this region will focus on determining the source of these high concentrations. An intriguing explanation, that will be intensely studied over the few months, is that nitric oxide, which is known to be produced during electrical activity, was generated in situ by intense convective activity within the intertropical convergence zone. An alternative explanation is long-range transport of emissions from the Asian continent. An understanding of this phenomena is important for understanding the global budget of ozone in the troposphere.

The primary measurement platform for the PEM-West expedition was the NASA

*Continued on Page 7*

# *Holloway Honored by ODU*

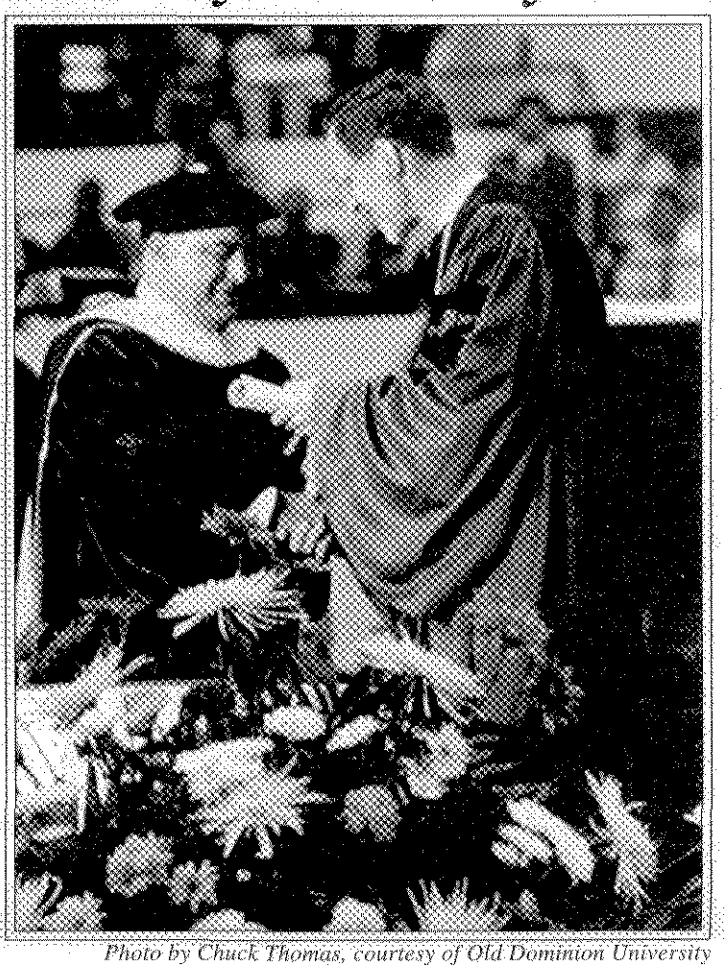
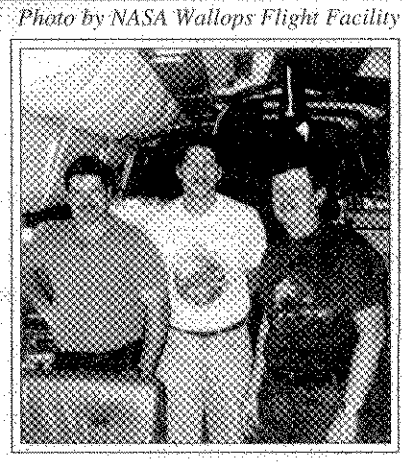


*Photo by Chuck Thomas, courtesy of Old Dominion University*

**At graduation ceremonies May 7, Center Director Paul F. Holloway was awarded an honorary doctorate degree from Old Dominion University by Dr. James V. Cook, president. After conferring the honor, Cook said, "As a distinguished research engineer in the field of aerothermodynamics and as a highly decorated manager, you have played a major role in the development of the Nation's aeronautical and space technology program for more than three decades. Your accomplishments are widely recognized throughout the aerospace industry. Those of us in the academic community, especially those here at Old Dominion University, are genuinely proud of your prodigious support of graduate and undergraduate engineering education and your support of university research programs."**

*Photo by NASA Wallops Flight Facility*

**Byron Meadows, above, Operations Support Division, makes adjustments to the Langley UV-Lidar system.**



**PEM-West team members, left to right, Dale Richter, SAIC; Mark Jones, Operations Support Division; and Ed Browell, Chemistry and Dynamics Branch, aboard the DC-8.**

# News Briefs

## Around the Agency

**NASA/FEMA SENSING SYSTEM TO SPEED DISASTER RELIEF** – NASA and the Federal Emergency Management Agency (FEMA) are exploring a cooperative venture to test and implement a prototype remote sensing system that will acquire, process and distribute photographic-like digital images of disaster-damaged areas to response and recovery officials in near-real time. "In past disasters, NASA's role has been to assist FEMA by providing aerial photographs to help their recovery operations and assessment of damage. This venture will enhance the technology and process to enable FEMA to manage disaster recovery more quickly," said Fred Gregory, associate administrator in NASA's Office of Safety and Mission Assurance in Washington, D.C.

## Speakers Bureau Report

The following Langley employees participated in the Speakers Bureau in the past several months.

**Dennis Bushnell** spoke to West Point High School students about "Space and Technology Careers."

**Nancy Kruse** spoke at Abingdon Elementary in Gloucester about "Planets in Our Solar System;" at the Virginia Beach Vo-Tech Open House about "Piezoelectric Film and Ceramics and Superconductors;" at Capt. John Smith Elementary, Hampton, on the topic, "Liquid Nitrogen Reactions;" at Page Middle School, Gloucester, about "Liquid Nitrogen Effects;" at Palmer Elementary School, Newport News, as a participant in "Passport to the World;" and during NASA Career Days, representing the NASA Co-op Program and the Apprentice School.

**David Glass** was a speaker at Brevard Middle School in Brevard, N.C. His topic was "NASA Aeronautics."

**Larry Cooper** spoke at the Early Childhood Centers of Newport News and Denbigh and at Coventry Elementary School, Yorktown, as part of their Heritage Day, about the "NASA Shuttle Program." Cooper also represented Langley at the Young Authors Festival for the Hampton City Schools.

**Dr. Victor Delnore** spoke to three classes at Bayside Elementary School in Virginia Beach about "Living in Space;" at the Virginia Beach Amateur Radio Club about "Radar from Orbiting Satellites in Space;" and at Northside Junior High School, Norfolk, on "Career Opportunities."

**Michael Uenking** spoke at Tallwood High School, Virginia Beach, about "Engineering Careers;" and at Woodstock Elementary, Virginia Beach, conducting a "Mock Shuttle Launch." He was also Langley's representative at Greenbrier Intermediate School's Science Celebration.

**Dr. Jag Singh** spoke about "Liquid Crystals —Their Applications in Aerodynamics" at Norfolk State University.

**Byron Meadows** spoke at Christopher Newport University about "Laser Atmospheric Remote Sensing."

**Dr. Jim Jacob** spoke about "Composites and Ceramics" at Norfolk State University.

**Angela Mason** and **Beth Lee-Rausch** spoke at Tucker Capps Elementary School, Hampton, about "NASA Careers."

**Chip Holloway** participated in the Festival for Arts and Sciences at Poquoson Elementary School.

**Dr. Joel Levine** spoke at the College of William and Mary about "A Tour of Other Worlds;" at Old Dominion University as part of their Retirement Learning Program; and at the Virginia Institute of Marine Sciences in Gloucester on the topic, "Earth on Fire." Levine also spoke to the Thomas Jefferson Program in Public Policy and to the Rotary Club of Williamsburg about "Global Environmental Problems;" at the National Congress on Aviation and Space Education, Norfolk, and the New York Academy of Sciences about "Earth on Fire;" and to the Solar System Exploration Elderhostel, Williamsburg about "A Planet at Risk."

**Patrick Troutman** spoke about the "Redesign of Space Station" to the engineering duty officers of the U.S. Navy's Supervisor of Shipbuilding in Norfolk.

**Elijah Kent** was a Science Fair judge at Southampton High School.

**Mark Lake** talked about "Large Space Structures" at the regional Tidewater Science Congress.

**Sam James** spoke at Lindsay Middle School, Hampton, on two occasions; first, about "Construction of a Catapult" and then on the "Trajectory of a Marble Shooter."

**Bill Hood** spoke to Boy Scout Troop #4 and to the Boy Scouts of America Scoutmasters and Leaders about "Space Exploration and NASA" and "Laser Research,"

**Julie Williams-Byrd** was NASA's representative at the Newsome Park Middle School "Career Day."

**Dr. Joe Heyman** spoke to the Williamsburg Rotary Club about "Tech Transfer — A Vision for NASA-Industry Partnerships."

**Joycelyn Simpson** represented Langley at the Tucker-Capps Elementary School Science Fair.

**Dr. Mary Ann Smith** spoke to students at the C. Tarrant Elementary School, Hampton, on "Mission to Planet Earth."

**Richard Davis** was a speaker for Science Day at Matthew Whaley Elementary School, Williamsburg. His topic was "Solar Travelling to the Planets."

**Taumi Daniels** was Langley's representative at Saunders Elementary School Science Fair.

**Thayer Sheets** spoke at the Virginia Business Round Table about the "Small Business Innovative Research Program."

**Jane Hogge** addressed students at Fairview Elementary School, Roanoke, about the "Space Shuttle."

**Brian Pritchard** spoke about "Space Station and Where Do We Go from There" at Virginia Polytechnic Institute and State University.

**John Bryant** spoke to the Smithfield Kiwanis Club about "The Ozone Paradox."

**Pamela Davis** and **Phil Robinson** gave a "NASA Overview" at Riverside Elementary School, Newport News.

**Dr. Christine Darden** gave a talk on "NASA's High-Speed Research Program" at Virginia State University.

**Dave Yeager** and **Mike Nelson** spoke about "Communications and Information Systems" at the NASA Headquarters ACC Conference.

**Terry O. Clark, Danny Barrows** and **Thomas Mitchell** spoke at Huntington Middle School, Newport News, and Queens Lake Middle School, Williamsburg, about "Math and Science."

## Boucher Addresses Langley Audience; Scott Honored by AIAA

**BY LEE RICH**

Congressman Rick Boucher (D-VA, 9th District), chairman of the House Science Subcommittee, spoke April 18 to 300 Langley employees about direction and funding of NASA's research program. Boucher, whose district includes Blacksburg, was accompanied to Langley by Virginia Polytechnic Institute and State University President Paul Torgersen and several university officials.

Boucher's visit was sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA). The focus of his address was the future of basic research, the limited resources to pay for it, and the choices that must be made. "In the past, we funded everything; the answer was always 'yes,'" he said. "But now the Cold War is over and funding for science is competing directly with veterans programs and housing programs."

Boucher has introduced a bill that he believes would force the White House and Congress to set clear research and development priorities, explain the value of funded programs to the public, and then track the success or failure of these programs. "It's very important to set priorities," he said. "The public sees a benefit in the construction of housing or in medical benefits for veterans, but may not understand a corresponding investment in scientific research. We have to justify every dollar spent."

Boucher made his position on Space Station clear: "Before I vote again on the Space Station, I will look closely to assure that science is adequately supported throughout NASA and that science is the principal driving force behind the station."

On the Chairman's list of needed spending are research for global climate change, biotechnology, space age materials, ultra-fast computers and university-based research centers.

Congressman Scott, who joined Chairman Boucher on the stage, made a few remarks in accepting honorary membership in the Hampton Roads Section of the AIAA.

## Take Our Daughters to Work Day

**Daughters and parents at the Take Our Daughters to Work Day – Langley's first.**

The Federal Women's Program Committee and the Hampton Roads Section of Women in Aerospace sponsored Langley's first annual observance of the *Ms.* Foundation's *Take Our Daughters to Work* Day April 28.

Fifty daughters came to work with their parents and participated in an interactive program at the H.J.E. Reid Conference Center. Then they went on a five-point tour of the Center, ate lunch in the cafeteria and spent the afternoon with their parents at their work sites.

Dr. Kristin Hessenius, director of the Internal Operations Group, welcomed the girls to the Center and congratulated them on being the first participants in the program at Langley. She challenged them to ask questions and share their experiences with their teachers and classmates.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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.

*Volunteers Recognized as Vital Resource*

# Community Service Central to Being Good Neighbor

BY MARNY SKORA

"Covering the news gives me the opportunity to see first-hand what's going on in the local area," said Terry Zahn, WVEC-TV news anchor and featured speaker at the recent volunteer recognition program. "Covering the *news* also makes me very aware of the *needs* in our community," Zahn told the audience of more than 125 employees.

Zahn also passed along some startling statistics:

• for first time in eight years, income of a typical U.S. household dropped

• the number of people in poverty in the U.S. rose for first time in seven years

• one in every sixteen U.S. families is on welfare

• there are 36 percent more female-headed families in the 1990s than in the 1980s

And, locally, Zahn reported, the need is just as vital. Our population has grown 15 percent in the past decade. Median household income continues to fall. Our local economy, traditionally fed by government jobs and government contractors, is threatened by cutbacks. And, the demand for food stamps rose 37 percent in just one year.

"The good news is that there are responsible neighbors like NASA Langley employees who are active in the communities where they live," Zahn continued. "You have always been a strong contributor to the Combined Federal Campaign. But you give more than money, you give of your time and talent.

"Your community service survey indicates that Langley employees donate more than 1,250 hours monthly to volunteer endeavors. And you volunteer collectively. The Day of Caring mobilized 60 volunteers who each took a vacation day to help others. And National Engineers Week speakers impacted over 28,000 local students. That's impressive!" he concluded.

Center Director Paul F. Holloway, who hosted the event, was joined by NASA Headquarters Director of National Service Tyrone Taylor and United Way President Joe Shtulman as he recognized NASA Langley volunteers.

"Langley's Community Service program is the strongest in NASA," Holloway reported. "That's because of your immediate response to our community's needs, because of your generosity and your propensity to 'get involved' and because of your ability to get to the root of a problem and offer a solution."

Holloway recognized members of Langley's Speakers Bureau and Operation Communication, those who participated in the United Way's Day of Caring and in Langley's National Engineers Week school visitation program and those who volunteer on their own—whether in their child's school, their church or a community organization.

"Look around and see the power we possess to counteract what's wrong in the world—or at least in our own community," Holloway said. "Thank you for stepping up to serve our neighbors."

Shtulman presented Holloway with a memento of the 1993-94 Combined Federal Campaign, congratulating the Center on another tremendous response to community need. Langley givers have characteristically been the most generous of Peninsula contributors.

Taylor thanked the Director for his strong and immediate support of the Agency's thrust in community service. "Langley is way out in front with an organized, thriving program that has both top management and employee participation," Taylor said.

Attendees were given copies of the new NASA Headquarters brochure outlining the Agency's community service program which details several of Langley's projects. Included also was a copy of the volunteer survey for employees to update or pass along to co-workers.

Taylor spoke briefly about the next community service milestone at Langley, a pilot program which will team Langley retirees with community organizations to benefit those in need on the Peninsula. Watch for an announcement!

***To receive a copy of the Agency Community Service brochure or a volunteer survey form, call the Office of Public Services, ext. 43309.***

*Photo by Peggy Hopkins*

**Center Director Paul F. Holloway, right, presents WVEC-TV-13 news anchor Terry Zahn with a Langley photo. Zahn was the featured speaker at the first of what will be an annual Community Service Recognition Program.**

## U. S. Savings Bonds – A Good Investment

No one said it would be easy to be a parent, but one part of parenthood can be made easier. Saving for college with U.S. Savings Bonds is an easy way to make sure the money is there by the time your child goes to college.

U.S. Savings Bonds are affordable, secure, guaranteed to grow, and they offer tax advantages. The interest they earn is free from state and local taxes, and federal income tax payments can be deferred until the bonds are redeemed.

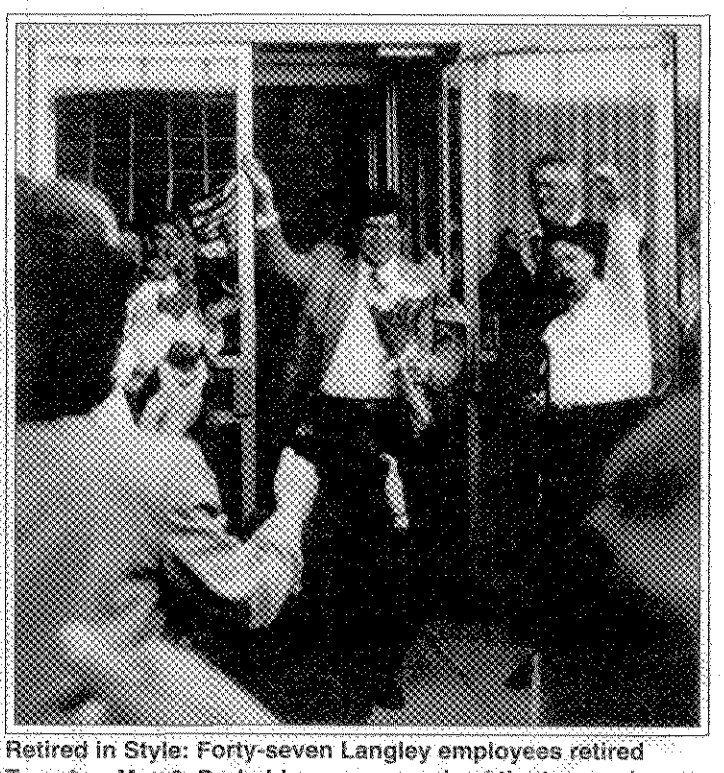
For more information, contact Langley's 1994 Campaign Coordinator for the U.S. Savings Bond drive Jim Ogiba, ext. 42075, or write: U.S. Savings Bonds for Education, Department of the Treasury, Washington, D.C. 20226. For a recorded message of current rate information, call 1-800-4US BOND.

Take Stock in America U.S. SAVINGS BONDS

# Langley Offers Buyouts: 47 Accept

In March, Congress passed the long-awaited Federal Workforce Restructuring Act of 1994, which authorized agencies to offer incentive payments or "buyouts" to encourage employees to resign or retire voluntarily. In response to passage of the Government-wide buyout legislation, Langley received a total of 222 applications for the separation incentive. Of the 64 Center employees (those who were eligible for an early out or managers and supervisors) were offered the buyouts, 47 accepted and 17 declined these offers. Employees could separate as soon as they received official notification from the Office of Human Resources that their application was accepted but no later than May 3, 1994. This will be the only time that buyout will be offered at NASA under the current legislation which expires March 31, 1995.

The 47 who left as of May 3 are: Robert M. Baucom, Richard G. Booth Jr., Richard M. Boykin Jr., Walter E. Bruce Jr., David F. Caplan, Michael F. Cavelli, Scarlett E. Coffey, Joseph B. Davenport Jr., Dariene D. DeRyder, Jarrell R. Elliott, Emily J. Evans, Joyce E. Fly, Ilona G. Gambill, Jack E. Harris, Gilbert A. Haynes, Gerald F. Hill, Lawrence H. Hoffman, John E. Hogge, William R. Hood, Joseph J. Howell, John D. Jackson, Archie L. Johnson III, Phyllis E. Jones, Eugene L. Kelsey, Kathryn L. Lee, Richard G. Lyeth, Allen G. McLain, Alfred J. Meintel Jr., William R. Motley III, John W. Oakley, George C. Olsen, George F. Palko, Barbara H. Pitts, Felix L. Pitts, Mickey G. Rowe, Iris B. Russell, Robert E. Satterthwaite, Asa L. Shaw Jr., Wayne E. Silver Sr., Margaret M. Snyder, W. Frank Staylor, S. Elmo Sterling Jr., Ann H. Suit, Kenneth F. Test, Joyce F. Tracy, Winn R. Vaughan and Doris B. Williams.



**Retired in Style: Forty-seven Langley employees retired Tuesday, May 3. Probably no one received the tremendous send-off that Gerald F. Hill, a physicist in the Aerospace Electronic Systems Division, received. A 40-car entourage, flags flying, and the sounds of cheers and horns created quite an audience as Hill was escorted out the gate in a white limousine, thus ending his 32-year NASA career.**

# The 737 Celebrates 20 Years as NASA's Flying Laboratory

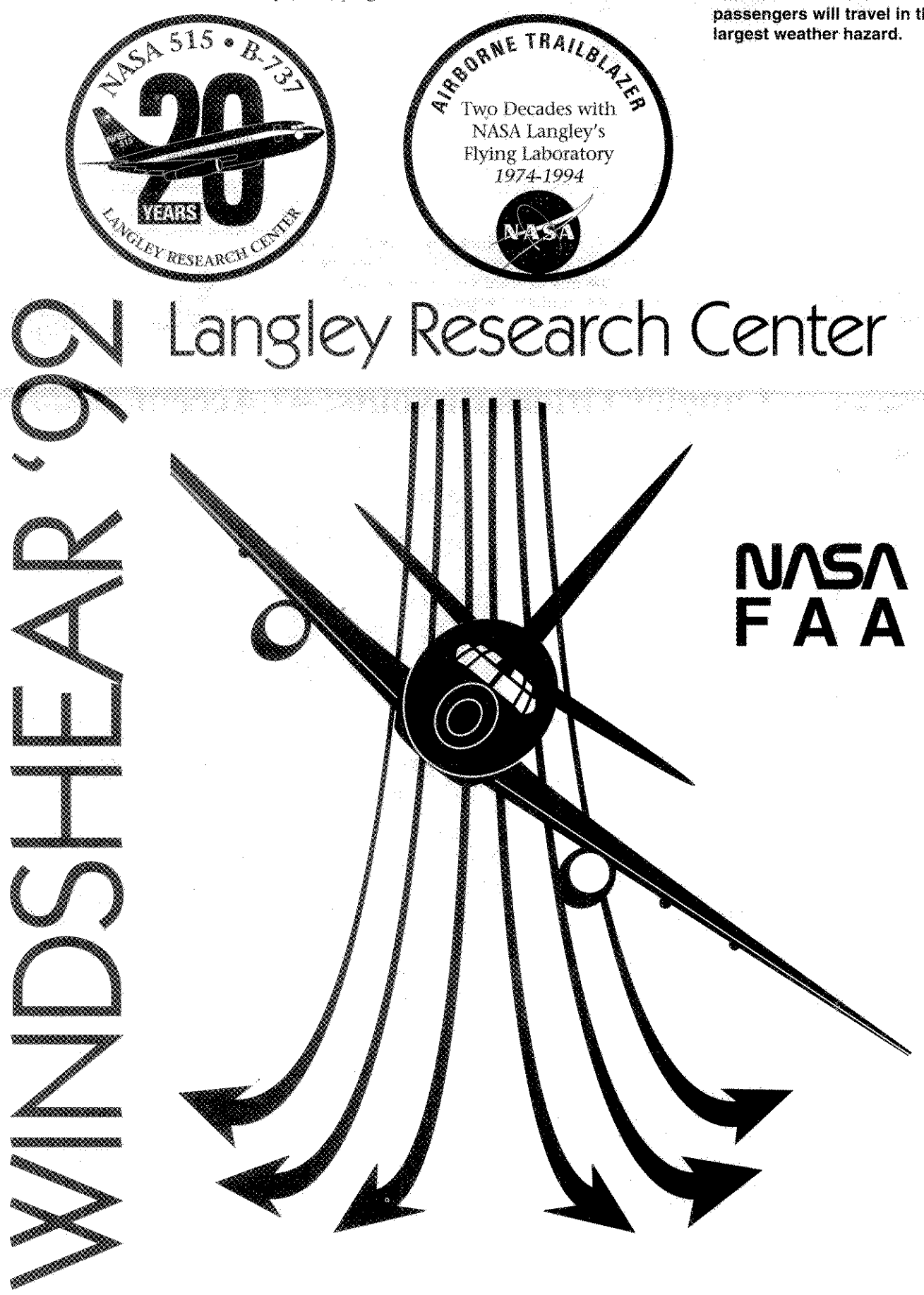
Since it first entered the NASA inventory in 1974, NASA 515 has been a testbed for research for many issues affecting aircraft safety, efficiency and capacity. Called an "airborne trailblazer," it goes beyond the typical research facility in that it demonstrates new concepts in real-world situations.

Government and industry decision makers could observe first-hand as research pilots used innovations in computer-generated display formats and content while interacting with air traffic controllers in a busy terminal area. Others experienced flying through potentially hazardous wind shears to prove that advance-warning devices really can give pilots precious extra seconds to avoid hazardous weather. As a result, this flying laboratory and its supporting facilities have been responsible for rapid adoption of new aviation technology by U.S. industry.

NASA 515 is the first B-737 built. Originally used by Boeing to qualify the 737 for airline service, the prototype 737 has since been heavily modified by NASA. It has two cockpits, a conventional B-737 forward cockpit providing operational support and safety backup, and an operational research flight deck positioned behind what was the first-class cabin section. Behind the research cockpit, in place of seating, are rows of computer consoles and data collection stations where researchers monitor real-time flight results.

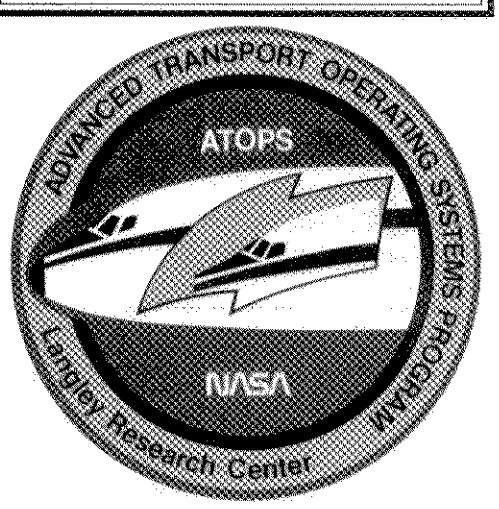
This national facility has been maintained and flown by Langley as part of the Center's Terminal Area Productivity (TAP) program.

***The Wind Shear Flight Tests,*** **an oil painting by John Clark, depicts Langley's 737 flying home after penetrating a wind shear over Orlando, Fla. Because of the research conducted by Langley's team, all airline passengers will travel in the future without the threat of aviation's largest weather hazard.**

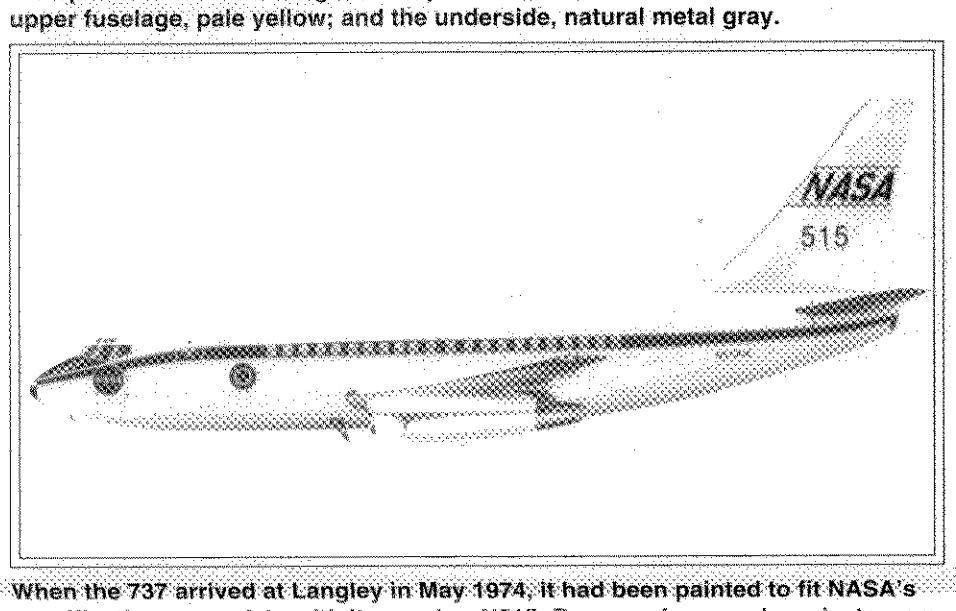



## NASA B-737 Facts and Figures

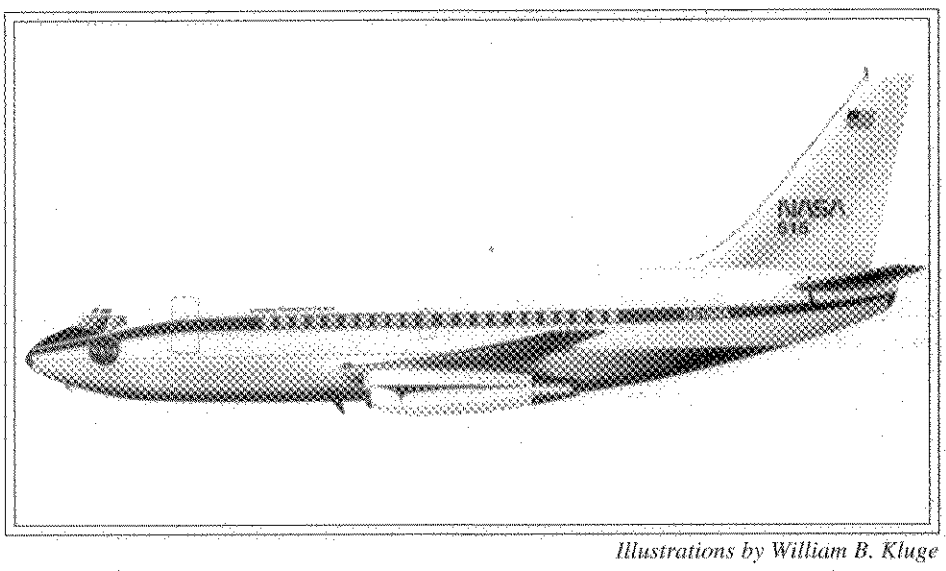
- **THE PROTOTYPE BOEING 737**
- **DATE OF MANUFACTURE:** 1967
- **FIRST FLIGHT:** April 6, 1967
- **ARRIVED AT LANGLEY:** May 17, 1974
- **COST TO NASA:** $2.2 million
- **DESCRIPTION:** Twin- engine, short-range transport
- **TOTAL FLIGHT HOURS:**
  - Upon arrival at Langley: 978
  - As of May 8, 1994: 2,966
- **GROSS TAKEOFF WEIGHT:** 97,800 lbs.
- **CRUISING SPEED:** 575 mph
- **RANGE:** 2,140 statute miles
- **CEILING:** 35,000 ft.



This is the original paint configurations for NASA's Boeing 737-100 Transport Systems Research Vehicle when it was rolled out at Boeing in 1967 as a prototype 737. Langley acquired the aircraft to conduct research into advanced transport aircraft technologies. The paint tail color was chocolate brown; the upper fuselage, pale yellow; and the underside, natural metal gray.




When the 737 arrived at Langley in May 1974, it had been painted to fit NASA's specifications complete with its number N515. Dozens of research projects were accomplished using the unique capabilities of the Langley 737.




*Illustrations by William B. Kluge*

Above is Langley 737 in its final NASA paint job, completed in September 1989. The scheme was designed to match NASA Graphic Standards. Artist William Kluge, who created the design, lists the colors as a white body, gray underbody, navy for the stripe and NASA logo, flat black for the nose, sky blue for the pinstripe and red for the highlights and NASA logo.

# The Flying Laboratory: A Very Valuable Aircraft

Some of the advanced technology testing that used the 737 from 1974-1994 included:

– **Electronic Flight Displays:** Boeing 757/767 aircraft have cathode ray tube electronic attitude indicators and horizontal situation displays. The technology was developed and first demonstrated on the Langley B-737 research aircraft.

– **Microwave Landing Systems (MLS):** Flights were conducted with the Federal Aviation Administration (FAA) evaluated MLS performance as a precision landing guidance system. As a result of joint flight demonstrations, the U.S. MLS system was adopted as the international standard approach and landing guidance system.

– **Precision Flare Control:** Aircraft landing-flare control computations, developed and flight tested to tighten touchdown area, demonstrated that improved touchdown accuracy could reduce time aircraft remains on runway.

– **Profile Descent Program:** Flights were conducted to evaluate the aircraft descent procedures from high altitude using automation to achieve efficient descent paths for fuel and time savings.

– **Wing Surface Coating:** Joint program with Boeing evaluated advanced paints for improved laminar flow over wing surfaces.

– **Digital Autonomous Terminal Access Communications (DATAC):** Joint program with Boeing developed, flight tested and demonstrated practical use of an onboard computer network to communicate between aircraft electronic flight systems. NASA/Boeing DATAC system adopted as industry standard.

– **Runway Friction Program:** Tests were conducted to improve and predict aircraft ground handling performance on slippery runways during bad weather.

– **Precision Guidance: "Airport '85" :** Joint program with U.S. Air Force required unique guidance capability to verify that proposed approach path to new Denver airport would not affect critical satellite link of Air Force communications system.

– **Total Energy Control System (TECS):** Joint program with Boeing validated new computations to improve fuel efficiency during climb and descent maneuvers.

– **Takeoff Performance Monitoring System (TOPMS):** Display formats, computations and alerts were developed and demonstrated to improve information available to the crew for assessing aircraft takeoff performance.

– **Helmet Mounted Display:** Joint program with McDonnell Douglas Aircraft Co. conducted flight tests of new display concepts applicable to advanced high-speed vehicles without conventional windshields.

– **Airborne Information Transfer System:** Flight tests were conducted to evaluate the benefits of using electronic data link, vs. voice, as primary communications system between aircraft and air traffic control.

– **GPS (Global Positioning Satellite) Performance Evaluation:** Joint program with Honeywell assessed GPS performance for self-sufficient landing guidance system for proposed orbital manned return vehicle and for commercial aircraft applications.

– **Engine Monitoring & Control System:** Engine display format developed and tested by NASA improved aircrew awareness of engine status when conditions are abnormal.

– **Airborne Wind Shear Sensors:** With industry participation, joint program with FAA developed and flight tested airborne wind shear detection sensors. Langley B-737 flight tested five wind shear measurement technologies. The wind shear hazard index, developed as part of the flight program, is the industry measurement standard and basis for FAA certification.

– **Advanced High-Lift Technologies:** Flight test data will validate new NASA computer fluid flow and wind tunnel techniques for developing advanced wing designs.

– **Optical Propulsion Management Interface System:** Joint program with McDonnell Douglas flight tested and evaluated use of fiber optic lines as communication link between pilot and engine.

# Langley's Space-Related Projects Make News This Year

BY CATHARINE G. SCHAUER

Langley space-related projects are making the headlines this calendar year, as researchers see the results of their efforts flying on a shuttle or gaining recognition in a variety of ways as on-going projects.

### *MAPS, the Latest*

MAPS (Measurement of Air Pollution from Satellites), which calculates the global distribution of carbon monoxide in the free troposphere, flew on Shuttle Endeavour April 9. Because of MAPS' previous flights on-board shuttle, Earth system scientists now know that carbon monoxide concentrations in the troposphere are highly variable around the planet, and that widespread agricultural burning in the South American Amazon region and the African savannas are major global sources of carbon monoxide in the troposphere.

During two dedicated Earth Observing space shuttle missions, in April and mid-August, MAPS will measure the distribution of carbon monoxide in the middle troposphere to evaluate CO sources and chemistry as well as evaluate the seasonal variation of this key atmospheric trace gas. Interpretation of the data will help scientists understand the consequences of human activities in global climate change.

The MAPS instrument was originally built by TRW Space Technology Group of California. It later underwent extensive changes and modifications by Langley engineers.

### *LITE Slated for September*

Langley is preparing to launch its Lidar In-Space Technology Experiment (LITE) in September 1994 aboard STS-64, Discovery. The project will detect stratospheric and tropospheric aerosols, probe the planetary boundary layer and measure cloud top heights. Lidar (light detection and ranging) is a remote sensing technique which can be used to study clouds and aerosols in the atmosphere with very high vertical resolution. Lidar is similar to radar except that very short pulses of light produced by a laser are used instead of radio frequency pulses. The LITE mission is the first time lidar will be operated in space to study the atmosphere.

The LITE system, developed by Langley, is a testbed for the development of technology required for future operational spaceborne lidars. It employs a three wave-length Nd:YAG laser and a one-meter-diameter collecting telescope. LITE data will also be useful in improving current spaceborne sensor measurement retrieval algorithms and in developing parameters of these atmospheric phenomena for use in global climate models.

New information which LITE will provide on the distribution and characteristics of clouds will increase America's understanding of its role in the global climate system. LITE will also provide information on aerosols in the atmosphere derived from both human and natural activity. Millions of tons of particulates are suspended in the atmosphere as a result of activities such as biomass burning, volcanic eruptions, wind erosion and the use of internal combustion engines. These aerosols are currently believed to have the potential to reduce the extent of greenhouse warming experienced by Earth. LITE will help study the distribution and sources of these particulates.

### *HALOE Still Flying*

Langley continues to manage the Halogen Occultation Experiment (HALOE) aboard the Upper Atmosphere Research Satellite (UARS). HALOE is obtaining high resolution (2-3 km) measurements of the vertical distributions of ozone, key trace gases (HCl, HF, NO, $NO_2$, $CH_4$, and $H_2O$), aerosols and temperature that will provide a better understanding of the chemistry and dynamics of the middle atmosphere. The experiment is unique in that measurements of HF (whose only source is chlorofluorocarbons, CFCs), taken simultaneously with HCl (a measure of the stratospheric chlorine), permit differences of the anthropogenic contribution of chlorine from that due to natural sources (chlorine is a major catalyst in the destruction of ozone).

### *ERBE and SAGE*

Ongoing Langley activities include the Earth Radiation Budget Experiment (ERBE) and the Stratospheric Aerosol and Gas Experiment II (SAGE II). ERBE non-scanner radiometers measuring total and shortwave solar energy continue to be operational on the Earth Radiation Budget Satellite, which was launched in 1984, and on two NOAA operational satellites launched in 1984 and 1986. These data are important in advancing our understanding of the Earth's radiation balance and in studying large-scale climate anomalies such as El Ninos and volcanic eruptions.

The SAGE II instrument, also launched on ERBE in 1984, measures aerosols, clouds, and trace gases ($0_3$, $H_20$, and $NO_2$) in the troposphere and lower stratosphere using solar occultation techniques. The SAGE II data continue to be used to provide inputs for global climate models and in studies of important atmospheric phenomena such as ozone depletion and disturbance of motion from volcanic eruptions.

### *OARE Prepares for Reflights*

Langley's OARE (Orbital Acceleration Research Experiment) measures drag forces in orbit and during early stages of re-entry into the atmosphere. It flew on its fourth mission in March 1994. OARE can measure absolute acceleration levels to an accuracy never before achievable on the orbiter. The measurements will be used to predict aerodynamic and other forces on future missions. Another OARE mission is planned in 1994 on Columbia, where the experiment will be adapted to support shuttle international microgravity laboratory (IML-2) research.

The Orbiter Experiments Program (OEX), which began in the 1970s, had its first Shuttle flight in 1981, and concluded with the OARE experiment on STS-58 in 1993. It used the shuttle as a testbed to measure orbiter aerodynamic performance during flight. OEX flight data have enabled NASA to validate its aerothermodynamic design methods for shuttle-class hypersonic vehicles. These methods include new, hypersonic wind tunnel testing techniques and state-of-the-art computational fluid dynamics (CFD).

In an effort to develop a less costly launch system for use to and from Space Station, Langley is working on designs for access to space. The study, conducted under the auspices of NASA Headquarters, examined three launch system options that would provide the nation's required payload delivery capability until 2030. The first option looked at upgrading the shuttle, the second examined a conventional technology expendable launch vehicle and the third studied the potential of applying advanced technology to reusable launch vehicle design. Langley was active in the development of the second and third options. The Access-to-Space study concluded that current launch operations costs could be reduced by designing a new, operationally efficient launch system with advanced technologies. Studies in this area are underway to refine the cost and sensitivities models to allow more refined technology trade studies.

### *The Durable LDEF*

The Long Duration Exposure Facility (LDEF) was a reusable, unmanned spacecraft designed to accommodate a wide variety of technology and science experiments that required long-term exposure to a low-Earth orbit environment. It was designed and built by Langley to be transported into orbit via the space shuttle, fly free and stable for an extended period of time and be retrieved by shuttle for return to Earth. LDEF, which spent five and one-half years aloft, transporting 57 experiments into space. It also focused on the evolution of galaxies and the impact of radiation on those who might someday live in space.

The LDEF's archive system is being developed to contain all LDEF-derived space environments and effects data, photographs, publications and hardware. It will be expanded in the future to include space environments and effects data from other sources. The system will be available to the public via Internet in December 1994.

The LDEF structure was disassembled at Langley and shipped in early May to Kennedy Space Center. There it will be reassembled and placed on permanent display at Spaceport U.S.A. The opening of the display is tentatively scheduled for 1995.

## *Video Section Honored*

The Video Section recently received an Award of Merit in the 1994 Society for Technical Communication (STC) competition in the Information for External Audiences category. Mike O'Hara was the producer for the award-winning production, chosen from more than 100 entries. The video is entitled "Leading Edge Vortex-System Details Obtained on F-106B Aircraft Using Rotating Vapor Screen and Surface Techniques."

According to Frank Ziegler, manager of the video competition for STC, entrants in the 1994 international contest represented all members of the society, the International Television Association and filmmakers from 22 states and Canada.

The video is a supplement to NASA TP-3374.

## Retirement Dinner for George Palko

A retirement dinner for George F. Palko will be held June 22, from 6 to 9:30 p.m., at the H.J.E. Reid Conference Center. The social will begin at 6 p.m., and dinner will be served at 6:45 p.m. A cash bar will be available. The cost is $14.50 per person, including the gift. For reservations or gift contributions, please contact Gloria S. Evans, ext. 44570, or Linda F. McKnight, ext. 44572, Mail Stop 481, by June 15. Please make checks payable to Gloria S. Evans.

## Retirement Party for Joyce Tracy

A retirement social for Joyce F. Tracy will be held at the Langley Officers' Club, Wednesday, June 8, 1994, from 5-8 p.m. The cost is $13 per person, which includes heavy hors d'oeuvres and a gift contribution. A cash bar will be available. Contributions for gift only are welcome. Please send checks payable to Effie Nicosia (M/S 185, ext. 42394) for reservations and gift donations by June 1, 1994.

***Mark Your Calendars – An Open House will be held Saturday, July 16, in recognition of the Apollo 25th Anniversary***

## PEM-West

*Continued from Page 1*

DC-8 aircraft which is based at Ames Research Center, Moffett Field, Calif. The aircraft carried instrumentation developed by scientists from U.S. and Japanese universities and several NASA centers. During the most recent mission, 17 flights were conducted from Guam, Hong Kong and Japan. Another aircraft carrying instrumentation developed by Japanese scientists from the University of Tokyo and the Japanese Institute of Environmental Sciences conducted measurements coordinated with those of the NASA aircraft.

### Ground Stations Used

Ground stations provided a set of measurements during the same time period the aircraft were active. Stations were located on several remote Pacific islands, the eastern coast of China, Japan, Korea, Taiwan and Hong Kong. A network of ground-based lidar systems in Japan have also made collaborative observations of the Asian dust storms prevalent during the February to April time frame. Many of these stations have remained active after the aircraft departed, providing a longer term of study of selected chemicals.

An important factor contributing to the day-to-day success of the expedition's flight planning, and to post-mission analysis, is meteorological data. During both Phase A and B, the Royal Observatory in Hong Kong served as the meteorological data center. Local forecasting was also provided by the U.S. Air Force meteorological facilities in Guam and Japan. The Royal Observatory was the central point for receiving a wide array of up-to-the-minute meteorological data which was then transmitted to the mission meteorologists stationed with the DC-8 aircraft. More meteorological data was also transmitted to the aircraft location from the Massachusetts Institute of Technology and from Langley.

"The PEM-West expedition illustrates the international collaboration that has become increasingly important in studying the impact of human activities on the global environment," Hoell said. Results from Phase A will be reported in the *Journal of Geophysical Research-Atmospheres* early next year. The first data workshop to review measurements from Phase B is scheduled for early November.

## *Virginia Air and Space Center News*

### Saturday Adventure Day Camps

The center will offer day camps two Saturdays each month, May through September, from 9 a.m. to 1 p.m. Each Saturday camp, for children ages 8 to 12, will focus on the following aerospace studies or archaeology/history studies.

May 21, *Discovering Science*: Experience the wonders of science as you travel back in time by examining rocks and fossils, splitting white light into colors and much more!

June 11, *Lighter Than Air*: Learn how early flight pioneers conquered the air in balloons, dirigibles and blimps as you build your own lighter-than-air vehicle.

June 25, *Environmental Science*: Be an engineer for a day as you discover how modern science and our environment interact in your own backyard.

July 9, *Fly With Us*: Soar through the air with a powered aircraft you'll build after learning the basic principles of flight.

July 16, *Invention Sensation*: Become the next Thomas Edison as you create your own "whatzit." Learn about NASA's inventions for space that are now used on Earth.

August 6, *Archaeology*: Explore the world of an archaeologist when you learn to retrieve artifacts and piece them together to learn about people who lived long ago.

August 27, *Future Life*: Design a space colony with other future astronauts. Traveling to space is the easy part – now you have to live there!

September 10, *Blast Off!*: Get ready for the countdown after you build your own model rocket – then, 3–2–1 – launch it!

September 17, *Science in Art*: Let your creativity soar as you learn how science and math help you draw. You will be on your way to enter the FAA-sponsored International Aviation Art Contest.

The fee for each session is $15 per child or $12.50 per member child, and includes all educational tools and materials to participate in camp projects. Space is limited and available on a first-come, first-served basis. For information or registration, call 727-9000, ext. 709.

### Tour Langley Research Center

The center, in cooperation with NASA Langley, is offering motor tours May through October 1994.

During the months of May and October only weekend tours will be available. Saturday tours are at 11:45 a.m. and 1:45 p.m. Sunday tours are at 1:45 p.m.

Tours will be offered Monday through Sunday from June 1 to August 31. Tours are provided at 11:45 a.m. and 1:45 p.m., Monday through Saturday and at 1:45 p.m. on Sunday.

Visitors can explore the birthplace of our nation's aerospace history, see five national historic landmarks including the original astronaut moon landing training device and get a glimpse of wind tunnels that can operate at up to 17,500 mph.

The fee is $5, $4 for members or combination ticket holders. The tour begins at the Virginia Air and Space Center and takes about one and one-half hours. Children ages four to 12 must be accompanied by an adult. For information, call 727-0800 or 1-800-296-0800, ext. 700.

### Week-Long Summer Day Camps

Virginia Air and Space Center
Hampton Roads History Center

Get set for the action this summer at the center when week-long day camp programs begin for children ages 8 to 12. From archaeology to aviation to history and the environment, the program will keep children enthralled Monday through Friday, from 9 a.m. to 1 p.m. The camps start June 20 and continue for seven weeks with the following themes.

June 20-24, **Archaeology Day Camp**: Explore the world of an archaeologist when you learn to retrieve artifacts and piece them together to learn about people who live long ago.

June 27-July1, **Aviation Day Camp**: Fly with us and you'll learn how and why planes fly when you construct paper and model airplanes, and meet real-life pilots.

July 11-15, **Environment Day Camp**: Use the scientific method to study ecology, recycling, life inside and outside your home, and how humans affect the environment.

July 18-22, **Astronaut Adventure Day Camp**: Blast off into space when you build and launch your own model rocket. Discover how to survive in space when you design your own space station.

July 25-29, **History Day Camp**: Time-travel to the Colonial days and visit tavern customers during the American Revolution. Jump ahead to the Civil War and witness the clash between the Monitor and the Merrimac as history comes to life.

August 1-5, **Invention Day Camp**: Got an idea to make life easier? Turn it into the real thing as you create your own invention and learn about space inventions that have helped on Earth.

August 8-12, **Space Colony Day Camp**: Travel to the planet Gilgamesh and work with other travelers to design a new habitat – tackling environmental issues, governmental structure, waste management and more.

The fee is $75 per child, per week, and includes all educational tools and materials to take part in camp projects. Since space is limited and available on a first-come, first-served basis, register early. To register or for more information, call 727-9000, ext. 709.

### Special Programs Focus on the Titanic

The center presents three programs that focus on the Titanic. Each program includes a guest speaker, viewing of the giant-screen IMAX® film *Titanica*, refreshments and music by the Hotel Paradise of Garden Orchestra. Here is the schedule:

June 23 at 7 p.m., Capt. Roy Alexanderson presents the *Titanic's Legacy: History of Cruise Liners.*

July 21 at 7 p.m., Bill Miller presents the *History of Early 20th Century Cruise Liners.*

August 18 at 7 p.m., Tom Crewe presents *Steamship Disasters of the Sea.*

Tickets are $13.75 for the general public and $11.75 for members. Tickets are available by calling 727-0900 or 1-800-296-0800, ext. 730. Seating is limited.

## Toastmasters Club News

### The 1994 Toastmaster Winners Circle

Regina Spellman and Danny Sharpe

Langley Toastmasters Regina Spellman of the Structural Engineering Section, and Danny Sharpe, pastor of the Faith Presbyterian Church in Newport News, were the winners of the 1994 Spring International Speech Contest and Table Topics Contest, respectively, at the club level in late March.

Spellman continued on in competition to win the next two levels of the International Speech Contest at Williamsburg April 14 (area level) and in Newport News April 30 (division level) with her speech entitled "Life Boats."

Filling in for Sharpe, Martha Brown of the Aeroacoustics Branch won second place twice above the club level for the Table Topic Contest at the Williamsburg and Newport News competitions. Spellman will represent the NASA Langley Toastmaster Club at the District 66 contests, the state level, May 21 in Norfolk.

### Tall Tale Champ

Dr. John Lin

Dr. John Lin was named the Toastmasters 1993 state tall tale champ for a yarn he wrote and delivered about a Polynesian restaurant waiter whose "Elvis-like hairdo" kept catching fire. Lin, who was honored last year as well by the Applied Aerodynamics Technical Committee of the American Institute of Aeronautics and Astronautics (AIAA) for his paper titled "Separation Control on High-Reynolds Number Multi-Element Airfoils," has been a member of the club since summer of 1992. He has continued to compete this year in the same category with a tall tale entitled "Mongolian Airlines."

Despite his success at telling tales, Lin does not intend to give up his science career for one in show business. "When I do the tall tales, it is just for my own fun," he said. "But my research is serious stuff."

# Happenings

**OLD ISSUES OF *RESEARCHER NEWS*:** Can you help complete our files? We are missing some issues of the *Researcher News* for our files and the Langley Archive files. Please check for these missing issues:

**1992 issues**: January 31, February 14 and 28, March 13 and 27, April 10 and 24, May 8 and 22, June 5 and 19, July 2, 17 (regular, not special, issue) and 31, August 14, October 9, November 20 and December 18.

**1991 issues:** January 11 and 25, February 8 and 22, March 8 and 22, April 5 and 19, June 28, July 12, August 9 and 23 and September 6 and 20.

Please consider donating the September 26, 1958, *Airscoop* to the Center's Historical Collection. It was an important issue, the one that heralded the transition from NACA to NASA. Contact the *Researcher News* at ext. 46126, Mail Stop 146.

**FOR RENT:** Poquoson townhouse. 3 BR, 2-1/2 baths, eat-in kitchen, living and dining rooms, patio, storage building. Available July 1, $600/month. Call evenings, 838-6000.

**HOUSE FOR SALE:** Denbigh, seller will pay closing cost on this 2-3 BR, 2-1/2 baths townhouse. Has fenced patio, living room w/ fireplace, dining room, eat-in kitchen, community center w/ pool and many extras. Asking $63,000. Near I-64, shops and schools. Call 887-2597.

**SCPD-LAFB PPD JOINT PICNIC:** Make plans to attend the Joint Picnic of the Satellite Committee for People with Disabilities (SCPD) and the LAFB Program for People with Disabilities (LAFB PPD) on Friday, June 3, 1994, from 3:00 p.m. until 7:00 p.m., at the H.J.E. Reid Conference Center Shelter # 1. For more information and reservations, please contact Beckie Williams at ext. 44534, by close of business, Wednesday, May 25, 1994.

**CONDO FOR RENT:** Myrtle Beach ocean front, fully furnished 2 BR w/ balcony, pool, sauna, etc., $960/week, May 28-Aug. 27; $615/week, pre- and post-season. Call Joe Drewry at 722-4443 for more information.

**LANGLEY AERO CLUB:** The Langley Air Force Base Aero Club invites all NASA Langley personnel, their families and friends to the 1994 Aero Club Open House, on Saturday and Sunday, May 21 and 22. The club will offer introductory flying lessons in a Cessna 152 or 172 and demonstrations of aerobatic flights. There will be displays and exhibits of military, private and homebuilt aircraft and opportunities for information and enjoyment. During the club's May membership drive, the initiation fee will be waived as well as a fee reduction for enrolling in the private pilot ground school course. Call Ken Jones, ext. 45013, for more information.

**HOUSE FOR SALE:** Hampton, 3 BR, 1-1/2 bath townhouse. Has upgraded carpet, fenced backyard w/ patio, storage shed. Near NASA/LAFB, I-64 and shops. Original owner asking $64,700. Call 827-5078.

**CARPOOL:** Looking for people to carpool from Ward's Corner, Norfolk. Call ext 44344.

**RETIREMENT PARTY:** Friends and associates of Ray Hook are invited to a retirement social in his honor June 24 in the H.J.E. Reid Conference Center from 5 to 7:30 p.m. For more information, contact Gin Marks, ext. 41714, Mail Stop 119.

**RETIREMENT PARTY:** Friends and associates of Jerry Elliott are invited to a retirement party in his honor Monday, June 13, at the Fort Monroe Officers' Club. Social hour begins at 6 p.m. with a buffet dinner at 7. Cost is $16 per person (includes gift). For reservations call Tracy Jones at ext. 44013, Mail Stop 489, by June 7. Gift only contributions gladly accepted.

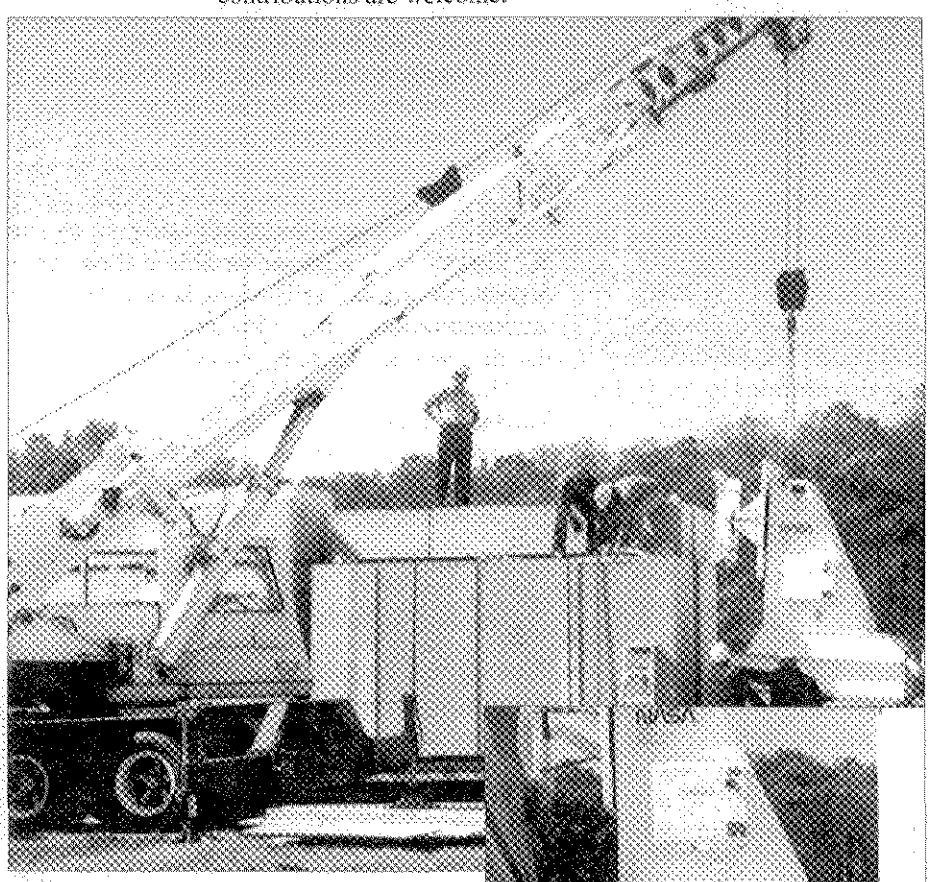
**RETIREMENT PARTY:** A party honoring Gilbert A. Haynes will be held at the H.J. E. Reid Conference Center on Friday, June 10. Social hour will begin at 6 p.m. followed by dinner and a short program. Cost is $15 per person. Those wishing to attend, call Shirwin Moore for reservations, ext. 43977, Mail Stop, by June 1. Gift only contributions are welcome.

## Notice

**The Public Mail Center (Building 1153, rooms 112, 114 and 115) will be closed from May 25 to June 3 for renovations.**

**HEALTH SEMINAR:** Long-term estrogen therapy has been shown to decrease a woman's risk of fatal heart attack. Estrogen helps to prevent osteoporosis, hot flashes and other symptoms associated with menopause. Dr. Jewell Barnett, a local gynecologist, will speak on "Estrogen Replacement Therapy" at the H.J.E. Reid Conference Center on Tuesday, May 24, 1994, at 2 p.m.

**RETIREMENT LUNCHEON:** A luncheon for Edna Cox will be held Thursday, June 2, at 11:30 a.m. at the Langley Air Force Base Officers' Club, Commanders' Room. Attendees will pay as they go through the line. For reservations and gift donations, contact Eloise Johnson, ext. 42498, Mail Stop 444 or Susan Stewart, ext. 42518, Mail Stop 444A, by May 25.



**Above, workers secure the crates carrying the Long Duration Exposure Facility (LDEF) for delivery to Kennedy Space Center (KSC). LDEF arrived at KSC safe and sound Wednesday, May 4. The truck carried 10 large crates and two pallets. From left to right, inset, Bob Oneal, former LDEF project coordinator; Gordon Owsley, LDEF logistics coordinator; and Jim Jones, LDEF experiment manager, bid farewell to their long-time project. Langley's job is complete. LDEF will be uncrated in 1995 and reassembled for display at KSC.**

*Photos by Bill Salyer*

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Researcher News

National Aeronautics and
Space Administration
**Langley Research Center**
Hampton, Virginia 23681-0001

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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Hi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 11 ❖ June 3, 1994

## Langley Leaders Awarded Presidential Honors

BY MARNY SKORA

Center Director Paul F. Holloway was presented his second Distinguished Presidential Rank Award in a special ceremony at the State Department in Washington, D.C., April 14.

Dr. Kristin A. Hessenius, director of the Internal Operations Group (IOG), and Dr. J. D. Lawrence Jr., chief of the Atmospheric Sciences Division, received Meritorious Presidential Rank Awards.

Philip Lader, White House deputy chief of staff, was the featured speaker at the presentation event. "I look at each of you who hold such an unwavering commitment to the success of the federal government and, quite frankly, I'm amazed," said Lader. "I've listened to an abbreviated list of your accomplishments and I'm impressed! I leave here with a heightened understanding of the Senior Executive Corps and a realization of the true role you play in the Federal government."

As Langley Director, Holloway leads the aeronautical and space research programs of the nation's oldest civil aeronautics research laboratory. His experience includes work in hypersonic aerodynamics, boundary layer transition and flow separation, analysis of entry flight mechanics, Earth orbital and planetary space missions and future space technology needs. A member of the original Space Shuttle Task Group, he has been directly involved with the Space Transportation System program and responsible for Langley's extensive development and operational support of the shuttle. Holloway joined the Langley staff in June 1960 as an aerospace engineer.

Paul F. Holloway

Dr. Hessenius came to Langley from NASA Headquarters where she most recently served as deputy associate administrator for Aeronautics. She is a strong proponent of joint and cooperative research with the aeronautical airframe and propulsion manufacturers to ensure relevance of NASA research programs. At Langley, she leads a staff of over 1,600 employees in IOG who run "the city of Langley." Hessenius began her NASA career as a research scientist in computational fluid dynamics at NASA Ames in California.

At Langley, Dr. Lawrence directs an internationally recognized research organization that conducts comprehensive global programs to improve man's understanding of the dynamic processes and chemical cycles in the Earth's atmosphere. He has focused the efforts of his staff on the prime scientific questions of national and international significance — ozone, Earth's radiation balance and clouds, and major geochemical cycles in the lower atmosphere. Lawrence began his NASA career in 1967 as a staff scientist in the Instrument Research Division.

Dr. Kristin A. Hessenius

Dr. J. D. Lawrence Jr.

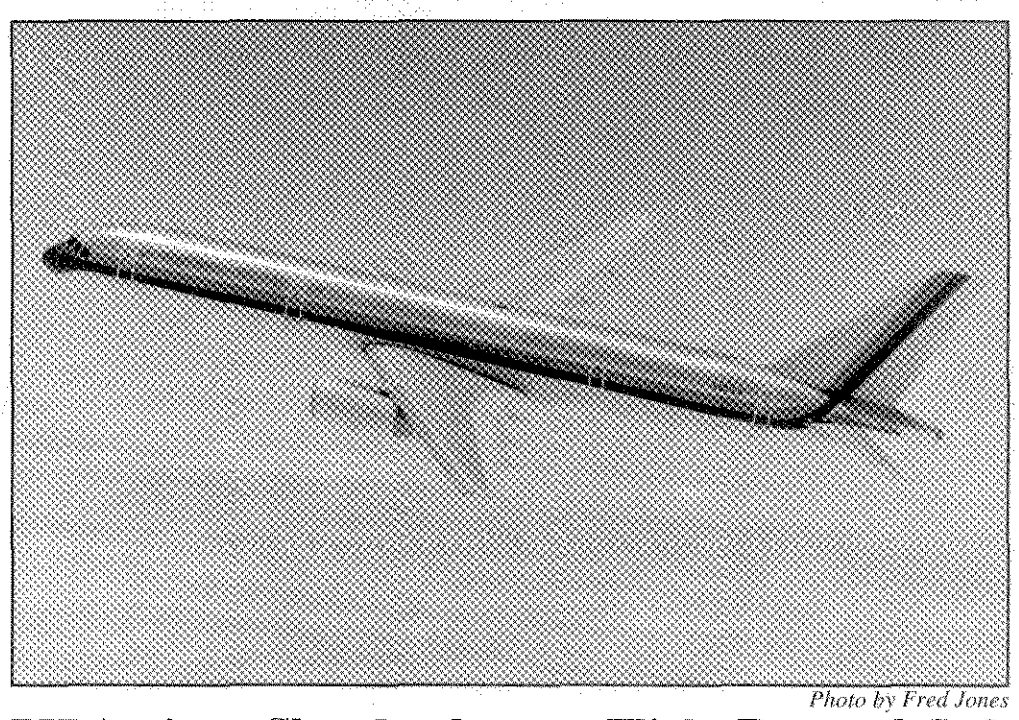


*Photo by Fred Jones*

## 757 Arrives; Slated to be next Flight Research Lab

**The Boeing 757-200 aircraft, recently acquired from the Eastern Airline bankruptcy estate, arrived on Center at 1:06 p.m. EDT May 19. The 757 will be modified extensively for a broad range of flight research programs to benefit the U.S. aviation industry and commercial airline customers.**

**The 757 will continue the work begun by the NASA 737-100 in state-of-the-art technologies like electronic cockpit displays, flight management systems and flight safety devices such as airborne wind shear detection sensors.**

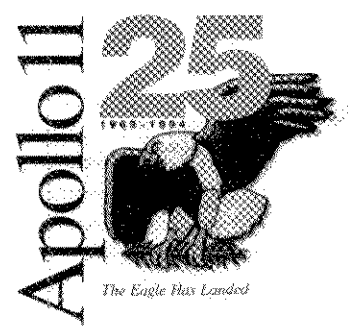
## Apollo Moon Landing Success Rooted at Langley

Today, almost 25 years after the first manned landing on the moon, President John F. Kennedy's commitment to the lunar mission sounds as bold as ever: American astronauts should fly a quarter of a million miles, make a pinpoint landing on a strange planet, blast off and return home safely after an eight-day voyage through space.

When Kennedy challenged the nation to risk this incredible journey, the only United States manned space flight up to that time had been Alan B. Shepard's 15-minute suborbital excursion in the Mercury capsule, Freedom 7. NASA was not exactly sure *how* the lunar mission should be made, nor was the Agency sure it could be achieved in less than ten years' time.

Answering the President's challenge and landing men on the moon by 1969 required the most sudden burst of technological creativity and the largest commitment of resources ever made by any nation in peacetime. At its peak, the Apollo program employed 400,000 Americans and required the support of over 20,000 industrial firms and universities.

Despite the Apollo 11 fanfare many of us remember and which all of us will commemorate this July, the U.S. Space program had truly humble beginnings. Not many Americans know that it was born at Langley.




As early as 1952, Langley researchers explored seriously the possibilities of manned flight into space. Out of these pioneering studies grew the NASA Space Task Group that conceived and directed Project Mercury, our country's original man-in-space program. Langley scientists, engineers and technicians provided much of the knowledge and know-how basic to the development of the Mercury spacecraft and its related systems. Langley employees also helped create the worldwide tracking network that monitored the first space shots. Furthermore, it was at Langley where the original team of NASA astronauts received their basic training.

Project Mercury was pure pioneering and put the first American in space. Later Project Gemini accomplished the first orbital rendezvous and docking and the first spacewalk. All of this prepared the way for Project Apollo during which the first humans left Earth orbit.

Subsequent issues of the *Researcher News* will outline Langley contributions to the exciting Apollo Program. Included in the series will be highlights on:

- the method chosen to get man to the moon: lunar orbit rendezvous
- the method designed to practice the linking of the Lunar Excursion Module (LEM) and the Command Module: rendezvous and docking
- the facility developed to simulate moon landings: lunar landing research facility
- the selection of the sites of the Apollo landings: lunar orbiter project

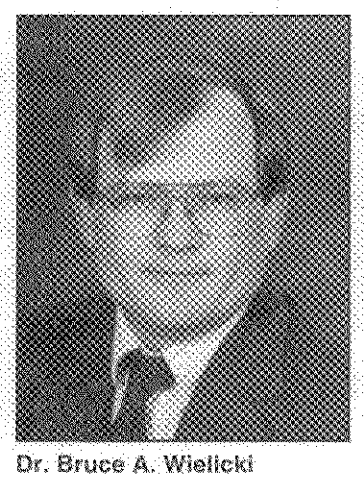
Half of Apollo's primary goal —landing on the moon— was achieved at 4:17 p.m. EDT on July 20, 1969, when Neil Armstrong piloted the "Eagle" to a touchdown on the lunar surface with less than 30 seconds' worth of fuel left in the LEM. That's how the drama is recorded in history, and it all started here.

# News Briefs

## Around the Agency

**HUBBLE TEAM RECEIVES COLLIER TROPHY:** The NASA Hubble Space Telescope Recovery Team received the 1993 Robert J. Collier Trophy from the National Aeronautic Association May 6. The citation honored the team "for outstanding leadership, intrepidity and the renewal of public faith in America's space program by the successful orbital recovery and repair of the Hubble Space Telescope." The Collier Trophy is widely considered the most prestigious aeronautical award in America.

Dr. Ira G. Nolt



Dr. Bruce A. Wielicki

# Fellowship Winners to Focus on Atmospheric Sciences Research

BY CRAIG MURDEN

Langley's atmospheric sciences research initiatives will get two-pronged benefits from this year's Thompson Fellowship winners.

Drs. Ira G. Nolt and Bruce A. Wielicki have been selected for these prestigious awards. The fellowships allow Langley researchers, who have shown continued growth, to spend time at off-Center educational or research institutions. The awards are named in memory of Dr. Floyd L. Thompson who was the Center's director from 1960 to 1968.

Nolt will begin his work in October at Queen Mary and Westfield College, London, England where he will participate in the Second European Stratospheric Arctic and Mid-latitude Experiment (SESAME). He has been one of Langley's leaders in the application of infrared sensor technology to atmospheric measurements and will continue that effort employing the Spectroscopy of the Atmosphere using Far Infrared Emission/Airborne (SAFIRE/A) instrument to study the role of the hydrogen cycle in Arctic ozone loss.

Nolt said, "The experience will contribute critical expertise to SESAME, advance my career goals and provide a first-hand evaluation of this new far infrared technology for future applications to NASA initiatives in atmospheric science." Langley's technology development has played a key role in SESAME which is the largest international study of polar ozone loss.

Nolt, an aerospace engineer in the Internal Operations Group, holds a doctorate in experimental physics from Cornell University and is the project manager and principal investigator for the Infrared Balloon Experiment.

Wielicki will embark on three activities when he reaches Colorado State University (CSU) in June. First, he will assess the feasibility of using radar and microwave radiometers for examining cloud properties from space. Second, Langley-derived data from the LANDSAT space platform will be compared to theoretical cloud models developed at CSU. Third, he will write two research papers on atmospheric science projects: the Clouds and Earth's Radiant Energy Systems (CERES) and the First ISCCP Regional Experiment (FIRE).

"These activities will explore new Langley-led satellite instrument concepts and improve the ability to remotely sense multi-layered cloud observations. Langley's contribution to global change science through study of the role of clouds in climate will be enhanced as will my skills in leading the Langley CERES team," he said. CERES is Langley's largest contribution to the U.S. Global Change Research Program.

Wielicki is the principal investigator for both CERES and FIRE. He is an aerospace technologist in the Space and Atmospherics Sciences Program Group and has a doctorate in physical oceanography from the Scripps Institution of Oceanography.

## Letters

### Thank You for the Retirement Party

**Ralph J. Muraca** writes: THANK YOU!! I want to express my thanks to all of my friends and co-workers for making the end of my career at Langley Research Center such a memorable occasion. Your warm and gracious comments and good wishes for my retirement meant a great deal to me. I'm really enjoying my retirement gifts and the photo albums and other mementos. I especially want to acknowledge the time and effort Joann Belsches, Harriett Coombs, John Cox, and Bill Fernald spent organizing the program. Finally, I want to thank the folks at the Reid Center for the outstanding job they did. Good luck to each of you as Langley completes its transition to the new organization."

**Barbara Pitts** writes: "I thank each of my friends who attended my retirement reception and contributed to my gift. You have helped make my 29 years at NASA Langley an enjoyable time."

**Steve Devan** writes: "I want to thank each of you for taking the time to sign my retirement album, coming by the office to visit at the retirement reception held in my honor, for all the interesting refrigerator magnets I received, and for all the beautiful and memorable retirement gifts. My service at NACA/NASA Langley and my association with you were transformed into a wonderful and memorable career. I was privileged to be a member of the great NASA team. To each of you I say—keep up the good work, thanks for a wonderful send-off and I'll see you at the Virginia Air and Space Center. Let's keep the Dream alive!"

*Mark your calendar:*
**Apollo Open House**
*Saturday July 16*
*Invite your family, friends and neighbors.*

Col. George Doersch

# *Fighter Ace to Speak at Colloquium*

BY CRAIG MURDEN

A World War II fighter ace who went on to a variety of Cold War military and civilian jobs is the June colloquium speaker.

Col. George Doersch will present "Air Power Changes From WW II to the Present" at the H.J.E. Reid Conference Center event at 2 p.m., Tuesday, June 14.

Doersch flew both the Republic P-47 Thunderbolt and the North American P-51 Mustang fighters from English bases during two combat tours between 1943 and the war's end. He is credited with 10-1/2 aerial kills. Doersch will relate his experiences in the development and application of air power during a career that spanned WW II propeller-driven fighters and bombers, SAC jet bombers, ballistic missiles, cruise missiles, Pentagon duty, spooky space ballistic missile intercepts and modern guided missiles.

Following his fighter experience, Doersch participated in manned nuclear weapon delivery systems. As the Cold War deepened, he was involved in planning the deployment of Jupiter ballistic missiles to Italy and Turkey and, later, was in command of a German-based nuclear-tipped MACE missile squadron at the time of the Berlin Wall construction.

During the 1960s he was assigned to the Pentagon advocating and deploying conventional weapons for the Viet Nam conflict and then to a classified program at Vandenberg Air Force Base before his retirement as a Colonel in 1967.

He joined the Hughes Aircraft Company later that year as a project engineer in the firm's Missile Systems Group where he was active in several air-to-air and air-to-ground missile guidance system development efforts. These projects included radar, infrared and anti-radiation technologies. He concluded his Hughes career as the Omaha district marketing manager in 1989.

A farm boy from Seymour, Wisc., he was in the National Guard when called to active duty in 1940 where he rose to senior noncommissioned rank. When the war started in 1941, he applied for Aviation Cadets and earned his pilot wings in 1943. He was then assigned to a fighter unit later that year which was sent to England for bomber escort duty, beginning his long and varied career.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# Creedon Discusses Focus of Langley's Aeronautics Program Group

*Dr. Jeremiah F. Creedon was named director of Langley's Aeronautics Program Group when the Center's new organization was announced.*

*The **Researcher News**, in this fourth in a series of interviews with Center leaders, asked Creedon to comment on his group, his vision for the group and the reaction of customers to the newly formed group. Here are his comments.*

***RN: Please talk about the structure of the Aeronautics Program Group.***

***JC:*** The Aeronautics Program Group (APG) has three primary components. The first is the Aeronautics Systems Analysis Division (ASAD). This division conducts aircraft performance and design studies to help identify future research activities at Langley. They also perform vehicle performance studies for specific research programs, such as High-Speed Research.

The second component consists of thrust offices for aircraft vehicle classes. There is a Subsonic Transportation Office that contains program managers for Rotorcraft and for elements of the Advanced Subsonic Technology program. There is a High-Performance and High-Speed Aircraft Office and a Computing and Critical Disciplines Office. In the future, we may have a Hypersonics Office, although, for the moment, hypersonics is handled in the Hypersonics Technology Office led by Lana Couch.

Finally, we have the Resource Support Group which supports all parts of the Aeronautics Program outside ASAD. This structure allows us to streamline the numbers of personnel needed and become more efficient in our operation.

By using a vehicle class structure, we will be organized along the same vehicle classes as Headquarters and most of the aeronautics industry. This will facilitate our interactions with external organizations.

***RN: What is your vision for the Aeronautics Program Group?***

***JC:*** My vision for the Aeronautics Program Group is that we will work as a team with the other groups at the Center to create a balanced program at Langley that addresses the highest payoff customer needs in aeronautics and consistently delivers technologies that our customers use in their activities and in their products. Our aeronautics vision has been to be the world leader in innovative technologies that contribute to the U.S. preeminence in Aeronautics. That hasn't changed. We have reorganized to be better able to realize this vision in the presence of a changing external environment.

We will determine advanced vehicle types and technology requirements for these vehicles from ASAD studies. Then the Research and Technology Group (RTG) and the Internal Operations Group (IOG) will identify what opportunities might be achievable in the disciplines and multi-disciplinary activities. Next, each vehicle thrust manager will lead Langley's interface with counterparts in industry to try to put together an integrated list of the kinds of things that industry really needs from a technology program at a research organization like Langley.

Finally, each thrust leader will design a strategic plan for their thrusts that will evolve as part of an overall Center and Agency strategic plan. That way, we will have work going on that is integrated with Ames, Lewis and Dryden as well as industry and universities. Finally, we can use the Agency-wide strategic plan as a tool to achieve another vision I have. That is a Langley that is neither under nor over committed. To get to that point, we are going to have to do a better job of balancing the jobs that we take on with the resources, especially people, that we have.

***RN: What are the major challenges APG faces?***

**Dr. Jeremiah F. Creedon**

***JC:*** We are in a time of budget volatility, and we are getting some pressure to do more programs with less institution. We will have to work closely with RTG and IOG to accomplish that. I really want to see if we can achieve, through budget adjustment exercises, an even greater sense of teamwork at Langley than we have already. That is going to be a challenge and it will be a difficult one, but I look forward to meeting that challenge.

We need to identify and formulate an integrated idea of what our customers want, but we also need a good set of well thought-out plans that outline how we are going to achieve these goals. Part of the job of APG is to interface with Headquarters and our customers to form an integrated set of goals. We will interact with Headquarters to find out what resources are available and will present reports of our progress to both Headquarters and our funders.

If this new organization is going to work as intended, there is going to have to be a division of labor that is different from the division of labor we have had before. It is going to require not only a lot of teamwork but also a lot of trust between organizations. If we don't have both the teamwork and the trust – if everybody ends up going to all the same meetings seeking to be in on and reviewing every decision, etc. – then we will end up being less efficient than before we began the reorganization process. We can and we will realize the desired benefits of this new organization through better teamwork and through trust.

***RN: What has been the external customer response to your organization?***

***JC:*** I can't think of a single time when an organization as large as Langley has made as fundamental a change as we have made on as voluntary a basis. This is really quite remarkable. The feedback I've gotten has been overwhelmingly positive.

Langley is very much recognized by NASA Headquarters as being out in front in seeing the need for change and implementing that change. Langley has served as a leader for change not only for the rest of NASA but for industry.

Feedback from our customers has also been positive, if more cautious. I think we need to do more to let our customers know how and why we reorganized. We can't ask our customers to understand immediately and in-depth how Langley works. We must go to them and explain our organizational concept. If, for some reason, the customer contacts the wrong person in seeking a response or decision, that is more appropriately made by some other part of Langley, we must redirect the contact ourselves so we can make it easy for our customers.

All in all, the external response to the reorganization has been very positive and I haven't heard any complaints from our customers.

***RN: Do you have any other thoughts you'd like to leave with our readers?***

***JC:*** The new organization has been a fundamental change for Langley. I think, whether we agree that this is the right organization or not, we must realize that Paul (Holloway) and the Center Redesign Team had something in mind when they started to reorganize the Center. The goal was to do things more efficiently, present more clearly defined decision-making processes, and achieve as many of the desired organizational concepts we identified as possible.

As I said before, the reorganization was done voluntarily, but with the full recognition that the conditions in which Langley is operating have changed dramatically. There is going to be increasing pressure to downsize the number and change the roles of all the government labs. We are undergoing these fundamental changes to adjust to this different situation in which the Center finds itself.

While the stakes are high and the pressures to reduce both the work force and the institution make the parameters under which we must work difficult, Langley has, as Gen. Dailey pointed out in his visit in April, everything it needs to make this transition. We have intelligent people, excellent facilities, the right programs and the right attitude toward transitioning our technology to users. We have everything we need to make the transition into the present environment and still realize our vision.

## Toastmasters Vice President to Speak at Federal Womens Program

In this rapidly changing world, certainty of self is one quality that can sustain us in both our professional and personal lives. Self-confidence and self esteem, however, are very elusive traits. These attributes are certainly keys to our personal success and can be learned and earned through self development.

Pauline Shirley, senior vice president of Toastmasters International, will discuss "Certainty of Self" at a special Federal Women's Program, Thursday, June 9, from 1-3 p.m. in the H.J.E. Reid Conference Center.

In her presentation, Shirley said she "encourages and motivates you to take your future into your own hands and undertake an evolution of self."

As senior vice president, Shirley is the second-ranked officer of the educational, nonprofit organization that teaches its members public speaking and leadership skills. She was elected to the one-year volunteer office by delegates from Toastmaster clubs throughout the world.

A dedicated Toastmaster for 12 years, Shirley has held leadership positions within Toastmasters ranging from club president to international director. She is executive manager at the Sherman R. Smoot Corporation , Washington, D.C.

## Massenberg to Speak at Luncheon

Dr. Samuel Massenberg, head of Office of Education, will be the luncheon speaker for the Hampton Roads Section of Women In Aerospace business meeting Tuesday, June 7, 12:30 to 1:30 p.m. in the new section of the cafeteria.

During his presentation, Massenberg will give an overview of the educational programs sponsored by Langley and describe how Langley employees can participate in these educational outreach programs. Massenberg will also show the videotape *Mission Earth Bound*.

All employees are invited. For more information, call Donna Roper at ext. 42505.

# Happenings

**RETIREMENT PARTY:** For Jerry Elliott on Monday, June 13, at the Fort Monroe Officers' Club. Social hour begins at 6 p.m. with a buffet dinner at 7 p.m. Cost is $16 per person (includes gift). For reservations call Tracy Jones at ext. 44004, Mail Stop 489. Gift only contributions accepted.

**RETIREMENT PARTY:** A luncheon for Dorothy T. Howell will held June 17 at the H.J.E. Reid Conference Center. A social will begin at 11 a.m. and a deli luncheon will be served at 11:30 a.m. Cost is $9 per person and includes the gift. For reservations or gift contributions, contact David. Shaw at ext. 45950 or Carolyn Watson at ext. 45574, Mail Stop 413, by June 10.

**FOR SALE: 1991** Suzuki DR 3505 street/trail motorcycle w/street and dirt tires, helmet, tie-downs. Mint condition, less than 250 miles, $2,300. Call 890-0409.

**FOR SALE:** 1981 Yamaha 185 motorcycle, low miles, mint condition, $300 or best offer. Call 722-1124.

**HOUSE FOR RENT:** Rancher on cul-de-sac in Riverdale; 3 BR, 2 Baths, large living room, dining room, den w/fireplace, eat-in kitchen, all appliances; attached garage with washer/dryer hook-up. No pets; 5 min. to Langley. $850/month plus deposit. Call 826-7638.

**PASSES AVAILABLE:** Causeway passes are available for the STS-65 shuttle launch, currently scheduled for July 8. If you plan to be in Florida and would like to witness the launch, contact Olin Jarrett, Office of Public Services, for a pass. Call ext. 46320 or communicate by E-mail o.jarrett@larc.nasa.gov.

**RETIREMENT PARTY:** Friends of John W. Oakley are invited to a party in his honor, Monday, June 27 at the Langley Officers Club, Williamsburg room. Social hour begins at 6 p.m., with wet bar available; dinner at 7 p.m. Cost per person, chicken almondine, $15; roast prime rib, $18, includes gift. For reservations, call Thomas Despett or William Conkling at ext. 44202, Mail Stop 484, by June 20. Gift only contributions are welcome.

**FWPC AWARDS NOMINATIONS:** All employees are encouraged to participate in the Federal Women's Program Committee (FWPC) award call to recognize employees' contributions to furthering the employment and advancement of women in the workplace. There are two categories: Employee of the Year and Supervisor of the Year. Nomination forms can be obtained by contacting your group FWPC representative or Patsy Campbell, at ext. 43291. Nominations are due to Campbell by June 10 at Mail Stop 178.

**RETIREMENT DINNER** for Robert Keynton will be held Monday, June 13, 6-8:30 p.m. at the H.J.E. Reid Conference Center. There will be an open bar and buffet. Cost per person is $14.50 and $28 for couples. For reservations or gift donations, contact Alberta Reid at ext. 45386, Mail Stop 423.

**RIDE NEEDED** from Forest Lake Apts. to NASA and back from 6/6 to 8/12. Will pay expenses. Call Buddy Poe at ext. 43467.

## Tests Seen as Step Toward Quieter Helicopter Blades

BY H. KEITH HENRY

Converting a small area of a helicopter main rotor blade into a controllable flap may prove to be an important step toward greatly reducing the irritating noise known as "blade slap."

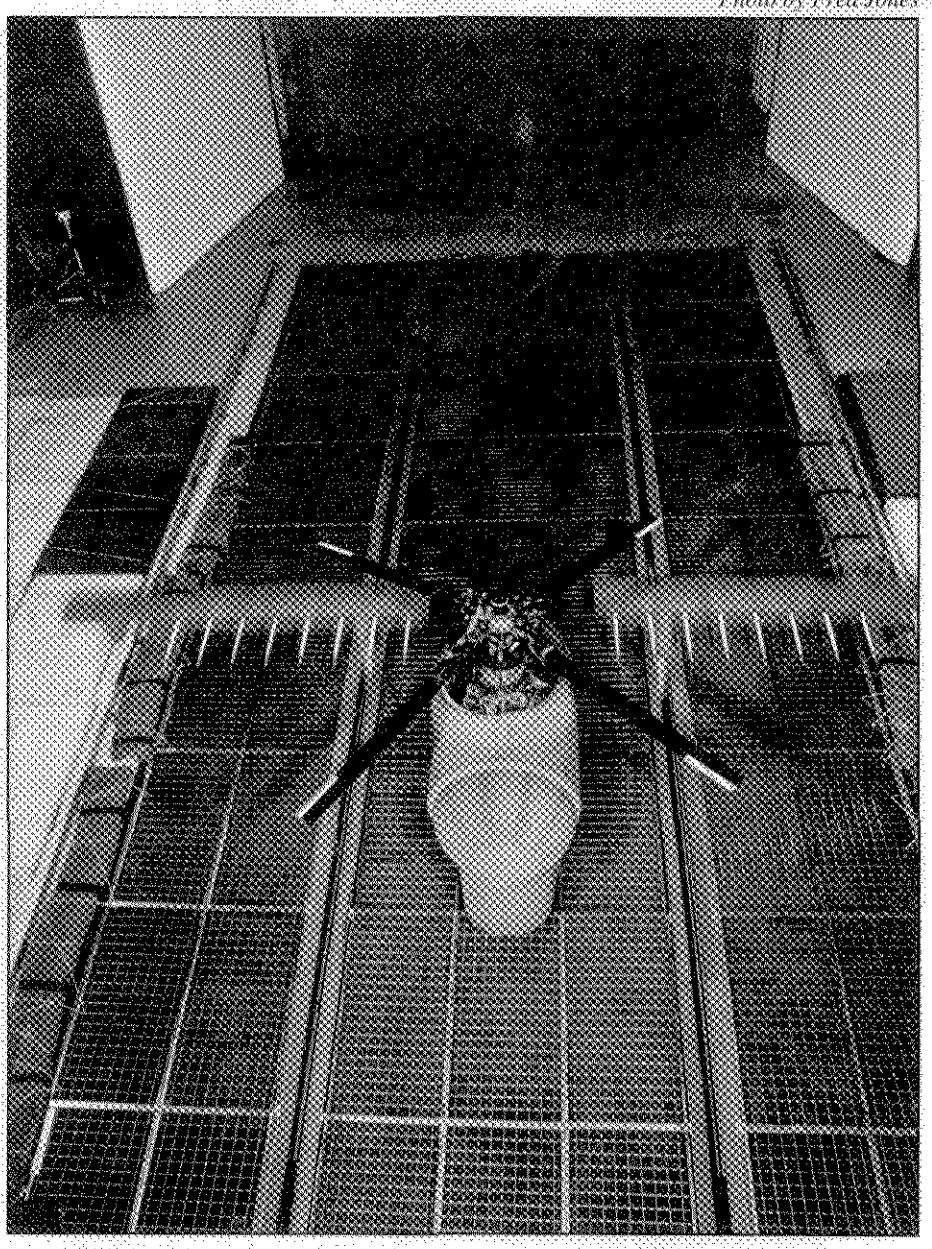
Tests conducted jointly by NASA, McDonnell Douglas and the U.S. Army indicate reductions in blade slap of four decibels in certain flight conditions using the concept. That translates to a reduction of 40 percent in the strength of the sound from blade slap. These results were obtained while simulating a helicopter flying through its own air turbulence during descent or landing, the time when blade slap is the loudest and when the helicopter is closest to people on the ground.

The McDonnell Douglas Helicopter Systems (MDHS) concept—called active flap control—was tested in a wind tunnel here. The specially built rotor model and test stand were designed and constructed by the MDHS facility at Mesa, Ariz. The Army Joint Research Program Office at Langley teamed with the Center because of an interest in exploring performance benefits using the flap control concept.

Costs for the $2 million project are approximately split between Langley and MDHS. For the tests, the model was fitted with flaps on the outer 20 percent of each blade trailing edge. The flaps were actively controlled in an attempt to limit the blade slap's sound. On either side of the model was an array of microphones that moved up and down the wind tunnel test section, mapping the noise "footprint" under the blades. To improve the quality of data gathered, the walls, ceiling and floor of the 14- x 22-Foot Subsonic Tunnel were treated with special acoustic foam.

By varying test conditions, researchers were able to take data on use of the flaps for vibration control and for increased aerodynamic performance. These results are still being analyzed.

*Photo by Fred Jones*



**THE LESS "THWAP-THWAP" THE BETTER. A promising concept for reducing helicopter blade noise is being investigated at Langley. This rotor test model is fitted with flaps on the outer 20 percent of each blade. The flaps are actively controlled in an attempt to limit the irritating slap sound heard on the ground.**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Researcher News

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National Aeronautics and Space Administration
Langley Research Center

Apollo 11 25 1969-1994 The Eagle Has Landed

# Langley Researcher News

Biweekly Employee and Contractor Publication

Volume 8 ◆ Issue 12 ◆ June 17, 1994

## Langley Trained Astronauts for Lunar Landing

*"Now is the time for this nation to take a clearly leading role in space achievement, which in many ways may hold the key to our future on Earth."*

These words, spoken by President John F. Kennedy in May 1961, are as timely now as they were then.

His charge to the Congress and the people of the United States was to land American explorers on the moon and return them safely to Earth. This would not only achieve United States' preeminence in space but would also establish the technology required to meet other national interests in space.

". . . this is not merely a race," Kennedy said. "Space is open to us now, and our eagerness to share its meaning is not governed by the efforts of others. We go into space because whatever mankind must undertake, free men must share fully."

### Tackling the Challenge of Lunar Landing

Among the challenges that lay ahead for U.S. scientists and engineers was to design, construct and test a vehicle that could achieve a successful lunar landing. To help solve this part of the overall problem of a lunar-orbit rendezvous, Langley engineers constructed the Lunar Landing Research Facility.

This facility was needed to explore and develop techniques for landing a rocket-powered lunar excursion module (LEM) on the moon's surface where the gravity is only one-sixth as strong as on Earth. Researchers also needed to determine the limits of human piloting capabilities in the unknown flight medium, the moon.

In the early 1960s, Langley personnel used helicopters to ascertain some of the difficulties of a vertical descent to a lunar landing but found that there were no direct parallels between flying an aircraft in Earth's atmosphere and piloting the LEM in the vacuum of space.

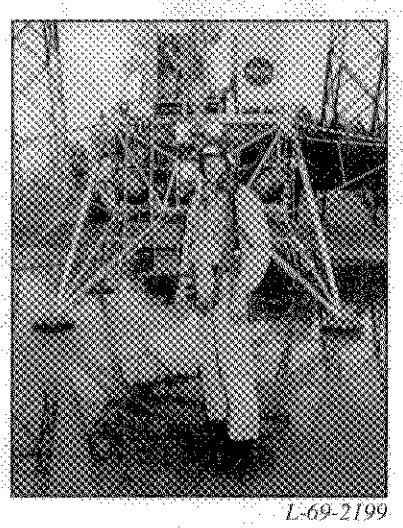
Langley researchers played a leading role in the original concepts behind the Lunar Excursion Module and they knew they faced some unique challenges in designing a successful LEM, one that could land and, perhaps, travel on the moon's surface.

### Building, then Training

Langley's Lunar Landing Research Facility was completed in 1965. It helped prepare the Apollo astronauts for the final 150 feet of their landing mission by simulating both the lunar gravity and full-scale LEM vehicle dynamics. The builders of the facility effectively canceled all but one-sixth of Earth's gravitational force by using an overhead, partial-suspension system. The system provided a lifting force by means of cables acting through the LEM's center of gravity.

The base of the facility was modeled with fill dirt to resemble the surface of the moon and 24 astronauts practiced lunar landings here. Both Neil Armstrong and Buzz Aldrin trained here for many hours before the lift-off of Apollo 11 in July 1969. The successful landing of the first men on the moon relied heavily on the expert training in ground equipment like Langley's Lunar Landing Research Facility.

The Lunar Landing Research Facility is just one of the many Langley contributions to the successful development of the Apollo 11 moon landing that will be celebrated in July.



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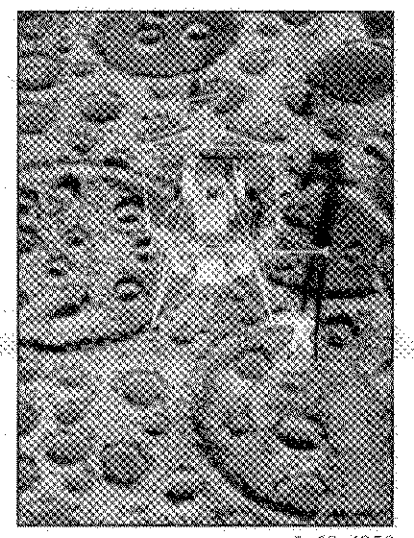
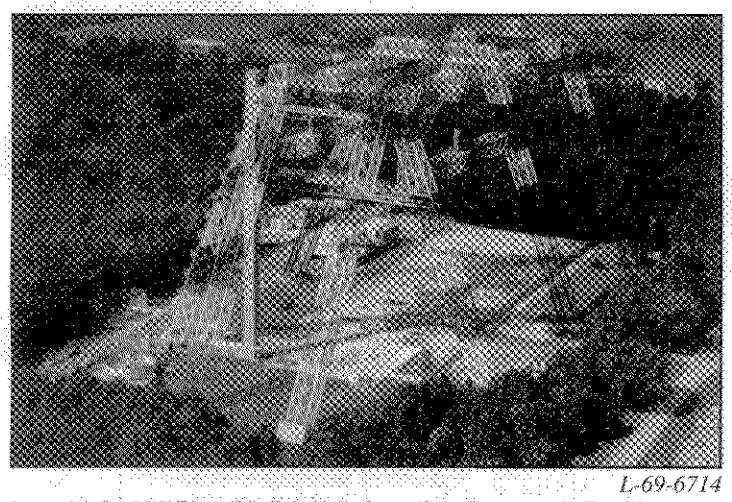
**Astronaut Neil Armstrong, suited up to train on the simulated moon surface at Langley, was the first man to walk on the moon.**



L-69-4850

**The Lunar Excursion Module Simulator at Langley's Lunar Landing Research Facility enabled astronauts to practice landing on the lunar surface. It gave Apollo astronauts a chance to study and safely overcome problems that could occur during the last 150-foot descent to the moon's surface.**



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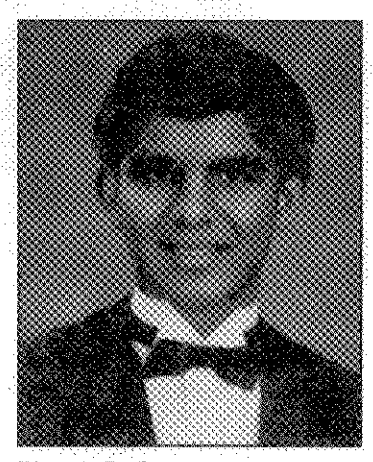
**Langley's 250-foot-high Lunar Landing Research Facility, with its simulated lunar surface, now a National Historic Landmark, was the site where Apollo astronauts perfected their piloting and moon walking techniques.**

## Gupta Wins NASA Scholarship

Piyush R. Gupta, son of Dr. Roop N. Gupta, Space Systems Division, was awarded a scholarship by the 1994 NASA College Scholarship Fund, Inc. Gupta is one of 25 students awarded scholarships honoring the Hubble astronauts and commemorating the 25th anniversary of the first lunar landing.



**Piyush R. Gupta**

Gupta graduated from Tabb High School this month, ranking number one out of 337 students and scoring 1370 on the Scholastic Aptitude Test. He was accepted as an Echols Scholar at the University of Virginia (UVA) and will enter UVA as a second year student this fall to pursue his career in medicine.

Gupta's accomplishments include being named a Virginia Scholar; selected by the Council of Higher Education in Virginia; selected for the Virginia Governor's School in Science for the gifted; awarded Most Outstanding Tennis Player and State Finals Medal; awarded a gold medal at the National Latin Exam; selected to participate in the Mentorship Program at Riverside Hospital; and chosen to receive certificates of excellence for two Science Fair projects.

He was the captain of the Tabb High School Tennis Team; president of the Academic Challenge for three years; vice president of the Key Club for three years; treasurer of the National Honor Society for two years; and a member of the Model United Nations, French Club, Latin Club, History Club, and Virginia Math League.

In addition to his many academic activities, Gupta significantly contributed to community affairs by serving as a volunteer at Riverside Hospital and in their blood drive. He also did volunteer work for the Special Olympics, Adopt-A-Highway cleanup project, and the local convalescent center.

Dr. Gupta said of his son, "We are proud of his many accomplishments and are pleased that NASA has honored him with this scholarship."

The NASA College Scholarship Fund, Inc., established in 1982, was endowed by Pulitzer Prize-winning author James A. Michener and again endowed in 1991 by a substantial gift from Mr. and Mrs. Michener. This past February, a substantial contribution was made to the fund by the Freedom Foundation. The gift was given in recognition of the 25th Anniversary of Apollo and the outstanding success of the Hubble Space Telescope servicing mission. The fund also receives contributions from agency employees through the Combined Federal Campaign.

## New Book Highlights High-Flying Tech Transfer

**BY ALLISON BALLEW**

A new, picture-packed book has joined the ranks of the prestigious "NASA History Series." It is the first publication devoted completely to aeronautics.

In *Airborne Trailblazer: Two Decades with NASA Langley's 737 Flying Laboratory*, author Lane Wallace not only tells the history behind this able-bodied research plane, but also explores the creative methods of technology transfer which the 737 made possible during its 20-year career at Langley.

There are several "technology transfer myths" which the author puts to rest -- including the idea that industry automatically "gobbles up" new technology as soon as it is received; that a "better mousetrap" is self-evident and doesn't need setting; that "exciting and valid" technology will "automatically" be used.

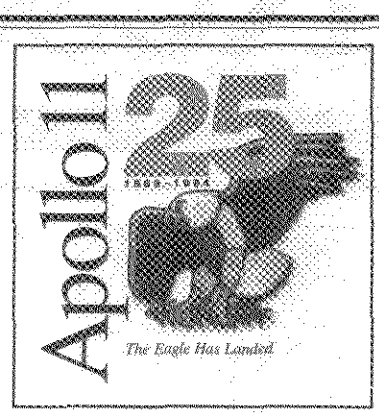
*Photo by Carole Chapman*

**Lane Wallace, author of *Airborne Trailblazer*, poses on the steps leading to the 737 aircraft, the subject of her book.**

*Continued on Page 4*

# News Briefs

## Open House Volunteers Needed




**To ensure success of Langley's Open House commemorating the 25th anniversary of Apollo 11, volunteers are needed to work at the gates, parking areas, command center, etc. If you are willing to volunteer your time for the event on Saturday, July 16, please contact Nellie Freeman at ext. 42056.**

### Announcements

## Retirement Luncheon

Friends and associates of **Mickey Rowe** are invited to a luncheon in his honor on Wednesday, June 29 at 11:30 a.m. in the H.J.E. Reid Conference Center. Cost is $7 per person and includes a gift. For reservations and/or gift contributions, contact Donna Speller, ext. 46636, Lee Lillard, ext. 47301, or Janet Nagele, ext. 46632, Mail Stop 157, by June 22.

## Retirement Social

A social will be held for **Frank D. Wiggs** in the H.J.E. Reid Conference Center's Langley Room, Tuesday, July 12, from 5-6:30 p.m. The cost is $7 per person, which includes heavy hors d'oeuvres and a gift contribution. A cash bar will be available. Contributions for gifts only are welcome. Send checks payable to Jeanne Covington, ext. 42545, Mail Stop 127, or Karen Smith, ext. 42456, Mail Stop 144, by July 1.

## Retirement Party

A party for **Joseph B. Davenport Jr.** will be held on Thursday, June 23, from 1-3 p.m. in the Building 1232A conference room. Gift contributions are requested. Send money or check payable to Nadine E. McHatton, ext. 44561, Mail Stop 399.

## Retirement Party

Friends and associates of **Ray Hook** are invited to a retirement social in his honor, Friday, June 24, in the H.J.E. Reid Conference Center from 5-7:30 p.m. Cost is $12 per person. For reservations, call Gin Marks, ext. 41714, Mail Stop 479. Gift contributions gladly accepted.

## Retirement/Going-Away Picnic

A picnic for **Claude R.Watts Jr.** and **Patricia M. Watts**, will be held on Friday, July 1, from 4-6 p.m. at the H.J.E. Reid Picnic Ground #1. Cost is $6 per person and includes food, drinks, music and gifts. Gift only contributions are welcome. Mail checks to Dollie McCown, ext. 43561, Mail Stop 381, or Sylvia Charity, ext. 42055, Mail Stop 377, by June 27. Call for more information.

## Retirement Notice

**Pete Stack** invites his friends and colleagues to an informal reception on Wednesday, July 13, 5-7 p.m. at the H.J.E. Reid Conference Center to help celebrate his retirement. If you plan to attend or for more information, contact Linda Sutherland, ext. 43640/l.w.sutherland@larc.nasa.gov, or Sharon Stack, ext. 43742/s.h.stack@larc.nasa.gov

## Special thanks to all blood donors

From the Office of Occupational Health Services and the Red Cross: "We wish to thank all blood donors for the fantastic blood drive on May 25! We exceeded our goal of 300 productive blood pints by providing 349 pints for use in the community. We appreciate your extra effort in response to the Red Cross' critical need, and hope to see you at Langley's bloodmobiles on July 27, September 28 and November 23."

## *Music Man* in Poquoson

The Poquoson Island players are presenting the *Music Man* at Poquoson Middle School June 17, 18, 19 (matinee), 23, 24, 25. Reserved tickets are $6; $7 at the door. Call 867-7477 for reservations and information.

### Letters

## Thank You from . . .

**From Cary Spitzer:** "My family and I want to thank each of you who were a part of my retirement celebration on May 18. Actually, "transition celebration" would be a better choice of words. The stunt kite should be great to fly. I will treasure forever the friendship of my many Langley colleagues. Godspeed."

**From Louise Sykes:** "Thank you to all my co-workers and friends for the phone calls, cards, flowers and plants that came in during my recovery from kidney transplant surgery. I appreciate working at NASA and you have all been like a family in my time of need. I'll see you all this summer."

**From Ashby Lawson:** "Thank you for the wonderful retirement party that you gave me. You really made me feel special. It was great seeing everyone again. I want to thank everyone for an outstanding 36-1/2 years at NASA. The time spent working with all of you were the greatest years of my life. There is not enough space to list all the people at NASA who touched my life. I am lucky to have worked with such outstanding people. Thanks for your love and support, and for making my career such a memorable one. I love you."

**From Joyce Fly:** "My family and I would like to thank all who, in any way, took part in my retirement send off. Your generosity and friendship overwhelms us. Thanks to all of the Payroll Section for a lovely surprise luncheon. Thanks to FMD and friends for a wonderful dinner party and beautiful gifts. Leaving such a prestigious Agency after 20 years fills me with nostalgia and appreciation. Change is exciting, but I shall truly miss everyone at NASA."

## *Helping Companies Develop Tomorrow's Technology Today*

BY MIKE SCOTT

In today's competitive marketplace it is paramount that NASA contribute to the fabric of U.S. industry *beyond* its direct aerospace missions. Technology is the engine powering the national economic base through the decade of the 1990s and into the 21st century. The mission of Langley's Technology Applications Group (TAG) is to foster Langley interaction with industry at the state, regional and national levels. Although, there are many facets to this interaction, one important element is to strengthen working relationships with state, regional and national centers who have had a historical tie with businesses and industry in their respective regions.

### TAG opens its doors

To foster better communication with these resources, the TAG staff met on June 9 and 10 with one such state center, the Center for Innovative Technology (CIT), located in Herndon, Va. Mike Miller, general manager of Virginia's CIT, is excited about Langley's emphasis on moving technology out of the laboratory. He said, "Langley is an asset for Virginia with the potential to transfer many new technologies to businesses throughout the Commonwealth."

TAG staff members also met at Langley on June 2, with the National Technology Transfer Center (NTTC) located in Wheeling, W.Va. Joseph Allen, director of Training and Economic Development for the National Center, said, "The new leadership at NASA Langley makes this facility a model that NTTC would like to share with all other federal laboratories." Also, on June 29 and 30, the Regional Technology Transfer Center (RTTC), located in New England and, on July 18-19, the Pittsburgh-based Mid-Atlantic RTTC will send representatives to visit TAG at Langley.

### TAG: Link to the Future

TAG will continue to form links with Langley researchers and Virginia's resources, as well as regional and national businesses, to help companies develop tomorrow's technology today. Dr. Joseph Heyman, acting director for TAG, has waited for 20 years to see a team like TAG formed on Center. He said, "Langley Research Center is an important resource for U.S. industry, representing broad enabling capabilities/facilities impacting U.S. competitiveness. Our job includes working with industry to commercialize NASA technology and developing partnerships with appropriate companies to enhance their capabilities while strengthening our own."

### In Memoriam

## Roy Steiner

Roy Steiner, a resident of Colton, Wash., died in December 1993. Steiner began working for NACA in 1941 and retired as an engineer from Langley in 1974.

Steiner worked on the Thunderstorm Project which studied the effects of storms on airplane configurations, and served on the supersonic transport evaluation team.

## Snowden Mills Jr.

Snowden C. "Dick" Mills Jr., 63, of Grafton, died Thursday, May 5. Mills retired from NASA Langley in 1990.

## Carl G. Baab

Carl G. Baab, 79, died Sunday, May 22. A native of Wilkes-Barre, Pa., he was a Newport News resident for more than 50 years.

Baab worked for NACA where he was associated with its initial space programs. He retired from NASA after 42 years of service. He was a member of the Virginia Peninsula Engineers Club.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor . . . . . Marny Skora

Editor . . . . . Ann C. Gaudreaux, The Bionetics Corp.

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Photojournalist . . Carole Petrachenko Chapman, The Bionetics Corp.

Photographer . . . . . Fred Jones

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.

# Institutional Management System Will Coordinate Center's Facilities

The Imaging and Computer Aided Design and Drafting (CADD) Technology team of the Electrical Electronic Systems Branch has coordinated aerial photography for the Center, Langley Air Force Base (LAFB) and Plum Tree Island compound, emphasizing NASA's west area, to support development of a Geographic Information System (GIS) for Langley. The project yielded negatives and prints that have been turned into digital maps for the whole Center.

An initial goal of the photography was to provide a visual standard for Langley's Automated Master Plan and Facilities Engineering Division's (FENGD) civil engineering projects with short term benefits to environmental and historical programs.

But GIS is only a part of a larger picture to form an Institutional Management System (IMS) for Langley. A Quality Action Team sponsored by Bob Wingate, deputy director of the Internal Operations Group, was charged with coordinating all institutionally related information on Center into one highly accurate and detailed database. A prioritized plan for using GIS was the result.

### *What's a GIS?*

GIS is an integrated system of computer hardware, software and trained personnel linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced. The resulting system will provide a database to help the decision-making process in areas such as planning, design, maintenance, repair, safety/emergency response, environmental and other institutional information.

GIS information, which has many applications, is also used by LAFB's civil engineering group and the surrounding communities. They, in turn, can use the data to generate information, for example, on the local environment, land use, defense and reduction of duplication of efforts and services.

### *So, what do we actually have?*

The black and white aerial photos have been digitally and mathematically corrected and overlaid with vector and attributed data describing utility details such as location of electric cables, water systems, etc. Extensive visual detail of Langley's infrastructure and viewable surfaces are now available via the Institutional Management System. These details are so enhanced, that the location of most cables, pipes, structures and trees on Center can be seen on a computer screen. These details can also be plotted to hard copy. The interior building details, for example, can supplement upcoming personnel moves resulting from Langley's reorganization.

### *What can we do with GIS?*

Besides being able to coordinate data such as telephone or computer network drops, produce a more efficient Master Plan or pinpoint preventive maintenance needs, the GIS, for example, could be a boon to the Center's safety and space utilization capabilities, according to Brad Ball, team leader for Imaging and CADD Technology.

Ball's example is a fire involving hazardous materials in a building at Langley. To demonstrate how GIS could help coordinate safety efforts and speed emergency response, Jay Waravdekar, Lockheed Engineering and Sciences Co., simulated a remotely triggered fire alarm at his workstation.

Using the computer, Waravdekar is able to pinpoint the exact location of the fire, what chemicals were involved and how they react to heat, water and other variables. In addition, he was able to determine the best route for firefighters to travel to the fire, the location of employees in the building, if any disabled personnel were assigned to that facility, all escape routes, the location of the shut-off valves for water, electricity, etc., the name, photo and location of the facility coordinator and his/her alternates, etc.

All of this information, Waravdekar said, could be made available to firefighters in the near future. It is hoped that a computer could be installed in each firetruck so that the data would be available before they even arrive at the destination. Another capability of the GIS is to display video footage of the actual routes firefighters might take into a building. The footage could show all hallways, obstacles, etc., that might be encountered.

The system is so sophisticated, Ball said, that if a hazardous chemical spilled and went down a drain, the computer would be able to display the route that chemical would take, where it would end up, how long it would take to reach its destination, the impact it could have when it arrived and possible containment options.

### *What's in the future for GIS?*

Potential uses resulting from GIS links and products would be a Langley GIS database that could issue reports for land and environmental use, hazardous conditions, utility/energy consumption; could generate analyses of utility networks, safety systems, electrical systems and energy consumption; and could print graphics used for the master plan database, the Facilities Utility Electronic Database (FUED) and the Business Data Systems Division and communications databases. GIS could link all spatially referenced data with all other Center databases providing a single-point graphical interface for data acquisition, manipulation and analysis.

According to Ball, GIS will be among the many other graphics that will be demonstrated at the upcoming Internet Fair. (See announcement at right)

# Langley's Education Programs Kick Off the Summer

**BY J.J. MILLER**

The invasion is on at Langley. From every nook and cranny, new faces are appearing in every division on Center. No, it's not a Martian invasion; this is the annual invasion of talent, energy and enthusiasm of college students and professors. The new faces are participants in one of the summer research programs at Langley, either the Langley Aerospace Research Summer Scholars (LARSS) program or the American Society for Engineering Education (ASEE) program.

Each summer, students and professors who are chosen to participate in these two programs come to Langley from across the United States. This year, they've come from as far away as Nevada and Puerto Rico.

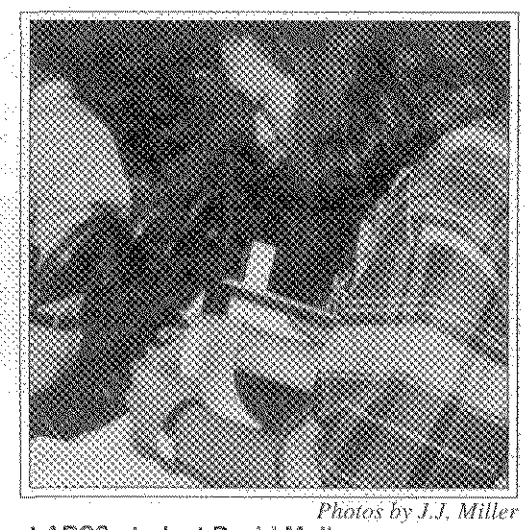
### The LARSS Program

The LARSS program is designed for rising junior or senior college students or first-year graduate students. The 10-week program involves intensive study under the supervision of a designated mentor in their field of interest. Under a mentor's guidance, participants complete a research project in their chosen field by summer's end.

The LARSS program, established in 1986, is designed to stimulate student interest in aerospace research and to encourage them to pursue advanced degrees in their fields. Students this year were chosen from more than 400 applicants and represent 40 colleges and universities and 24 states.

### The ASEE Program

The ASEE program is also a 10-week summer program. Forty fellows from more than 160 applicants were chosen. They represent 41 colleges and universities and 23 states. ASEE, established in 1964, is a coordinated effort between Hampton University and NASA. According to Hampton University professor John H. Spencer, the 1994 ASEE co-director, "The program is so popular that it has grown 40 percent over last year. The popularity is not only among the fellows themselves, but among the NASA researchers as well."

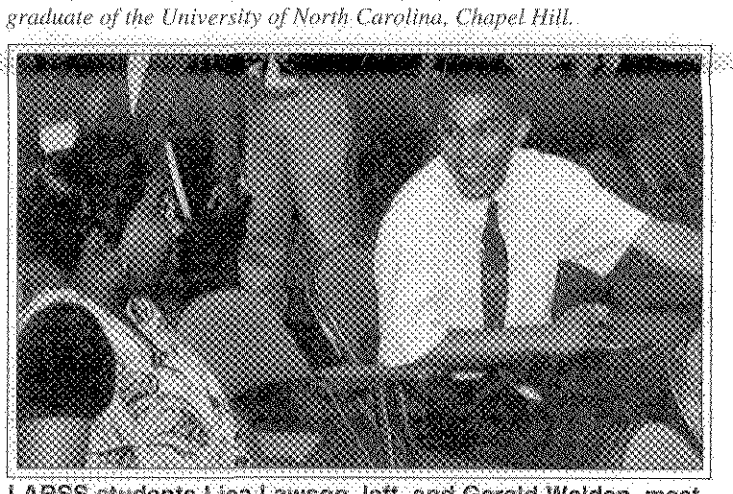


*Photos by J.J. Miller*

**LARSS student David Molloy pages through the NASA literature distributed to all students during orientation June 6.**

ASEE strives to further the professional knowledge of qualified engineering and science faculty members in aerospace research with the goal of enhancing their teaching activities through an exchange of ideas between the fellows and their NASA associates. These objectives are achieved by providing opportunities to actively participate in innovative research and exposure to technical lectures from distinguished scientists and engineers.

*J.J. Miller is a student in the LARSS program. She is a recent graduate of the University of North Carolina, Chapel Hill.*



**LARSS students Lisa Lawson, left, and Gerald Walden, meet each other at the orientation session as other students line up for name tags and information.**

# Come to the Fair

The H.J.E. Reid Conference Center will be the site of the NASA Langley Internet Fair Tuesday, June 28, from 8 a.m. to 3 p.m.

Langley staff members will demonstrate how to use the World Wide Web browsers (WWW) like Mosaic to find information on the Internet. Other demonstrations will include Langley's EOSDIS, Langley Technical Report Server and TOPS technology transfer applications, electronic mail and the Geographic Information System (GIS).

Bell Atlantic representatives will showcase their new capabilities for the Integrated Services Digital Network and Library staff members will show visitors how to access the on-line catalog STILAS.

Attendees can preview the Multi-cast Backbone (MBone), which allows real-time audio, video and whiteboard conferences from individual workstations.

Dr. H. Lee Beach, deputy director will welcome visitors at 8 a.m. and Dr. Joseph Heyman, acting director, Technology Applications Group, will deliver the keynote address. For more information, contact Gretchen Gottlich, ext. 42303/ g.l.gottlich@larc.nasa.gov

# It's Strictly Marsville for Middle School Students

## Cosmic Village comes to life at Langley

Twenty-two teams of middle school students from Hampton, Portsmouth and Chesapeake swarmed to Langley in June to participate in Marsville – the Cosmic Village. The program, presented by the Challenger Center for Space Science Education, Alexandria, Va., helps create for students a positive vision of the technological society of the 21st century and of their role in making that society a reality. It emphasizes academic content, creative and critical problem-solving, social skills and decision-making. The program stresses math, science, aerospace and technology.

The 175 students, who had been preparing for months for the link-up day, were asked to create a new human world, a multinational settlement on Mars.

### Planning Marsville

Mission teams consisted of about six students with a teacher team leader. Each team solved simulation-based problems in classrooms in their home schools. Students created models of one specific life support system assigned to them for the Martian settlement: air supply, communications, food production and delivery, recreation, temperature control, waste management or water supply.

After a team completed its system, it was matched with two other teams from the other schools. The three teams formed a Habitat Crew. Each crew was responsible for constructing an inflatable habitat to house them on Mars. The young people communicated their construction plans via written and electronic means until they all met on link-up day at Langley.

### Link-Up Day

The day began with introductions by Pete Thomas of Langley's Office of Education followed by instructions from Christa Hubbard, the day's facilitator from the Challenger Center. A simulated blast off of the shuttle landed everyone at the space station where groups of 50 were transported to Mars and, after a harrowing ride through the Noctus Labyrinth, deposited one and all in Valli Marineris. Once there, eight habitats were constructed by the crews of seventh and eighth graders. The crews then set up their system models for the specific Martian life support systems previously assigned to them. All habitats were then linked together to form "Marsville – The Cosmic Village."

Students next had an opportunity to share their problem-solving strategies, successes and failures. The day's activities also included lunch weigh-in/uniform checks, presentations of research and a walk-through of the linked habitats. The lunch weigh-in, conducted by Sherry and John Tanner, was just one of the many problem-solving events. Only so much weight could be transported per person to Mars. The dilemma: What to do with the excess food before blast-off?

### Plenty of Help on Hand

The Marsville project was made possible by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA) Pre-College sponsorship program. Bob Tolsen, AIAA representative, was on hand with volunteer graduate students from the George Washington University to answer questions and give students any help they needed.

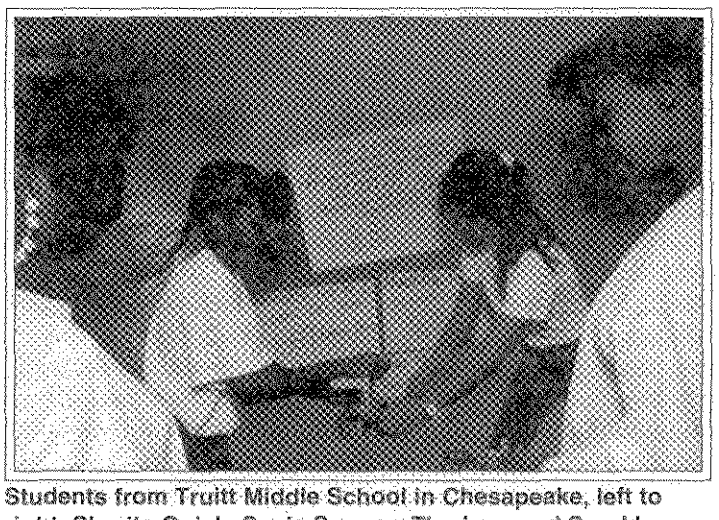
"This would not have been possible," Thomas said, "without the support from AIAA. They paid the fee for the program to be brought here and volunteered to assist as coaches and judges. This is the first time we have tried to bring the Marsville program to Langley and we'd certainly like to do it again."

Keith Leung of Western Branch Middle School said he and his team members enjoyed the challenge of inventing. Their solar-fueled polar cap melter-device separated the hydrogen and from the oxygen in the melted water and stored it in two tanks for future use. One was as an energy source and one for habitat living.

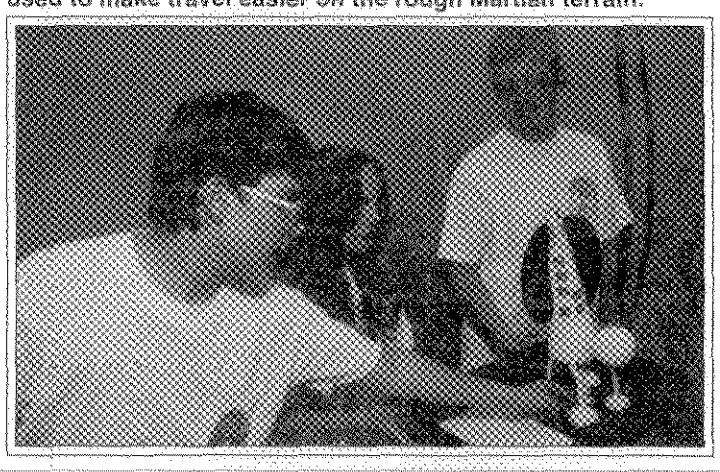
Crystal Strickland, ace reporter from Crestwood Moore Middle School in Chesapeake, filmed the habitat-building from start to finish. "We are going to show the video at our graduation ceremony so everyone can see what a great job we did and how much fun we had working in Marsville."

**Tora Kulenguski, Amber Stone (in tunnel) and Sally Dalton all from Western Branch Middle School, and teammate Jason Schreck of Spratley Middle School, Hampton, build the tunnel and connect it to the fan that will keep the habitat inflated. Eight habitats were constructed by 22 teams of middle school students in "Marsville – the Cosmic Village" at Langley.**

*Photos by Fred Jones*



**Students from Truitt Middle School in Chesapeake, left to right, Sherita Quick, Susie Sawyer, Thu Lam and Sparkle Couther continue to shore up the inside of their habitat with more tape. Mars "facts" are taped to the wall of the structure. Below, Jonathan Andrews, Lee Ellen Goodrich and Chad Hall, left to right, from Hunt Mapp Middle School, Portsmouth, demonstrate to other crews how their transportation system works on Mars. The round feet were used to make travel easier on the rough Martian terrain.**



## Legislative Action: NASA FY95 Budget

**BY LEE RICH**

The Space Station this year, amidst action on NASA's fiscal year '95 (FY95) budget, is the target of the largest termination effort to date. The NASA FY95 budget request is $14.3 billion, $2.1 billion of which is funding for Space Station.

During the week of May 15, House and Senate Appropriations Committee Chairman, Rep. David Obey (D-WI) and Sen. Robert Byrd (D-WV), divided $508.6 billion in discretionary funds among the 13 Appropriations Subcommittees in each Chamber. NASA's appropriations are determined by the House and Senate Subcommittees on Veterans Administration, Housing and Urban Development and Independent Agencies. The House Subcommittee Chairman, Rep. Louis Stokes (D-OH), received $400 million less in total allocations than he had expected, and the Senate Subcommittee Chair, Sen. Barbara Mikulski (D-MD) received $700 million less. The Departments and Agencies funded by these subcommittees obviously will be affected.

In May, Stokes asked NASA how it would handle a $200-300 million cut, should one be imposed. Rep. George Brown, Chairman of the Committee on Science, Space, and Technology, whose support for Space Station has until this year been unwavering, served notice that a budget below $14 billion may force him to endorse cancellation of Station because he believes that NASA's other programs, especially science, will be shortchanged. Rep. Tim Roemer (D-IN) introduced an amendment to terminate Space Station. This measure will be taken up during Floor debate.

With the markup of NASA's budget by the Stokes Subcommittee on June 9, action has now begun in earnest. Should you wish to follow events which chart NASA's future course, you are invited to join in an informal discussion of Capitol Hill proceedings, including player lineups and scorecards, at noon on June 23 in the Langley Room of the H.J.E. Reid Conference Center. For further information, call Lee Rich, Congressional Affairs officer, ext. 46529.

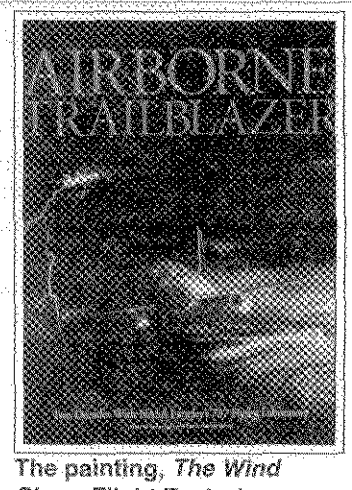
## Airborne Trailblazer

*Continued from Page 1*

Since its early days with NASA, the Langley 737 aircraft has been a testbed for cutting-edge research, including aircraft safety, efficiency and reliability.

Wallace describes how the research conducted by Langley's 737 was instrumental in changing future aircraft. The book also tells the practical research provided by the 737, including "glass cockpits," the microwave landing system, the Global Positioning System and airborne wind shear detection.

Wallace is an aviation writer who has published over 200 articles on aviation and aerospace topics. Her writing includes new developments in NASA research and military aircraft technology. She graduated with honors from Brown University in 1983, with a degree in semiotics, a philosophical study of signs and symbols and their function in languages. She owns and flies her own airplane, a 1946 Cessna 120.




**The painting, *The Wind Shear Flight Tests*, is on the cover of the book. The artist is John Clark.**

*The same process of distribution used for Langley's 75th anniversary book, **Winds of Change**, will be used for **Airborne Trailblazer**. Each civil servant at Langley will be sent a copy directly. Copies will also be sent to the head offices of contract companies for their distribution. Retirees may request a copy of the book by calling the Public Mail Center at 864-3293.*

***ORDER INFORMATION: Airborne Trailblazer** can be ordered by mail from the Superintendent of Documents, P. O. Box 371954, Pittsburgh, PA 15250-7954 or by FAX to (202) 512-2250. GPO price for the publication is $27 which includes shipping and handling. The GPO stock number is 033-000-01140-7.*

# NASA Brings Information Superhighway to Local Public High Schools

BY J.J. MILLER

The information superhighway has arrived at Bethel High School thanks to NASA's High Performance Computing and Communications (HPCC) Program, and a dedicated supporting staff of NASA engineers and teachers committed to bringing 20th century technology into their school systems. The program, designed to bring the computer skills into kindergarten through grade 12 classes, has been implemented in five schools in Hampton, Newport News, Williamsburg and Poquoson. In Hampton, the site is Bethel High School, where Langley officials recently had the chance to evaluate the accomplishments of the program and to meet some of the students involved.

## Langley Visits Bethel

Center Director Paul F. Holloway, Dr. H. Lee Beach, deputy director, Dr. Douglas Dwoyer, director, Research and Technology Group, and other Langley officials spent a morning observing and celebrating the accomplishments of the program that has brought HPCC into the Peninsula schools. The program developed by NASA has become a model for school systems around the country. Penn State University officials also attended the meetings to learn more about this program that has been such a success in Virginia. Susan Brooks, a computer teacher at Bethel, was quick to point out that the success was due in large part to Langley engineers like Gary Warren of the Computational Aerodynamics Branch, who were always only an e-mail message away to answer any questions that arose.

Teachers in the school system gave their summer vacation time last summer to attend a four-week training program that taught them the ins and outs of the Internet, the hardware and software they would be teaching and computer programming. The teachers have not only taught their high school students the basics that they learned in training, they also developed curricula that incorporate the computer knowledge, and taught students how to use their new knowledge in other classes, too. Students have used the Internet to get information for English papers and for work in foreign language classes as well as for their work in math and computer class. In addition, the teachers will attend annual supercomputing workshops to maintain up-to-date knowledge of hardware and software available for use in the schools.

## Learning the Basics

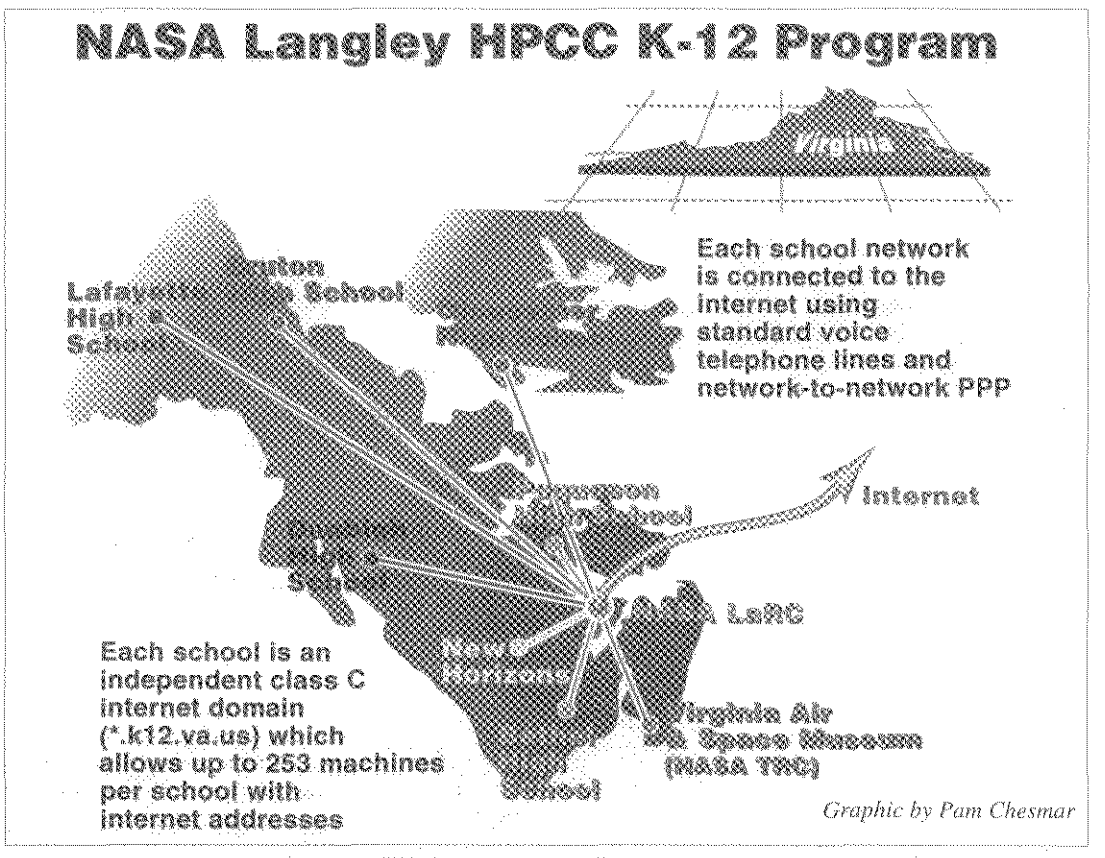
Initially the students learned the basics: computer literacy, including the vocabulary of computers, about hardware and software and about networking. Students then learned how to write their own programs and learned how to solve problems by writing programs. They communicate through e-mail with their friends at school as well as pen pals across the country, and they even receive their assignments through e-mail for certain classes. Many students have put their names on listserves and have communicated with *Newsweek*, MTV and Disney.

Each school is equipped with a computer lab with 15 computers, all connected directly to the Internet. The reaction of students has been better than even the NASA staff and teachers had hoped. Senior students have even joked about flunking their last year in order to remain connected to Internet. The big question about life in college for these students has become "Will I still have access and, if not, can we come back here?" Melia Hellmann, the Denbigh High School teacher who runs the program at her school said. "This program is the best kept secret on the Peninsula."

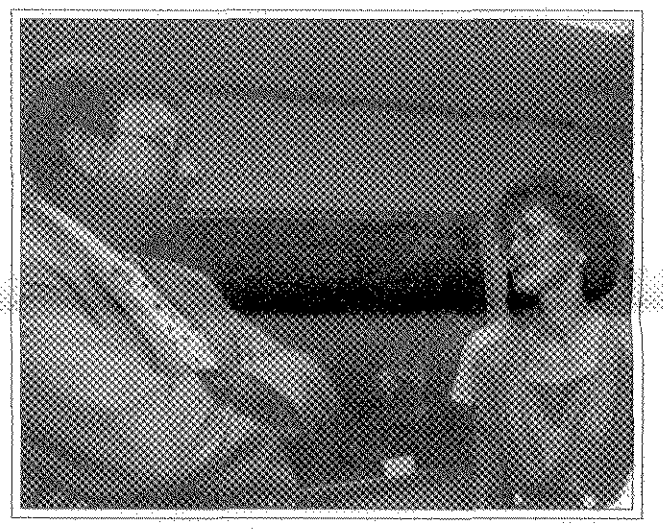
Teachers at Bethel High School are especially happy about the pride the students have for their computer lab and their personal knowledge and abilities on the machines. Plans for expansion of the labs in the future are bright. The success has been so great, teachers are excited about integrating the computers into classes for all students in all classrooms. "They are very proud of the lab—it's theirs," said Brooks, who served as the leader of the program at Bethel. "The kids feel special, because their facility is like a college's. But we could not have done this without the expert resource personnel and customized training from NASA."

In all, eight sites will be linked with Langley through the HPCC to Internet.

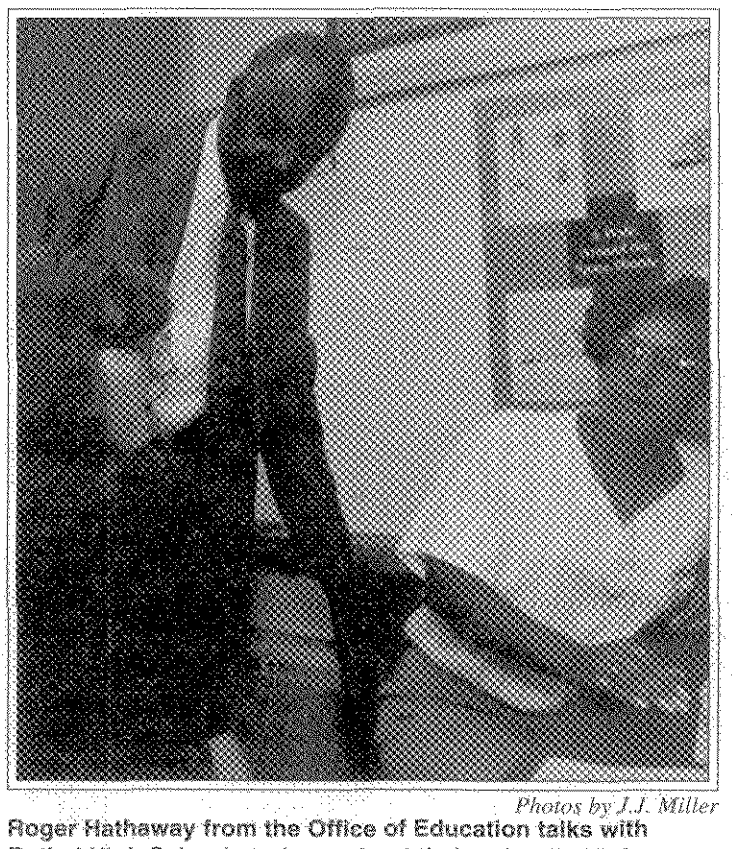
*J.J. Miller is a LARSS student at Langley this summer.*




*Graphic by Pam Chesmar*



**The graphic (top) shows the link-up between Langley and the Internet. All the locations are linked except Bruton and Gloucester High School and the NASA Teacher Resource Center, which will be completed this summer. Above, Research and Technology Group Director Dr. Douglas Dwoyer talks with Bethel High School computer teacher Susan Brooks about her students' progress.**



*Photos by J.J. Miller*

**Roger Hathaway from the Office of Education talks with Bethel High School students about their school's High Performance Computing and Communications Program**

## *Moon Shot* to air in July

A two-part documentary entitled Moon Shot will air on July 11 and 13 on TBS. Each segment is two hours long and will be shown at 8:05 and 10:05 p.m. Produced by Varied Directions, the series will focus on Apollo 11 accomplishments and the 25th anniversary of the lunar landing.

Much of the archival material for the *Moon Shot* documentary came from Langley and the Center is credited for its cooperation with the producers. In a statement from the company, the producer stated, "The staff of Varied Dimensions appreciates the cooperation received from the employees and retirees of NASA Langley Research Center."

# SFTE Sponsors Silver Symposium

The Patuxent River Chapter of the Society of Flight Test Engineers (SFTE) invites participation in the Silver Symposium in Washington, D.C., August 1-5.

The symposium theme is "Working Together to Enhance Flight Testing." Plans include technical sessions, panel discussions, vendor exhibits, keynote and banquet presentations and an activities program.

Reduced military budgets and personnel reductions are forcing many companies to conduct flight testing using smarter approaches and less expensive techniques. The symposium will be a forum for flight testers to share ideas.

For information, call Dean Carico, symposium chairman at (301) 826-1382 or write him at Silver Symposium, P.O. Box 2213, Patuxent River, MD. 20670-5304.

# Happenings

**EXERCISE IN COMFORT:** Fitness program of low-impact, bench aerobics and weight training; nutrition analysis is provided. Instructors are certified in personal training and aerobics. Classes are Tuesday and Thursdays, 5-6 p.m. and Saturday, 9:30-10:30 a.m. in the air-conditioned LAA gym. Call ext. 42295 for information.

**POWERWALK PROGRAM:** Join an exercise activity for all fitness levels. The powerwalk classes will be given by the LAA Aerobics Club starting in July. Classes begin in the LAA gym with warm-ups/stretches. Toning exercises and cool-downs will follow in the gym after outdoor walking sessions. Classes are on Tuesday and Thursdays in July from 4:45-6 p.m. and on Saturdays from 9:15-10:30 a.m. Call ext. 42295 for information.

**HOUSE FOR SALE:** Woodcreek, 3 BR, 2 bath, loft, living and dining rooms, gas fireplace, garage, privacy fence. New heat pump/water heater, all appliances, near NASA. Only $2,500 to assume 8% loan at $711/month. Call 874-3121.

**AIAA ANNOUNCEMENTS:** The American Institute of Aeronautics and Astronautics is sponsoring a golf outing Thursday, June 23, at Eaglewood Golf Course, Langley Air Force Base. Proceeds will go to the "Futures in Aerospace" scholarship fund. For more information and to make reservations, call John Paulson, ext. 45071.
**AIAA's 15th Annual Spring Picnic** will be held at the H.J.E. Reid Conference Center June 23 from 4:30-7 p.m. Reservations are required by June 20. For information, contact Dan Vicroy, ext. 42022/d.d.vicroy@larc.nasa.gov or Stan Lamkin, 723-3544/s.l.lamkin@larc.nasa.gov

**CARPOOL:** Looking for a person to carpool from Rt. 636/Rt. 17 in Gloucester. Call Laura Bass, ext. 43632.

**WANTED:** Himalayan kitten. Call 827-6447.

**LAA DANCE:** The Langley Activities Association country western dance will be Saturday, June 18. Lessons at 7 p.m; dance at 8 p.m. Cost is $3 per person.

**CONDO FOR RENT:** One BR, living room, kitchen on Sanibel Island, SW Florida coast. Lanai, pool, tennis. On-site mgmt. $600/wk. June-Dec. 565-1849.

**FOR RENT:** Poquoson apartment, 1 BR, 1 bath, furnished. Available June 1, $450 per month (includes electric and water). Call evenings 868-4608 or leave message.

**HOUSE FOR SALE:** Hampton, 5 BR, 3-1/2 baths, eat-in kitchen, living and dining rooms, den, fireplace, washer and dryer. Asking $132,000. Call 826-6994.

**SAILING LESSONS** through the Langley Yacht Club: Junior sessions and adult four-week sessions. Call 764-3922 or 764-7220 for applications or information.

**EDUCATIONAL TRAVEL TOURS:** Experience England, France and Spain in 18 days during June 1995; all inclusive package. For itinerary and information, call Jeanene McKissick, 867-9544. Call now for early-bird special.

**PASSES AVAILABLE:** Causeway passes are available for the July 8 launch of STS-65. Contact Olin Jarrett, ext. 46320/o.jarrett@larc.nasa.gov

**RIDE NEEDED** from Forest Lake Apts. to NASA and back from 6/6 to 8/12. Will pay expenses. Call Buddy Poe at ext. 43467.

**HOUSE FOR SALE:** Denbigh, 3 BR, 1-1/2 bath, 12 mi. from NASA, privacy fence, garage, all appliances, $74,500. Lease/purchase possible. Call 877-2186.

**TOWNHOUSE FOR RENT:** Two-story w/2 master suites, vaulted living and dining room ceilings, kitchen, fireplace, washer/dryer hook-up, garage and carport, 10 min. to Langley, $750/mon. plus deposit. Call 988-1630.

**HOUSE FOR RENT:** Hampton, 4BR, 1-1/2 bath w/living and dining rooms, appliances include washer/dryer, near I-64. $750/month. Call 851-9265.

**HOUSE FOR SALE:** Tidemill Farms, 3 BR, 2 baths, garage, new windows, siding and roof; includes appliances. Asking $83,000. Call 766-0398.

**ROOM FOR RENT:** In Merrimac Shores, w/cooking and laundry privileges, waterview. Available immediately. Call 722-2440.

**LANGUAGE LESSONS:** Professional, experienced teacher, Russian/English as a Second Language (ESL), using modern methods, all skills. Call 850-1246.

**HOUSE FOR SALE:** In Poquoson, 3 BR townhouse, 2-1/2 bath, kitchen, laundry, dining area, family room w/fireplace, living room, deck appliances, etc. Asking $94,000. Call eves, 898-8463.

**FOR SALE:** Pair of Infinity speakers and Sony cassette deck used in LAA Lounge, excellent condition. Best reasonable offer accepted by July 1. Call Andrea Whitesides at ext. 46369.

## *NASA Langley Open House Scheduled for July 16*

Langley is inviting the public to an Open House July 16, from 9 a.m. to 4 p.m. The Open House commemorates 25th anniversary of the Apollo 11 Lunar landing — perhaps the most impressive achievement in modern history — when man took his first steps on the moon July 20, 1969.

Space Week, July 16-24, celebrations will include:

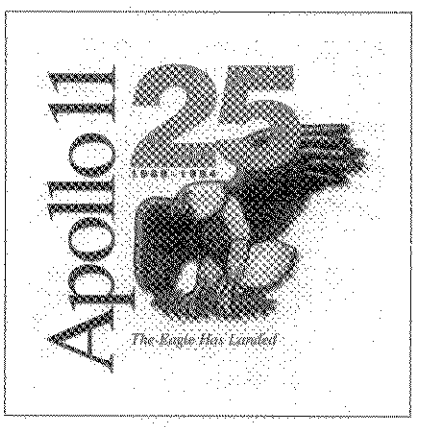
**July 16**
- The Open House will feature tours of key facilities at the Center, including the historic areas that supported the Apollo mission. Exhibits, videos and demonstrations will highlight current research technology and its application to industry.

**July 20**
- First Day Issue of U.S. postage stamps celebrating the 25th anniversary of Apollo 11. Stamp cancellation and purchases are available.
- Colloquium Series speaker John Houbolt, 2 p.m. at the H.J.E. Reid Conference Center. Houbolt is one of the scientists whose concept of the Lunar-Orbit Rendezvous made it possible for the United States to land men on the moon. Houbolt will also speak at 7 p.m at the Virginia Air and Space Center as part of the Sigma Series.
- *Blue Print for Space* opens at the Virginia Air and Space Center

**July 23**
- Free admission to the Virginia Air and Space Center; charge for IMAX® films.

**• The Langley Cafeteria will feature special Apollo menus during the week of July 18-22 to celebrate Space Week.**

**• Month-long activities during July at the Virginia Air and Space Center include special Apollo items for sale in the Gift Shop; special exhibits on Apollo and other earlier missions; and bus tours of NASA Langley Research Center.**




***Mark Your Calendars for These Special Apollo Events Coming in July!***

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Researcher News

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National Aeronautics and Space Administration
Langley Research Center

Apollo 11 25 1969–1994 The Eagle Has Landed

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 13 ❖ July 1, 1994

## *A Message from the Director*

I want to personally invite all employees, contractors and retirees to attend our Open House, Saturday, July 16. In addition, I hope that each of you will bring your family, friends and neighbors to sample a bit of the past and promise for the future.

Planned in commemoration of the 25th anniversary of the Apollo 11 moon landing, this Open House will offer more than a history lesson. We will proudly display many of our current projects, work that will enable vital aerospace advancements in the near future as well as into the next century.

Langley is one of the world's premier research laboratories and we have much to be proud of. We have made and continue to make contributions to the community, the state and the nation. The Open House will allow us to show off our Center. It is extremely important to let our neighbors know who we are and what we do.

Please join me for Langley's Open House. I encourage you to bring your family members and friends. This is a rare opportunity for them to see, first hand, some of the nation's best research facilities.

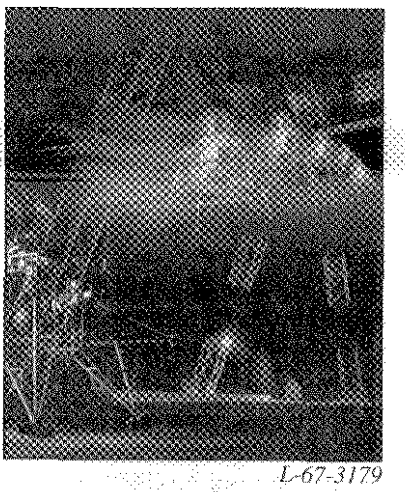
*Paul F. Holloway*

## Langley's Behind-the-Scenes Work Helped Launch Apollo 11

Langley was a key center for testing and research in support of the Apollo missions. Hundreds of hours of wind tunnel testing were conducted here, through which researchers helped determine the aerodynamic characteristics of the Apollo-Saturn launch configuration. And, in order to evaluate Apollo's ablative heat-shield materials, an electric arc heater was used to duplicate the intense heat generated by friction during reentry. In many of the Center's facilities, including the 8-Foot High-Temperature Tunnel, Langley engineers conducted critical investigations into the structural integrity of Apollo.

One of the major research projects managed by Langley for Apollo was FIRE (Flight Investigation Reentry Environment). Though this project consisted mainly of flight tests involving Atlas rockets with recoverable reentry packages, FIRE also involved wind-tunnel testing. The purpose of the project was to study the effects of reentry heating on spacecraft materials.

From lunar orbiter tracking data, staff members constructed representations of the moon's gravitational field. These mathematical models proved invaluable in the design and timing of critical operating maneuvers during the flight of Apollo 11 and the subsequent lunar landing missions.



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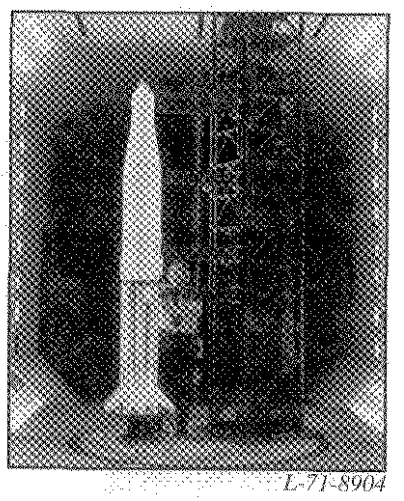

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**During a nighttime training session, at right, a multiple exposure captures the movement of the Lunar Module simulator, a manned vehicle designed at Langley. It was used to familiarize the astronauts with the characteristics of a lunar-landing-type vehicle. Researchers studied the effects of wind and atmospheric turbulence on the Saturn 1B rocket, middle photo, and escape tower in Langley wind tunnels. The rocket was used to launch Apollo lunar spacecraft into orbit around the Earth to train for manned flights to the moon.**

**Below, Langley provided extensive research and technical support for the development of the Mercury (a precursor to the Apollo program) program's "Little Joe" launch vehicles, constructed at Langley in 1959. "Little Joe" was a test vehicle powered by a cluster of four Sergeant solid rockets in a single airframe. It helped ensure the dependability of the Mercury capsule's escape system and parachutes.**

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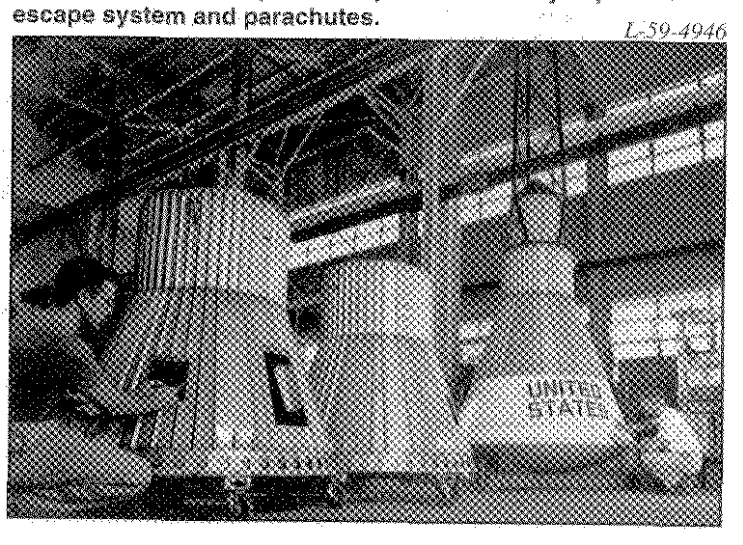

## Houbolt to discuss Apollo Lunar Landing Mission

**Dr. John C. Houbolt**

Dr. John C. Houbolt, former chief scientist at Langley, will review space activities for the time period 1957 to 1969, the first Sputnik to the first Apollo landing on the moon, at a Colloquium, Wednesday, July 20, at 2 p.m. in the H.J.E. Reid Conference Center. His talk will highlight the struggle to have the Lunar Orbit Rendezvous (LOR) and the Lunar Module (LM) adopted for use, and how they emerged as the choice for the central element in successfully performing one of the most remarkable achievements in human history — that of landing humans on the moon on July 20, 1969.

Houbolt, a distinguished aeronautical engineer, was a key player in the development of the Lunar Orbit Rendezvous and the Lunar Module. He began his career at Langley in 1942 and served as associate chief of the Dynamic Loads Division from 1949 to 1961 and chief of the Theoretical Mechanics Division from 1961 to 1963. From 1963 to 1975, he was senior vice president and senior consultant at the Aeronautical Research Associates of Princeton, Inc., before returning to Langley in 1976. Here, he was as Langley's chief scientist until his retirement in 1985.

During his career, Houbolt authored or co-authored more than 140 technical reports and was the winner of numerous awards. In 1983, he received a Space Act Award for the conception and development of the LOR concept. Houbolt was selected as the Peninsula Engineer of the Year in 1989, and was elected to the National Academy of Engineering in 1990.

Houbolt will also speak on the Apollo Lunar Landing Mission July 20 at 7:30 p.m., at the Virginia Air and Space Center as part of the Sigma Series.

## OARE Will Fly on STS-65

For the first time, acceleration measurements were taken by the Orbital Acceleration Research Experiment (OARE) during reentry of Columbia during STS-62 in March 1994. Now, OARE will fly again on STS-65, scheduled to lift-off July 8.

An international group of scientists have the OARE instrument flight data which measures the low-frequency environment (e.g.., drag) so that "micro-gravity" experiments can be interpreted. Lewis Research Center, Cleveland, Ohio, heads the distribution of acceleration measurements for the international group on this shuttle mission.

OARE was originally conceived at Langley by the OARE principal investigator Robert C. Blanchard, who is still active with the experiment and the flight data. Langley researchers are anxious for the OARE data because it provides valuable aerodynamic information in the "rarefied-flow," i.e., large velocity and low density air flow conditions, flight regime that can be compared with numerical computations being developed here. OARE data can be compared with other numerical techniques as well, such as direct simulation Monte Carlo techniques.

The OARE data is particularly unique because rarefied-flow ground measurements, the other type of data used to compare numerical techniques, are extremely difficult to obtain.

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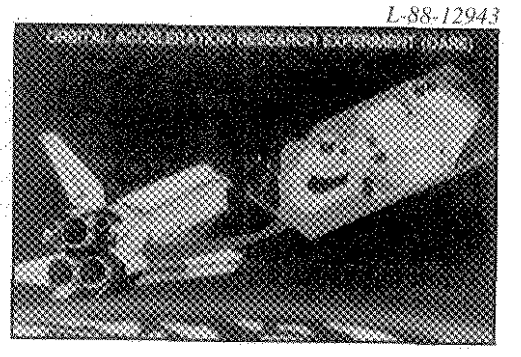


**The OARE instrument, at right, will fly again on STS-65, in mid-July.**

# News Briefs

## Around the Agency

**CREW NAMED FOR FIRST SPACE SHUTTLE/MIR DOCKING MISSION** – A seven-member space shuttle crew, led by veteran astronaut Robert L. "Hoot" Gibson (Captain, USN), will launch next year to perform the first docking with the Russian Space Station Mir to exchange crews. Joining Gibson on the mission will be Pilot Charlie Precourt (Lt. Col., USAF) and Mission Specialists Dr. Ellen Baker, Greg Harbaugh and Bonnie Dunbar. Russian cosmonauts Anatoly Solovyev and Nikolai Budarin will serve as the Mir-19 crew and replace Vladimir Dezhurov, Gennadiy Strekalov and U.S. astronaut Norman Thagard who are scheduled to be launched aboard a Soyuz spacecraft next March for a three-month stay on the space station as the Mir-18 crew. STS-71 is currently scheduled for launch in mid-1995 using the orbiter Atlantis, which has been modified to carry a docking system compatible with the Russian Mir Space Station. The orbiter will carry a Spacelab module in the payload bay in which various life sciences experiments and data collection will take place throughout the 10-day mission. Solovyev was born in Riga, Latvia, but now lives in Russia. Budarin was born in Chuvash Autonomous Republic, Kirya, Altir region and now lives near Moscow. They will switch places with the Mir-18 crew (Dezhurov, Strekalov and Thagard) which is scheduled to conduct three months of experiments aboard Mir before returning to Earth aboard Atlantis with the other five crew members.

# Health Corner

### Bloodmobile Report

The May blood drive brought in 349 pints of blood with 18 first-time donors according to organizers Karen E. Ridlon and Pete Edgette of Langley's Occupational Health Services (OHS) and Red Cross representative Kitti Schatz.

Following are the multiple blood donors: 16 gallons, James Leiffer; 14 gallons, H. Neale Kelly and John Kovtun; 13 gallons, Joseph Powers; 11 gallons Henry Zumbrun and James Dorst; 9 gallons, Frank Boyer; 8 gallons, Edgar Collier, Otto Ridley, Mark Lord, Cadd Moore III, Randy Fly and Robert Daugherty; 7 gallons, Barry Brunner and Kathryn Wurster; 6 gallons, James Adkins, Charles Jenkins and James Thomas; 4 gallons, Basil Shrader, Gregory Hogge, Michael Carr, Jon Thompson, Roger Johnson and Lee Jordan; 3 gallons, John Inge, Thomas Walker, Keith Woodman, Steven Bene, Steve Lee and Gail Blow; 2 gallons, Melissa Proffitt and Salvatore Buccellato; and 1 gallon, Kelly Smith, Ginger Freeman, Brian Overbay and Kyle Bullock.

First time donors were Jennifer Hubble, Dana Hammond, Sullivan Donadio, Uwe Steinhau, Maria Esquibel, LaDonna Haynes, Donna McIntosh, Kenneth Porter, Kevin Shelton, Delores Kochman, Deneen Corbin, Marie Lane, Paul McClung, Eileen Wong, Diane Griffin, Amanda Fitzgerald and Raymond Papp.

The next blood mobile visit will be July 27 from 9 a.m. to 3 p.m. at the H.J.E. Reid Conference Center.

### Join the "O" Team--- Be a Trauma Donor!

The most serious kind of blood shortage is that of Type O blood. All blood types are important and needed but Type O is known as the universal donor. This means that in an emergency, any patient can receive Type O negative blood, while about 86 percent can receive Type O positive blood. This is why O donors are considered "trauma" donors, and why their blood is in greatest demand, according to Occupational Health Service's Karen E. Ridlon.

Pledge cards to join the American Red Cross O Team will be available for all Langley Type O blood donors at the July 27 bloodmobile. Everyone's commitment, especially during the summer months and holiday seasons, is essential in keeping the community's Type O blood supply available. Please pledge to participate in at least three of six blood drives held at Langley each year. There are only three blood drives left in 1994 --- July 27, September 28 and November 23. For more information about Langley's bloodmobiles, call ext. 43194.

## Vretakis Retires as Air Force Liaison

Nicholas G. Vretakis, chief of Langley's Air Force Liaison Office since 1964, retired after 41 years of government service.

Vretakis started his Air Force career in 1953 at Wright Patterson Air Force Base, Dayton, Ohio. He received his 40-year pin for government service at Langley last year.

Vretakis worked as a liaison between NASA Langley researchers and the Air Force's labs and development organizations. He worked on many concepts and designs for military aircraft. He said, "We worked with the best engineers, scientists and researchers available, both in the Air Force and here at Langley. It was a win-win situation for everyone. Every Air Force plane has a part of Langley in it."

Dennis Carter now serves as the new chief of the Air Force Liaison Office and he can be reached by calling ext. 45212.

## Announcements

### Retirement Party

A party will be held on Friday, July 22, for Richard M. "Dick" Boykin Jr. in the H.J.E. Reid Conference Center. Open bar is at 5:30 p.m., and hors d'oeuvres at 6 with program following from 6:45-8:30 p.m. The cost is $12 per person and gift only contributions will be accepted. For reservations/contributions, call Harriett A. Coombs, ext. 47010, or Brenda L. Selby, ext. 47004. Make checks payable to Selby at Mail Stop 430, by July 5.

### Retirement Social

Pete Stack invites friends and colleagues to a social Wednesday, July 13, from 4 to 6 p.m. at the H.J.E. Reid Conference Center. If you plan to attend, contact Linda Sutherland, ext. 43640/ l.w.sutherland@larc.nasa.gov, or Sharon Stack, ext. 43742/ s.h.stack@larc.nasa.gov

### Retirement Dinner

There will be a dinner to honor Clarence F. Breen, Friday, July 8, from 6 to 9 p.m. at the H.J.E. Reid Conference Center. Cost is $14 per person; gift contributions are also welcomed. Contact Mrs."QP" Gray, ext. 47233, Mail Stop 429 or V.W. Wessel, ext. 43344, Mail Stop 421 for reservations.

### Retirement Party

Friends of Peter E. Lewis are invited to a party in his honor, Tuesday, July 26 at the H.J.E. Reid Conference Center. Cash bar and heavy hors d'oeuvres start at 5 p.m., with a program to follow. Cost per person is $13. and includes a gift. For reservations and/or gift contributions, call Anne Holland, ext. 47255, or Butch Barringer, ext. 46903. Send checks payable to Anne Holland, Mail Stop 440 before July 18.

**Correction:** The valedictorian for Tabb High School, class of 1994, was Bor Jen (Paul) Sun. The NASA Scholarship winner, Piyush R. Gupta, was incorrectly listed as the school's number one graduate in the June 17 issue of the *Researcher News*.

# *Conway Chosen for AIAA Distinguished Lecture Program*

Bruce A. Conway

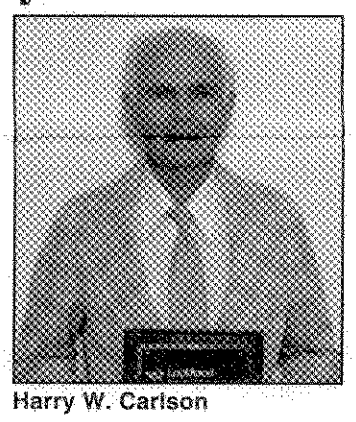
Bruce A. Conway has been selected by American Institute of Aeronautics and Astronautics (AIAA) President Brian Rowe to participate in the 1994-1995 AIAA Distinguished Lecture Program.

Conway is currently head of the Planning and Resources Management Office. There he provides direction in the areas of human and financial resources management, strategic planning and process improvement, management information systems and quality improvement strategies.

Conway began his Langley career in 1971. He was named chief of the Instrument Research Division in 1989. He is an associate fellow of the AIAA and chaired the AIAA Technical Committee on Sensor Systems. He holds a master of science degree in aerospace engineering from George Washington University. Conway has published numerous technical papers and received Langley and NASA Group Achievement Awards and a Skylab Achievement Award.

The program was established in 1969 to provide speakers for local AIAA sections, particularly those sections in less traveled parts of the country. As a Distinguished Lecturer for the coming year, Conway is expected to present several talks; his topic is "Aerospace Measurements: Challenges and Opportunities."

# Carlson Honored by Lockheed


Harry W. Carlson

A Lockheed Technical Excellence Award (TEA) was presented to Harry W. Carlson by H. Pat Haney, Langley program manager, Lockheed Engineering and Sciences Company. Carlson received the award for his pioneering work on analytical tools to predict and minimize aerodynamic drag-due-to-lift for flow that is neither completely attached nor completely separated from wing surfaces. The TEA inscription read," for the development of innovative analytical prediction methods that have significantly improved the state-of-the-art of aircraft wing design."

Carlson joined NACA in 1952 and retired from NASA Langley in 1980. He worked with Langley's Advanced Aircraft Program to predict and optimize the performance of advanced military aircraft. After his retirement, he continued to develop several computer codes for Lockheed that have addressed the unique design constraints for advanced supersonic fighter wings. His codes are used exclusively by industry and were incorporated by Lockheed into codes used in the development of the F-22.

## In Memoriam

### William Morris

William "Bill" Morris, 74, died Tuesday, June 14. Born in Bluefield, W.Va., he was a Peninsula resident for 48 years. Morris was a veteran of World War II and a retiree from Langley.

### Ashby G. Lawson

Ashby Garland Lawson, 54, of Hampton, died Monday, June 13. A lifelong Peninsula resident, Lawson retired from Langley in May after 36-1/2 years of civil service.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# Heyman Highlights Langley's New Technology Applications Group

*Since April 11, Charles P. Blankenship, director, Technology Applications Group (TAG), has been Acting Deputy Director at Marshall Space Flight Center (MSFC). He is scheduled to return at the end of September. In his absence, Dr. Joseph S. Heyman is TAG's acting director. In this interview, Heyman shares his vision for TAG, its structure and goals.*

**RN: What is the structure of Technology Applications Group (TAG)?**

**JH:** We have taken an unusual step of organizing TAG with very little internal structure to give us the maximum flexibility to meet a very dynamic marketplace. Instead, we are building a team. Team building is critical. Key elements of that team represent four sectors in the shape of a wheel (see illustration below).

One sector is information and data. For TAG to be successful, we need to develop better ways to use electronic media and state-of-the-art tools to communicate internally, to archive data, and to develop databases and information that will be valuable to both the Center and to our external customers.

The second element of the wheel is the technology patent structure, which handles the "intellectual property" that is one of the focal points of industry interest. It may take the form of a hardware patent, a software program copyright or technical know-how, but it is intellectual property. TAG has the patent staff members within its organization. This is important because the patent process is one of the tools we use for licensing and forming partnerships.

The third program element in the structure is a financial resource that NASA brings to small businesses. Those programs are the Small Business Innovative Research program (SBIR), the Small Business Technology Transfer program (STTR) and the Aerospace Industry Technology Program (AITP). This is the first year that AITP has been offered by NASA. The purpose of these programs is to stimulate businesses to partner with the government and to work in focused mission areas that have dual use and, by using dual-use technologies, generate greater competitiveness for U.S. industry.

The fourth spoke of the wheel is the technology transfer team. These people represent engineers and scientists who have dedicated their professional careers to fostering technology partnerships with industry. They discover business needs by communicating with business; they identify the Langley technologies by knowing the Center, not just by reading papers but by knowing the people. They initiate the process of forming industry partnerships, helping to get the paperwork done, cutting the red tape, getting the agreements signed, sealed and delivered so researchers can do the work. And, very importantly, they stay with the project from beginning to end so that the TAG researcher team has a partnership or a kinship with the industry team. Partnering is an important concept in which industry is asked what they can bring to the table and how they would use NASA expertise. That expertise may take the form of a patent license, use of a facility at the Center, or a communication with a scientist or engineer. We want to help industry use this resource to turn that industry action into wealth generation and, through that, vitalize that industry sector.

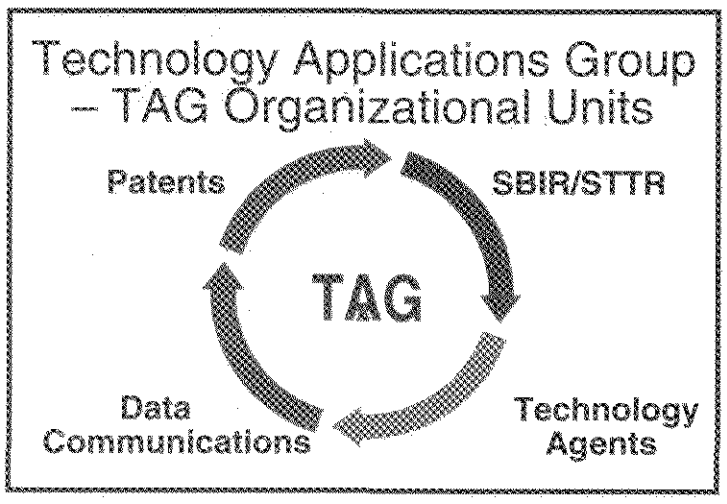
**RN: What is the vision for TAG?**

**JH:** TAG's vision is to improve the present and future value added by Langley to the U.S. business sector for economic competitiveness. I quote Jay Henn from Code R at NASA Headquarters: "The continued investment by U.S. taxpayers is ultimately determined by benefits received by U.S. taxpayers." I think this succinctly sums up my thoughts on Langley's continued success. Producing benefits to the taxpayer really defines what our vision is. TAG as an organization has been put together to facilitate partnerships with industry.

The Center has an opportunity to shape its own future through dynamic reorganization. We are entering a new era of greater partnership with industry and recognizing that enhancing U.S. economic strength is part of our mission, part of our reason for being. The Center Director identified technology transfer as a primary thrust after his nine-month assignment with NASA's Administrator. He returned with great ideas about what Langley could do and could be. The Center is committed to that new direction which builds on our past culture of working with industry.

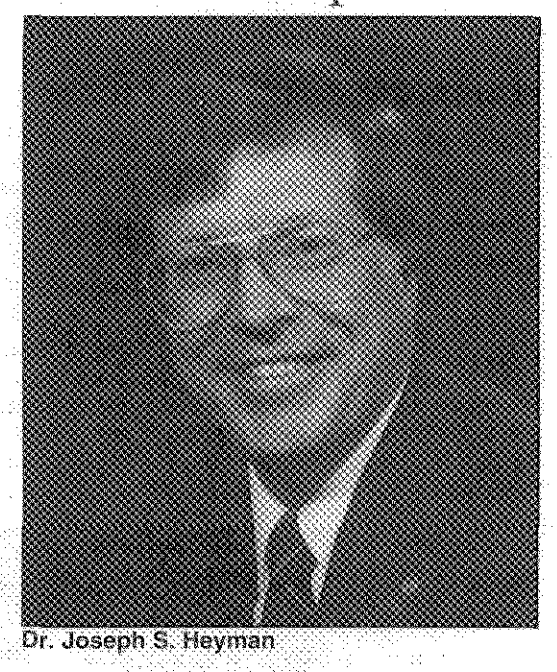
TAG's job is to match the industry needs with the technical resources of the Center to select and prioritize winners. Markets are changing dramatically as programs mature and new programs emerge, and as industry identifies or reprioritizes needs. One element of TAG that Paul Holloway jump-started was the Technology Opportunities Showcase (TOPS). TOPS, held last October, helped us define how to form TAG. TOPS required us to identify and obtain an inventory of Langley technologies, sort out how we would work more effectively with business, using our patent and licensing process and our partnership/agreement process. We developed communication using simple one-page technical descriptions. TOPS shed a tremendous amount of light on how TAG should be formed in order to meet our customers' needs.

I'm happy to say TOPS was a dramatic success, well beyond our expectations. We are planning TOPS '95, April 6-8, to partner with the local community. Therefore, TOPS '95 will be conducted as a team effort that involves local industry. It will be part of a Virginia Peninsula Technology Fair which will involve NASA Langley, CEBAF, the business community and the Peninsula Advanced Technology Center coupled with the Center for Innovative Technology. We would love for that to become the Oshkosh of Tidewater attracting people from a broad sector to this uniquely identified place called Tidewater Virginia. And as Oshkosh is identified with aeronautics, we would like the Peninsula technology fair to become identified with high technology and quality business.




**RN: How do we get there – What steps do we take?**

**JH:** The criteria that we have always used in selecting, hiring and training our researchers has been their engineering and scientific prowess or their prowess in supporting the engineering and scientific endeavors. We typically have rewarded people for that ability. Now we must recognize that, in addition to their technical expertise, part of the value that each individual adds at the Center is going to be measured by their ability to communicate what their work does in terms of adding value or providing cost benefit to the nation.


Dr. Joseph S. Heyman

That means that the researchers have to take the initiative to know the new customers and understanding what the customer wants. In fact, the reorganization of the Center is based on that premise. When the researchers better understand what the customer wants, they can better focus the resources within his or her command. Suddenly, we have become an organization that has a much better vision. I am excited about the new organization's balance between the discipline strengths, our traditional focus, and the value of using our discipline strengths as a resource for U.S. industry.

**RN: How will TAG foster Langley's success?**

**JH:** Researchers and engineers often tend to "let the work speak for itself." If we only let the work speak for itself, it will be words on a piece of paper in a closed book. That book may be the tombstone, "the R.I.P." of Langley. That, to me, is the concern that we must face. If we want to play an active role in the future of the nation, as we have in the past, we have to show our value to a new generation.

The greatest challenge is prioritizing technologies and investments that have the greatest potential for economic impact in our society. Those are tough decisions. Even experienced businesses are challenged to make good research and development decisions.

TAG, to facilitate that, is going to be a very different organization than we have seen in the past. TAG is not an administrative organization but a truly facilitative one. We will strive to understand commercialization or work with industry partners who do understand the process of commercialization. We will develop the tools so we have the capability in-house to do the proper assessment of the commercial impact of technologies. We can then pick those technology partnerships that will be the winners, give them the backing, personnel, visibility and strength they need to be successful. We'll have to nurture them. The key is to partner with the industry before the technology is mature. Clearly, once a technology surfaces, our emphasis will be to identify the industry partner or teams of industry partners that will work with us to bring this technology to commercialization. That is the process.

**RN: What has been the reaction of external customers?**

**JH:** We initially saw a certain amount of skepticism, and we are working to overcome past perceptions of government labs. Now we are finding more and more that our external customers are ecstatic that we are taking this step.

We take on as a challenge to be the leader within NASA and to help lead the federal government in showing the value of the national labs to the economic strength of the country.

# NASA Basketball Association Announces Tournament Champions

*B-League Tournament Champions: The Stars*

Front row, from left to right, are Weldon Staton, Chris Cruz, Will Nucknolls and Vernon Dykes; back row, Michael Jones, Gordon Bayless, Willie Watson, Kirk Ayers and Robert Lee III. Teammates not pictured are Nate Couser and Warren Atkins.

*D-League Regular Season Champions: The Aztecs*

Aztecs, left to right, are Stan Cole, Jeff Singleton, Dave Soistmann, Dave Turnock and Don Keller. Not pictured are teammates Ken Dawson, Bryan Dansberry, Steve Krist, Tim Kariya, Marty Waszak, Bill LaMarsh, Russ Rausch and Carey Buttrill.

*D-League Tournament Champions: The Gougers*

Front row, left to right, are David Throckmorton, Craig Humes, Dale Bess, Robert Fox and Woodrow Whitlow. Back row, left to right, are Don Humes, Matt Hooker, Greg Nowicki, Larry Hoffman, Larry Bement and Dennis Foley.

*B-League Regular Season Champions: The Tools*

Team members are left to right, Kurt Detweiler, Dave Knutson, Steve Young and Brian Cheshire. Not pictured are Jeff Lyon, Kevin Dutton, Keith Murray, Carl Elks, Jim Leiffer and Bill Tomek.

*C-League Regular Season and Tournament Champions: The Herd*

The Herd, front row, left to right, are Brian Jensen, Harry Belvin, Kenny Young, Lloyd Marks and Charles Poupard. Back row, left to right, are Sean Kenney, Jeff Conover, Brent Weathered, Barry Lawhorne and Jeff (Beef) Hyle. Not pictured are Chad Rice, Wes O'Neal and Jamie Godsey.

# Hansbrough Ends Tenure as Exchange Chairman

BY GORDON DEGEAR

Andrew "Jerry" Hansbrough has stepped down as chairman of the Langley Exchange Council after seven years of service. Hansbrough, chief of the Scientific and Technical Information Division, oversaw many significant changes to the Exchange operations during his tenure as chairman. Foremost was the completion of the Langley gymnasium and fitness center, Building 1222B in 1988, built primarily with non-appropriated funds.

After years of planning, the Langley Child Development Center completed two major additions in 1992, doubling its capacity for infant care and adding a new kindergarten facility. Also in 1992, was the addition of the Exchange Shop gift store in the main cafeteria, replacing the Langley Visitor Center gift counter.

The Exchange's busy 1992 also included its 75th anniversary employee picnic and "time capsule" participation. Another welcome addition, new snack vending machines were installed throughout the Center.

The main project for the Exchange in 1993 was the addition of the "Aerodyner" cafeteria, opened in July in Building 1202.

Hansbrough's successor in the position, appointed by Center Director Paul F. Holloway, is Jeffrey A. Parker, head of the Property and Transportation Branch. Parker has served as assistant to the director for Management Operations, head of the Industry Relations Office and assistant branch head of the Logistics Management Branch during his Langley career.

# *Nominations Sought for Seminars, Conferences and Fellowships*

Langley is seeking nominees for Office of Personnel Management (OPM) Management Development Seminars, Brookings Management Programs and NASA-sponsored fellowships. All group and division offices have received, or will soon receive, memoranda which list these programs, eligibility guidelines and recent Langley participants who can share their personal experiences about a particular program.

Management education programs at the OPM Management Development Seminar centers in Oak Ridge, Tenn., Lancaster, Penn. and Denver, Colo., are two-week seminars covering a variety of topics. They are open to GS/GM-13 and above who have not attended an OPM seminar in the last five years.

Brookings Institution conferences are for senior-level managers, GS/GM-15 and Senior Executive Service (SES) employees. Many of these one-week conferences are offered in Williamsburg and cover broad policy issues.

NASA-sponsored fellowships are available for both managers and non-managers from GS-12 to SES employees. The management fellowships offer an opportunity to study at Harvard University, Massachusetts Institute of Technology, Stanford University, Carnegie Mellon Institute, Penn State University, Syracuse University or Simmons College for periods from two weeks to one year. NASA also offers, in conjunction with National Space Club, three fellowships which are open to nonmanagement employees. These three allow recipients to pursue research or coursework at any institution in the United States or abroad, where a faculty sponsor can be 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 group level. All nominations must have group endorsement. Competition for these programs is limited to Langley civil servants. Group nomination deadline is July 7. For additional information, call Louise C. Hamilton, ext. 42571.

# *Look up in the sky!*

The following are status reports of some of NASA's missions currently in orbit.

## Voyager

Both Voyager 1 and 2 spacecraft are healthy as they head out of the solar system, and continue to collect data on fields and particles in their quest to detect the heliopause — the outer boundary of the Sun's energy influence. Both spacecraft are also using their ultraviolet spectrometers to look back at the Sun and study solar activities. Voyager 2 will use the spectrometer and the planetary radio astronomy experiment to observe the impact of comet Shoemaker-Levy-9 with Jupiter in July.

## TOPEX/Poseidon

The TOPEX/Poseidon satellite remains in good shape and its science instruments continue to collect oceanographic data on schedule.

The satellite has completed more than 8,500 revolutions of Earth since its launch Aug. 10, 1992. The mission is mapping global sea level changes to an unprecedented accuracy of less than five centimeters. The science data team continues to generate interim geophysical data records which are made available to the science community via the Physical Oceanography Distributed Active Archive Center. Data maps of global sea level change help scientists improve their understanding of seasonal warming and cooling, winds and global climate change.

## Ulysses

The Ulysses spacecraft, on its way to explore the polar regions of the Sun, is traveling through areas of space never before visited.

In this region well below the Sun's magnetic equator, the spacecraft has encountered a more tranquil zone where magnetic interference is at a minimum. Surprisingly, the solar wind originating from the Sun is speeding at double the rate (800-kilometers per second or about 2-million miles per hour) at which it normally flows along the equator.

During July the spacecraft will be in a position to measure radio emissions and plasma waves that ripple outward from a series of impacts caused by the collision of Comet Shoemaker-Levy-9 into Jupiter's gaseous atmosphere.

# Two Education Programs Highlight Teachers and Students

BY BRIAN FOWLER

There are two things one can always be sure of during the summer months at NASA Langley: First, the weather will be unbearably hot; and second, there will be a variety of students and guest researchers on Center.

Although these visitors may cause longer lines in the cafeteria or take up valuable parking spaces, they are an essential part of NASA's commitment to education. This commitment is fulfilled by a variety of programs offered by the Office of Education. Two such programs are the Teacher Enhancement Institute and the Governor's School NASA Mentorship Program.

### Teacher Enhancement Institute

The NASA/Langley Teacher Enhancement Institute is in its first year as a Langley program. It consists of two, two-week sessions (June 20 to July 1 and July 18 to July 29) for local primary, elementary and middle school teachers in science, mathematics and technology.

The program is being coordinated by American Society for Engineering Education (ASEE) summer faculty members Dr. Tina Marshall-Bradley, Dr. Lynn Lambert, Dr. Ron Simmons and Dr. Randal Carlson.

One of the program's goals is to explore tactics for transferring newly developed techniques and technologies to the classroom.

During the two-week sessions, teachers develop a one-week learning module, to be applied in the classroom, incorporating aeronautics into mathematics, science and even art lessons. Teachers also hear speakers on physics, mathematics, chemistry and robotics and have access to Teacher Resource Center materials. Each session includes a trip to the Virginia Air and Space Center and an opportunity to participate in flight instruction through Piedmont Aviation.

Marshall-Bradley said that, to apply for the program, teachers had to submit a one-page plan describing an innovative classroom activity in mathematics, science or technology that would include involvement of parents and the community.

This year, 200 teachers applied and 40 were selected to participate in the program.

"What makes this program different is that when the two weeks are over, the program doesn't really end," Marshall-Bradley said. "Post-institute follow-ups will be done to ensure that the participants are able to apply workshop strategies to their classroom, making it a useful experience benefiting teachers and students."

**The first group of teachers in Langley's Teacher Enhancement Institute pose in front of Langley's historic Variable Density Tunnel near the H.J.E. Reid Conference Center.**

### Governor's School NASA Mentorship Program

The Governor's School for the gifted, a NASA Mentorship Program, is a five-week program, from June 26 to July 29, for rising high-school juniors and seniors who anticipate a career in aerospace engineering.

During their five weeks, students live on the campus of the College of William and Mary and commute to Langley each day. On Center, they work with mentors on specific research projects. Last year, students worked on a variety of projects, including the Laser Atmospheric Sensing Experiment (LASE) and mathematical applications used with fluid dynamics.

The program, which is funded by the Virginia Department of Education, is designed to prepare students for the intellectual demands of science at the college level. By allowing the students to spend five weeks in a college dormitory, the program also prepares students for the social and emotional demands of college life.

In addition to their regular work, Langley students participate in College Week, an activity designed to give the students a sample of the many choices they will have among universities. During this week, the students are visited by representatives from two dozen colleges, giving them an opportunity to practice interacting with admissions officials.

At the end of the five weeks, students give presentations to the entire group about the project on which they worked.

This year, 15 students were chosen by the Virginia Department of Education to work at NASA Langley. More than 400 other students will take part in similar programs at the Virginia Institute of Marine Science, the Medical College of Virginia and the College of William and Mary.

*Brian Fowler is a LARSS student and a rising junior at Virginia Polytechnic Institute and State University.*

## *Volunteers are needed for Langley's Open House, July 16*

*(See Page 8 for details)*

# *25th Anniversary Apollo 11 Stamps To Be Issued*

BY KIRSTEN WILLIAMS

Plans to celebrate the 25th anniversary of the Apollo manned lunar landing have been signed, sealed and delivered courtesy of NASA and the U.S. Postal Service.

The Postal Service has commissioned two stamps in honor of the silver anniversary of the historic mission, a $9.95 express mail stamp and a 29-cent stamp. The stamps were jointly created by artists Paul Calle, designer of the original Apollo stamp, and his son, Chris Calle, designer of the 20th anniversary stamp.

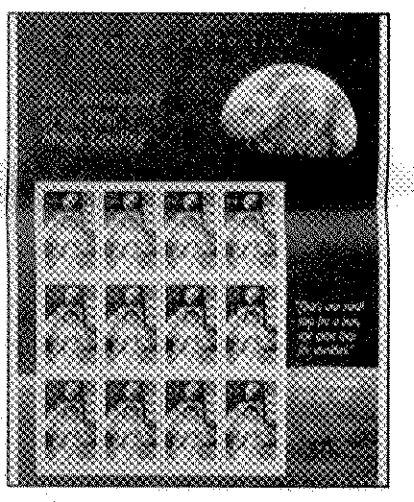
NASA and the Postal Service will dedicated the stamps at the National Air and Space Museum, where the artists will be on hand to autograph stamp sheets. Stamp ceremonies and first-day sales also will occur at ten NASA field centers. The stamps will also be dedicated at the Noordwijk Space Expo in Noordwijk, Holland, too.

Locally, on July 20 at 10 a.m., NASA Langley and the Hampton Postmaster will dedicate the express mail stamp and a miniature sheet of twelve, 29-cent stamps at the H.J.E. Reid Conference Center. The ceremony will be open to the public.

Following the ceremony, the stamps will go on sale in the Langley Room of the Reid Center for first-day pictorial postmarks. Express mail stamps will be sold individually, while the 29-cent stamps will be sold in sheets of twelve. NASA Langley and the main branch of the Hampton Post Office will be the only two sites in Virginia for first-day-of-issue cancellation, although the Postal Service will sell the stamps at all Hampton stations.

The Langley Exchange will sell cachet envelopes for $2.50 each in the Langley Room. NASA employees wishing to attend the dedication ceremony can charge their time to Job Order A1619.

*Kirsten Williams, a LARSS student, is a rising senior at the University of Virginia.*



**The 29-cent stamp is the focus of the U.S. Postal Service's poster advertising the new issue, at right.**
**Below, the Post Office is also issuing a $9.95 Express Mail stamp, celebrating the first moon landing in 1969.**

## Galileo Mission Beyond the Asteroid Belt

The Galileo spacecraft is now well beyond the asteroid belt, heading for its mid-July observations of Comet Shoemaker-Levy-9's impact with the night side of Jupiter. The spacecraft is still transmitting scientific observations and images stored onboard from its Aug. 28, 1993, flyby of the asteroid Ida and its newly discovered moon. The science team reported preliminary analyses of Ida and the Moon late in May.

The spacecraft is the only observer in a position to image the impact sites, which will be out of view of Earth. The data will be stored on Galileo's onboard tape recorder for later playback.

In July 1995, the spacecraft will release its Jupiter atmospheric entry probe. From that point, the orbiter and probe will fly separately to Jupiter. Probe entry, atmospheric data relay and orbit insertion will all occur on Dec. 7, 1995. The orbiter will then collect data about Jupiter, its major moons and its magnetosphere for the next two years.

## AIAA Technical Committee Members Announced

Fifteen Langley employees have been approved for new membership on American Institute of Aeronautics and Astronautics (AIAA) Technical Committees, bringing the total Langley membership for 1994-95 to 65. The AIAA Technical Committee memberships are very important appointments to Langley employees and to the professional society.

Langley members have long been recognized by the AIAA as vital members who have made valuable contributions to the committees through the years. A complete list of committees and Langley committee members follows. Aeroacoustics, Robert J. Mack and Ruth M. Martin; Aerodynamic Measurement Technology, Richard R. Antcliff; Air Breathing Propulsion, Laurence E. Leavitt; Air Transportation Systems, Alan Wilhite; Aircraft Design, Samuel M. Dollyhigh; Aircraft Operations, Charles H. Scanlon; Applied Aerodynamics, Richard L. Campbell and Elizabeth M. Lee-Rausch; Artificial Intelligence, Paul C. Schutte; Atmospheric Flight Mechanics, Robert D. Braun, John V. Foster and Dan D. Vicroy; Computer Systems, James F. Watson Jr. and Steven D. Young; Design Engineering, Dennis H. Petley and James H. Starnes Jr.; Digital Avionics, Daniel L. Palumbo; Economics, Arlene A. Moore; Flight Simulation, Jacob A. Houck and Marilyn E. Ogburn; Flight testing, Long P. Yip; Fluid Dynamics, Rosemary R. Baize and Patrick E. Rodi; General Aviation Systems, Eric C. Stewart; Ground Testing, David E. Reubush; Guidance, Navigation and Control, Luat T. Nguyen and Douglas B. Price; History, John E. Teter Jr.; Hybrid Rockets, David C. Beals; Interactive Computer Graphics, Winifred S. Feldhaus and Kam W. Hom; Life Sciences and Systems, Marston J. Gould; Liquid Propulsion, Roger A. Lepsch Jr.; Management, Kristin A. Hessenius and James L. Raper; Materials, David E. Bowles and Warren C. Kelliher; Missile Systems, Adolphus B. Blair Jr.; Multidisciplinary Design Optimization, Jean-Francois M. Barthelemy, Peter G. Coen, Jerry M. Newsom and Jaraslaw Sobieski; Nuclear Thermal Propulsion, Jag J. Singh; Plasmadynamics and Lasers, Lin H. Chambers and John U. Shebalin; Propellants and Combustion, G. Burton Northam; Sensor Systems, Sharon S. Welch; Software Systems, Robert F. Estes and Carrie K. Walker; Space Automation and Robotics, Jack E. Pennington; Space Systems, Roger Breckenbridge and Joseph B. Talbot, chairman; Space Transportation, William M. Piland; Structural Dynamics, Carl E. Gray Jr., Jennifer Heeg and Jill M. Marlowe; Structures, Jerrold M. Housner, John B. Malone and Richard E. Snyder; Systems Effectiveness and Safety, V. William Wessel, chairman; Systems Engineering, Robert J. Pegg; Technical Information Services, Thomas E. Pinelli and George J. Roncaglia; and Thermophysics, K. James Weilmuenster.

## Symposium Asks 'What is the Value of Space Exploration?'

A public symposium will take place July 18-19, 1994, in Washington, D.C., to address the question, "what is the value of space exploration?" The Mission From Planet Earth Study Office, Office of Space Science, at NASA Headquarters is planning the event, which will be held at the Gilbert H. Grosvenor Auditorium, National Geographic Society headquarters, in Washington, D.C.

The purpose of the symposium is to foster discussion and debate about the past, present and future value of space exploration, paying special attention to potential contributions in the post-Cold War world. Symposium planners are aiming to broaden the dialogue beyond the space community to include in the program, for example, economists, educators, historians, industrialists, and politicians. Opposing viewpoints will be sought to provide critical evaluation and analysis. Both robotic and human exploration will be considered.

The symposium is organized around two themes: how space exploration has influenced the world we live in, and how space exploration may influence the future. Speakers will address these themes in the context of topics such as science, the economy, education, and culture. The program will provide time for discussion among speakers and audience.

Robert M. Adams, Secretary of the Smithsonian Institution, is program chair and astronomer Carl Sagan will deliver a keynote speech. The University of Maryland at College Park is cosponsoring the event.

A summary report on the symposium, highlighting discussion themes, conclusions, agreements, and disagreements will be distributed to all participants and other interested parties. The event is free and open to the public, but tickets will be required. For more information, contact: Linda Billings, Code SX, NASA HQ, phone (202) 358-0872, fax (202) 358-3097, e-mail: lbillings@sl.ms.ossa.hq.nasa.gov

## *Virginia Air and Space Center News*

Virginia Air and Space Center
Hampton Roads History Center

### *New Film Fees*

The center has restructured its movie ticket prices. IMAX® tickets may be purchased separately. Prices are $5.50 for adults and $4.50 for children; fees for two films are $9 for adults and $5.50 for children. Fees for senior citizens and children, ages four through 12, are lower.

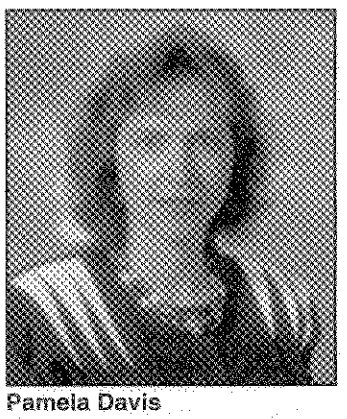
New summer operating hours, through September 30 are Monday – Wednesday, 9 a.m. to 5 p.m. and Thursday – Sunday, 9 a.m. to 7 p.m.

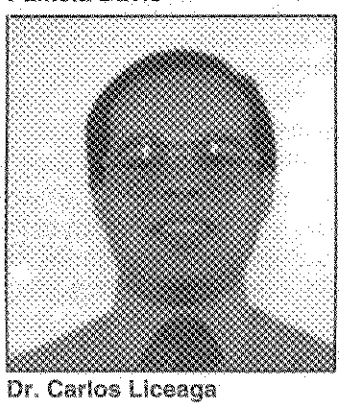
### *Membership Discounts*

As of July 1, NASA employees will receive a discount in purchasing a membership to the center. Discounted fees are: Bronze membership, $30 (regularly $35); Silver membership, $40 (regularly $50); and Gold membership, $85 (regularly $100). For detailed information, call Beth Pritchard, membership coordinator, at 727-0900, ext. 718.

## Davis and Liceaga Head for Academic Fellowships

This summer, two Langley employees will leave for Agency-sponsored academic fellowship programs. They are Pamela Davis, Landing and Impact Dynamics Branch, and Dr. Carlos Liceaga, Spacecraft and Sensors Branch.


Pamela Davis


Dr. Carlos Liceaga

Davis, an aerospace engineer, will attend the Smith College Management Program for Woman in early July. The three-week program, during both Summer '94 and '95, emphasizes the analytical, organizational and managerial skills of participants. Also covered are building support networks, organizational structures and team situations.

Davis began her Langley career in 1981 and is responsible for formulating experimental programs and conducting research of aircraft landing gear systems components. She has been involved in the NASA/Industry Radial Tire, the F-4 and F-16 Radial Tire Programs as well as other programs related to the effects of pavement surface treatment on their friction characteristics. She has a master of science degree in structural engineering from George Washington University.

"The Smith College Program," Davis said, "will allow me to enhance my management, leadership and administrative skills. This will help me attain my goals of motivating people to their greatest potential as well as leading them in reaching their own career goals."

Liceaga is attending the International Space University (ISU), from June 24 to Sept. 2. ISU promotes the peaceful exploration and development of space through education and research in 10 space-related fields.

Liceaga will travel to Barcelona, Spain, where he will spend four weeks studying the different areas in the Space Engineering Department and four more weeks studying specialty topics. His topics will focus on designing a spacecraft to travel to an asteroid and study it, and designing systems that would provide health and education to remote areas of the world using satellites.

Liceaga presently works on computers that perform command and data handling for satellites. He holds a doctorate in electrical and computer engineering from the Carnegie Mellon Institute. He began his Langley career in 1981 and teaches or has taught at Old Dominion University, the College of William and Mary and Thomas Nelson Community College.

## GWU Modifies Degree Programs

In the past academic year George Washington University (GWU) has modified the requirements for several of its engineering degrees. Through the Joint Institute for Advancement of Flight Sciences (JIAFS), GWU currently offers courses at Langley leading to the degrees of master of science (MS), engineer and doctor of science in the areas of aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, structural dynamics and structural engineering, and master of engineering management (MEM).

The required courses for the various areas for the MS degree have been consolidated and the number of required courses has been reduced. Currently three courses are required in the areas of aeroacoustics, aeronautics, astronautics and fluid mechanics and thermal science. Three courses are also required in the structural dynamics and structural engineering curriculum. The changes allow the student more flexibility in tailoring the MS degree to their interests. General requirements for the non-thesis MS degree remain unchanged.

The non-thesis MS degree has been modified to allow students to take up to two directed research or project courses which may lead to a paper. This allows students working on focused programs to obtain academic credit and to publish their work. The comprehensive examination for the non-thesis MS degree will no longer be required.

The requirements for the degree of engineer and for the doctor of science degree remain unchanged. Several courses have been modified and new ones have been added to the curricula during the last year.

The curriculum in engineering management has been modified extensively. One of the prerequisite courses has been deleted and most of the other courses have been reorganized to reflect current management activities. The comprehensive examination has been retained in the MEM program. For additional information on any of the GWU graduate engineering programs contact the JIAFS Office at ext. 41982.

# Open House Offers a Glimpse of the Past and a View into the Future

BY DIANA POPE

**In recognition of the Apollo 11 moon landing, Langley Research Center will have an Open House celebration. On Saturday, July 16, from 9 a.m. to 4 p.m., visitors to the open house will see a cross-section of Langley work.**

Though Apollo 11 astronauts set foot on the moon almost 25 years ago, visitors to Langley's Apollo Open House certainly will not be walking through the Langley Research Center of decades past. They will see cutting-edge research and technology proudly rooted in the past, yet clearly focussed on the future. Bert Rockey, Open House Project Manager, said, "The work Langley is doing today is vital to the future, just as the work we did many years ago on the Apollo program is recognized today."

Visitors will get a taste of the past and see two National Historic Landmarks: the Lunar Landing Research Facility and the Rendezvous Docking Simulator, both crucial elements of the Apollo success story. The open house, though, will focus on research and technology elements intrinsic to current aerospace programs.

The Apollo Open House will be a free, self-directed, walking tour of selected Langley facilities. Visitors can choose from a menu of facilities and visit sites in whatever order they prefer. Langley staff, stationed at each facility, will provide directions and explanations of exhibits.

Several of the exhibits will be youth-oriented and encourage visitor participation. Most facilities will be accessible to the disabled. The H.J.E. Reid Conference Center auditorium will feature a captioned Apollo film and exhibits about the Apollo program. For the convenience of visitors who are hearing impaired, a sign language interpreter will be available to host tours of the Center at 11 a.m. to 2 p.m. To take advantage of this opportunity, meet in the lobby of the conference center.

### BUILDING 1297

Today's Impact Dynamics Research Facility was originally used to simulate lunar landings during the Apollo program. A lunar module, suspended from the gantry, enabled astronauts to practice landing on the moon's surface. Presently, the facility is used to crash test full-scale aircraft. Test articles from crashworthiness tests will be displayed.

### BUILDING 1244

At the hangar, visitors will look to the ceiling to view the Rendezvous Docking Simulator, which allowed Apollo researchers and astronauts to practice docking vehicles in space. On the ground level, visitors will see several aircraft used at Langley, one of which (the Boeing 737) they may board for an interior view.

### BUILDING 1268A

"Flight simulation training was key to the Apollo 11 mission; most of the training the astronauts had for the mission was on simulators," says Simulation Systems Branch Head Billy Ashworth. Visitors to the Flight Simulation facility will see the Differential Maneuvering Simulator and the Visual Motion Simulator. Also, "junior pilots" can manipulate target models.

At the Transport Systems Research Vehicle (TSRV) Simulator, visitors will see the electronic moving map developed to aid pilots in taxiing. A brief video will provide more information on the TSRV and the Boeing 737.

### BUILDING 1220

At the Reliable Computers for Aircraft Safety exhibit, visitors will see reverberation test chambers where researchers test computers used in commercial aircraft for reliability and safety. Videos and posters will show testing processes particularly focussed on computer performance in intense electromagnetic fields that radars, radio broadcast transmitters, etc., create.

Visitors to the Space Robotics exhibit will learn about two important projects: the Hydraulic Manipulator Testbed (HMTB) and Omniview. The HMTB, which simulates an on-orbit, space manipulator experiment, will be featured in live demonstrations. Visitors will also see Omniview, which provides multiple, simultaneous, undistorted images of selected portions of the hemisphere directly in front of a television camera.

### BUILDING 1298

Researchers have designed the Guidance and Control for Advanced Aircraft exhibit to encourage visitor participation in various interactive demonstrations of guidance and control concepts. Children will earn certificates for operating a flight simulator used for control system development.

### BUILDING 1250

The Atmospheric Sciences Research Facility will feature several current experiments conducted aboard space shuttles and satellites including: Measurements of Air Pollution from Satellites (MAPS), the Halogen Occultation Experiment (HALOE), and the Light Detection and Ranging Experiment (LIDAR). A slide show will depict effects of biomass burning.

### BUILDING 1299

The Low-Frequency Antenna Test Facility simulates a free space environment for performing antenna measurements. Visitors will see the large test chambers and various test models used for conducting antenna research.

### BUILDING 1251

Visitors may also walk through the Unitary Plan Wind Tunnel. Aspects of virtually every supersonic military airplane, missile and spacecraft in the United States have undergone developmental tests here. The tunnel has operated continuously since 1955 — 14 years before the Apollo moon landing.

### BUILDING 1212

At the 14- x 22-Foot Subsonic Wind Tunnel, visitors will see various wind tunnel models prepared for testing. They will go into the tunnel test chamber and may also view a Bell Helicopter Tilt Rotor which researchers are currently testing.

### BUILDING 1208

"Most people have experienced noise," says researcher Andy Powell, "so they can relate to our work here in acoustics research." Visitors will hear (and feel!) a sonic boom demonstration, witness a demonstration of active noise control, and learn about noise reduction research. Children can explore characteristics of sound at an interactive display.

### BUILDING 1230

At the relatively new Nondestructive Evaluation (NDE) Laboratory, visitors will see how researchers use X-ray, ultrasonic and thermal equipment to view internal structures of materials used in constructing aircraft. Displays will elaborate on the processes and significance of examining materials for flaws and irregularities that might make an aircraft unsafe.

### BUILDING 1205

Researchers at the Materials Research Laboratory test the behavior of advanced structural materials under application of mechanical and thermal loads. Exhibits will feature advanced composites and light metallic alloy materials currently being developed for subsonic and supersonic commercial transport aircraft.

### BUILDING 1225

"The technician work force is an essential ingredient at NASA Langley," says Rockey. At the Advanced Machining Development Laboratory, work done by Langley technicians will be displayed: composite material aeronautical models, cast ceramic and metallic models, electronic packaging, space structures and facility fabrication, etc.

### BUILDING 1216

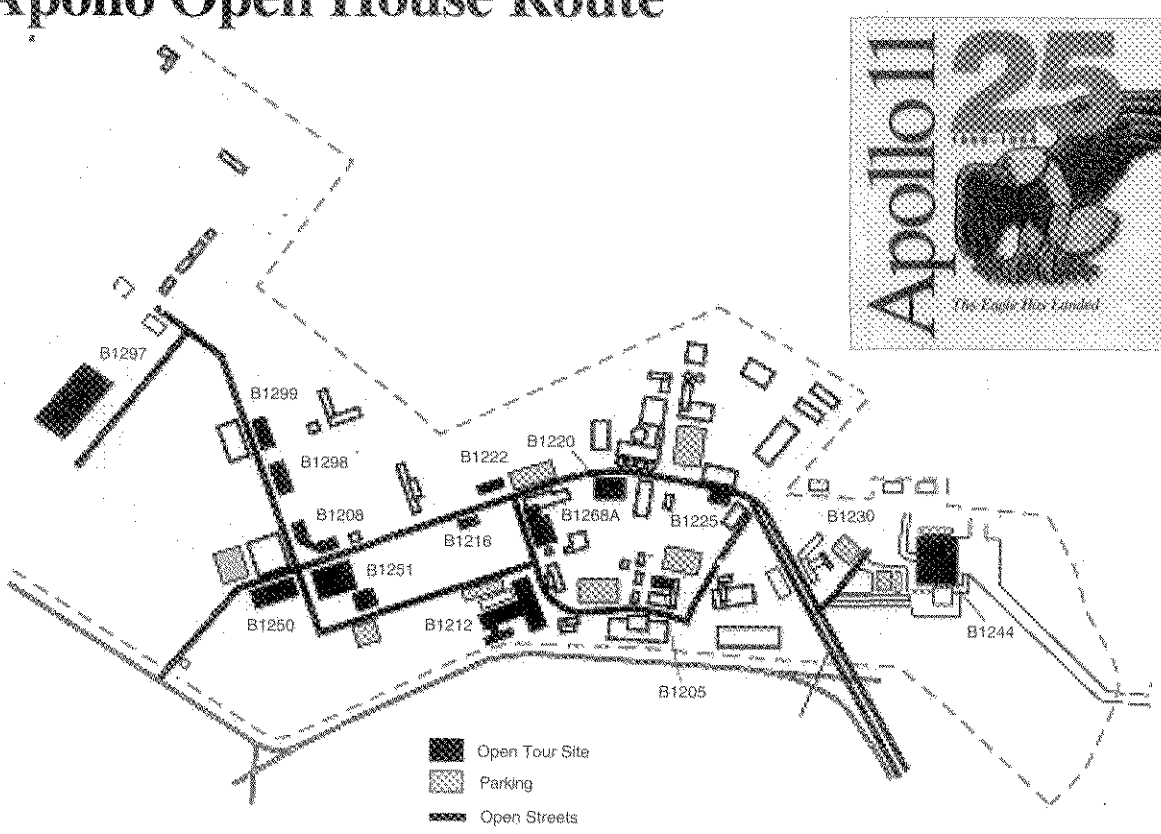
The Office of Education exhibit will feature demonstrations in the Teacher Enhancement Institute Computer Lab and examples of Distant Learning, which includes music provided by *Mission Earthbound* and *Stepping into the Unknown*. Actors from *Mission Earthbound*, an interactive television program designed to teach children about atmospheric sciences, will be signing autographs. Children can learn to make Cuderla Flyers, a paper plane.

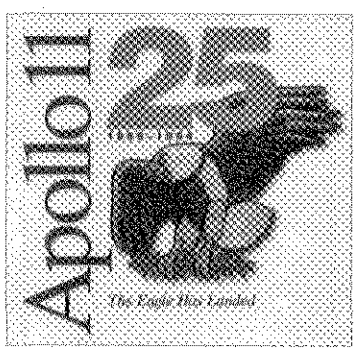
### BUILDING 1222

Also on July 16, the National Space Society will sponsor a model rocket launch on the H.J.E. Reid Conference Center grounds. For the price of the kit, approximately $5 per person, visitors can assemble and launch their own small rockets (details on page 8). Food and beverage will be also available on the grounds.

*Diana Pope is a LARSS student this summer at Langley. She is a rising junior at Vanderbilt University in Nashville, Tennessee.*

## Apollo Open House Route



# Happenings

**FOR RENT:** Poquoson apartment, 1 BR, 1 bath, furnished. Available June 1, $450 per month (includes electric and water). Call evenings 868-4608 or leave message.

**HOUSE FOR SALE:** Great assumption, Woodcreek, 3 BR, 2 baths, loft, living and dining rooms, fireplace w/gas logs, garage, privacy fence. New heat pump and water heater, all appliances, near Langley. Only $2,500 to assume 8 percent loan at $711/month. Call 874-3121.

**LIBRARY TOURS:** The Technical Library will offer tours every Thursday at 1:30 p.m. Tours start on the third floor lobby of the library. No reservations are required. Questions or comments can be referred to the reference staff at ext. 42356.

**FOR SALE:** Troy State University text for course on Public Personnel Management: Practices for the '90s; $10. Call 898-8463 evenings.

**FOR SALE:** Miniature Schnauzer, male, AKC registered, salt & pepper, born May 1. Call 898-5113.

**CELEBRATE:** Kick off Langley's Open House with a special outdoor celebration, Friday, July 15, at the H.J.E. Reid Conference Center picnic grounds, from 4:30-8:30 p.m. All employees and contractors are invited to attend. A "special invitation" is extended to all the wonderful folks who have volunteered their time in making the 25th anniversary Open House a success. The party will be moved into the conference center in the event of rain. This celebration is made possible by the NASA Exchange. For information, call Andrea Whitesides, ext. 46369.

**RETURN BORROWED ITEMS:** The Disability Program manager is taking inventory of all available equipment, videos, books, etc. If you have borrowed any of these items and forgotten to return them, please do so now so that accounting can be accurate. Questions should be directed to Diane Forrest, ext. 47718.

**FOUND:** Ladies watch found in Langley Credit Union parking lot. Call Tanya, ext. 44188.

**REUNION NOTICE:** The Bethel High School class of 1979 15-year reunion picnic will be on Saturday, August 6. Call Bethel High School or 766-0391 between 5 and 10 p.m. for details.

**NOTICE:** Langley Activities Association Basketball and Volleyball Open Play Rules state that the LAA Gym is for the use of NASA employees and contractors assigned to this Center. The LAA gym is not a public building. Everyone must have a security badge while using the facilities. For more information, call Andrea Whitesides, ext. 46369.

**SYMPHONY TICKETS:** Virginia Symphony '94-'95 Masterworks season will include Beethoven's *Symphony No. 9*, *Scheherazade*, *Pictures at an Exhibition*, Mahler's *Symphony No. 9* and other orchestral pieces. Dance season features *Romeo and Juliet*, *Cinderella* and Ballanchine. Pop series includes performances by Maureen McGovern, Crystal Gayle and Doc Severinson. For season tickets, call the ticket store at 380-0040.

**ROOMMATE WANTED:** Looking for non-smoking male/female to share new 2 BR, 2 bath townhouse in Coventry. Near Langley, all amenities, no pets; $400/month includes all utilities except phone. Six-month lease, $250 deposit. Call Jolene, (h) 496-1061, (w) 221-2419.

**FOURTH AT THE FORT:** Fort Monroe's Independence Day celebration on July 4 will include fireworks, live bands, exhibits and amusement rides and games. It is free and open to the public. There will be several bands playing from 4-10 p.m., all in the Walker Field area. Fireworks begin at 9:15 p.m. For more information, call 727-2312 or 727-3302.

**LOST BOOK:** *Software Engineering Economics* by Barry Boehm, call #QA 76.6, B618 1981, Technical Library #31176001729772. If found, call Larry Matthais, 766-9726.

**MODEL ROCKET LAUNCH:** To celebrate National Space Week, the National Space Society will host its annual model rocket launch starting at 10 a.m. Saturday, July 16 in the picnic area behind the H.J.E. Reid Conference Center. During the day, adults and children can purchase model rocket kits, then build and launch them. Astronaut Byron Lichtenberg will also be on hand for the event. For more information, call Doug Stanley, ext. 44518.

## Open House Volunteers Needed

**To ensure success of Langley's Open House commemorating the 25th anniversary of Apollo 11, volunteers are needed to work at the gates, parking areas, command center, etc. If you are willing to volunteer your time for the event on Saturday, July 16, please contact Nellie Freeman at ext. 42056.**

## *NASA Langley Open House Scheduled for July 16*

Langley is inviting the public to an Open House July 16, from 9 a.m. to 4 p.m. The Open House commemorates the 25th anniversary of the Apollo 11 Lunar landing — perhaps the most impressive achievement in modern history — when man took his first steps on the moon July 20, 1969. See Page 7 for details of activities and a list of open facilities.

Space Week, July 16-24, celebrations will include:

**July 16**

- The Open House will feature tours of key facilities at the Center, including the historic areas that supported the Apollo mission. Exhibits, videos and demonstrations will highlight current research technology and its application to industry.

**July 20**

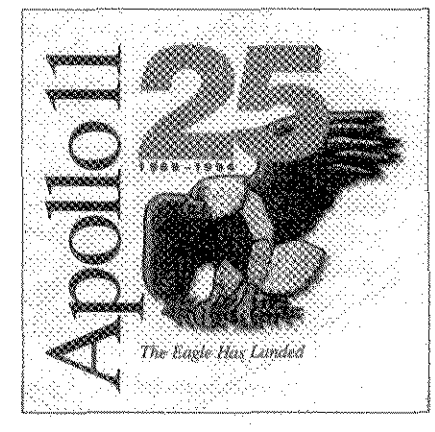
- First Day Issue of U.S. postage stamps celebrating the 25th anniversary of Apollo 11. See Page 5 for details.
- Colloquium Series speaker John Houbolt, 2 p.m. at the H.J.E. Reid Conference Center. Houbolt is one of the scientists whose concept of the Lunar Orbit Rendezvous made it possible for the United States to land men on the moon. Houbolt will also speak at 7:30 p.m. at the Virginia Air and Space Center as part of the Sigma Series.
- *Blue Print for Space* opens at the Virginia Air and Space Center

**July 23**

- Free admission to the Virginia Air and Space Center with NASA I.D. card; charge for IMAX® films.

**• The Langley Cafeteria will feature special Apollo menus during the week of July 18-22 to celebrate Space Week.**

**• Month-long activities during July at the Virginia Air and Space Center include special Apollo items for sale in the Gift Shop; special exhibits on Apollo and other earlier missions; and bus tours of NASA Langley Research Center.**




***Mark Your Calendars for These Special Apollo Events during Space Week!***

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Researcher News

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**Langley Research Center**
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National Aeronautics and Space Administration
Langley Research Center

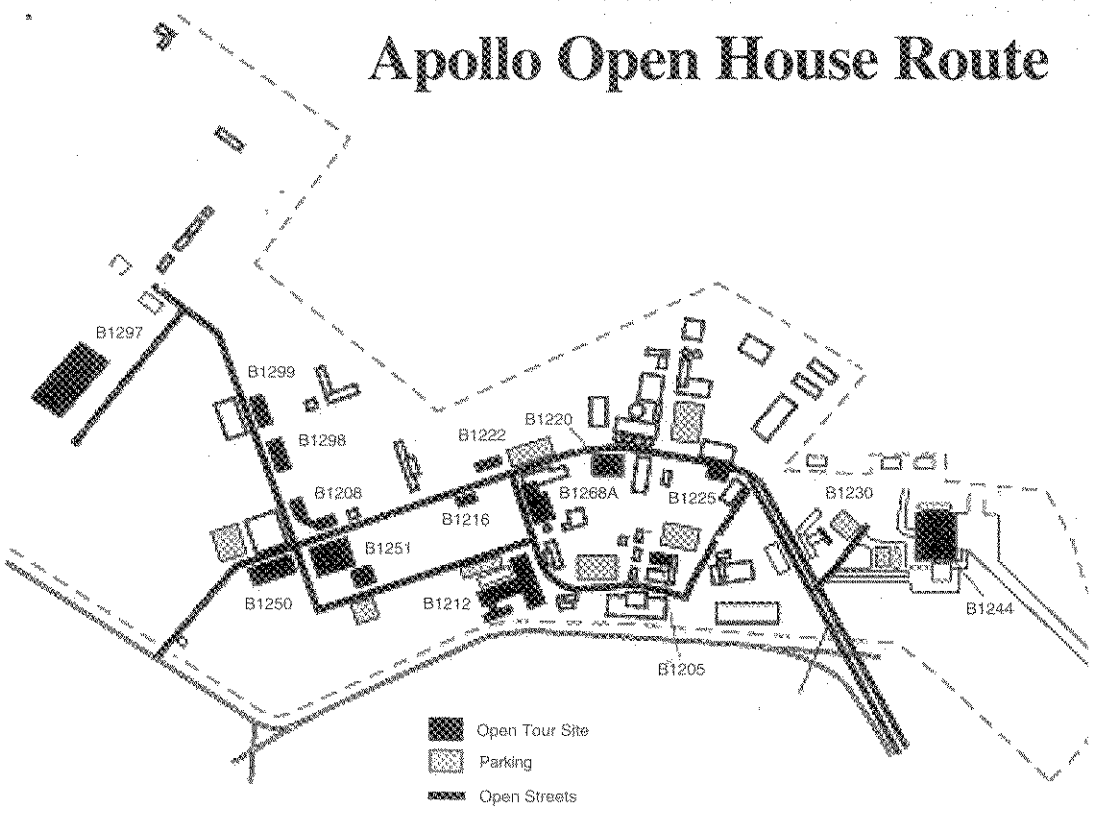
Apollo 11 25 1969–1994 The Eagle Has Landed

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 14 ❖ July 15, 1994

## Apollo Open House Route



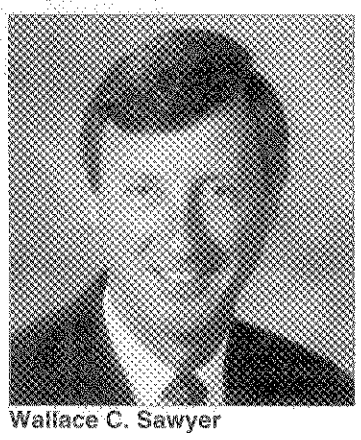

## Langley Open House Guide to Facilities

The following Langley facilities will open their doors to the public from 9 a.m. to 4 p.m. at the Open House Saturday, July 16, celebrating the 25th anniversary of Apollo 11. (See map above)

| Building | Topic |
|---|---|
| **B1205 Materials Research Laboratory** | Composites and light alloy material developments for next generation commercial aircraft. |
| **B1208 Acoustics Research Laboratory** | Acoustic and noise reduction developments and unique helicopter noise reduction method. Hear "sonic boom" minimization. |
| **B1212 14- x 22-Foot Subsonic Wind Tunnel** | Large subsonic wind tunnel test section; Bell Helicopter tilt rotor model being tested. |
| **B1216 Office of Education** | Educational projects, demonstrations, displays and community outreach. |
| **B1220 Information Research Facility** | Computer developments for aircraft safety, space robotics and single camera multi-imaging. |
| **B1222 H.J.E. Reid Conference Center** *Special Center tours with interpreter for the hearing impaired at 11 a.m. and 2 p.m.* | **Grounds:** National Space Society rocketry; buy, build and launch a model rocket. Food and beverages available. **Inside:** Apollo film will be shown hourly (captioned for the hearing impaired); display tables. |
| **B1225 Advanced Machine Development Laboratory** | Fabrication capability exhibits including precision casting, micro-electronics, structural assemblies and numerical control machining. |
| **B1230 Instrument Research Laboratory** | Nondestructive methods of examining aircraft parts to improve reliability and safety, and reduce costs. |
| **B1244 Flight Research Hangar** | Display and explanation of aircraft used in Langley's research programs. |
| **B1250 Atmospheric Sciences** | Displays, including a video and computerized slide show of aircraft and space experiments that measure atmospheric properties and global trends. |
| **B1251 Unitary Wind Tunnel** | Supersonic wind tunnel complex: test models, control room, test sections and tunnel drive system. |
| **B1268A Flight Simulation Laboratory** | Recent developments in pilot displays are demonstrated using a Boeing 737 cockpit simulator. In the Flight Simulation Facility, simulated flight is demonstrated by the Differential Maneuvering Simulator and the Visual Motion Simulator. |
| **B1297 Impact Dynamics Research Facility** | Controlled and instrumented aircraft crash tests lead to improvements in aircraft safety designs. |
| **B1298 Guidance and Control Research Laboratory** | Aircraft guidance and control for safe future aircraft including basic concepts and a "hands-on" flight simulator. |
| **B1299 Electromagnetics Research Laboratory** | Large, low-frequency antenna chamber that simulates a free-space environment for conducting antenna research. |

## Sawyer Leads Langley's High-Speed Research Project Office

BY KIRSTEN WILLIAMS


Wallace C. Sawyer

Wallace C. Sawyer has been named director of the High-Speed Research Project Office at Langley.

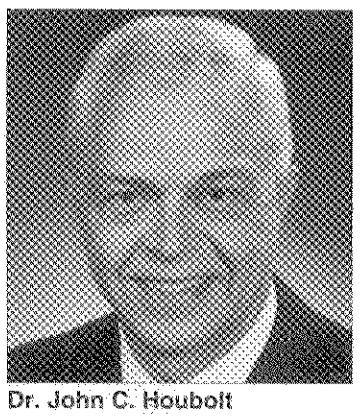
As director, Sawyer will oversee Langley's efforts as lead center for NASA's High-Speed Research Program. He will also provide project leadership for activities conducted at NASA Lewis and Ames Research Centers. Sawyer will be responsible for leading the development of critical technologies in the areas of aerodynamic performance, airframe materials and structures, flight deck technology, propulsion technology and system integration to support the development of a potential high-speed civil transport.

Sawyer served as deputy director of the Aeronautics Program Group at Langley from February to June 1994. As deputy director, he was responsible for strategic planning, advocating for resources, maintaining external and internal customer interfaces, and coordinating aeronautical systems analyses studies.

Sawyer began his Langley career in 1965 as an aerospace engineer. He has served as head or assistant head of several branches; assistant chief of the Advanced Vehicles Division; acting deputy director of Aeronautics for High-Performance Aircraft at NASA Headquarters; chief, Advanced Vehicles Division; and acting deputy director for Aeronautics at Langley.

Sawyer received a bachelor of arts degree in physics and mathematics from Elon College in North Carolina and has done graduate work in physics at the College of William and Mary and in engineering management at George Washington University. The author or co-author of 45 technical publications and a chapter in a technical textbook, Sawyer is an associate fellow of the American Institute of Aeronautics and Astronautics (AIAA).

## Apollo Lunar Landing Mission Is Topic of July Colloquium


Dr. John C. Houbolt

Dr. John C. Houbolt, former chief scientist at Langley, will review space activities between 1957 and 1969, at a Colloquium, Wednesday, July 20, at 2 p.m. in the H.J.E. Reid Conference Center. His talk will highlight the struggle to have the Lunar Orbit Rendezvous (LOR) and the Lunar Module (LM) adopted for use. He will detail how they emerged as the choice for landing humans on the moon on July 20, 1969.

Houbolt, a distinguished aeronautical engineer, was a key player in the development of the Lunar Orbit Rendezvous and the Lunar Module. He began his career at Langley in 1942 and served as associate chief of the Dynamic Loads Division from 1949 to 1961 and chief of the Theoretical Mechanics Division from 1961 to 1963. From 1963 to 1975, he worked in the aerospace industry before returning to Langley in 1976. He was Langley's chief scientist until his retirement in 1985. Houbolt authored or co-authored more than 140 technical reports and, in 1983, he received a Space Act Award for the conception and development of the LOR concept. Houbolt was selected as the Peninsula Engineer of the Year in 1989, and was elected to the National Academy of Engineering in 1990.

He will also speak on the Apollo Lunar Landing Mission at 7:30 p.m., July 20, at the Virginia Air and Space Center as part of the Sigma Series.

# News Briefs

## EOSDIS Unveiling Ceremonies Slated for July 20

BY KIRSTEN WILLIAMS

Center officials will celebrate the beginning of construction for the new Earth Observing System Data and Information System (EOSDIS) and Distributed Active Archive Center (DAAC) building at the corner of Langley Boulevard and South Wright Street on Wednesday, July 20 at 9 a.m.

The Honorable Ralph M. Hall, chairman of the Subcommittee on Space, Committee on Science, Space and Technology, will be the keynote speaker for the dedication ceremonies.

EOSDIS is an information system supporting the Earth Observing System (EOS), an essential part of the Agency's Mission to Planet Earth program. EOS, a long-term "global change" research program, is designed to improve our understanding of the Earth's system of natural processes involving the atmosphere, oceans and land. The program focuses on the causes and processes of global climate change. Through this study, scientists hope to be able predict climate changes and see how human activities affect climate changes and vice versa.

The EOS program involves several flight projects, research and information systems like the Data and Information System. Langley has also been designated one of eight DAACs for the EOS program. The Langley DAAC will store information about clouds, aerosols, tropospheric chemistry and the Earth radiation budget, and help customers access that information. The other DAACs will store information on different global change topics, but a customer can access DAAC and get information from all eight.

Through the EOS and Mission to Planet Earth programs, scientists intend to develop the knowledge necessary to support the complex environmental policy decisions looming ahead.

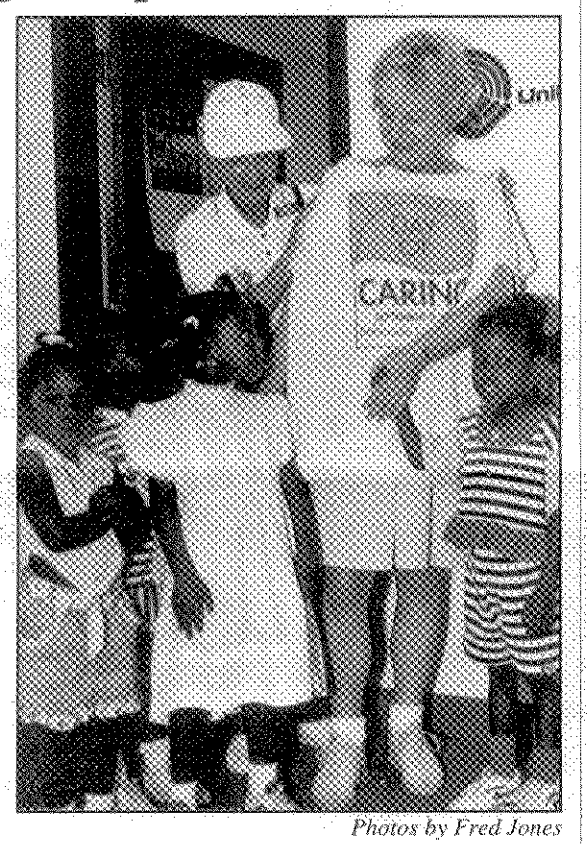
## *1994 Day of Caring Set for September 8*

NASA Langley will join Virginia Power, Newport News Shipbuilding, Riverside Hospital and other community-minded organizations to sponsor this year's community Day of Caring to be held September 8.

Last year, the Day of Caring mobilized more than 600 volunteers from area businesses and federal facilities to help the community. Volunteers did general clean-up, fix-up chores, worked at day camps for children, audited financial records, served as teacher's aides, worked at a food bank, programmed computers or used their plumbing, electrical, air-conditioning, landscaping or carpentry skills.

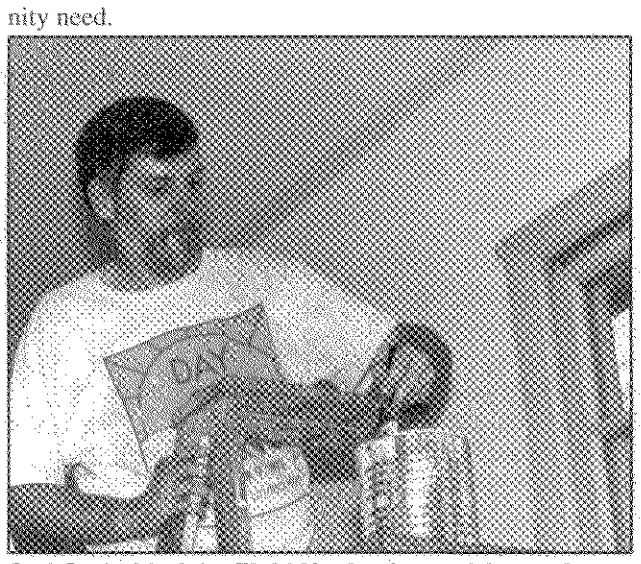
Civil servants interested in participating in the 1994 Day of Caring should contact Marny Skora, Langley's Community Service Officer, at ext. 43315 for a volunteer form. The first 100 Langley employees to register will be granted administrative leave for this community service activity. Contractors who wish to participate should contact their corporate office.

Day of Caring tasks are many and varied — but all are singularly focused on community need.



*Photos by Fred Jones*

**Helen Bruce (right), Information Systems Division, and Margaret Gieseking, recently retired, spent the day with the children of the Downtown Hampton Child Development Center. It was a toss up as to who had more fun!**



**Carl Gerhold of the Fluid Mechanics and Acoustics Division, employed his painting talents to fix-up Girl Scout Camp Skimino. He was pleased with the results of the day's labor.**

### Announcement

## Termination of Early Buyout/Early Out

At the senior managers' retreat held in Washington, D.C., on June 23, Center Director Paul F. Holloway was informed that there would be no further buyout activity under the current legislation which expires March 1995. In addition, the authority for "early out" retirement will expire August 2, 1994. There are no plans to extend this authority. Questions may be directed to Linda Park at ext. 42605.

## Pinelli Given Outstanding Article Award

BY BRAD DOUGHERTY

Dr. Thomas E. Pinelli has received the Technical Communication Outstanding Article Award for 1993. Pinelli was recognized for his article titled "The Impact of Language and Culture on Technical Communication in Japan." The Society for Technical Communication presented the award during their annual conference in Minneapolis. The other authors of the article were John R. Kohl and Rebecca O. Barclay of Rensselaer Polytechnic Institute, Michael L. Keene of the University of Tennessee at Knoxville, and John M. Kennedy of Indiana University.

The article was determined to be the best one published in *Technical Communications*, the Journal of the Society for Technical Communication. The award winning article deals with the communication practices of aerospace engineers and scientists and the use of the Japanese language in aeronautics. Since Japanese culture has many differences from the western world, it is instructive to examine the Japanese system of communication, according to Pinelli. "The Impact of Language and Culture on Technical Communication in Japan" explores the effect of language and culture and supports its findings with empirical data.

The article was part of a research project sponsored by NASA and the Department of Defense. The purpose of the study was to examine the flow of scientific and technical information on the individual, organizational, national, and international levels. The study results should increase productivity and innovation in the aerospace industry due to the improvement in communication.

In 1974, Pinelli began his NASA career as an administrative operations specialist. He was named head of the Visual Imaging Branch, Scientific and Technical Information Division, at Langley in June 1994. He received a doctorate in Library and Information Science from Indiana University. Pinelli has received numerous awards including the American Society for Information Science's Doctoral Dissertation Award.

He is a member of the American Institute of Aeronautics and Astronautics, the American Society for Engineering Education, and the Society for Technical Communication. Since 1985 Pinelli has served as the associate editor for Research of *Technical Communications*.

*Brad Dougherty is a rising senior at Indian River High School in Chesapeake. He is a Governor's School student this summer at Langley.*

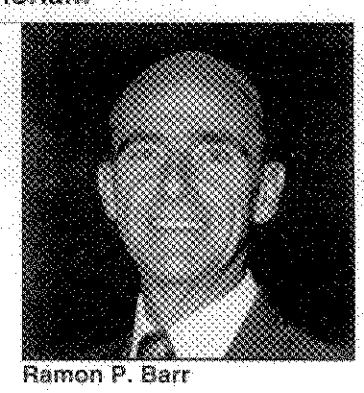
### Letters

## Thank You Note

From Edna Cox: "I want to express my thanks to all of my friends and co-workers who attended my retirement luncheon and contribution to my gifts. Your kindness will be remembered forever. It was a beautiful way to end my NACA/NASA career."

### In Memoriam

## Ramon P. Barr



**Ramon P. Barr**

Ramon Paul Barr, 59, a native of Pottsville, Penn., and long-time Peninsula resident, died Sunday, June 26. He was a Poquoson resident for more than 50 years.

Barr began working for Langley in 1961, and was a 1963 graduate of the Langley Apprentice School. He became assistant chief of the Operations Support Division in 1989. He served as a technician and a manager providing support to laboratories, wind tunnels and the city of Langley, according to those who worked with him.

## Roland Tully

Roland Tully, age 72, who worked at Langley for 40 years as a fine-instrument machinist and supervisor, died June 6. Tully began working for the National Advisory Committee for Aeronautics (NACA), in 1939 and he retired from Langley in 1977.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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Editor. . . . . Ann C. Gaudreaux
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All materials are subject to editing.

# Langley's LITE Will Be Primary Payload on September Shuttle

BY MARCIA WESTMORLAN

When the Space Shuttle Discovery roars into space Sept. 9, it will carry the nine-year hopes and labors of a cross-section of Langley scientists, engineers and technicians: The Lidar In-Space Technology Experiment (LITE).

That mission's primary payload will be an instrument, conceived and built at Langley, that will capture a truly global view of the world's weather patterns and atmospheric phenomena.

Lidar, which stands for light detecting and ranging, has been an important tool for gathering atmospheric data with lidars based on the earth and in aircraft for almost 30 years. This remote sensing technique measures such things as cloud and aerosol height and movement. It has provided a powerful means of studying various aspects of the lower and middle atmosphere, (the troposphere and the stratosphere), and has contributed to our understanding of the role of clouds and aerosols in climate and ozone depletion.

Ground-based lidar instruments profile the atmosphere over a single viewing site, while lidars onboard aircraft can gather upward- or downward-looking data over a wider area. But each of these methods is limited to sampling a comparatively small region. A space-based lidar offers a truly global view.

With lidar in space, scientists hope to collect information on weather patterns and atmospheric phenomena that is not possible from the ground or from aircraft. The information retrieved will help scientists create better climate models.

### A Technology and Science Mission

Because this mission marks the first time a lidar has been used in space, the basic hardware performance of the lidar will be closely monitored by the engineers who built it. They will be monitoring how well LITE handles the rigors of launch, operation in space and landing.

The emphasis on technology testing is evident in the name LITE, Lidar In-Space Technology Experiment.

This focus on technology and science is also evidenced by the ongoing cooperative Langley effort which involves engineers who are designing and building the instrument and their constant interaction with the atmospheric scientists who will study and interpret the data provided by LITE.

Project Manager John Rogers and his team have taken laborious steps, such as simulations and a two-day readiness review, to make sure LITE's hardware will work in space. A working lidar system will enable Project Scientist Pat McCormick and his team to gather the science data they want.

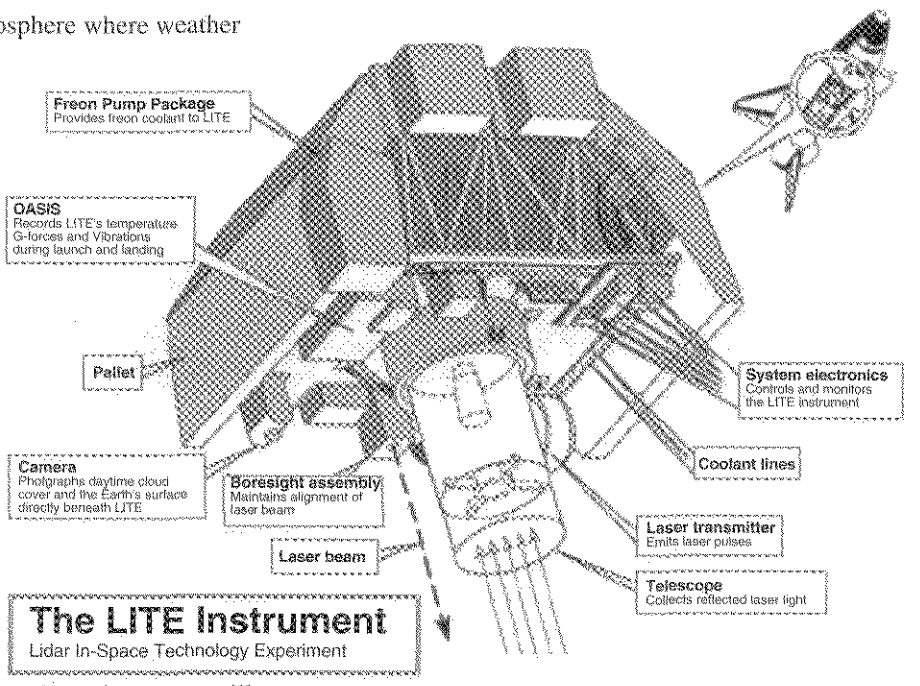
### How Lidar Works

Lidar is similar to the radar commonly used to track everything from airplanes in flight to thunderstorms. But instead of bouncing radio waves off its target, lidar uses short pulses of laser light. Some of that light reflects off of tiny particles in the atmosphere, or aerosols, then back to a telescope aligned with the laser. By precisely timing the lidar "echo," and by measuring how much laser light is received by the telescope, scientists can accurately determine the location, distribution, and nature of the particles. The result is a revolutionary, new, space-based tool for studying particulates in the atmosphere, from cloud droplets to industrial pollutants, that are difficult to detect by other means.

Lasers also produce a tight, coherent beam that does not spread apart as much as ordinary light. From an orbital altitude of 300 kilometers, LITE's pencil-wide laser beam would spread to only 300 meters wide at the surface — about the size of three football fields. This allows the LITE instrument to measure a very small, narrowly defined column of the atmosphere with each pulse. A space-based lidar offers another great advantage in its ability to penetrate thin or broken clouds to "see" through to the troposphere — the lower part of the atmosphere where weather systems form.

### Geographic Areas Studied

A wide variety of phenomena which occur in particular geographic areas will be studied. Representative examples include the organization of clouds in the western Pacific warm pool, marine stratus decks off the coasts of California and Peru, marine stratus cloud decks and plumes from biomass fires in South America and Africa, and the transport of desert dust from the Sahara Desert. Tropospheric aerosols will be studied over the Amazon rain forest, and gravity waves will be studied over the Andes Mountains in South America; and reflection properties of desert surfaces in the United States, Africa and China.




**The LITE Instrument**
Lidar In-Space Technology Experiment

### Coordinating ground truth data

An important part of the LITE mission is its ground truth program. Ground truth data provides a known standard against which information collected from the orbiter platform can be compared for the purpose of verifying the accuracy of LITE's atmospheric measurements.

The LITE instrument will take 45 hours of data including a number of 15-minute "snapshots" over target areas selected either for scientific interest or to support validation observations. At specific locations, aircraft carrying lidars and numerous ground-based lidars will make measurements at the same time under the path of shuttle. The lidars will collect similar data. A lidar at Langley, for example, will take upward-looking data at the exact time the space shuttle is passing overhead. Among the other "snapshot" targets are sites in Europe, Australia and the Sahara Desert (to observe desert dust aloft). About 52 sites in 15 countries will make ground-based measurements during LITE overflights. In addition, balloon and aircraft measurements will be made of aerosol, cloud and surface parameters and their radiation characteristics to help validate and make more useful the LITE data.

This collection of ground truth data will be performed jointly with both U.S. and international aircraft with a total of five aircraft making numerous coordinating flights. The international team includes Canadian and European aircraft.

### The LITE mission

The LITE instrument will be mounted to a pallet inside the open payload bay of Discovery, which will orbit upside-down at a relatively low altitude, 260 kilometers or 140 nautical miles, so that each downward-pointing lidar pulse is dispersed as little as possible on its way down through the atmosphere. Over the course of its nine-day mission, LITE will operate and collect atmospheric information during ten approximately four-and one-half hour sessions (for a total of about 45 hours.) In addition, five 15-minute "snapshots" will be performed over specific target sites. The measurements will include observations of clouds, tropospheric and stratospheric aerosols, characteristics of the planetary boundary layer, stratospheric density and temperature, and a number of surface characteristics.

During those periods, the returning lidar signals collected by LITE's telescope will be converted to digital data, which will be stored on tape and simultaneously transmitted down to investigators on the ground.

Space Shuttle Discovery, orbiting at an inclination of 57 degrees to the equator, will pass over most of the planet's surface every 90 minutes. The LITE instrument will be able to collect data for a wide range of geographic and atmospheric settings, including the open ocean, in a very short period of time.

LITE's lidar instrument will flash extremely short pulses of laser light directly downward, ten times every second. These pulses, lasting less than 30 billionths of a second each, will be in three different wavelengths corresponding to ultraviolet, infrared and visible green light. The signals returning to the space shuttle after reflecting off of small airborne water or ice droplets and aerosols (suspended particles) are easy to identify. Timing the returned signal pinpoints the particles to within an accuracy of 15 meters or approximately 50 feet.

## Letter from the Chairman of SCPD

The new year has started for the committee and summer is here. Welcome to all of the members that have joined the Satellite Committee for People with Disabilities (SCPD) during the last few months. I hope that we can be of service to you this year, both new members and old. How can we be of mutual service to each other? As President John F. Kennedy said, "Ask not what your country can do for you, ask what you can do for your country." The same goes for SCPD.

We are a great group with much more potential than we use. We have accomplished many things in the past, and hope to do many more in the future. We need your help and have many areas where your input and ideas are welcomed:

- Make a commitment to the SCPD as a member and/or an officer, a member of the Disabled Persons Advisory Committee (DPAC) or the Disabilities Program;
- Participate on one of the following subcommittees: training; technology and equipment; recruitment/placement; historical/publicity; awareness; activities/conferences; accessibility; or budget;
- Deaf Awareness Week (Sept. 18-24);
- Disability Awareness Month (October)

These are just a few key functions where volunteers are needed. Your help is needed any time on any of our committees or projects. If you want to help in planning our many functions, join us at the SCPD meeting on the second Wednesday of each month in the cafeteria dining room or contact Beckie Williams, ext. 44534, Mail Stop 124.

Thank you for supporting the committee's efforts.

*— William M. Vance*
*Chairman of the Satellite Committee for People with Disabilities*

# 25th Anniversary of Apollo 11

## Langley's Lunar-Orbit Rendezvous Makes Apollo 11 a Success

*"Americans can view the successful landing of Apollo 11 with immense pride and satisfaction. It was a noble mission. It spoke well for what mankind can accomplish, given the goal and the will to attain it.*

*"That the dream of today can become the reality of tomorrow was once again demonstrated in eloquent fashion. The world needed such a demonstration to help restore its faith in a future where even more difficult tasks loom large."*

***— Edgar M. Cortright, former director of Langley***

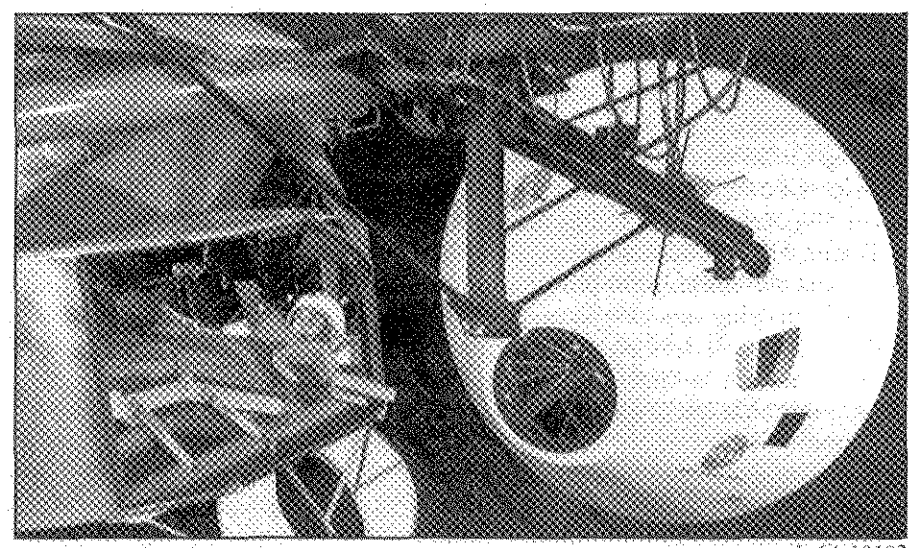
### How to Get to the Moon?

When President John F. Kennedy made his historic decision in May 1961 to land Americans on the moon before the end of the decade, NASA had studied various ways to accomplish that task. They were uncertain, however, which way was best. Mission planners narrowed the options to three: direct ascent, Earth-orbit rendezvous (EOR) and lunar-orbit rendezvous (LOR).

In July 1962, after months of evaluation and intense debate, NASA selected LOR as the primary mission mode to land astronauts on the moon. Direct ascent, a favorite of NASA officials, was ruled out because of the huge new launch vehicle required to accomplish the mission — the proposed Nova rocket that would take too much time to develop. The EOR concept was ruled out because it required two separate launch vehicles.

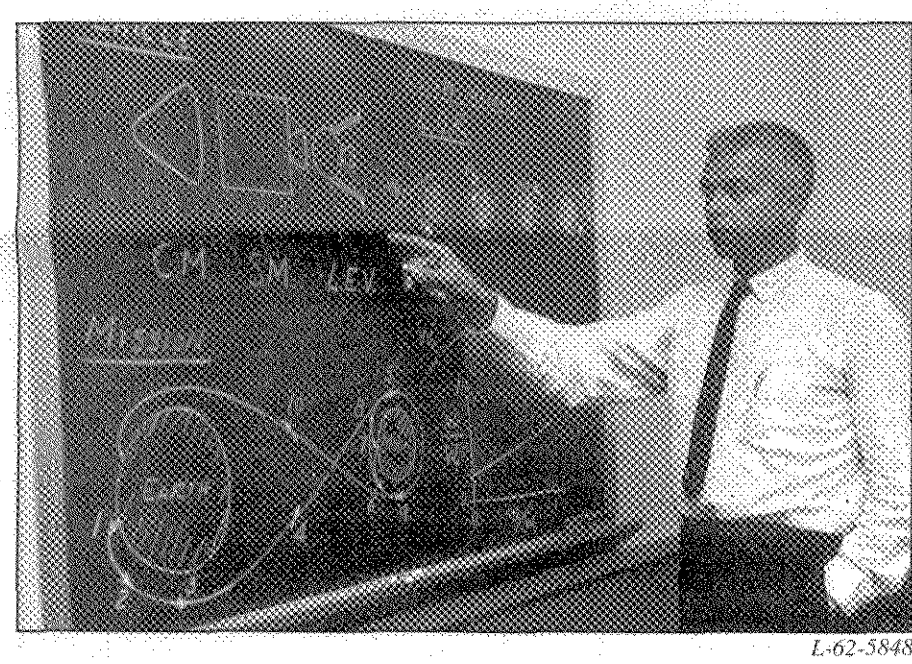
NASA selected LOR after Langley researchers proved the feasibility of rendezvous in space and revealed the important engineering and economic advantages of a manned moon landing through lunar-orbit rendezvous. Advocates of LOR at Langley played vital roles in convincing NASA leadership that LOR was not only as safe as either direct ascent and Earth-orbit rendezvous, but it also promised mission success some months earlier.

Several of the most significant facilities used to develop techniques for LOR and prepare the astronauts for Apollo missions were designed, built and operated by Langley.



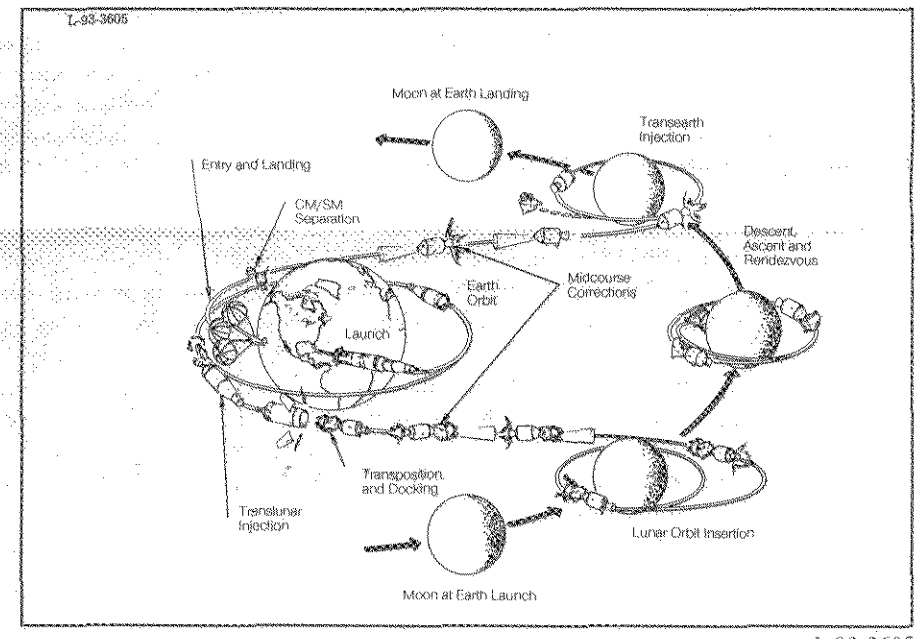
L-64-10192

**Lunar-orbit rendezvous required docking the lunar module with the command module in lunar orbit. Astronauts practiced the complex task of separating and uniting spacecraft to master docking techniques in Langley's Rendezvous and Docking Simulator, now a National Historic Landmark.**



L-62-5848

**Dr. John C. Houbolt, in this 1962 photo, explains the lunar-orbit rendezvous concept that, in the opinion of many historians, was chief among the reasons why the United States, in less than a decade, managed humankind's first extraterrestrial excursion. Houbolt will be the speaker for Langley's July Colloquium, July 20. See story and photo on Page 1.**




L-93-3605

**A stage-by-stage lunar mission profile shows the path and maneuvers of the Apollo 11 mission from lift-off to landing.**

### *The Lunar-Orbit Rendezvous (LOR) Concept*

The brainchild of a few true believers at Langley who had been experimenting with the idea since 1959, the basic premise of LOR was to fire an assembly of three spacecraft into Earth orbit on top of a single powerful rocket (Saturn V). This assembly would include: one, a mother ship or command module (CM); two, a service module (SM) containing the fuel cells, attitude control system and main engine; and, three, a small lunar lander or excursion module. Once in Earth orbit, the last stage of the rocket would fire, boosting the combined Apollo spacecraft into its flight trajectory to the moon. In lunar orbit, two crew members would don space suits and climb into the lunar excursion module (LEM), now called lunar module (LM), and take it down to the surface. The third crew member would maintain a vigil in lunar orbit in the mother ship. After exploring, the LM would rocket back up and dock with the CM. The lander would then be discarded in space or crashed into the moon, and the three astronauts and their command ship would head back to Earth.

Langley's bold plan for rendezvous in lunar orbit held out the promise of achieving a manned landing on the moon by 1969, but it presented many technical difficulties. Success depended on NASA's ability to train astronauts to master the techniques of landing the LM on the lunar surface, returning it to orbit, and docking with the mother ship.

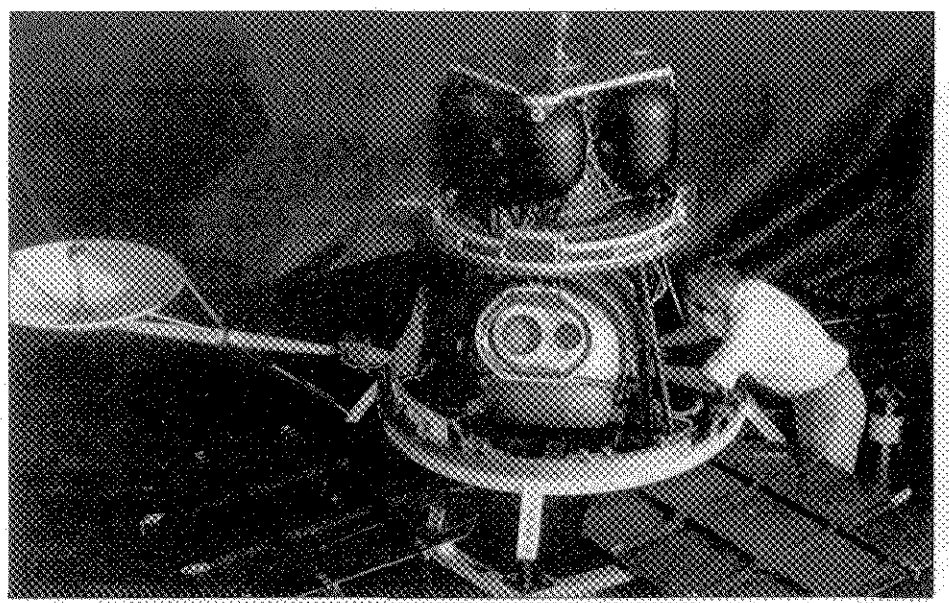
### *Objections to LOR Overcome*

When Langley engineers first suggested the concept of a lunar-orbit rendezvous (LOR), NASA had rejected it for being too complicated and risky. If rendezvous had to be a part of Project Apollo, critics of LOR felt it should be done only in Earth orbit. If that rendezvous failed, the threatened astronauts could be brought back home simply by allowing the orbit of their spacecraft to deteriorate. But if a rendezvous around the moon failed, the astronauts would be too far away to be saved. Nothing could be done.

In retrospect, it is now known that LOR enjoyed several advantages over the other two options. It required less fuel, only half the payload and less brand-new technology than the other methods. It did not require the monstrous Nova rocket; and it called for only one launch from Earth whereas the Earth Orbiting Rendezvous (EOR) required two. Only the small, lightweight lunar module (LM), not the entire spacecraft, would have to land on the moon. This was perhaps LOR's major advantage. Since the lander was to be discarded after use, and would not need to return to Earth, NASA could tailor the design of the LM for maneuvering flight in the lunar environment and for a soft lunar landing. In fact, the beauty of LOR was that it meant that NASA could tailor all of the modules of the Apollo spacecraft independently.

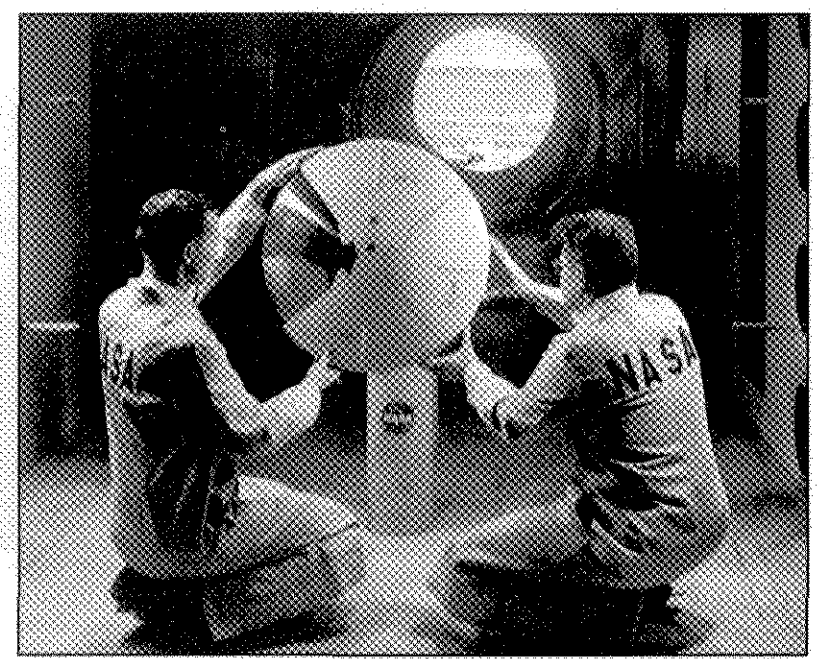
Houbolt would not let the advantages of LOR be ignored. As a member of the Lunar Mission Steering Group, he had been studying various technical aspects of space rendezvous since 1959 and was convinced, like several others at Langley, that LOR was not only the most feasible way to make it to the moon before the decade was out, it was the only way.

Langley researchers were the first at NASA to recognize the fundamental advantages of the LOR concept and they fostered the idea and fought for it. LOR's approval came in 1962 and the race to land astronauts on the moon began.



L-67-7231

Between 1966 and 1967, the Lunar Orbiter Program, managed by Langley, helped put five Lunar Orbiter spacecraft into lunar orbit. This program helped mission managers pick the best landing sites for the Apollo astronauts, including the exact spot in the Sea of Tranquility for the first manned moon landing.



L-62-8895

Apollo spacecraft reentry was studied in Langley wind tunnels. Researchers, above, studied the effects of reentry heating on spacecraft materials in support of the Apollo program. The project, known as Flight Investigation Reentry Environment (FIRE), involved both wind tunnel testing and the launching of rockets with recoverable reentry packages.

## *Rendezvous Docking Simulator*

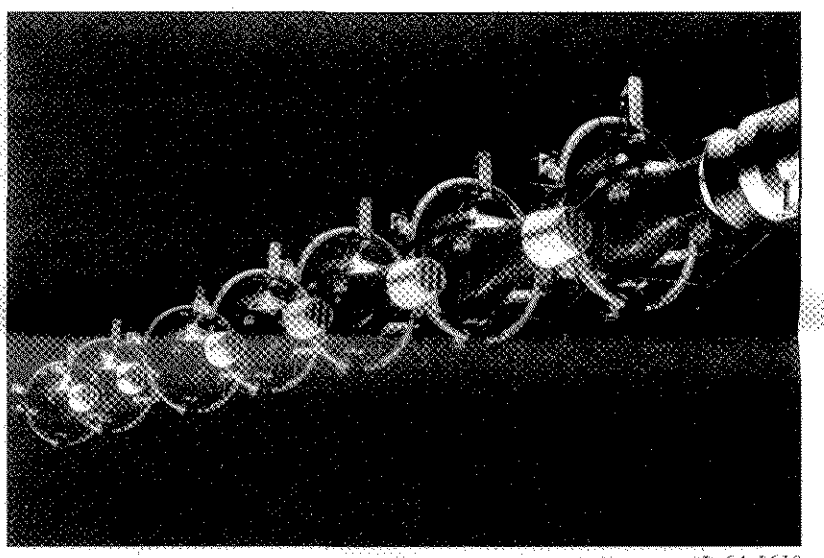
One of the trickiest yet most essential maneuvers that had to be perfected on the ground before it could be tried in space was the linking of the Lunar Module (LM) and the Command Module (CM). The ability to rendezvous and dock the two vehicles in space was critical to the success of LOR, because if there were a failure the two astronauts in the LM would have no means to return to Earth — and NASA would have no means to rescue them. The first men on the moon, international heroes, would die inside the LM, and the commander of the CM would be forced to leave his buddies in their orbiting coffin and head for home alone. Nothing was secretly more terrifying to the CM commander than this possibility.

NASA had to do everything it could to ensure that this tragedy did not happen.

In the early 1960s, Langley researchers built various simulators to study the feasibility of space rendezvous and orbital docking. The most advanced of these, the Rendezvous Docking Simulator, significantly improved the chances of mission success through LOR by giving the astronauts a routine opportunity to pilot dynamically-controlled, scale-model vehicles in a safe and controlled three-dimensional environment closely approximating that of space.

Rendezvous in space could turn sour with paralyzing swiftness. An onboard computer could fail, a gyroscope might tilt the wrong way, or some other glitch might occur to complicate the performance of a necessary maneuver. Pilots of both the LM and the CM had to be ready to make crucial decisions instantaneously. Without Langley's Rendezvous Docking Simulator, the astronauts would not have been nearly as well prepared for handling the pressures of LOR. With the help of this ingenious device, they were able to master all of the necessary rendezvous and docking skills before lift-off.

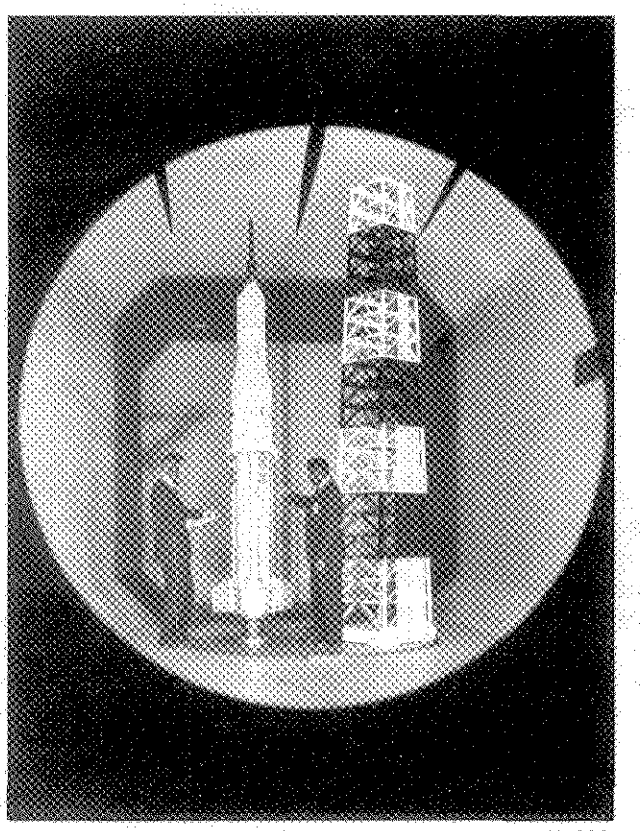
**All excerpts are taken from *Engineer in Charge: A History of Langley Aeronautical Laboratory, 1917-1958* by Dr. James R. Hansen.**



L-64-1610

Called the Gemini Rendezvous Docking Simulator, rendezvous and docking in space was tested and practiced at Langley with free-moving vehicles suspended on cables. Built in 1963, this full-scale simulator was used by Gemini and Apollo astronauts to practice pilot-controlled techniques needed to link two vehicles in space. This docking technique was critical to the success of the entire mission. The Rendezvous Docking Simulator is now a National Historic Landmark.

Extensive research into the aerodynamic forces affecting the Saturn-Apollo launch configuration was done in Langley wind tunnels. In this 1963 photo, researchers study the effects of wind on the Saturn V rocket and escape tower. The Saturn V was the launch vehicle developed for the Apollo lunar missions. With the Apollo spacecraft atop, the actual Saturn V stood 363 feet tall.



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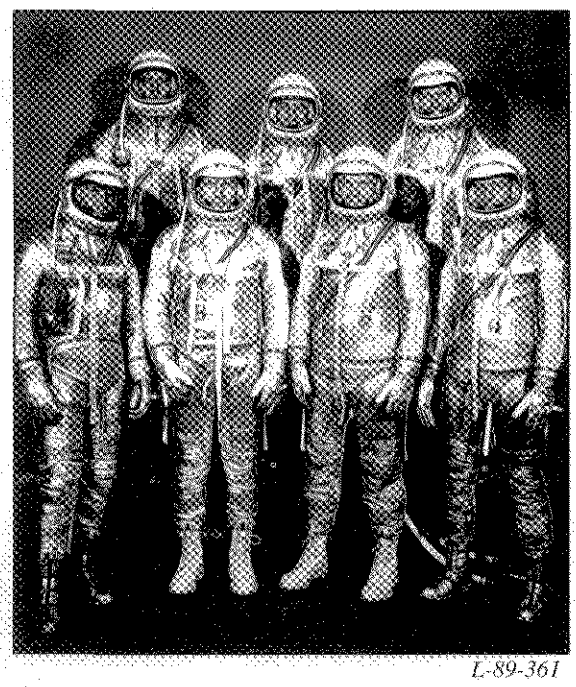

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The Mercury astronauts, NASA's "Original Seven" as they came to be called, trained at Langley. They were, from left to right, top row, Alan Shepard, Virgil "Gus" Grissom, Gordon Cooper; bottom row, Walter Schirra, Donald "Deke" Slayton, John Glenn and Scott Carpenter. In April 1959, the astronauts arrived at Langley to practice on equipment simulators, and to familiarize themselves with procedural and technical aspects of their mission. They paved the way for others to follow, including the astronauts of the Apollo missions.

# HPCC Fellowship Program Established at Langley

BY DR. MICHAEL F. CARD

NASA Langley, the Institute for Computer Applications in Science and Engineering (ICASE) and four Virginia universities have established an innovative doctoral fellowship program that will place computationally-oriented graduate students in internships with Langley research teams in their thesis-writing years. The purpose of the Virginia/ICASE/LaRC Program in High Performance Computing and Communication (VILaP-HPCC) is twofold: to enhance NASA's ability to conduct computationally-intensive aspects of its research mission, and to educate applied computer scientists capable of lifelong contributions to "Grand Challenge" problems. Its theme is "computer science in the service of the national aerospace agenda." Universities contributing students to the program are: George Mason University, Old Dominion University, Virginia Polytechnic Institute and State University and the College of William & Mary.

Signing the agreement that will begin the program for High Performance Computing and Communication between Langley, ICASE and four universities are Center Director Paul F. Holloway, right, and M. Youssuff Hussaini, director of ICASE. Looking on are, left to right, Langley's Chief Scientist Dr. Michael F. Card, Deputy Director Dr. H. Lee Beach Jr. and Professor David Keyes from Old Dominion University.

### Keyes Will Direct

David Keyes, a professor of computer science at Old Dominion and a senior research associate at ICASE is the program's first director. He explains, "The term HPCC has been used to refer to disciplines ranging from computer science and computer engineering on one hand to computational science and computational engineering on the other. The former emphasize the development of software and hardware tools, the latter, simulation of the physical world via discrete computational models. Developers of computational tools — libraries, environments, protocols, and devices — don't interact enough with modelers. This sometimes leads to tools that are not broadly useful. Conversely, many modelers seek raw resources without appreciating how they are supplied, and hence compute and communicate ineffectively."

M. Yousuff Hussaini, director of ICASE, sees the VILaP-HPCC as distinctive in two ways: "First, mentoring from full-time NASA scientists and engineers gives graduate students direct contact with real-world problems, computer codes and computer hardware. Being exposed to problems as they first arise in practice gives student interns a head start over those who first hear about them at conferences.

Second, unlike existing university-NASA educational programs, this program involves students with a computer science orientation. A priority NASA research program like multidisciplinary optimization builds extensively on in-house disciplinary strengths, but most researchers trained as engineers encounter implementation hurdles when limits of machine architecture or existing language capabilities are reached. Having computer scientists in residence will help ensure that existing in-house solutions are not overlooked and that ultimate solutions take advantage of modern developments."

### Program Requirements

VILaP-HPCC fellows will satisfy curricular requirements of greater breadth than typically exist in an academic computer science department and will be accountable for the direction of their research. The main research contributions are expected to be algorithms and productivity-enhancing environments for large-scale distributed parallel computation, scientific visualization, and scientific data base query. Certain specialty courses such as adaptive grid algorithms, nonlinear optimization or parallel compilers, will be taught centrally at Langley by NASA or ICASE experts. Fellows also have access to Langley's world-class computing facilities, which include an Intel Paragon and, by August, a new IBM SP2.

"Since NASA tracks the computer performance envelope, a symbiotic relationship exists in which students have access to expensive equipment and federal laboratories receive the benefit and evaluation of their experiences with it," explains Manuel Salas, manager of the Computational Aerosciences Office and coordinator of HPCC activities at Langley. "The breadth of HPCC and the magnitude of resources required to provide a state-of-the-art curriculum and research environment are such that a pooled effort leverages state and federal resources more effectively than duplicated efforts in achieving national impact."

The VILaP-HPCC is jointly administered by an Executive Council made up of an equal number of university professors and NASA scientists, plus a representative of ICASE. Langley representatives on the present Executive Council are: H. Milton Holt, chief, Information and Electronic Technology Division; Salas; John N. Shoosmith, chief systems analyst, Information Systems Division; and Thomas A. Zang, head, Multidisciplinary Optimization. Piyush Mehrotra, senior staff scientist for Systems Software, is the ICASE representative. Langley administrators who helped launch VILaP-HPCC include Chief Scientist Dr. Michael F. Card, Dr. Douglas L. Dwoyer, director, Research and Technology Group, and Assistant Director Roy V. Harris Jr.

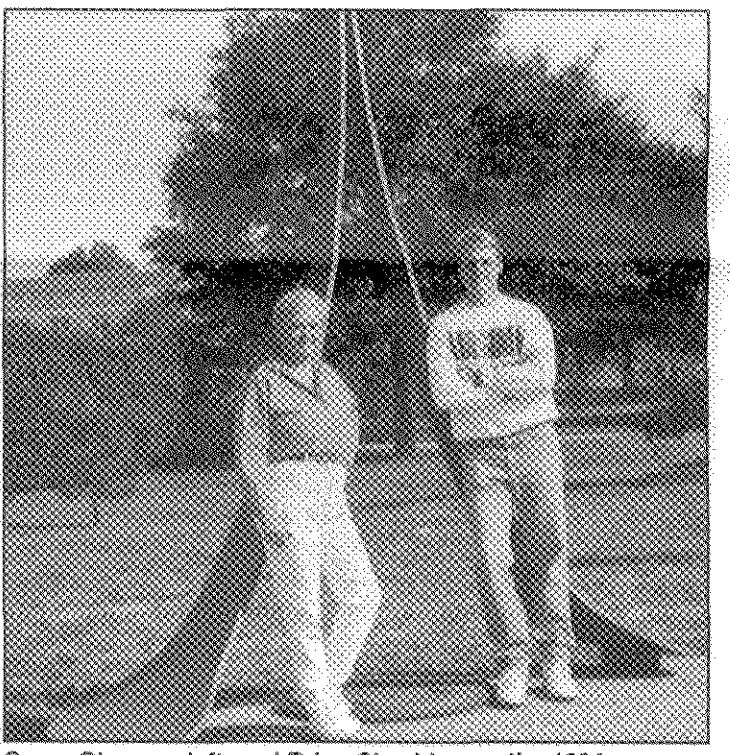
Students must apply for a VILaP-HPCC fellowship from one of the participating university departments. Those with undergraduate backgrounds in either science and engineering or in computer science and interdisciplinary interests are viable candidates. The Langley Office of Education, Dr. Samuel E. Massenberg, director, and Edwin J. Prior, deputy director, will administer the fellowships. For more information, write to the Director, VILaP-HPCC, ICASE, Mail Stop 132C.

# Training Committees Serve Both Apprentices and Journeymen Technicians

An Advisory Committee on Technician Training and seven Trades Committees have been formed to identify the training needs of apprentices and journeymen technicians.

The Advisory Committee is responsible for determining policies and establishing regulations and procedures for the Engineering Technician Apprentice Program. The Trades Committees serve as extensions of the Advisory Committee and represent the 14 trades on Center. They also assist the Advisory Committee on apprentice program issues and assess the training needs of journeymen-level technicians. Any apprentice or journeyman technician with a suggestion or question about training should contact the Trades Committee representative listed here or call Donna Martin in the Employee Development Branch, ext. 42595.

The committees and their chairpersons are: Engineering Technician Designer (architectural, electrical, mechanical), Richard M. Boykin; Engineering Technician (facilities operations – labs and tunnels), James D. Smith; Electrical Engineering Technician, Jerry M. Nichols; Engineering Technician (mechanical development/outside machinist and facilities operation/controls), Robert F. Graham; Electronics Technician (aircraft, avionics), Tony L. Trexler; Electronics Technician (research), Mitchel E. Thomas; Electronics Technician (fabrication) and Engineering Technician (aerospace model development/fabrication development/materials processes/mechanical development–machinist), John D. Buckley.



Grace Gleason, left, and Brian Cheshire are the 1994 technician representatives for the Facilities Operations–Labs and Tunnels Trades Committee. Technicians working in OSD (Operations Support Division) labs or tunnels who want to make recommendations about training needs can call Gleason at ext. 47965 or Cheshire at ext. 43162.

# Customer Service Holds Key to Reinvention

Recognizing that improved customer service is essential to restoring trust in government, President Clinton issued Executive Order 12862, Setting Customer Service Standards, in September 1993. This mandate initiated a government-wide customer service improvement program that sets the standard for services provided to the public as equal to the best in business.

By September 1994, each federal agency that has customers will develop a Customer Service Plan that will explain to the American people what they can expect from the agency. Managers tasked with the challenge of developing the plans asked the National Performance Review and the Federal Quality Institute for "how to" help.

The response was two "Putting Customers First" conferences where managers identified what they needed to do to develop agency plans. Here are the simple guidelines suggested:

Clarify the mission of your agency. Focus on why you are in business. Identify who your customers are. Ask your customers what they want, rather than assuming you know what matters to them. Find out if your customers are satisfied with the service you are giving. Finally, develop a simple customer service philosophy that everyone, employees and customers alike, can understand.

Reprinted from the *National Performance Review Reinvention Roundtable* newsletter.

# Virginia Air and Space Center News

### SIX-MONTH CAMPAIGN CELEBRATES OUR PLACE IN SPACE

Twenty-five years ago this July, America's dream of landing on the moon became a reality—millions of people around the world shared in this historic moment. NASA Langley Research Center played a major role in the creation of the U.S. Space Program, from pioneering rocket technology and training the original seven Mercury astronauts, to designing space stations of the future. To celebrate Virginia's rich legacy of achievement in space exploration, the Virginia Air and Space Center has developed a six-month campaign entitled, *Our Place in Space,* which will begin this July and continue through December 1994.

The *Our Place in Space* campaign will feature three elements designed to educate the community about the past, present and future of space exploration:

- Blueprint for Space - July and August
- Living, Working and Playing in Space - September and October
- Destiny in Space - November and December

Each element will offer different activities, programs, events and exhibits.

*Our Place in Space* will kick off this July with a new exhibit about early speculation on space flight called *Blueprint for Space* and a celebration of the 25th anniversary of the first moon walk. In September the main focus will be the opening of the *Living, Working, Playing in Space* exhibit and children's demonstration gallery. During October, November and December the campaign will focus on the new IMAX® film called *Destiny In Space,* which makes its world premiere at the Smithsonian National Air and Space Museum this June. The campaign will also feature a series of monthly lectures, an astronaut camp-in, a Halloween space costume party and a poster contest about future space exploration.

## Blueprint for Space – Science Fiction to Science Fact

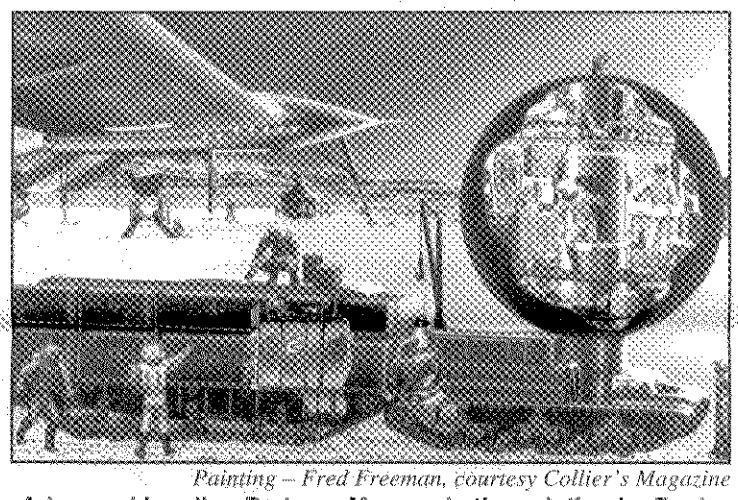
"What you will read here is not science fiction. It is serious fact. Moreover, it is an urgent warning that the U.S. must immediately embark on a long-reserve development program to secure for the West 'space superiority.' If we do not, somebody else will."

With this sentence, from 1952 to 1954, *Collier's* magazine introduced a two-year, eight-article series on the potential for human space flight based on drawings by Werner von Braun. Approximately 60 original design drawings and artwork that accompanied the articles are the focus of the center's newest exhibition, *Blueprint for Space*, which opens July 20 and continues through December 1994.

Through the exhibition, visitors to the center have the opportunity to see how science fiction and the dream of space travel became reality. From science fiction to science fact, the exhibit will depict everything from Jules Vernes' Victorian conception of a spacecraft to illustrations developed by NASA.

Visitors will also see drawings of futuristic landing parties on Mars and astronauts living in a moon ship; sketches of the stages of rocket separations and even animation cells from the Disney "Tomorrowland" series, which was developed from the *Collier's* series. The exhibit offers a fascinating look at early speculation on space flight — eventually many of the blueprints led to real technology. The articles and television shows helped convince Americans that space travel was both possible and desirable.

In 1955, President Dwight D. Eisenhower announced plans to develop a satellite, which was to be launched in 1957 or 1958. However, it was the Soviet Union's launch of Sputnik October 4, 1957, that finally propelled the United States into the "space race."



*Painting – Fred Freeman, courtesy Collier's Magazine*

**Advanced Landing Party on Mars — In the painting by Fred Freeman is the imagined landing on the snow-covered polar caps of Mars, hence the need for a ski-equipped plane. The painting is part of the *Blueprint for Space* exhibit.**

The center's *Blueprint for Space* exhibition traces the development of rocketry and the concept of space travel in the 20th century. Particular attention is paid to the early contributions, and the development of operational rockets in Germany. The exhibition also highlights the career of Werner von Braun, whose World War II experiences as director of the German V-2 missile project were vital to the development of postwar ballistic missile technology in the United States and, by extension, the U.S. space program.

Von Braun was one of the major contributor's to the *Collier's* series. Other contributors included science writer Will Ley, astronomer Fred L. Whipple and Heinz Haber, a specialist in space medicine.

*Blueprint for Space* was conceived and developed during the past several years by noted author and lecturer Frederick I. Ordway of Washington, D.C., and art historian Randy Lieberman of New York. They worked in conjunction with their colleagues in Huntsville and the U.S. Space Rocket Center to create the exhibit. The exhibit was recently on display at the National Air and Space Museum.

The Virginia Air and Space Center's hours are 9 a.m. to 5 p.m. Monday through Wednesday and 9 a.m. to 7 p.m., Thursday through Sunday. Admission to the exhibits is $4.00 for adults, $3.50 for seniors and $2.00 for children 4 through 12 years old.

The center is located off Interstate 64, exit 267. Follow Settlers Landing Road to downtown Hampton. The center is on the left. For information call (804) 727-0900 or 1-800-296-0800.

*Virginia Air and Space Center*
*Hampton Roads History Center*

### ROTORCRAFT - A DREAM OF SPIRAL WINGS

In celebration of the 50th Anniversary of the American Helicopter Society, the Virginia Air and Space Center will open *Rotorcraft–A Dream of Spiral Wings* Friday, June 30.

This special exhibition, which will be on display through December 31, 1994, will examine the history of helicopters from Korea and Vietnam to their peacetime roles in law enforcement, fire fighting and sea rescues. The exhibit will also focus on the many roles which industry, NASA Langley Research Center, the Aviation Applied Technology Directorate at Fort Eustis and the military have played in the evolution of this remarkable machine.

The new exhibit includes a display wall developed by the American Helicopter Society to commemorate their 50th Anniversary. The 50-foot mural covers the history of helicopters ranging from Sikorsky's VS-300, the first vertical takeoff and landing vehicle, to current state-of-the-art versions.

Other highlights of *Rotorcraft* include a Hughes 300 helicopter, provided by Fort Eustis. The Hughes 300 is the standard training helicopter used to instruct pilots in the basic flight of a rotorcraft. Two models, one of a Skycrane helicopter and the other of a research helicopter from NASA, are also included in the exhibit.

Visitors will also see a working scale model research helicopter from NASA used in ground-vibration tests. The model demonstrates many components of the helicopter's development, from design and flight systems, to current usage benefits.

### Membership Fees Reduced

The center is offering reduced membership rates for NASA employees for new individual/family membership purchases. Rates are: Bronze membership, $30; Silver membership, $40; and Gold membership, $85. Call Beth Pritchard, membership coordinator, at 727-0900, ext. 718, to make purchases.

# Legislative Update

### Space Committee Chairman at Langley

On July 20, 1994, all Langley employees, contractors, retirees and the general public are invited to celebrate the 25th anniversary of the greatest engineering feat of all time: the landing of men on the Moon, July 20, 1969. Congressman Ralph Hall, (D-TX), chairman of the Subcommittee on Science, Space and Technology, will be the keynote speaker for an anniversary stamp ceremony in the H.J.E. Reid Conference Center at 10 a.m. Chairman Hall's comments will center on Langley's essential role in the successful realization of an "impossible" undertaking. Chairman Hall will also introduce the film, *For all Mankind*, which features footage from the Mercury, Gemini and Apollo missions. The film will be shown at 11 a.m. and after the Colloquium.

After the ceremony, stamps will be sold in the Langley Room from 10:30 a.m. to 3:30 p.m. The following will be offered: Express Mail – $9.95; miniature sheet of twelve 29-cent stamps – $3.58; Stamp Folio – $4.95; and Cachet envelopes – $2.50.

### FY95 Budget

On Wednesday, June 29, the House of Representatives passed the fiscal year 1995 (FY95) spending bill (HR 4624) for the departments of Veterans Affairs (VA), Housing and Urban Development (HUD) and Independent Agencies (including National Science Foundation, NASA, Environmental Protection Agency and others). NASA's budget was passed at $14,000,684,000, a reduction of $240,000,000 from the Administration's request. NASA funding included $2.1-billion for Space Station. An Amendment to terminate Space Station failed 278-155. Action on NASA FY95 funding now moves to the Senate where the Appropriations Subcommittee on VA, HUD and Independent Agencies, chaired by Barbara Mikulski (D-MD), will mark up its bill after the Senate returns from recess July 12. The measure then goes to the full Appropriations Committee, then to the Senate floor for action. The House and Senate versions will then be taken up in a conference to produce a final bill which will then be voted on by both chambers. For more information, call Lee Rich, at ext. 46529.

# Happenings

**RETIREMENT PARTY:** Friends of Peter E. Lewis are invited to a party in his honor, Tuesday, July 26 at the H.J.E. Reid Conference Center. Cash bar and heavy hors d'oeuvres start at 5 p.m. with program to follow. Cost per person is $13 and includes gift. For reservations/gift contributions, call Anne Holland, ext. 47255, or Butch Barringer, ext. 46903. Send checks payable to Anne Holland, Mail Stop 440, before July 18.

**FOR SALE:** Dining table, solid teak, double extension, four matching covered chairs, Scandanavian design, $350; baby items: Storkcraft crib, solid, hardly used w/ Laura Ashley accessories, $250 or b/o; assorted baby items, b/o.; *Liber Usualis,* good condition, $50. Call 872-8246, 10 a.m. to 9 p.m.

**SAILING LESSONS** are available through the Langley Air Force Base Yacht Club. There are daytime classes for juniors and evening classes for adults. Call 764-3922 or 764-7220 for applications or more information.

**HOUSE FOR SALE:** Great assumption in Woodcreek, 3 BR, 2 baths, loft, dining and living rooms, fireplace w/gas logs, garage, privacy fence, new heat pump and water heater. All appliances, 20 min. from Langley. Only $2,000 to assume 8 percent loan at $711/month. Call 874-3121.

**FOR SALE:** 1989 Ford Escort Wagon w/manual transmission and A/C, 90,000 miles, near-mint condition, new Michelin tires, $2200 or b/o. Call Williamsburg 229-8092 evenings or leave message.

**FOR SALE:** 1989 Dodge Colt E; 3-door hatchback, five speed, air and stereo. $2850. Excellent condition. Call Cheri after 5 p.m. 898-8463.

**FOR SALE:** Black and white purebred one-year-old Japanese Akita, female, good w/children, shots updated, needs loving home. Asking $300, negotiable. Call James at 865-1622.

**POWERWALK:** Reebok Powerwalk® classes begin in the LAA Gym for warm-ups followed by an outdoor walking session on Tuesday and Thursday from 4:45 to 6 p.m. and Saturdays from 9:15 to 10:30 a.m. For Summer aerobics, join the LAA Aerobics Club for a full fitness program. Low-impact, bench aerobics, weight training and nutrition analysis are provided. Classes are Tuesday and Thursday, 5 to 6 p.m. and Saturday, 9:30 to 10:30 a.m. in the LAA Gym. Call ext. 42295 for more information.

**BALLROOM DANCING** lessons are offered at the Langley Air Force Base Officers Club Mondays from 5:30 to 6:30 p.m. Cost is $5 per person. Call Fred Duffy, instructor, at 496-3790 or 874-2039 for more information.

**HOUSE FOR SALE:** Newport News, 4BR, 2-1/2 baths, family room w/fireplace, central air, gas heat, cul-de-sac, fenced yard, much more. Priced below assessment at $102,000, or assume 7 percent VA loan. Call 599-5794.

***Airborne Trailblazer: Two Decades with NASA Langley's 737 Flying Laboratory***

The same process of distribution used for Langley's 75th anniversary book, **Winds of Change**, will be used for **Airborne Trailblazer,** the first aeronautics title in NASA's historical series. Each civil servant at Langley will be sent a copy directly. Copies will also be sent to the head offices of contract companies for their distribution. Retirees may request a copy of the book by calling the Public Mail Center at (804) 864-3293.

**ORDER INFORMATION: Airborne Trailblazer** can be ordered by mail from the Superintendent of Documents, P. O. Box 371954, Pittsburgh, PA 15250-7954 or by FAX to (202) 512-2250. GPO price for the publication is $27 which includes shipping and handling. The GPO stock number is 033-000-01140-7.

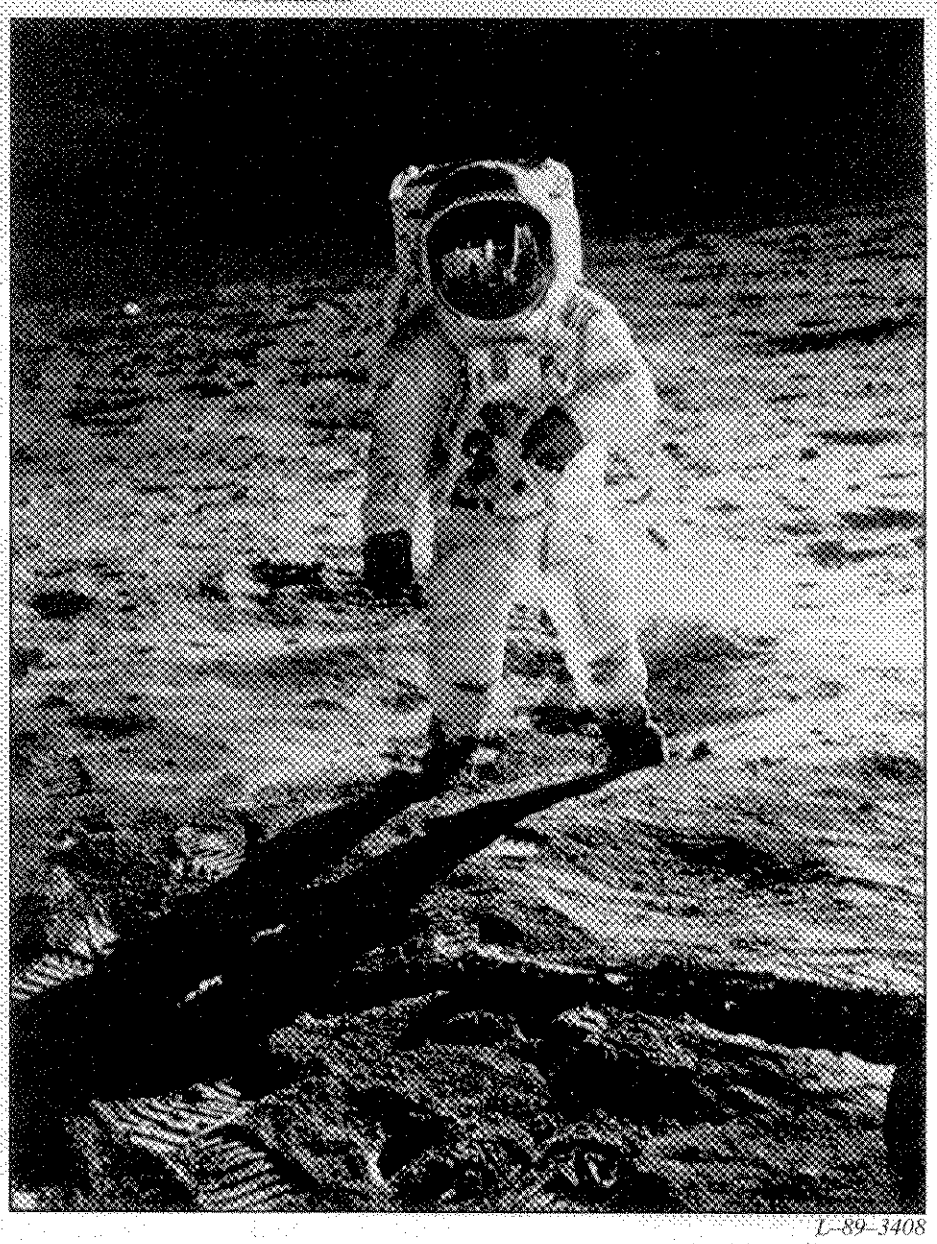
## Notice to All Langley Personnel

Phase II of the modifications to Langley Boulevard has begun. This phase will complete the widening of Langley Boulevard from two to four lanes beginning just before North Dryden Street through to Gate #5 at Wythe Creek Road.

The telephone optical cable which runs adjacent to the road from the C&P Building on Wythe Creek Road is being relocated. When new cable is installed, the curbs and walks along Langley Boulevard adjacent to Building 1209 will be removed.

Some traffic disruption may occur periodically and will require all personnel to use caution when driving near the on-going work. Gate #5 should remain open but traffic may be reduced to one lane for short periods during the day. Work should be completed by the first week in September. Anyone with questions about this work should call Skip Schroeder at ext. 47230.

**VIRGINIA SHAKESPEARE FESTIVAL:** The festival at the College of William and Mary in Williamsburg, will feature *Othello* and *A Midsummer Night's Dream* in repertory until July 31. Tickets are $12; season tickets, $20, with group discounts available. Call the Box Office at 221-2674 for ticket orders and information.



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**Buzz Aldrin, lunar module pilot, was photographed on the lunar surface by astronaut Neil Armstrong, commander of the Apollo 11 mission. Aldrin became the second man to set foot on the moon when the spacecraft landed in the Sea of Tranquility on July 20, 1969.**


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Researcher News

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Apollo 11 25 The Eagle Has Landed

# Researcher News

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 15 ❖ July 29, 1994

# Testing LITE Technology: The First Step

BY MARCIA WESTMORLAN

Langley engineers and technicians will be working around the clock at Johnson Space Center to make sure that LITE, the first lidar in space, performs as planned when it goes into orbit on the Space Shuttle Discovery in early September.

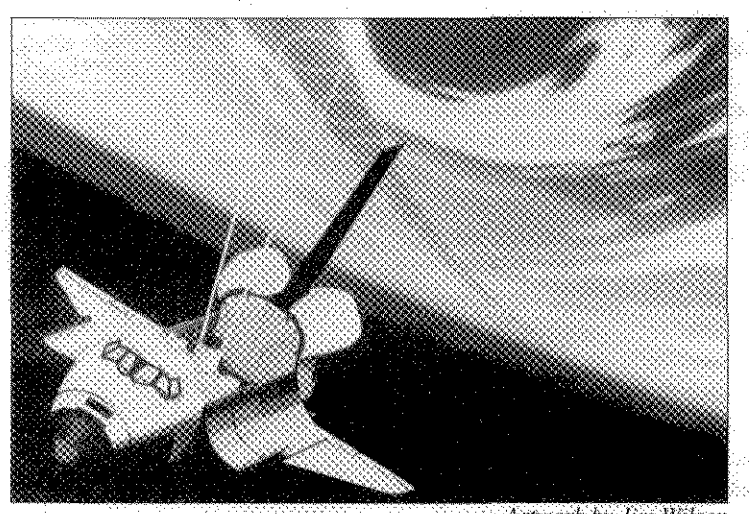
LITE stands for Lidar In-Space Technology Experiment. Engineers will use information from LITE to create a new family of instruments that will study the atmosphere from space and possibly revolutionize the way weather is predicted.

Before data that will provide a finely detailed global view of weather patterns and other atmospheric phenomena can be collected, all of the instrument's machinery has to work properly.

As Project Manager John Rogers puts it, "Pat McCormick (LITE project scientist) is the user of this data. We are responsible for developing the hardware to get the data for him. It has been a long-time partnership." Rogers and his team want to verify that the entire system works as planned in orbit. For example, they must ensure that the laser and telescope remain aligned, and that the shuttle's built-in cooling system can handle the heat produced by a powerful lidar instrument.

This engineering side of the LITE team has been hard at work since 1985 developing, building and testing the first atmospheric lidar to be used on a space-based platform. According to Rogers, "Our primary objective was to take a lab-based system (laser) and space harden it. The basic approach was to try to make it think it is in a lab."

Langley engineers designed a laser they believed could handle the rigors of space. It was built to their specifications by Titan Spectron in Costa Mesa, Calif. The laser is encapsulated in an aluminum canister with dry nitrogen and is isolated thermally and structurally.



*Artwork by Jim Wilson*

**Artist's conception of the LITE instrument aboard the shuttle. The circles indicate the path of the lidar as the shuttle orbits Earth.**

### The OASIS

A system within the LITE instrument called OASIS, for Orbiter Experiments Autonomous Supporting Instrumentation System, will be powered up at launch and will record the stresses of launch on the lidar, orbit insertion and landing.

According to LITE Instrument Manager Richard Couch, "It may be that we overbuilt, it may be that we underbuilt. That data (from OASIS) will tell us that."

The laser will be pointed toward the Earth and beam narrow pulses of laser light through the atmosphere. LITE's telescope will measure the laser's light as it is reflected from clouds, gas molecules and suspended particles in the air, and from the Earth's surface. Making sure the boresight assembly is successful in keeping the telescope and laser beam aligned is a technology objective that is absolutely necessary to collecting useful atmospheric data. "What you have to have for a lidar to work is that the laser beam and the telescope are pointed at precisely the same column of atmosphere," Couch explained.

### The Boresight System

This is where the prism in the boresight system comes into play. The boresight system is designed to adjust the laser beam plus or minus one degree in two axes. This adjustment allows for such eventualities as slight warping or flexing of the orthogrid platform on which LITE has been secured. Couch added, "If you don't have it, (alignment) there is no return signal in the receiver. It is dead quiet." Engineers also had to contend with the effects of the massive heat produced by the lidar system and the possibility of optical contamination. "Thermal control and contamination are the biggest problems for an instrument like this," Couch said, "The shuttle is a nice bird to fly on. It gives a lot of good accommodations, such as a built-in cooling system and lots of power. For a first try at making lidar measurements from outside the atmosphere it is a good vehicle to use."

### The Telescope

The telescope used with LITE is the engineering model of the Orbiting Astronomical Observatory telescope from Goddard that flew in 1968. When Langley engineers found the one-meter diameter telescope, it was being used intermittently on a ground-based system by one of the scientists at Goddard. It had been "subjected to the rigors of climate so to speak," Couch said. "It required a lot of cleaning up, but even with that it was a lot cheaper than buying a new one."

The extensive refurbishing included dismantling the telescope and recoating the optical surfaces as well as resurfacing many parts. "We figure that little acquisition from Goddard saved us about $6 to $8 million," Couch said. The long-term goal of this first LITE mission is to collect information on the possibilities of operating a lidar system on an independent space-based platform for five to ten years. Couch said there are already several identified roadblocks to that goal. "One thing that needs to be done is the development of newer laser technology that does not consume as much power as our laser does," Couch said. "Someone needs to get into the business of developing a low-power laser with the same output energy that LITE has."

*Continued on Page 6*

# *Building the Information Superhighway* is August Colloquium

"Building the Information Superhighway — From Dream to Reality" will be the topic of the Colloquium by Dr. José-Marie Griffiths, Monday, August 8, at 2 p.m. in the H.J.E. Reid Conference Center.

The last few years have seen intensive discussion, lobbying, funding and implementation of components of a National Information Infrastructure (NII), more popularly known as the information superhighway. The NII is not the dream of an engineer nor the answer to a marketing person's dream. The NII is here today in the shape of the radio systems used in public safety agencies, in the miles of fiber that run in the streets, in the telephone wires and utility lines that drape the horizon.

While the dream of the information superhighway has captured the collective imagination, some serious questions have emerged regarding the reality of putting the superhighway into place. Concerns have centered around private versus public interests, privacy and security, equal access opportunities and legal and financial issues. Who will have access to the highway? Where will you go? What services will be available and how will you use them? What will block your way? These questions and a look at the emerging NII and its impact on the individual and the institution will be addressed by Griffiths.

Griffiths is vice chancellor for Computing and Telecommunications at the University of Tennessee, Knoxville. She is also director of the School of Information Sciences and the Center for Information Studies, as well as a professor and collaborating scientist, in a position jointly sponsored by the University and Martin Marietta Energy Systems. She has a bachelor of science degree in physics and a doctorate in information science, both from the University of London, England.

Griffiths has written more than 150 books, technical reports, and articles, and has given more than 250 presentations, keynote addresses, and workshops. Her current research interests include digital libraries and access to heterogeneous distributed databases.

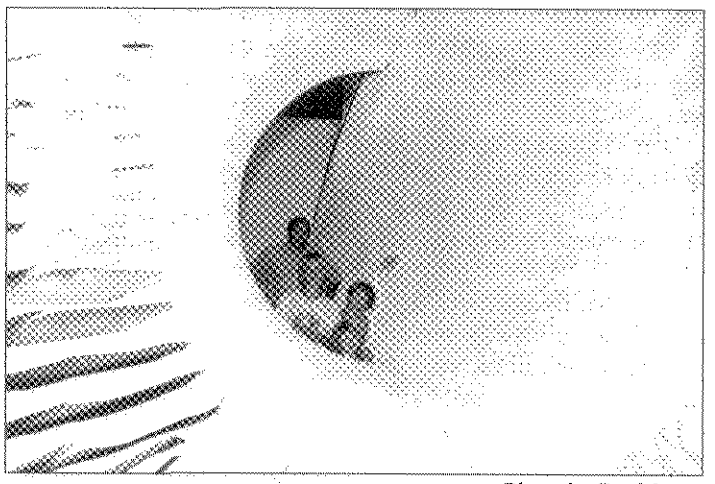


*Photo by Fred Jones*

# Thousands Attend Langley Open House

**Ken Dudley, in back, gives some Open House visitors a look at the large anechoic chamber where antenna are measured at the Electromagnetics Research Laboratory exhibit. More photos and the Open House story are on Pages 4 and 5.**

# News Briefs

## Around the Agency

### NASA/FAA Sponsor General Aviation Competition

NASA and the Federal Aviation Administration (FAA) announced their joint sponsorship of a general aviation design competition for students at U.S. aeronautical and engineering universities.

The contest will challenge teams of undergraduate and graduate students — working with faculty advisors — to develop a multi-disciplinary design for a general aviation aircraft. Complete competition guidelines are now available. Designs must be submitted by May 1, 1995. Up to four cash awards totaling $11,000 will be announced at an awards ceremony in July 1995 at the annual Experimental Aircraft Association Fly-In Convention and Sport Aviation Exhibition at Oshkosh, Wis.

"These are the types of opportunities NASA needs to develop to capture the bold initiative and innovative enthusiasm that exists in our nation's college ranks," said Dr. Wesley L. Harris, NASA's associate administrator for Aeronautics. "This partnership with academia — and ultimately, industry — represents the way we want to do business at NASA," he said.

Richard A. Weiss, the FAA's director of General Aviation and Vertical Flight Research and Development notes, "It is the policy of the FAA to foster and promote general aviation. It is our hope that participation by universities will become an integral part of the revitalization effort now underway and that the competition will serve to stimulate breakthroughs in technology and its application."

Technologies to be addressed in the competitive designs will include integrated cockpit system, propulsion, integrated design and manufacturing, and aerodynamics. For purposes of the competition, general aviation aircraft are defined as fixed-wing, single-engine, single-pilot, propeller-driven aircraft. "Universities have drifted away from general aviation with the decline in the industry's condition. NASA and the FAA developed this competition to help reverse that trend and begin to involve faculty and students in general aviation," said Dr. Bruce J. Holmes, manager of NASA's General Aviation Program Office, NASA Langley.

All designs submitted in accordance with competition guidelines will be reviewed by a selection panel of representatives from NASA, the FAA and industry. All design projects will receive critical evaluation and feedback. Faculty and students are encouraged to plan now to incorporate this design challenge into fall design classes and projects. Involvement of industry advisors is encouraged, as is the participation of women and minorities on design teams. Teaming across departments and among institutions also is encouraged.

Interested faculty and students may request guidelines from: Virginia Space Grant Consortium, 2713-D Magruder Blvd., Hampton, Va. 23666. Requests may be faxed to 804/865-7965. The Consortium, a nonprofit aerospace educational coalition, is disseminating information on the competition on behalf of the sponsoring agencies.

### Welch Named Chief of News and Information at NASA Headquarters

Brian Welch, a veteran public affairs officer for the space Agency, has been named chief of News and Information at NASA Headquarters, Washington, D.C. Welch began his NASA career as a public affairs cooperative education student at Langley in 1979. In 1981, he moved to the Johnson Space Center, Houston, Texas, to become editor of the center newspaper, *Space News Roundup*. In 1984, he became a public affairs mission commentator, providing real-time descriptions from the Mission Control Center during space shuttle flights. He also served as manager of the mission commentary team and as a newsroom manager at Johnson during shuttle flights. Most recently, he served as Deputy News Chief at the center. In 1993, he served a ten-month tour of duty at NASA Headquarters as speech writer for NASA Administrator Daniel S. Goldin.

### Speakers Bureau Report for June

The following Langley employees spoke to various groups in June:

**Dr. William B. Grant** spoke at Kecoughtan High School about "Airborne Lidar Measurements of Aerosols and Ozone."

**Jane M. Hogge** spoke to students at Fairview Elementary School, Roanoke, Va., about "Mission to Planet Earth."

**William C. Tennis** spoke at the Por Point School, Cornwall, England, on the "History of NASA."

**Thayer Sheets** spoke to the Smithfield Kiwanis Club about the "Small Business Innovative Research/Small Business Technology Transfer Programs."

**Dr. Christine Darden** spoke at the Gloucester Ruritan Club about "Sonic Boom."

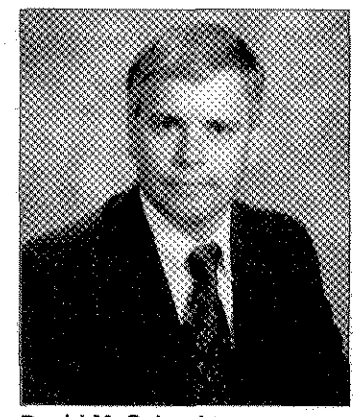
**Dan Vicroy** spoke to the Naval Space Command at the Rappahannock Regional Library in Fredricksburg, Va., about the "Apollo Anniversary."

### *Quotable*

*"We are going to have to organize ourselves cooperatively, sanely, scientifically and in regenerative spontaneity with the rest of humanity around Earth . . . We are not going to be able to operate our spaceship Earth successfully unless we see it as a whole spaceship and our fate as common. It has to be everybody or nobody."*

***— Buckminster Fuller***

## Schuster Honored by AIAA



**David M. Schuster**

David M. Schuster received a certificate of merit from the American Institute of Aeronautics and Astronautics (AIAA) for his paper entitled "Application of a Navier-Stokes Aeroelastic Method to Improve Fighter Wing Performance at Maneuver Flight Conditions." The paper was presented at the 1993 AIAA Applied Aerodynamics Conference and the award was conferred on Schuster during the 12th annual conference in June.

Schuster, principal engineer for the Langley Program Office of Lockheed Engineering and Sciences Co., works in support of the Aeroelasticity Branch. He is responsible for the implementation and application of advanced three-dimensional computational aerodynamics methods to problems in unsteady aerodynamics and aeroelasticity, including analysis of the National Aero-Space Plane (NASP), High-Speed Civil Transport (HCST) and the application of Navier-Stokes aeroelastic methods to the design and performance of high-performance aircraft.

Schuster received his master of science and doctorate in aerospace engineering from Georgia Institute of Technology. While employed by Georgia Tech Research Institute, he participated in a three-year GTRI/Air Force/NASA Langley aeroelastic research program for NASP. He is a senior member of AIAA, a member of the Society of Automotive Engineers and the recipient of the Hermann Schneider Medal and Weston Awards presented by the University of Cleveland, where he earned his bachelor of science degree in aerospace engineering, for exemplary performance as cooperative education student.

## Letters

### Thank You for Your Concern

**From Elizabeth and Bob Buchan:**

"Dear NASA Family:

It is my joy in life to find
At every turning of the road
The strong arm of a comrade kind
To help me onward with my load.
And since I have no gold to give,
And love alone must make amends,
My only prayer is, while I live—
God make me worthy of my friends.

*Frank Dempster Sherman*

I want to thank all of you for your kindness to Elizabeth and me during the recent weeks following my surgeries. Your prayers and many expressions of support and concern have helped to sustain us during this very difficult period. I look forward to seeing you all once again soon. Thank you again."

### Retirement Party Thank You

**From Ray and Ernie Hook:** "To the many friends and colleagues that made my retirement party a memorable occasion as well as a fun time, a heart felt thank you! The 39 years since I entered on duty at the Langley Aeronautical Laboratory have been most enjoyable due to the fine people at Langley and the good work that we accomplished together. On June 24, 1994, you came through again for me and my family. The memories, momenta and gifts are very much appreciated and will be cherished more as time goes by. God speed to you all."

## In Memoriam

### Reginald L. Barber

Reginald L. Barber, 73, a life long resident of Newport News, died Sunday, July 10, 1994. After 37 years with NACA/NASA, he retired in 1974 as director of real estate.

### Roy Steiner

Roy Steiner, a resident of Colton, Wash., died in December 1993. He began working at NACA in 1941 and worked on atmospheric turbulence in the Thunderstorm Project. He retired from Langley as an engineer in 1974.

### John M. Elliot

John M. (Jack) Elliot, 76, died June 16, 1994, from injuries suffered in an accident June 9 in San Diego, Calif. From 1947 to 1953, he was a test pilot with NACA. He worked as a test pilot at Convair and as a mechanical engineer in San Diego, where he retired in 1986.

### Nadine C. Kemper

Nadine Carroll Kemper, 93, of Warsaw, Va., died July 8, 1994. Kemper was a draftsman at Langley.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# A Tech Transfer Approach to Research

BY BRAD DOUGHERTY

The Composites and Polymers Branch at Langley has been on the forefront of technology since its inception. The branch has received more than 80 patents for various ideas, products and processes during this time and the practice of creating new materials and processes continues unabated. The branch is helping to lead both NASA and the nation into the next century of polymeric research.

The charter for the branch is to develop polymers and composites for the aerospace industry. The technology relates to structural composites and adhesives as well as high-temperature and high-performance polymeric materials. Examples include coatings and films for future aircraft and for durability in a space environment. The branch also has a more basic research interest: to understand the physical and mechanical properties of polymers as related to their chemical structure. To that end, state-of-the-art facilities are available. There is an advanced thermal analysis laboratory, exceptional microscopy and spectroscopy equipment and rheological (melt-flow) instrumentation. A mechanical test facility includes test analysis equipment. There is also an advanced prepreg facility to make composite tape and a facility for composite fabrication and preparation.

A primary thrust of the branch is in the High-Speed Research (HSR) project and leading the way in the development of a structural material for the High-Speed Civil Transport (HSCT). Langley chemists have created a number of substances that exhibit favorable characteristics at high temperatures. Preliminary testing of materials for the HSCT is already underway at both Northrop and Boeing.

The polymers for use in the HSCT have to meet a number of criteria. They have to last 60,000 hours at 350-degrees Fahrenheit, be processed fairly easily, and be cost effective. Some of Langley's materials are extremely close to meeting these standards. Dr. Brian Jensen, senior polymer scientist, has developed one polymer that has very positive characteristics. Besides Jensen's polymer, the branch has four other polymers that are candidates for HSR.

## Non-HSR Uses

The polymers being developed for HSR are not limited to aerospace applications. Also being pursued is a new field in composites and polymers. Nanocomposites, also known as suprastructures, are assemblies of molecules into complex multi-molecular structures. Researchers are hoping to control ordering of the components on the molecular level to form stable supramolecular assemblies.

Still another area of research involves the fabrication of composites using robotic placement. This is known as Advanced Tow Placement (ATP). Prepreg tape is created from polymer-matrix-impregnated carbon fiber tows (synthetic strands of fiber). The tape can then be laminated through ATP to form various composite structures. Applications include airplane wings and industrial pipe liners.

Dr. Joycelyn Simpson, a National Research Council post-doctoral researcher, is working on the development of "smart polymers" or piezoelectric polymers. They generate an electric response when pressure is applied to them. The main use of these polymers is in imbedded sensors that would alert the user to changes in conditions such as temperature and pressure. The uniqueness of these polymers is their high-temperature capability. State-of-the-art piezoelectric polymers can only operate in room temperature regimes. According to Dr. Terry St. Clair, branch head, these materials appear to be useful at temperatures in the 400-degree Fahrenheit regime.

Dr. Patricia McDaniel at work in the polymer laboratory.

While the thrust of the branch is in HSR, research is continuing in the space environment. After the Long Duration Exposure Facility (LDEF) was retrieved in 1990, the reaction of polymers and composites to the space environment became apparent. "LDEF was a wonderful learning experience. The effect of space itself on materials is invaluable information," said Dr. Phil Young, an analytical polymer scientist. "Scientists now know what kinds of polymers have good characteristics in space and those that do not warrant further development."

Dr. John Connell, a senior researcher, is developing atomic oxygen-resistant polymers for potential space application. Several of these materials have been patented and flown on space shuttle missions to assess their resistance to the harsh, low Earth-orbit environment. In that environment, the polymers intrinsically form an inorganic glass coating because of their unique molecular structure. Another aspect of the space side of the branch is the development of cryogenic foams for insulating liquid hydrogen and liquid oxygen fuel tanks on the single-stage-to-orbit vehicle that NASA is developing.

## Technology Transfer

With the Center's restructuring, emphasis is being placed on transferring technology to the public through patents. Patents provide a useful mechanism for transferring technology through licensing. "It is very difficult to license technology that you do not own," according to St. Clair.

Branch staff have a patent agent working very closely with them. Joy Bryant, a graduate of the College of William and Mary Applied Science Program, has handled the filing of about 10 to 12 new patents per year for the past three years. In addition to filing patents, Bryant works with the technology transfer team and answers any questions researchers have relating to the writing of disclosures, the status of pending applications and technology transfer. As a patent agent, she handles matters within a Patent and Trademark Office.

Before becoming a patent agent, Bryant worked as a polymer scientist for six years and obtained her master of science degree in polymer science from the University of Akron. During this time, she received a patent for a material she invented. "My background as a polymer scientist provides me with the knowledge to understand what the researchers' inventions are all about and helps me when working with patent applications," Bryant said. Once a patent is granted or while the case is pending, NASA will try to license the invention as soon as possible. According to St. Clair, about 20 percent of the patents/applications are either licensed or they are in the negotiation stage. "The Composites and Polymers Branch has the most patents of any Langley branch since 1970," said Dr. George Helfrich, patent counsel.

Photos by Fred Jones

Patent agent Joy Bryant examines a ribbonizing powder-impregnated towpreg invented by Don Sandusky, right.

Many of the researchers in the branch are involved in the marketing process. Don Sandusky, a NASA Graduate Student Researcher's Program (GSRP) fellow in the doctoral program in applied science at the College of William and Mary, developed a unique, cost-effective process to fabricate polyimide towpreg ribbon for ATP applications. His process provides significant improvement over the current state of the art because of high-quality and high-production speeds. The NASA patent office has received commercial interest for licensing the "ribbonizing" process from an aircraft material supplier and a manufacturer of down-hole pipe liners, both of which use robotic part fabrication.

Another aspect of the Composites and Polymers Branch operations is the opportunity for education in the branch. The College of William and Mary's graduate program in applied science allows students to work with local businesses and institutions. Langley is one of these institutions. The students gain valuable hands-on experience, and the work they accomplish while at Langley is always complementary to the branch's research, said St. Clair.

Dr. Patricia McDaniel worked extensively with the branch to earn her doctorate in applied science. Through funding by the GSRP, she was the first person to receive a doctorate in the William and Mary applied science polymers track. "I liked the idea that one could do a research project with real- world applications instead of something strictly esoteric," she said. While working on her graduate studies, McDaniel developed a material that is currently in the patent process. She is now performing post-doctoral research in the branch on nanocomposites and said, "Since the area of nanocomposites and suprastructures is relatively new and nearly all of our work is groundbreaking, many of the applications for these materials are not known."

Cathy Fay works as a liaison between the branch and the College of William and Mary. Fay said, "My liaison position between Langley and the Applied Science Program is mutually beneficial to both institutions because of the exchange of technical information, expertise and other resources. I also coordinate efforts concerning safety issues and compliance to NASA regulations by college personnel." In addition to her administrative duties, Fay is also pursuing a doctorate.

Other students also gain valuable experience in the Composites and Polymers Branch. There are 14 students working exclusively in the branch this summer, representing North Carolina State University, Virginia Polytechnic Institute and State University, Hampton University, Georgia Institute of Technology, Spelman College and the University of Illinois.

*Brad Dougherty is a Governor's School student and a rising senior at Indian Creek High School in Chesapeake.*

# Visitors Enthusiastic about Apollo 11 Open House

BY DIANA POPE

Visitors came to Langley's Apollo 11 Open House July 16 for a variety of reasons. Some were employees who took the opportunity to show Langley to their families and friends. Others saw it as an opportunity to educate their children and themselves about aerospace research and technology.

## What Visitors Said

Many also came for the reason Diana Gulley did: "The many TV shows that focused on the moon landing peaked my interest in NASA and Apollo," said Gulley. In addition, the event also sparked interest in NASA's future for the more than 7,000 visitors while they celebrated the past.

Visitors like David Stone were also intrigued by the connections between past and future found at Langley. Speaking specifically of the Unitary Wind Tunnel facility, Stone, a participant in the NEWEST (NASA Education Workshop for Elementary School Teachers) program, said, "What's really impressive to me is that these facilities and equipment, built in the 1950s, are still useful for research and technology that will impact the 21st century!"

Stone and his friend Bob Weingast, NEWEST participant, were pleased to have "lucked out" and been at Langley during Open House week. Weingast, a teacher from New York who was taking photographs of facilities, said, "I'm trying to take as much of this as I can back to the children I teach."

Many children from Tidewater and beyond came to the Open House. They were mesmerized by "Apollo 11 Highlights," a film shown in the H. J. E. Reid Conference Center. This was their way to experience what many of their parents had experienced 25 years ago on live television. The young visitors also showed great interest in the current research and technology that will affect their futures. One grateful parent was Anne Chapman, whose children Josh and Sarah particularly enjoyed the Flight Simulation Facility. "I'm very thankful to everyone who put this event together," said Chapman. "Obviously, an incredible amount of work went into preparation. It's been a long, hot day, but this is not the kind of thing that happens every weekend, so I'm glad we could come."

Many children found exhibits that fit well with their specific interests. "He's into robots," said the mother of Martin Press, as she watched him delight in the robotic arm and Omniview camera at the Information Research Facility, "so he really likes this exhibit."

Jason Batts enjoyed the Model Rocket Launch that the National Space Society held on the grounds of the conference center. He was "warming up" for the astronaut camp he'd be attending the next week at the Virginia Air and Space Center. His mother, Liz Batts, said, "We came to the 75th anniversary open house, too, and the kids really liked things like the Lunar Landing Research Facility."

Other "experienced" Langley visitors were Will Dupuy and his children, Jessica and Travis. "We live in the area and come out here every time Langley has a big event," said Dupuy. The Dupuys brought Irene Saauedra and Juan Josae-Bello, both foreign exchange students from Spain, with them to Open House. All of the children agreed with Jessica's statement that "We like science classes okay, but this is definitely better than school!"

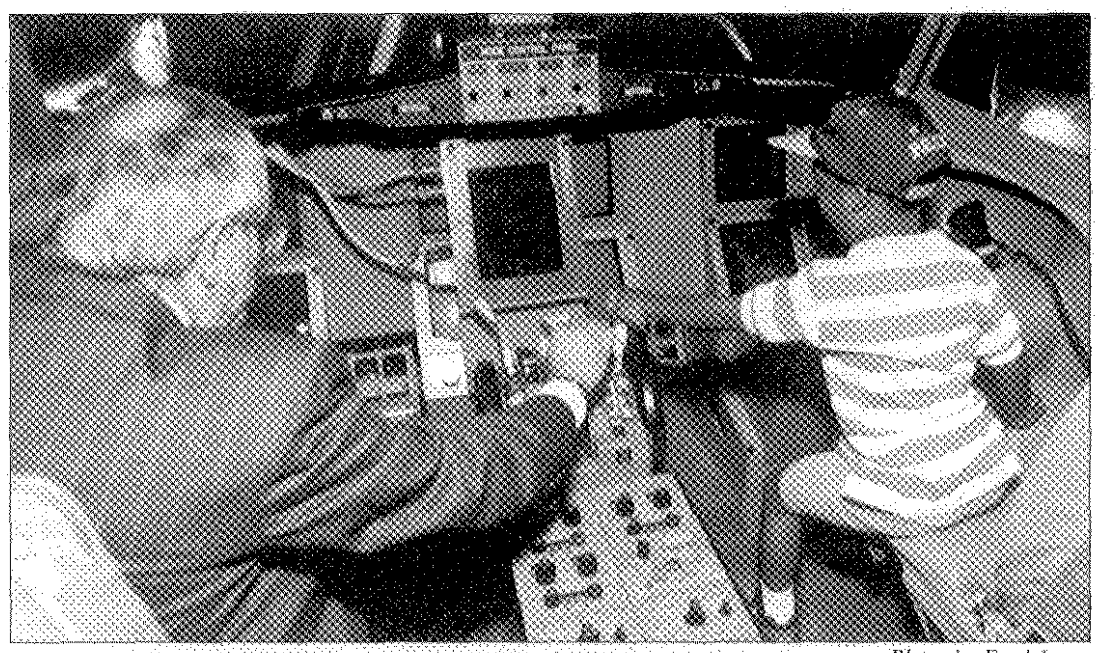


*Photo by Fred Jones*

**Floyd S. Shipman of the Systems Architecture Branch, shows a delighted Dominic Taylor the 737 Simulator in Building 1268A. Visitors were able to see some of Langley's other Flight Simulators in the branch as well.**

## Adults Liked It, Too

Of course, the children weren't the only ones enjoying the commemorative event. "Fun" was the word used by many adults as well to describe their day at Langley.

A hands-on flight simulator at the Guidance and Control exhibit had been set up to provide children with the opportunity to learn about guidance and control concepts. However many "bigger kids" decided to get in on the fun too. As she waited in line for her turn to "fly," Diana Gulley worried a little: "I don't play video games like my son James does, so I'll probably crash the simulator!"

Many other facilities also had exhibits designed especially for children, yet enjoyed by all ages. At the Acoustics Research Laboratory, an entire room was devoted to teaching children basic concepts of sound through hands-on demonstrations. The Office of Education exhibit provided children with the chance to build model airplanes.

Interactive opportunities at many exhibits encouraged visitors to "learn by doing." At the Flight Simulation Laboratory, visitors could operate target models on a video monitor after watching the Differential Maneuvering Simulator and Visual Motion Simulator demonstrate simulated flight. The Instrument Research Laboratory exhibited a thermal camera which allowed visitors to see just how hot they were on that sunny Saturday.

## Checking Out Langley's Research

For many visitors, learning about the research done at NASA Langley was more than just curiosity. "Let's face it," said Robert Powers. "We spend a lot of money in tax dollars, and we like to see where it's going." The Open House gave visitors a close look at their investments in cutting-edge research that will affect their lives. Langley researchers were pleased at the opportunity to exhibit their work and at the overwhelmingly positive responses they got from visitors.

## Exhibitors' Reactions

"We've had a steady stream of visitors since about 8:45 this morning," said Rudy Williams, a lab manager at the Information Research Facility.

"We've gotten a good response," said Odilyn Santa Maria, an aerospace technologist at the Acoustics Research Laboratory. "I think everyone can relate to our exhibit because everyone can relate to the concept of community noise."

Robert Holt, an electronic technician at the Electromagnetics Research Laboratory, stated, "We have been busy! This is the first time that this facility has been open to the public, and we have been very pleased with the response. I think visitors have enjoyed what they've seen here and learned a lot about what we do."

It was a busy day for researchers and visitors. With 17 facility stops open to the public, visitors got an interesting overview of the work done at NASA Langley. They also gained new perspective on the past, present, and future of aerospace research and technology in America.

*Diana Pope is a LARSS student this summer at Langley. She is a rising junior at Vanderbilt University in Nashville, Tennessee.*

*Photo by J.J. Miller*

**Dave Dress discusses the facilities and equipment at the Unitary Wind Tunnel with Bob Weingast, left, and David Stone, right, both elementary school teachers participating in the NEWEST program at Langley.**

*Photo by Fred Jones*

**Angie Jenkins, seated right, helps young visitors build model airplanes at the Office of Education exhibit. There was much cutting and pasting among the guests.**

Photo by J.J. Miller

At the Acoustics Research Laboratory, G. Clark Smith discusses interior noise control with a group of Open House visitors while Tommy Hunt, age 7, listens intently.

Photo by J.J. Miller

Two children learn about the basic concepts of sound from Barry Lazos in the Acoustics Research Laboratory.

Photo by Hubert Lloyd

Wayne Boston demonstrates fabrication capability at Langley for curious young visitors at the Advanced Machine Development Laboratory exhibit.

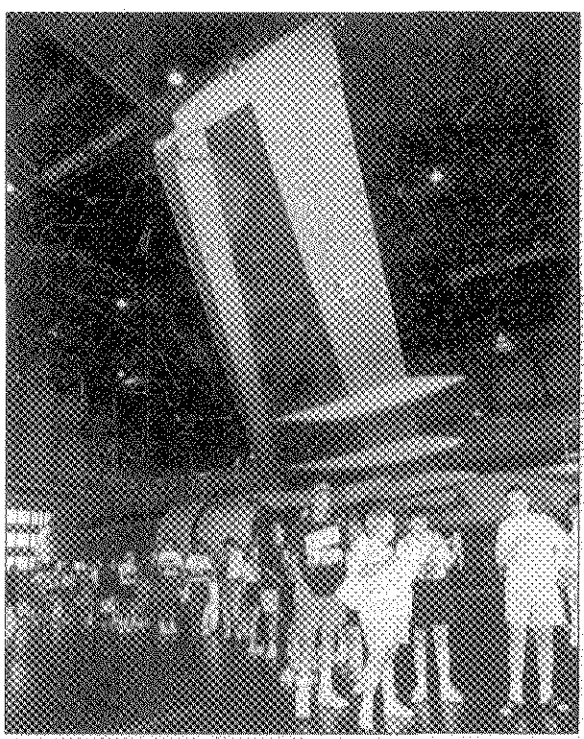
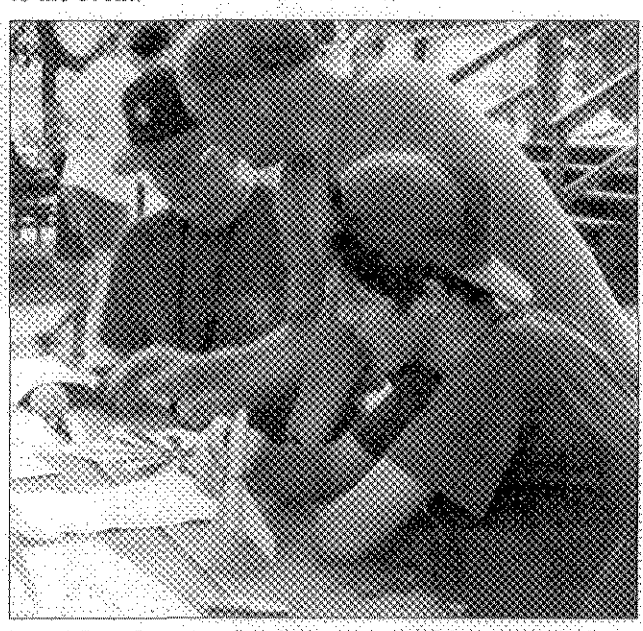


Photo by Fred Jones

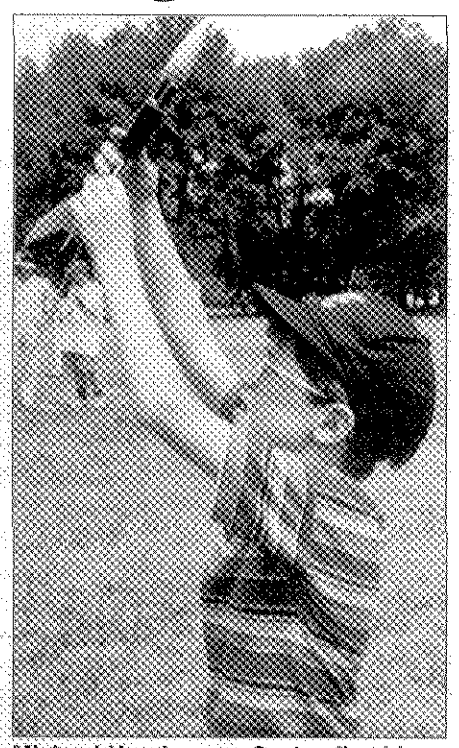
Under the wing of the 757, Open House visitors wait in line to enter the 737 – Langley's famous "Flying Laboratory."

# Model Rocket Launch — A Big Hit

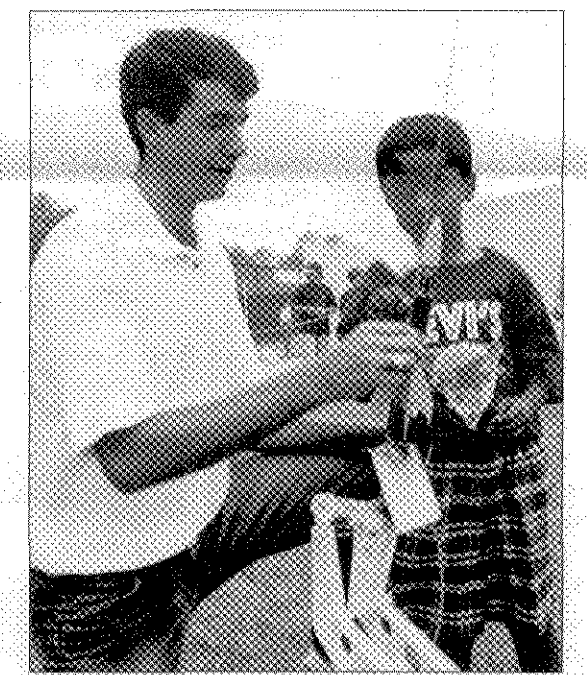
A model rocket launch sponsored by the National Space Society on the grounds of the H.J.E. Reid Conference Center at Open House July 16 thrilled participants and bystanders alike (see photos). Visitors could purchase, build, and launch model rockets and they flocked to the event.



Local Boy Scouts plot their course with one of their leaders. Many scouts earned the Space Exploration Badge for their participation in the launch activities.



Michael Hendry, age 8, steadies his rocket in preparation for launch.



With some help from Spencer Johnston, left, of the Aeronautical Engineering Branch, Prateesh Maheshwari sets up his rocket.

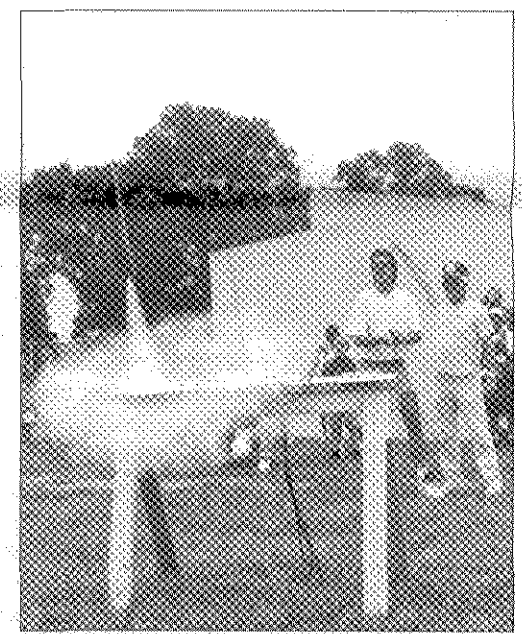
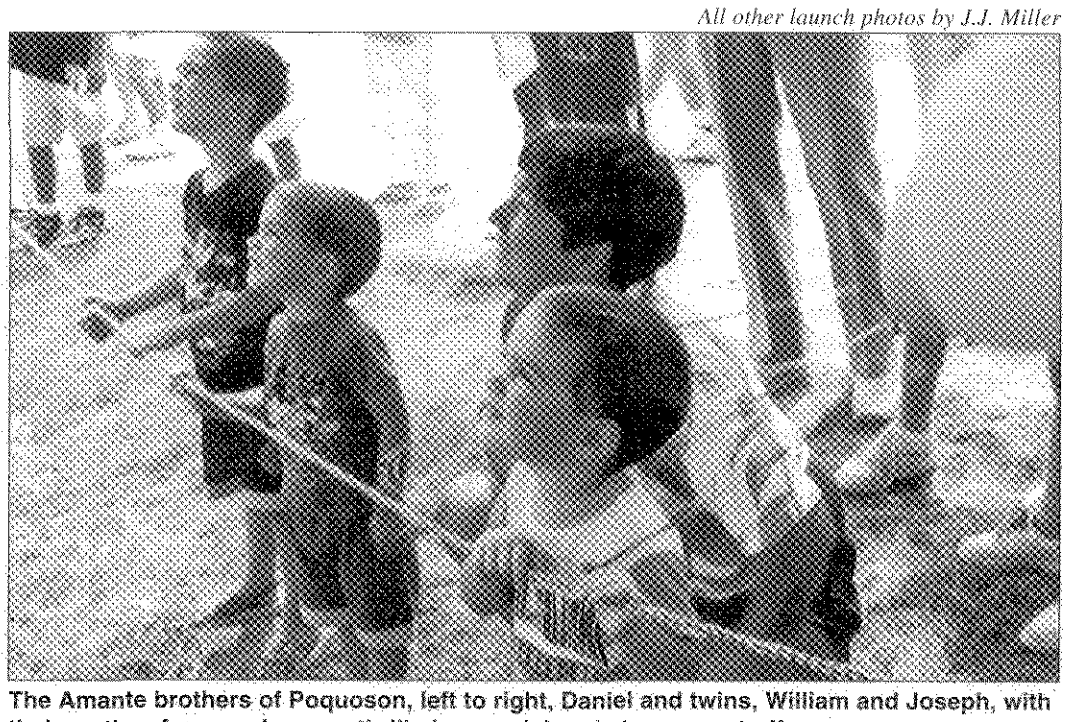


Photo by Fred Jones

Dave McMillan, left, stands with Dave Shuster, Systems Development Branch, who oversaw the model launch as McMillan's F-14 Navy fighter model is successfully sent into the sky.

All other launch photos by J.J. Miller



The Amante brothers of Poquoson, left to right, Daniel and twins, William and Joseph, with their mother Annemarie, were thrilled as model rockets were set off.

# *Apollo Anecdotes: Langley's Role in Testing*

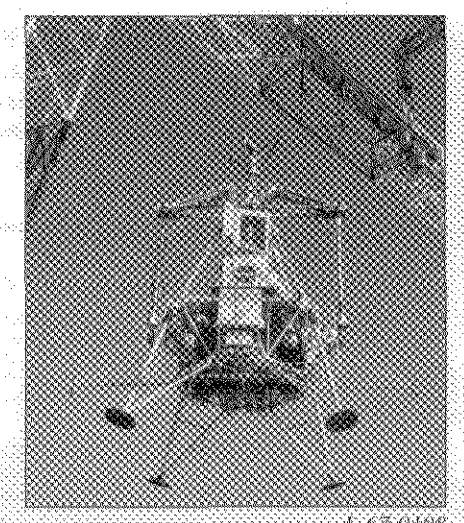
**BY MARK SCHAFFER**

There were a lot of successes in the Apollo program. But who made sure everything worked — was tested and tried out? Who helped train the astronauts for their mission? Langley did, with the most visible reminder of that time the Lunar Landing Research Facility (LLRF), the large gantry, that was used in many gravity simulations.

One of the most important objects tested was the LEM or the Lunar Excursion Module (now called the LM). The problem was simulating the one-sixths gravity of the moon on the earth. So, the gantry or LLRF was built and a cable/pulley assembly was designed to lift five-sixth of the vehicle's weight as well as adjust to the pitch, roll and yaw of the vehicle. The other one-sixth of the weight was controlled and lifted by a hydrogen peroxide engine and attitude control jets of the same fuel.

Testing the LM was important, but the way to generate lower gravity was a challenge before the gantry existed. Robert A. Champine, a retired NASA test pilot, was part of the early decisions on the design of the LM and how it was tested. Researchers tried a crane behind the hangar in the early 1960s as well as the crane in the hangar used for moving the planes around. Neither was satisfactory. Testers then tried rigging up cables in the Full Scale (today's 30- x 60-Foot) tunnel, using compressed air as roll, pitch and yaw jets and a load cell for a lifting jet. "It was far more complicated than anything at that point for testing," Champine said. Though the tunnel provided important information, it was limited in that there was just about no horizontal movement available. "The LM was tied at the top and swung like on the end of a rope. It could only move two or three feet." After finding out as much about the LM design as they could using the then current facilities, the team sought funding for the gantry that would allow a greater range of motion for the LM and a more finalized version of the LM for testing.

For Champine, it was a thrill to go out to the gantry, at least after a while. "It was a psychological quandary - like looking down the side of a building from the roof - very disruptive. My first time up in the LM I got a thoroughly terrible feeling of height. I had to stop everything and take the elevator up into the steel work and walk around until I was accustomed to the height. The others thought it was odd but after a couple of days, I could fly okay. The training helped to overcome that - it was the high point for me, a thing to remember."



L-67-9108

**Test engineer Maxwell Walker Goode takes the Lunar Module though its paces at the gantry.**

Lee H. Person Jr., Aircraft Operations Branch, a NASA research pilot since early 1962, was one who tried out many of the ideas developed to help put man on the moon. Person registered some 80 flights on the LM, each about 90 seconds long with a 90-minute turn around time. "Sometimes we just stayed out there all day for a couple of flights," he said.

Kenneth "Dick" Yenni, Aircraft Operations Branch, was another NASA research pilot at the time and he echoed Person, "Sometimes we were out there from 8 a.m. to 9 p.m. and never even got a flight off."

Yenni also remembered the first designs of the LM where the cockpit was like that of a Bell Helicopter. "They used to haul you up there and then you'd rock back and forth, staring at the ground sometimes. It got to you sometimes." The cab was later changed to more of a stand-up version and was more stable.

Tests were first done in the daytime but once the pilots were proficient, tests were at night and the landing area under the gantry was altered to resemble the moon's surface – complete with craters and debris.

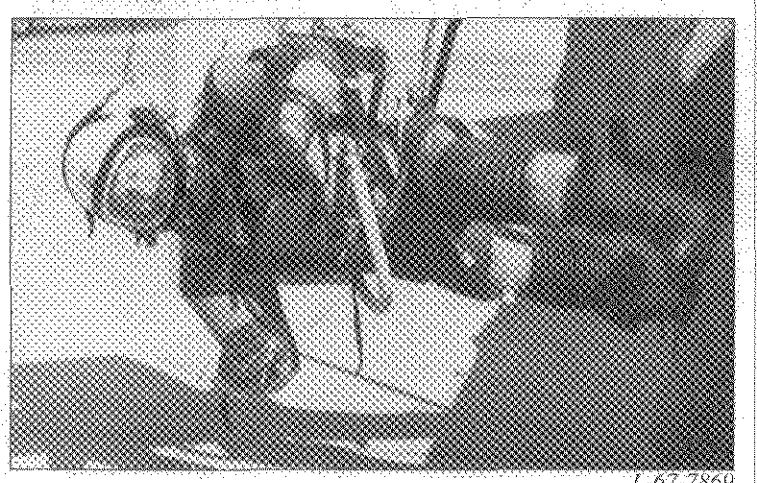
The "lunar surface" was made by using slag from steel furnaces that was mixed with concrete and laid out under the gantry in the form wanted. Water was applied and the mixture hardened. Dr. Randall L. Harris Sr., a test engineer at the time, said, "We were able to get the crater density we wanted, but they were only six-inches high. So one day, another engineer and I went out with black paint and painted in longer shadows."

Eric Stewart, Flight Research Branch, another test engineer remembered Don Hewes, the branch head for the LLRF, bringing in a sprayer from home to paint those shadows. "I was one of the ones looking at all the moon data we had to come up with the crater distribution we used." That type of ingenuity was applied to many of the tests to better simulate the task of accomplishing the Apollo mission successfully.

Variations on the backpack, scooter-like vehicles and even "jet shoes" were all tried at different facilities, but they never flew on Apollo. Other ways of moving around were tried out too, though the lunar rover was ultimately chosen.

"It was a very interesting and very challenging program. It was with great satisfaction that we developed workable ideas for Apollo," said Champine.

"We thought it was the beginning of the first people on the moon," Stewart said, "but it was really the end. We thought we'd go back to the moon regularly and that those astronauts wouldn't be pretty unique. But they are."



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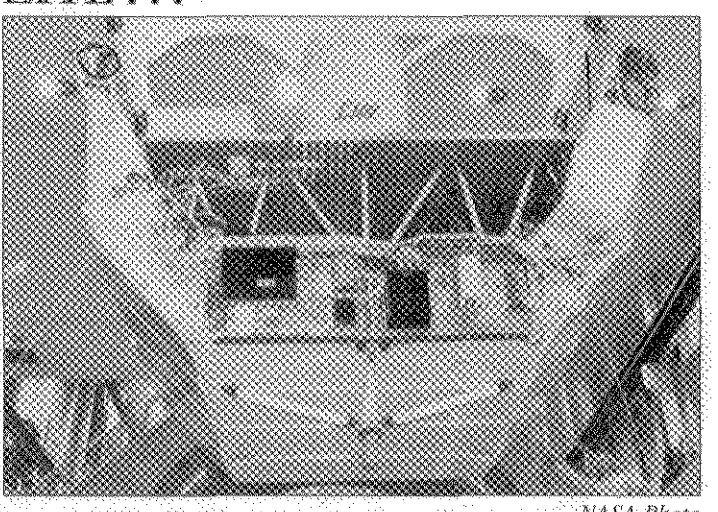
**Randy Harris takes a simulated lunar stroll sideways in a full pressure suit as part of the testing for the lunar mission.**

# LITE . . .

*Continued from Page 1*



*NASA Photo*

**In the Operations and Checkout Building, the Lidar In-Space Technology Experiment (LITE) is being transferred to a work stand. During its shuttle flight, LITE will collect data on stratospheric and tropospheric aerosols, the planetary boundary layer, cloud top heights and atmospheric temperature density in the 10- to 40-kilometer range.**

Of the roughly 2,000 watts of electrical power drawn by the laser when lasing, only about one-half of one percent (or ten watts) comes out as a usable optical signal. For example, if residential lighting were this inefficient, it would take the power used by a large flood light to power a night light.

LITE was originally planned to fly on at least two shuttle flights. The first one was to test the basic hardware performance and the second was to use the lidar to collect atmospheric data for the scientists. Since that time, the two missions have been combined requiring that the technology be tested and the science data be gathered in the same nine-day period. "We have taken the science requirements that were primary for the second mission and pulled them in with our technology objectives for the first mission," Rogers said. "So we are working very closely with Pat McCormick to make sure that we achieve both objectives. "In some cases, to prove the lidar system you can't can't really separate the technology from the science. In order for it to be meaningful you need to have meaningful science. Our objectives are very closely intertwined there."

The LITE instrument will take 45 hours of data including a number of 15- minute "snapshots" over target areas selected either for scientific interest or to support validation observations. At specific locations, lidars on aircraft and numerous ground-based lidars will make measurements at the same time under the path of shuttle. An international team of scientists are helping to collect this "ground-truth" data.

Rogers said, "We in the LITE Project Office are not lidar experts. We have some expertise on developing flight hardware but are totally dependent on the science team for looking at the return signal and assessing the quality of that data. The science community is working hard to do some near real-time processing during the mission to maximize the science returns."

*Photo by Fred Jones*

## Born on the 20th of July

**July 20, 1969, was a special day for the entire world, but Natasha Wilson has an extra reason to celebrate – it was her day of birth! Wilson is working as a LARSS student this summer in the Human Engineering Methods Program. As part of her birthday celebration, she arrived early at the Apollo II stamp ceremony and was among the first 200 attendees to receive free stamps. Fran Sansone of the U.S. Postal Service cancelled Wilson's Commemorative First Day Cover.**

# SHARP Students at Langley This Summer

BY BRIAN FOWLER

Some of the "sharpest" high school students in the Tidewater area are at Langley this summer as part of the Summer High School Apprenticeship Research Program (SHARP).

The program is an eight-week, intensive science and engineering apprenticeship for high school students over the age of 16 living within commuting distance of Langley.

SHARP is specifically designed to serve minorities under-represented in the NASA workforce and is part of a larger NASA goal to strengthen the Nation's efforts to employ minorities and females in science and engineering, according to Walt Darden, the program's director.

Begun in 1980, the SHARP program is sponsored by NASA Headquarters and is used as a feeder program to create a pool of future NASA employees in science and engineering.

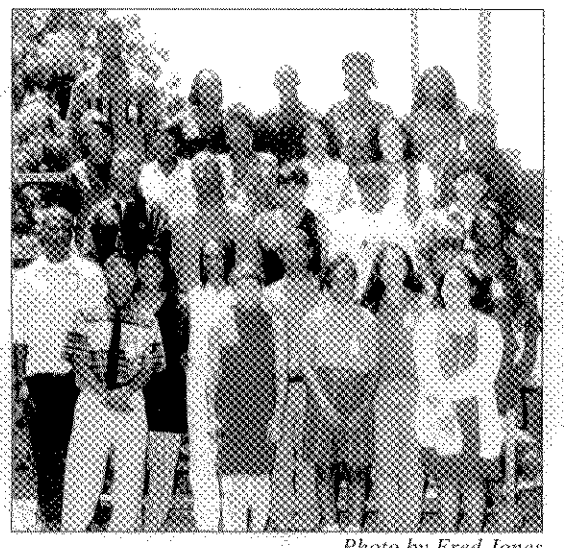


*Photo by Fred Jones*

**The 1994 SHARP students take a break from their work at the H.J.E. Reid Conference Center picnic grounds. The 26 high school students are spending eight weeks at Langley this summer.**

This year, 26 high school students were selected to work at Langley from June 20 to August 12. During their time here, these students will work a 40-hour week under the supervision of a mentor. Eighty percent of their time will be spent in the laboratory. The remainder will be spent on tours, reports and career counseling. Students will be required to complete designated assignments, make oral presentations, prepare written reports, and participate in a variety of enrichment activities.

In the past, students have worked on projects like designing a water tunnel test of the effects of jet exhaust on upper wing airflow, and studying a shuttle orbiter aerodynamically-separated from external tanks during ascent while solid rocket boosters are firing.

SHARP's objective is to involve students in individual working relationships with active researchers with the hope of stimulating broader career interests in science and engineering.

# NASA Employs *NEWEST* Method of Teaching

BY BRIAN FOWLER

Recent national studies indicate that if a child has not developed a meaningful interest in science and mathematics by the third grade, the prospect of doing so diminishes over time. That's why the Education Division at NASA Headquarters has made pre-college education and teacher enhancement programs a priority. NASA, along with the National Science Teachers Association (NSTA), sponsors the NASA Education Workshop for Elementary School Teachers (NEWEST).

*Photo by Fred Jones*

**The 1994 NEWEST teachers pose at the Langley hangar in front of the T-38.**

NEWEST is a two-week program designed to give outstanding elementary teachers a chance to personally experience the U.S. aerospace program. The primary goal of the workshop is to translate NASA studies to the elementary level.

From July 10 - 22, this year, 23 participants got a chance to learn the latest about aeronautics and space activities at Langley.

One objective of the program is to use NASA's missions to demonstrate the integrated applications of science, mathematics, technology and related subject matter by expanding curricula and providing instructional opportunities for elementary school teachers.

The program is intended to enhance the teaching techniques, science and math skills and academic preparation of the elementary teacher. In addition, the program is intended to expose teachers to the use of educational technologies to deliver lessons.

NEWEST is open to U.S. citizens who are full-time elementary teachers in grades K-6 with at least five years teaching experience. The teachers can be from public or private schools in the U.S., U.S. territories, Department of Defense dependent schools, Department of State overseas schools or Bureau of Indian Affairs schools.

NEWEST takes a unique approach to elementary childhood education. By giving elementary teachers the tools to do a better job, "NEWEST helps lay the foundation for the next generation of NASA scientists and engineers," said Pat Link, the program's director from the Office of Education.

*Brian Fowler is a LARSS student and a rising junior at Virginia Polytechnic Institute and State University.*

## Internet Fair Follow-Up Information

The Internet Fair Team with members from five divisions at Langley hosted the Internet Fair on June 28, 1994. More than 1,000 Langley employees and guests attended this event and about 300 persons registered for three upcoming workshops: "Writing High Tech Mark-up Language," "Installing World Wide Web Browsers," and "Serving Information." The Internet Fair Team operated largely as a Self-Directed work team. Teaming with management, they secured the necessary resources to design, and implement the Fair. All graphics were approved on-line resulting in maximum input from team members, significant savings in supplies, and expedition of the proofreading process. Internet Relay Chat, an interactive wide-area text-based conferencing system was utilized thus enabling team members to brainstorm while doing other work concurrently. E-mail was used to a large extent to reduce meeting time.

The Internet Fair Team realized process improvement and cost savings in four major areas: graphics; advertising; teaming implementation; and archiving. The organization of the Internet Fair is a prime example of how the World Wide Web and other information technologies are assisting Langley in archiving its mission.

A description of the fair is presented and is available on-line (http://ice-www.larc.nasa.gov/FAIR/). A video tape of the fair is also available at the Technical Library. For more information please contact Gretchen Gottlich, phone: 864-2303 or E-mail: g.l.gottlich@larc.nasa.gov

**The Internet Fair Team received a Team Excellence Award recently for their work in organizing the fair.**

## SHARP Career Awareness Program

The NASA Langley Summer High School Apprenticeship Research Program (SHARP) will hold its annual Career Awareness Program August 1 in the H.J.E. Reid Conference Center from 9 a.m. to 3:30 p.m. This event provides an opportunity for high school juniors and seniors and their parents to interact with representatives of engineering and science departments of various colleges and universities. For additional information, contact Walt Darden at ext. 44848, Mail Stop 219.

# Office of Education to Join National Consortium

BY BRIAN FOWLER

Beginning in 1995, NASA Langley's Office of Education will join the National Physical Science Consortium (NPSC) in an effort to curb the dramatic drop in the number of minorities and women pursuing graduate degrees in the physical sciences.

NPSC is a unique coalition of leading universities, national laboratories, government agencies and private corporations dedicated to ensuring that the United States remain at the top in the various fields of physical sciences.

To achieve this goal, the NPSC has determined that more undergraduate women and minorities must be given the opportunity to obtain graduate degrees in astronomy, chemistry, computer science, geology, materials science, mathematics and physics. Until now, these students have had trouble gaining access to the American scientific community due to lack of finance or direction.

The NPSC helps these students by offering a combination of financial aid, research experience and mentoring support. It also offers participants an opportunity to network with other NPSC graduate students, researchers from universities and employer organizations in the consortium.

Students selected to participate must progress through a full-time study program at a NPSC university, leading to a doctoral degree in the physical sciences.

During the summer, participants work for a NPSC employer member. Langley's participation in the program, referred to as the LaRC-NPSC, will begin in Fiscal Year 1995 under the management of Roger Hathaway, Office of Education. Hathaway plans to award four fellowships per year.

Students selected by Langley must work 12 weeks during the summer on Center for each year they are in the program. While here, students will work on a research project with the help of a Langley technical adviser. The deadline for NPSC fellowship applications for 1995 is November 15, 1994. Additional information may be obtained by calling the Office of Education at ext. 45209.

# Happenings

**CONDO FOR RENT:** Hampton Club, 1 BR, washer/dryer, ceiling fans, all other appliances, two pools, fitness center, security system, near NASA, available Sept. 1, $425/month. Call 838-8422.

**TOWNHOUSE FOR SALE:** Hampton Threechopt Village, 3 BR, 2-1/2 baths, den, living and dining rooms, breakfast nook, cul-de-sac, privacy fence, $75,900. Call 825-1475 and leave message.

**HOUSE FOR RENT:** Brick ranch in Poquoson, 3 BR, den, attached garage. Call 838-8111.

**FOR SALE:** Imagewriter II dot matrix color printer, $175; assorted baby items/summer maternity clothes; classical piano sheet music, all levels. Call 887-5124.

**HOUSE FOR SALE:** **Great assumption,** Woodcreek, 3BR, 2 baths, loft, dining and living rooms, fireplace w/gas logs, garage, privacy fence. New heat pump & water heater, all appliances, near NASA. Only $2,000 to assume 8% loan at $711/month. Call 874-3121.

**AEROBICS CLUB PICNIC:** The LAA Aerobics Club is sponsoring a PowerWalk® with instruction on technique for first-timers, followed by a cook-out with low-fat foods, Wednesday, Sept. 7, at the LAA picnic grounds. PowerWalk® begins at 5 p.m. and the cook-out at 6 p.m. Register early for a space in the PowerWalk® class or come and eat! Cost for this event is $4. Call ext. 42295 for more information.

**FITNESS WITH AEROBICS:** The LAA Aerobics Club features bench, low-impact and weight training on Tues. and Thurs. from 5-6 pm, and Sat. from 9:30-10:30 a.m. Participants may alternatively take part in the new PowerWalk® classes from 4:45-5 p.m. on Tuesday and Thursday, and on Saturday from 9:15-10:30 a.m. Nutrition, and body composition analysis given before class. All classes meet in the LAA Gym and are open to civil service employees, contractors and their families. Call ext. 42295.

**LAFB AIR SHOW:** The annual Langley Air Force Base Community Appreciation Air Show, "The Spirit of the Virginia Peninsula" will be held Aug. 6, from 9 a.m. to 5 p.m. There will planes on display: the Stealth Fighter, B-52, AWACS, B-1 Bomber, A-10, as well as demonstrations of military, civilian and vintage aircraft. The U.S. Army's parachute team, the Golden Knights, will also be performing. Refreshments will be available throughout the day, and admission is free. For more information, call 764-2018.

**FOR SALE:** Half golden retriever/black lab puppies, eight weeks old, color, either completely black or blond, $50. They need a fenced-in yard. Call Karen, 867-7977.

**FOR SALE:** 1986 Chevy Camaro, automatic with A/C, power windows and locks, am/fm stereo, near mint condition. Call Shonda at 851-4854.

**KI-AKIDO:** The Peninsula Ki-Akido Club invites you to participate in this gentle martial art. The location is the York Village Shopping Center, Rt. 17, Grafton. Classes are Monday-Thursday from 6:30 to 8:30 p.m. For more information call 229-2219.

**FOR SALE:** Epson LQ-510 24-pin dot matrix printer w/about 500 sheets of fanfold paper, $150 o/b/o. Call 850-1273, evenings.

**FOUND** at the Open House, July 16, one child's purse. Call Security, ext. 43420, to identify and claim.

**WALK WITH ME:** Start organizing a Memory Walk Team now and register to join the Alzheimer's Association – Hampton Roads Chapter event, Saturday, Sept. 24. Teams will be eligible for prizes and all money collected will benefit the association. For more information and registration forms, contact the Alzheimer's Association on the Peninsula at 800-755-1129, Southside, 459-2405.

## Construction Announcement

New parking lots and widening of Langley Boulevard will be worked on in this order:

| Building | Start Date | Complete Date |
|---|---|---|
| 1267 A | June 13 | July 19 |
| 1222 | July 20 | August 29 |
| 1252 (Water Tower) | August 30 | November 2 |
| 1212 B | November 3 | December 9 |
| Widening Langley Boulevard and North Wright Street | December 12 | March 22, 1994 |

These dates may be affected by weather problems. People are discouraged from parking on the grass under trees since this will kill the roots.

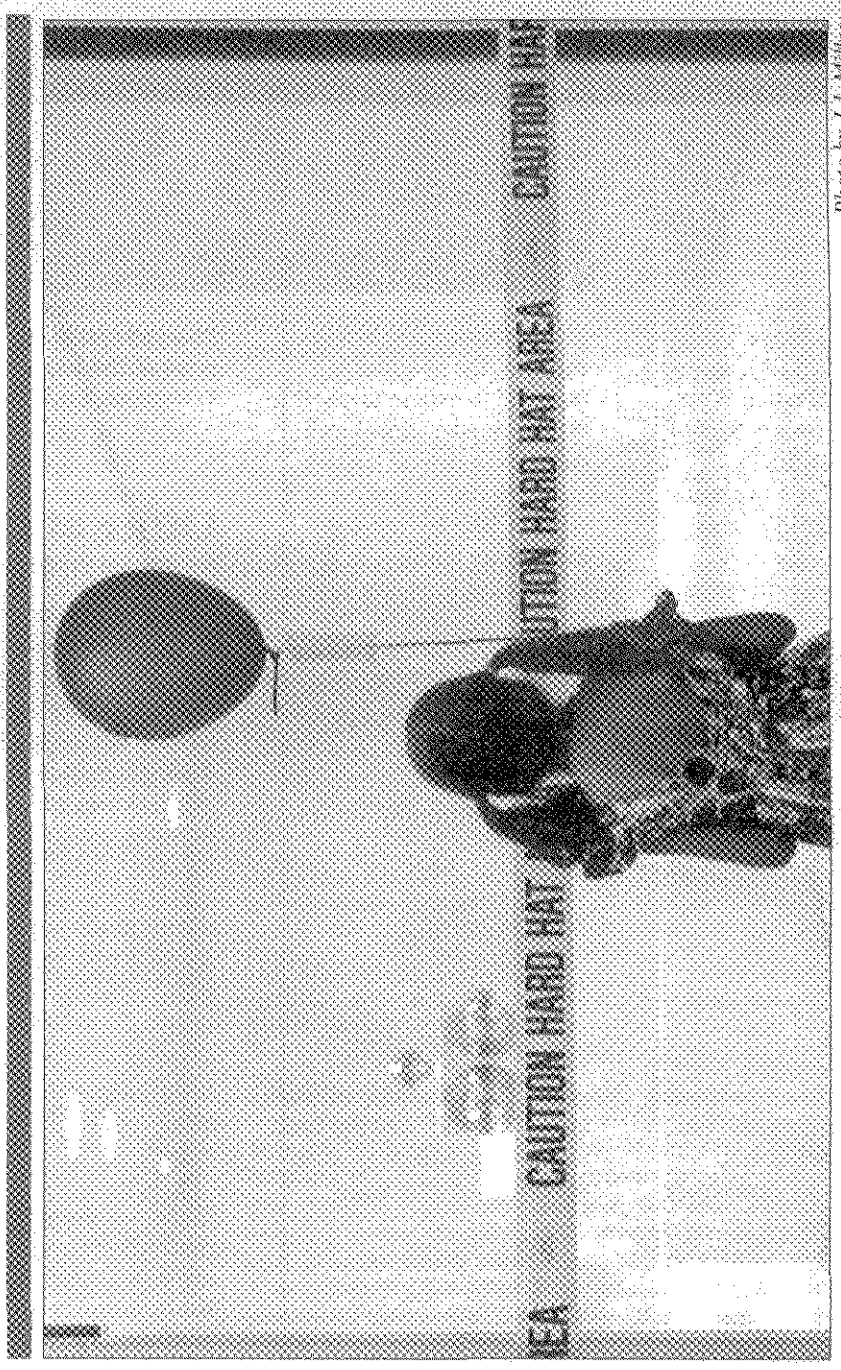



*Photo by J.J. Miller*

**While clinging to her NASA balloon, Sarah Chapman, age 7, of Hampton, peers into a test chamber at the Information Research Facility where flight control computers are tested for reliability in adverse environments.**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Researcher News

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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 16 ❖ August 12, 1994

## LITE Science Signals New View of Atmosphere

BY MARCIA WESTMORLAN

The information collected during LITE's nine-day shuttle mission is expected to herald dramatic new levels of insight for climate modelers and weather forecasters while establishing lidar-in-space as the atmospheric science tool of the future.

Project Scientist Dr. M. Patrick McCormick said, "Our hopes are that when the climate and atmospheric sciences communities see the LITE data, they are going to push for a permanent lidar in Earth orbit."

LITE, which stands for lidar in-space technology experiment, will mark the first time a lidar instrument has been used to collect atmospheric data from a space-based platform.

Lidar is a remote sensing technique that can be used to study such things as clouds and suspended particles called aerosols. Lidar sends out short pulses of laser light and detects a portion reflected back from the atmosphere. By doing so, it obtains very high vertical and horizontal resolution.

### Basic Testing to Be Done

The LITE experiment — designed, engineered, built, and monitored by Langley — will fly as the primary payload on Discovery, scheduled for launch in September. The six basic areas of testing during the mission will be atmospheric density in the stratosphere; surface characterization; stratospheric and tropospheric aerosols; clouds; and the planetary boundary layer, which is the region of atmosphere where we live, up to one mile from the Earth's surface.

McCormick's goal is "to wring every bit of science that we can out of this mission. We are trying to show its utility. There are going to be some applications that jump out of this flight that we never thought about. We are going to observe things that no one knew we could get out of lidar measurements."

McCormick believes LITE will make it possible to define all of the fine structure around jet streams, massive fronts, intertropical convergence zones and more.

"That is what LITE brings to the table," he said. "It brings the capability to probe the troposphere, with measurements of exceedingly high vertical and horizontal resolution. Plus, the instrument carries its energy source with it so we can discriminate against background noise by using filters that block out everything else. Because we take our (light) source with us we are independent of sources of radiation like the sun and the moon that other techniques depend on.

"In addition, the mathematics needed to understand the backscattered laser light are straightforward and not dependent on assumptions."

He believes LITE's lidar will be able to measure cloud tops to within 15 meters which is more precise than any other remote sensor.

"At this point in time, that is even better than the climate modelers need," McCormick said. "We know where the laser pulse is anytime after we discharge it. So when we get a reflection off a cloud we know exactly where that cloud is relative to the shuttle."

### LITE Gathers Aerosol Information

LITE is also expected to produce important information on aerosols. Aerosols are any solid material suspended in the atmosphere. McCormick's branch has been involved in aerosol research for 20 years, especially the understanding of stratospheric aerosols and their radioactive and chemical effects, and their effects on aircraft.

These aerosols are produced mainly from volcanic eruptions. More recently, McCormick's efforts have included tropospheric aerosol studies.

*NASA Photo*

**Workers in the Operations and Checkout Building at Kennedy Space Center are transferring Langley's Lidar In-Space Technology Experiment (LITE) into the payload canister transporter for transfer to the Orbiter Processing Facility where it will be installed into the cargo bay of the orbiter Discovery. LITE, which will demonstrate the technology of a spaceborne lidar instrument, is slated to fly on STS-64 in early September.**

Deputy Project Scientist Dave Winker said, "In our opinion, LITE is the best instrument that has ever been put in space for studying tropospheric, or lower atmospheric, aerosols.

"We want to use it to study sources and transport of aerosols which we have been able to do from aircraft but never from a global perspective. We are looking at human-derived and natural aerosols such as erosion and desert dust."

One targeted area will be the Sahara Desert in which dust is moved by Atlantic tradewinds.

"During this season there tend to be a lot of very large dust storms which makes the air impressive to study," Winker said.

"We want to learn about the amount of material transported and how far it is transported. We also want to learn the geological and chemical impact from this airborne dust and if it is deposited in the ocean."

It is important to study clouds and aerosols because both reflect sunlight back to space. If there is an increase in cloudiness over Earth, the Earth tends to cool because the clouds reflect light before it gets to Earth to warm it, Winker said.

The same is true with aerosols. "We generate millions of tons of aerosols due to industrial activity," he said. "They sit in the atmosphere and reflect (light) back to space. That has a cooling effect."

Aerosols may also affect clouds by acting to increase or decrease the amount of cloudiness.

"That is one of the things we don't know for sure," Winker said.

"We are trying to study the impact of clouds and aerosols on Earth's radiation budget - which is a climate issue. There is a lot of interest in this around the world because of its impact on greenhouse warming and other phenomena."

### Gravity Waves Are Studied

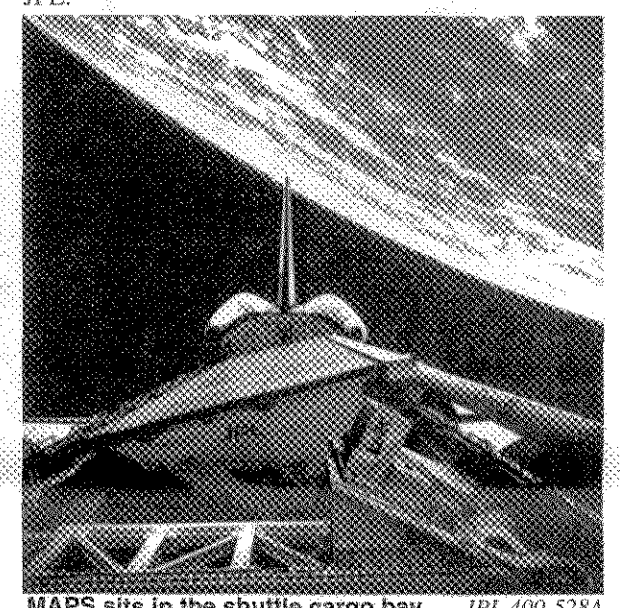
Another aspect of study expected to produce breakthrough data will be gravity waves over the Andes Mountains in South America.

*Continued on Page 5*

## Langley's MAPS Flies Again!

BY JOHN FEDORS

Langley's Measurement of Air Pollution from Satellites (MAPS) is scheduled to fly August 18 on the Space Shuttle Endeavour (STS-68) as part of the Shuttle Radar Laboratory (SRL-2) payload. As a result of this upcoming ten-day and seven-crew mission, scientists around the world will again be provided a unique vantage point for studying how the Earth's environment is changing. The SRL-2 payload is comprised of the Jet Propulsion Lab's (JPL) Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR), and MAPS. The German Space Agency (DARA) and the Italian Space Agency (ASI) are providing the X-SAR instrument to JPL.



**MAPS sits in the shuttle cargo bay.** *JPL 400-528A*

As part of NASA's Mission to Planet Earth Program, the MAPS experiment measures the global distribution of carbon monoxide (CO), an important indicator of the atmosphere's ability to cleanse itself of greenhouse gases and pollutants. The MAPS measurements provide the only near-global database of atmospheric carbon monoxide values in the troposphere (the region from 2 to 10 miles above the surface of the earth).

Technological and agricultural activities are generating CO in large and increasing quantities. The major sources of this colorless, odorless gas are automobile engine emissions and the burning of forests and grasslands. Once CO enters the atmosphere, it is transported over long distances and is ultimately oxidized to carbon dioxide by the hydroxyl (OH) radical, which is found "loose" in the atmosphere. The OH radical is the key participant in the breakdown and removal of greenhouse gases such as methane that has significant impact on the chemistry of stratospheric ozone and, potentially, on the climate of the atmosphere. Because MAPS is being flown twice in the same year, scientists will be able to study seasonal differences in the sizes and locations of carbon monoxide sources from latitudes 570-degrees South to 570-degrees North. Scientists will also be able to study how different large-scale weather patterns in April and August affect the transport of carbon monoxide. During August, the dry season in the Southern Hemisphere, increased biomass burning is expected to create large amounts of CO in those regions where the gas concentration was low in April.

The MAPS experiment is conducted by a team led by Principal

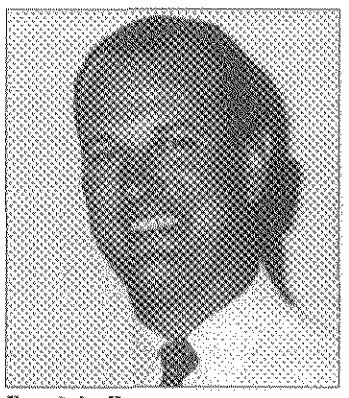
*Continued on Page 6*

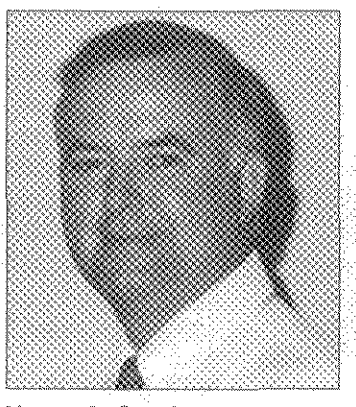
# News Briefs

## Silver Snoopy Awards Given to Seven at Langley

Astronaut Kenneth S. Reightler Jr. was on Center July 15 to honor seven Langley employees with NASA's Silver Snoopy Award. Recognized for their valuable contributions to the space program were Frank L. Boyer and Vance A. Overbay, both of the Systems Development Branch; H. Harris Hamilton II and Robert C. Blanchard, both of the Aerothermodynamics Branch; Dr. Eric T. Madaras, Nondestructive Evaluation Sciences Branch, and Dr. Mark S. Lake and Judith J. Watson, both of the Structural Mechanics Branch.

The Silver Snoopy Award is given to recognize those individuals who have contributed significantly to the success and safety of human space flight. The awards have been flown aboard a shuttle flight and are personally presented to the winners by a NASA astronaut, in this case by NASA astronaut Reightler.


Frank L. Boyer


Vance A. Overbay

H. Harris Hamilton II

Robert C. Blanchard

Dr. Eric T. Madaras

Dr. Mark S. Lake

Judith J. Watson

## Four Norfolk Public School Students Win Essay Contest

Four students were selected to receive awards after writing an essay on "Why I Want to Attend Space Camp." The contest was sponsored by Janaf Shopping Center and the Norfolk Public Schools' Science Department.

Michael Lyons, Lafayette Winona Middle School, and Allison Flood, Azalea Middle School, each won an all-expense-paid scholarship to Space Camp in Huntsville, Alabama, in August. Each scholarship is valued at $1,000. Presenting the awards was Anthony J. Maturo Jr. of Langley's Employee Development Branch. Nick Tolleson of Rosemont Middle School won second place, receiving four Busch Gardens passes and tickets to Nauticus. Third place recipient was Chris Wood of Northside Middle School, who won four Busch Gardens passes and Virginia Air and Space Center tickets.

**Left to right: Diane O'Brien, Janaf Shopping Center; Stephen Peters, principal of Lafayette Winona Middle School, accepting for winner Michael Lyons; Allison Flood, winner; Anthony J. Maturo Jr. of the Employee Development Branch; Nick Tolleson, second place winner; John F. Smith Sr., Norfolk Public Schools; Chris Wood, third place winner; and George Raiss , Norfolk Public Schools.**

*Correction: The workshop available, "Writing Hypertext Markup Language (HTML)" was noted incorrectly in the 7/29 issue.*

### In Memoriam

#### Roy T. O'Connor

Roy T. O'Connor, 68, a native of Halifax County and a Peninsula resident for 44 years, died Saturday, July 16.

O'Connor retired from Langley in 1979 after 24 years of service.

#### Draper D. Smith

Draper Diehl Smith, 83, of Hampton died Thursday, July 14. He was born in Virginia and had been a Peninsula resident for 44 years.

Smith was an electrical engineer at Langley and retired in 1977 after 35 years of service.

#### Ruth H. Hute

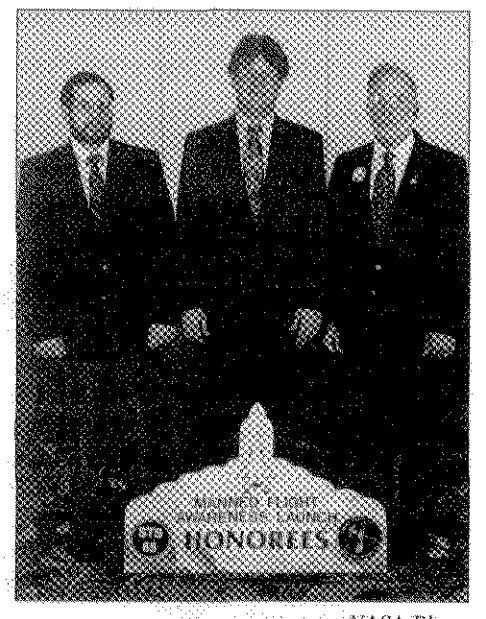
Ruth Hopkins Hute, 69, a native of Poquoson, died Tuesday, July 26.

Hute was retired from Langley after 38 years of service.

## Langley Trio Receive Manned Flight Awareness Awards

Three Langley employees were honored with Manned Flight Awareness Awards this summer. They are Gregory J. Brauckmann, Experimental Hypersonics Branch (EHB), Richard H. Couch, Projects Division, and Charles H. Greenhalgh Jr., Nondestructive Evaluation Branch.

The awards were presented during ceremonies at Kennedy Space Center that coincided with the launch of STS-65 July 8.



*NASA Photo*

**From left to right, are Charles H. Greenhalgh, Gregory J. Brauckmann and Richard H. Couch following the Manned Flight Awareness Award ceremony in July.**

Brauckmann was cited for his work on the hypersonic aerodynamics of the shuttle orbiter in a heavier-than-air test gas. His work, according to Charles G. Miller III, head of EHB, "has significantly enhanced the Agency and the nation's capability to accurately develop and assess the aerodynamic performance of the next-generation space transportation system concept and advanced aerospace vehicles in general. His contribution to the understanding of the orbiter aerodynamics via innovative ground-based testing represents a benchmark in aerodynamics."

Couch's work has centered around technical and managerial leadership for the Lidar In-Space Technology Experiment (LITE) since 1985. As LITE instrument manager, "he makes strong technical contributions in several areas that have been instrumental in developing NASA's first space-based lidar system," according to Leon Taylor, chief of the Projects Division. Couch maintains all LITE technical and programmatic interfaces with NASA Headquarters as well as the other NASA centers.

Greenhalgh has been recognized for significant contributions to projects directly related to the space shuttle and to payload experiments such as HALOE and ERBE. Using nondestructive testing techniques, he developed, tested and implemented radiographic and ultrasonic techniques for the inspection of critical hardware with the objective of characterizing the electrical activity in various weather conditions common to the Kennedy Space Center area. The data is used to refine and safely relax launch commit criteria, thereby increasing launch availability and reduce the chance for weather holds and delays. "His work represents his consistent, high-quality efforts in support of the space shuttle and associated payloads," said John T. Hughes III, supervisory engineering technician, Fabrications Division.

### In Memoriam

#### Bernard Rashis

Bernard Rashis, a former resident of Hampton, died Saturday, June 25.

Rashis was a native of Chicago who moved to central Florida in 1974. He was an aeronautical engineer, retiring after serving 20 years at Langley.

#### Ruth W. Feick

Ruth Whitted Feick, 69, of Hampton, died Wednesday, July 20. Feick was a mathematics technician at Langley where she worked in the 16-Foot Wind Tunnel. She retired in 1972 after 23 years.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# Governor's School Students Benefit from the Summer at Langley

BY BRAD DOUGHERTY

Fourteen high school juniors and seniors were at Langley this summer participating in the Governor's School NASA Mentorship Program. Each student worked closely with a mentor at Langley within that mentor's field of expertise. The Virginia Department of Education sponsors this five-week program. Students presented a project showcasing their activities during the fifth week.

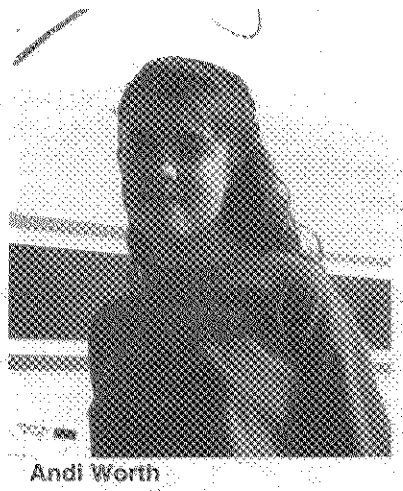
Students are from areas throughout Virginia. When not at Langley, the students stayed at the College of William and Mary with about

Sabrina Chan

200 other students attending the Governor's School Science program. This year, the students worked on a variety of projects.

Sabrina Chan is a rising senior at the Governor's School for Government and International Studies in Richmond. This summer at Langley, Sabrina worked with Dr. Ja Lee, a research scientist in the Measurement Science and Technology Branch. Her project was to test the radiative properties of various gases in the atmosphere, especially nitrogen. Sabrina ran tests to compare the properties of pure nitrogen to mixtures of air. She found that the radiation of the air mixture is half that of the nitrogen ion. To test the radiative properties of the gases, Sabrina ran the gases through a Penning Ionization Chamber. In the chamber, excited nitrogen ions release light that is measured by the spectrometer. Sabrina then interpreted the data and graphed it using a computer. The results will have many benefits to designing NASA spacecraft. If the true effects of atmospheric gases can be found, then materials to protect the shuttle from shock waves in reentry will be easier to select. Finding the effects of the gases will also aid the validation of the computer models now in use. Right now, the model is inaccurate because the properties of the shocked gases are not entirely known.

Sabrina is considering attending Rice University, Princeton University, Duke University or the University of Virginia. She plans to major in either engineering or one of the physical sciences. "My experience at Langley has given me insight into career opportunities for scientists. Being in the mentorship program has allowed me to see what scientists actually do," Sabrina said.



Andi Worth

### Andi Worth

The NASA mentorship has also had very positive effects on Andi Worth, a rising junior at Ferguson High School in Newport News. Andi worked with Daniel Perey, an electronics engineer in the Nondestructive Evaluation Sciences Branch. For her project, Andi worked with the Optically Stimulated Electron Emission (OSEE) system. The space shuttle's solid rocket boosters are coated with a substance called HD-2 (high density) grease so they won't corrode in the salt air. The grease has to be removed before fueling or the protective liners between the rocket and the fuel won't stick to the steel properly. OSEE uses an ultraviolet light to inspect the solid rocket boosters prior to refueling. If all the grease is not detected, the results can be disastrous. By improving the reliability of the inspection process, the likelihood of another Challenger-type disaster due to contamination of the shuttle boosters is reduced. Andi was trying to find the optimum conditions at which to run the ultraviolet light. To test the light, Andi changed the flow of argon gas into the light and tested it with and without a heat sink. She then gathered data using various sensors to determine optimum working conditions. After spending the summer at Langley, Andi has decided that she wants to pursue engineering. She is planning on attending Le Touneau University in Longview, Texas.

### Brian Boggess

Brian Boggess is a rising senior from Radford High School in Radford, Va., who worked in the Systems Development Branch with Dave Shuster, the facility safety head of a potentially

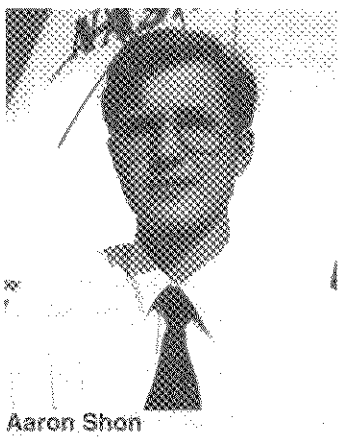
Brian Boggess

hazardous test area. His project was to test R125, a possible replacement for freon R12. Freon R12 contains chlorofluorocarbons (CFCs) that are harmful to the environment and the ozone. R125 has hydrofluorocarbons (HFCs) which are much less harmful to the environment. Before the R125 can replace freon, it must be safety tested for combustibility. To test it, a steel cylinder with six heating bands is heated to 350-degrees Fahrenheit and then pressurized with the R125. The material is then ignited and the results are monitored by sensors such as thermocouples and pressure gauges. The Transonic Dynamics Tunnel at Langley currently uses freon R12 and is looking for an environmentally safe replacement. NASA is considering at R125 to fill such a role.

After spending the summer at Langley, Brian plans to study engineering. "I thought that I wanted to be an engineer and this summer has reinforced my preferences," he said. Brian would like to study mechanical engineering at the University of Virginia.

### Aaron Shon

Aaron Shon, a rising senior at Osbourn High School in Manassas, worked in the Vehicle Performance Branch with Dr. John E. Lamar. Lamar is the senior aerodynamicist for the F-16XL High Lift Flight Project and Aaron's work emphasized the computer science aspects of the project. The data gathered on this aircraft will have application to the High-Speed Civil Transport program. In particular, Aaron used a new Data Base Management System to input flight data contained in reports so that the information could be available for electronic interrogation. Aaron also viewed flight and wind-tunnel video tapes as a part of the data analysis process. He captured vortical flow images of interest using a videoprinter and recorded the times for later image digitization and processing. In addition, he was involved in modifying a FORTRAN computer code for the estimation of vortical flow effects on the aerodynamics of slender wings. Aaron would like to attend either Carnegie Mellon University or Stanford University. He plans to major in computer science. "Because of the mentorship program, I better understand the research and development process. This experience has helped me to decide what I should consider later in life," Aaron said.



Aaron Shon

*Brad Dougherty is a rising senior at Indian River High School in Chesapeake.*

# Health Corner

### Bloodmobile Report

The July 27 bloodmobile drive yielded 337 pints of blood, according to coordinators Karen E. Ridlon and Peter J. Edgette of Langley's Occupational Health Services, and Kitti Schatz of the Red Cross.

A special thank you is extended to multiple donors whose continued support is greatly appreciated: 13 gallons, Harry Heyson; 10 gallons, Daniel DiCarlo and Joseph Price; 8 gallons, Kenneth Voss, Virgil Laney and James Young; 6 gallons, Larry Harvey, Edward Self and Dennis Caldwell; 4 gallons, Clarke Morledge, Henry Kelley, George Finelli, William Lupton and Robert Gifford; 3 gallons, Emitt Fuller, Michael Wusk, Stephen Jones and Patricia Wright; 2 gallons, Lynda Foernsler, Karen Ault and Michael Chattin; and 1 gallon, Shirley Dunston, Connie Jones, William Prosser and Edwin Conner. First-time donors were Keisha Armistead, Brent Bates, Dana Chandonnet, Jimmy Fung, Judith Hannon, Mark Slager, Debbi Tolliver, Robin Tutterow and Craig Watry.

The next bloodmobile visit will be September 28, from 9 a.m. to 3 p.m., in the H.J.E. Reid Conference Center.

# Team Awards Given for Group Efforts

### X-31 Drop Model Team

"For outstanding teamwork in the conduct of the X-31 Drop Model Program which provided results that were vital to the success of the full-scale flight program," the following people were honored: Mark A. Croom, David Fratello, Luat T. Nguyen, Harry A. Verstynen, Jose R. Villeta, Kenneth R. Yenni, Vernon E. Dyke, Charles R. Hyde, Jeffrey J. Massie, Junilla I. Applin, Gary B. Bayless, Robert F. Bryant Jr., C. Mark Cagle, Earl P. Conkling, Clinton Duncan, Guillermo A. Gonzales, Ronald G. Hermansderfer, John D. Johnston, David D. Shuster, Richard T. Wheeler, Ronald D. White, Dr. Vladlislav Klein, Catherine W. Buttrill, Randy G. Ferrell, E. Thomas Freeman, Paul D. Hangsleben, John Landry, Kevin Cunningham, Richard A. Leslie, George M. Makoweic, A. Wes O'Neal, Alfred R. Riopel and Wade S. Saltzgiver.

### ANSER Flight Experiment Hardware Development Team

"For outstanding contributions leading to the successful development of the hardware for the NASA F-18 Actuated Nose Strakes for Enhanced Rolling (ANSER) flight experiment" the following people were honored: Daniel J. DiCarlo, Dana J. Dunham, Cynthia C. Lee, Daniel G. Murri, Gautam H. Shah, Mark E. Strickland, Selene D. Garcia, Thomas J. Abbott, Douglas F. Auvil, Steven K. Bene, Frank L. Boyer, Karen A. Burch, C. Calvin Davis, Robert B. Davis, E. Thomas Hall Jr., Carl J. Hamilton, John B. Kovtun, Paul G. Link, Mark T. Lord, Richard F. Mason, E. Bruce McLemore, Gerald E. Miller, Robert L. Myers, Wendy F. Pennington, Garland D. Reece, Homer F. Rush Jr., S. Elmo Sterling Jr., Dwight D. Stroupe, George B. Whitehurst Jr., Norman Willey Jr., Jeffrey J. Massie, Mark L. Jordan, David D. Kershner and B. Douglas Taylor.

# General Aviation Featured in NASA's Oshkosh 1994 Exhibit

Extending a "helping hand" to general aviation was highlighted in NASA's exhibit at the annual Experimental Aircraft Association Fly-In Convention and Sport Aviation Exhibition at Oshkosh, Wis., July 28-August 3.

The display highlighted the Agency's joint efforts with industry and academia to pioneer high-payoff aeronautics technologies that make American aircraft more competitive, friendlier to the environment and safer to fly.

Visitors to "Flying Friendlier Skies" discovered how NASA is aiding the general aviation industry in areas ranging from modernizing the cockpit, to reducing the cost of designing and manufacturing aircraft and simplifying propulsion controls. The display includes a cockpit mock-up with video animation.

Other components of the exhibit featured NASA's efforts to design a next-generation supersonic airliner; NASA's role in making air travel safer for pilots and passengers; efforts to revitalize subsonic airplanes and the nation's airspace system; and how products of NASA research travel from the lab to the runway.

Although the NASA exhibit was focused on aviation, there also were displays on the Hubble Space Telescope, space shuttle, Earth and space science studies, space technology and the space station.

Outside the NASA pavilion, guests examined the 38-foot-tall (one-tenth scale) model of the Saturn V rocket, which launched the Apollo astronauts to the first moon landing and other Langley-tested designs for the lunar mission; a 29-foot-long (full-scale) engineering research model of the HL-20 lifting body, and a conceptual design for transporting people and small amounts of cargo to and from low-Earth orbit.

Fifteen of the 25 living Apollo astronauts appeared at a special program, "Salute to Apollo," including the three Apollo 11 astronauts, Neil Armstrong, Edwin "Buzz" Aldrin and Michael Collins. Many of the astronauts participated in informal discussions during the convention talking about their interest in the world of flight and how involvement in aviation changed their lives, The Fly-In's salute presented one of the largest-ever public reunions of surviving Apollo astronauts.

Rep. James Inhofe (R-OK) participated in a NASA Forum July 31 led by Langley's Dr. Bruce Holmes on the subject "U.S. General Aviation: A Plan for Revitalization." Rep. Inhofe, a member of the Aviation Subcommittee, discussed legislative initiatives, including product liability, intended to help the U.S. general aviation industry.

On August 1, Rep. Colin Peterson (DFL-MN) joined Holmes in a program for senior executives of general aviation companies. Rep. Peterson is chairman of the Employment, Housing and Aviation Subcommittee of the Government Operations Committee. Rep. Peterson addressed the business and regulatory climate in the United States.

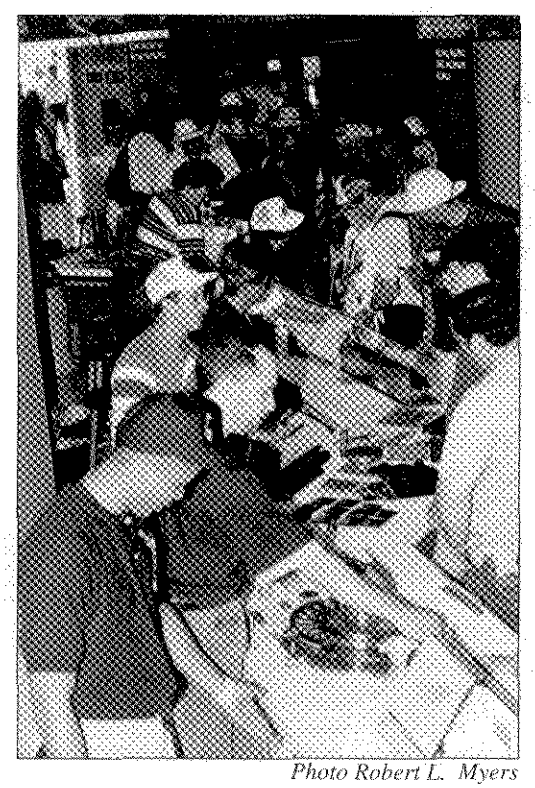


*Photo Robert L. Myers*

**Crowds throng to the NASA exhibit booth during the EAA Fly-in Convention in Oshkosh, Wis.**

*Photo Robert L. Myers*

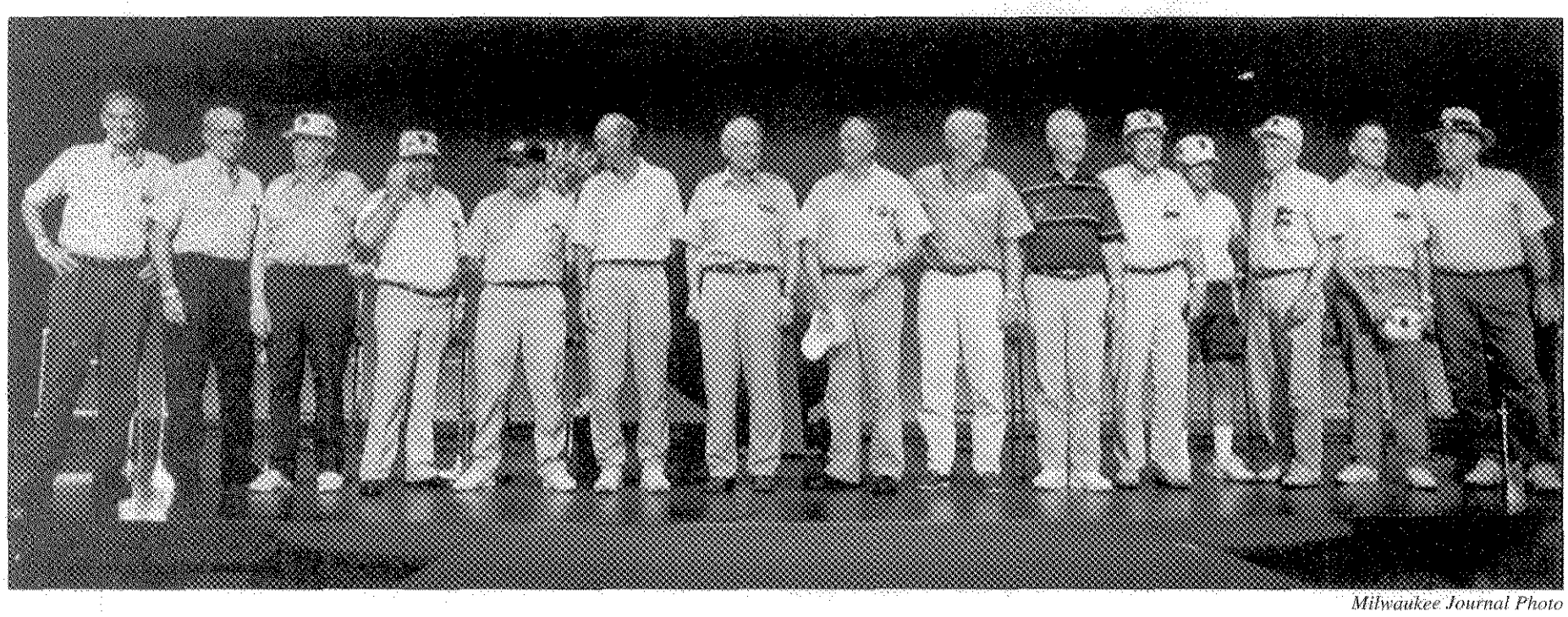
**A visitor to the NASA exhibit at Oshkosh checks out a model of the proposed Space Station.**

## Oshkosh Odds and Ends

*Compiled by Peter J. Chapman, vice president of conventions and community relations for the Experimental Aircraft Association (EAA)*

At the 1993 EAA Fly-in Convention at Oshkosh, Wis.:

— An estimated 800,000 people and 11,000 airplanes visited the convention
— 79 nations were represented in the visitor's tent, including 2,330 registered international guests
— More than 5,000 volunteers provided 200,000 people-hours to prepare and administer the convention
— 353 commercial exhibitors were on hand
— 56 Federal Aviation Administration (FAA) air traffic controllers worked the convention
— 30 on-site food outlets dispensed almost 350,000 beverages; 142,490 sandwiches; 51,269 orders of French fries; 98,002 ice cream cones and 42,828 pieces of chicken
— 1,138 media representatives registered at the EAA press headquarters
— 394 business and pay phones were activated



*Milwaukee Journal Photo*

**Fifteen of the surviving Apollo astronauts made an appearance at the Experimental Aircraft Association Convention in Oshkosh. From left, they are Charles Duke, Al Worden, Stuart Roosa, Dick Gordon, Pete Conrad, Michael Collins, Edwin "Buzz" Aldrin, Neil Armstrong, Eugene Cernan, Jim McDivitt, William Anders, Jim Lovell, Frank Borman, Walt Cunningham and Wally Schirra. They appeared as part of a special program to mark the 25th anniversary of the first manned lunar landing mission.**

# NASA Langley and TRW Sign Agreement to Develop a Camera to "See" through Fog, Smoke, Darkness

*Photo by Fred Jones*

**Signing the various agreements during the ceremony at Langley are, seated from left to right, Norbert F. Smith, senior staff manager, McDonnell Douglas Advanced Programs and Technology Business Development; Robert Marohn, TRW project development manager; Center Director Paul F. Holloway; Eliot Cohen, Advanced Research Projects Agency (Department of Defense); and Ed Nowacki, vice president and general manager for TRW's Space and Technology Division. Standing are James Y. Taylor of Langley's Research and Projects Contracts Branch, who signed the Cooperative Agreement for Langley; Tom Campbell of Langley's Electromagnetic Research Branch and TRP executing agent for the Passive Millimeter Wave Camera; Dr. Merit Shoucri, TRW program manager; and Jeremy Becker-Welts, attorney advisor in Langley's Office of Chief Counsel.**

A consortium led by Langley and TRW's Space and Electronics Group signed a two-year, $6.4-million cost-sharing agreement to design and build a camera that can see day and night through poor weather conditions. The camera will be used by both military and commercial aircraft to land in low- or no-visibility conditions; by armored vehicles to operate in fog, smoke or sandstorms; by commercial airlines for enhanced vision applications and by proposed civil aircraft that could have windowless cockpits such as the High-Speed Civil Transport.

The program is part of the White Houses' Technology Reinvestment Project (TRP) to develop new technologies with dual-use applications for military and civilian users. The TRP program is managed by the Department of Defense's Advanced Research Projects Agency (ARPA).

The passive millimeter camera, which produces real-time video images, can "see" in conditions, such as smoke and fog, through which visible and infrared sensors cannot. Unlike a radar, which emits a signal, the camera uses a passive sensor that would allow the military to use it for all-weather operations, including landings and takeoffs, in-flight refueling and in reconnaissance.

The camera sensor uses a focal plane array of about 1,000 receivers made up of millimeter-wave monolithic integrated circuits (MMIC) developed by TRW. "These chips reduce the cost of producing the camera, improving performance and reliability. There is nothing like it in the marketplace," said Dr. Merit Shoucri, TRW's program manager. "The camera opens up a new window of sight in the millimeter wave portion of the electromagnetic spectrum. It will allow the military to own the weather as well as the night."

According to Tom Campbell of the Electromagnetic Research Branch, "It is important that Langley be involved in the development of this technology due to its potential for so many applications in aeronautics." As the executing agent for ARPA, Langley has facilitated negotiations between ARPA and TRW for the camera technology reinvestment project. Jeremy Becker-Welts, Office of Chief Counsel, developed the framework for all the legal documents necessary for the initiation of this project that were approved by ARPA program management and legal representatives. Signing of all related documents took place at Langley July 21 and the planned kick-off dates for technical tasks is August 24. In addition to the agreement between Langley and TRW, a separate Space Act Agreement between Langley and TRW was signed to allow the Center's participation in the consortium. Other members of the consortium are McDonnell Douglas Aerospace, Air Force Wright Laboratory, the Army Research Laboratory and the University of California at Los Angeles.

## LITE . . .

*Continued from Page 1*

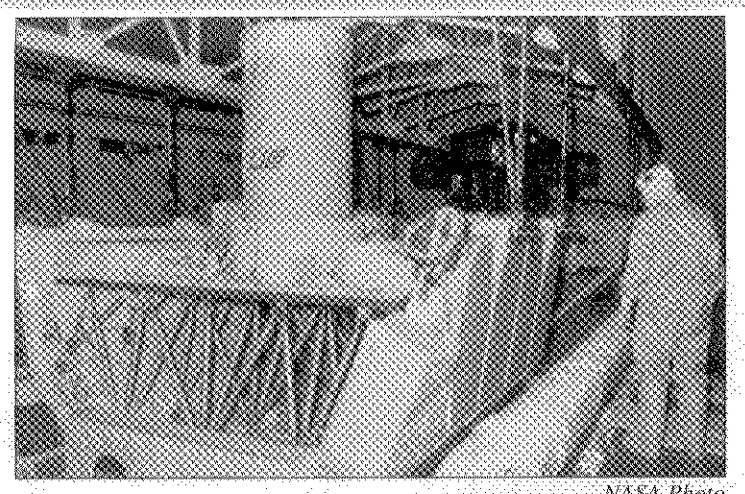
Gravity waves occur at altitudes of 30-50 kilometers and are a primary mechanism of transport within the upper atmosphere. By studying them and how they act to transport material, scientists can better tell the state of the upper atmosphere. They also hope to determine its effect on the distribution of some of the constituents of ozone and the dynamics of temperature structure in the upper atmosphere.

"The Andes are where we expect the effect to be the largest," Winker said.

Gravity waves are caused by wind blowing over surface features such as mountains.

"The Andes have strong winds," Winker said. "The wind flowing across the mountains will set up pressure fluctuations, or amplitude fluctuations, that propagate upward, and as they go up they get larger and larger in atmospheric density. As they get larger they start to influence the winds and temperature in the upper atmosphere."

Each "data-take" during the LITE mission has been carefully planned and laid out in "excruciating" detail, McCormick said. Because of the importance of validating the LITE measurements, this being the first flight of a spaceborne lidar, a carefully planned "ground-truth" or "correlative measurements" plan has been developed. McCormick notes that "presently, 55 research groups from 20 countries will be involved in LITE's validation, making measurements while LITE flies over their sites or by directly flying under LITE's ground track. This includes two instrumented aircraft from the U.S., one from Canada and two from Europe."



*NASA Photo*

**Langley's Lidar In-Space Technology Experiment, left, is loaded into Discovery's cargo bay ay Kennedy Space Center. Behind LITE is the Spartan 201 payload.**

According to Winker, "We really feel pretty confident LITE is going to work so we've put a lot of effort into planning what we are going to do with the data."

LITE will help determine what modifications need to be made for a future, permanent space-based lidar that will collect the information climate modelers need. Computer climate models now have limited accuracy because of large gaps in the information atmospheric scientists are able to collect.

"When we develop a small system that is lightweight with high efficiency, we can specifically go after what the modelers need, whether it be for climate, chemistry or weather prediction," McCormick said.

As exciting as the science data may be, Winker thinks the greater impact of the LITE mission is going to be showing the relevance of lidar. "Lidar," he says, "is something that is completely new that has never flown in space. Most observers remain to be convinced of what impact it will have. So this is our chance to demonstrate that."

## Technology Opportunities Showcase (TOPS) Group Award Announced

"For planning, developing and executing the first Langley Research Center Technology Opportunities Showcase which was a critical element in the Langley strategy to highlight the potential for the dual use of its aerospace technologies with non-aerospace industry," the following people were honored: K. A. Chasteen, Dr. George F. Helfrich, Dr. Joseph F. Heymen, Christyl C. Johnson, Uriel M. Lovelace, Elaine C. McMahon, Carrie K. Walker, Stephanie A. Wise, Thomas J. Yager, Daniel R. Collins, George B. Finelli, Robert M. Baucom (retired), Dr. Franklin H. Farmer, Sally O. Mauldin, Rosa C. Webster, A. Gary Price, Lee R. Rich, Ann H. Suit (retired), A. Vernon Vann, Calvin C. Chandler, Tony L. Trexler, Ann C. Gaudreaux, Keith Henry, Frederick D. Jones, John C. Martin, Michael A. O'Hara, William C. Salyer Jr., Catharine G. Schauer, Marny M. Skora, Diana Freeman, Robert Blakeslee, Jimmy S. Brock, Sullivan R. Donadio, James D. Ferrell, Thomas H. Hall Jr., Charlie B. Harris Jr., Cathryn L. Murray, George F. Palko (retired), Jeffrey A. Parker, D. Edward Phillips, Michael C. Rammel, Brenda F. Spencer, Patrick F. Turner, Pamela F. Verniel, Lucy B. Watkins, Vernon W. Wessel, Rodney P. Adams, John T. Bowen, Stephen A. Campbell, Elizabeth G. Fedors, Karen L. Freidt, Arthur L. Gooden, Michael J. Kirby, William B. Kluge, Lawrence M. Merrill, Carolyn F. Moore, Vincent R. Roland, Lillian C. Ross, Anna T. Ruzecki, Roderick L. Waid, Charles W. Watson Jr., Scott D. Williams, Edwin J. Prior, David E. Reubush, Willard R. Weaver Jr., Leonard M. Weinstein, Robert D. Witcofski, Frederick O. Allamby, George D. Allison, Ginger L. Freeman, Joseph J. Mathis Jr., Deanna L. Wooster, Andrew L. Forbes Jr., Nancy L. Grabiner, Sheree L. Hall, James L. Raper, Jodie J. Salaam, Debbie Steigerwald and Janice C. Yates.

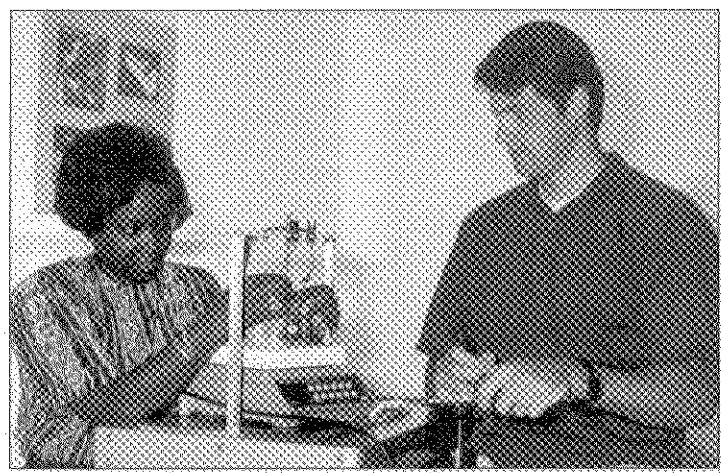
## Office of Education Offers Graduate Student Programs

BY BRIAN FOWLER

The Graduate Student Researchers Program (GSRP) awards fellowships of up to $22,000, for one year, that are renewable, for up to three years. The Program tries to reach a culturally diverse group of graduate students whose research interests are compatible with NASA's programs in space science and aerospace technology.

GSRP was implemented in 1980 to cultivate additional research ties between NASA and the academic community. GSRP is also designed to significantly increase the number of highly-trained scientists and engineers in aeronautics and space science, applications and technology.

Students are selected on the basis of student academic qualifications; the quality of the proposed research or plan of study; the proposal's relevance to NASA's research interests; and the ability of the student to accomplish the defined research. To apply, each student must submit a research proposal with supporting documentation no later than February 1, 1995. The students are then competitively evaluated. All students must be enrolled as a full-time graduate student in a fully accredited U.S. college or university and must not be receiving other federal funds. Each year, about 40 new fellowships are awarded from the combined NASA centers. Langley's GSRP has 80 participants with minorities totalling 29 percent and females 27 percent of the group. This year, 24 new students out of 151 applicants were selected to participate in the Langley GSRP.



**Dr. Joycelyn Simpson of the Composites and Polymers Branch talks with Donald Sandusky who is a doctoral candidate from the College of William and Mary and part of the Graduate Student Research Program at Langley.**

GSRP also includes two smaller components: The Underrepresented Minority Focus component which strives to increase the number of underrepresented minorities in the program, and the High-Performance Computing and Communications component, a multi-agency program designed to accelerate the development and application of high-performance computing systems. Additional information may be obtained by contacting the Office of Education at ext. 44000.

## Summer Programs Wind Down

BY BRIAN FOWLER

Once again, the dog days of August have settled in on eastern Virginia. It is time to bid farewell to many students and guest researchers who spent their summer here and are now returning to school.

Today marks the end of two summer programs at NASA Langley: the Summer High School Apprenticeship Research Program (SHARP) and the Langley Aerospace Research Summer Scholars (LARSS) program.

SHARP concludes with a graduation program. Three of the best speakers from the group of students will make presentations to family, teachers, fellow students and Langley employees. The presentations will be the same ones given during their oral presentation seminars held on August 3, 4 and 5. In their presentations, the students will talk about the work they did during their summer at Langley. One highlight of the apprenticeship program was hosting other SHARP students from Goddard Space Flight Center and Wallops Flight Facility. During their eight week stay here, SHARP students also participated in a college fair to learn about engineering and science programs at various universities.

The LARSS program also ends today. The program, for college undergraduates and first-year graduate students, began on June 6. During their 10 weeks on Center, LARSS students heard from a variety of speakers as part of a lecture series. Students also participated in a Career Awareness Seminar on July 28 and had a banquet on July 27 to commemorate their participation in the program.

The NASA Education Workshop for Elementary School Teachers (NEWEST) completed its two-week run July 22. One highlight of the program was a one-day trip to flight school at Piedmont Aviation Services Inc. at Norfolk International Airport. At the school, teachers were treated as beginning aviation students. They learned the principles of flight and how weather affects aviation. They practiced in a flight simulator and went through an actual preflight routine. At the end of the day, the teachers flew in a general aviation airplane.

Another highlight of their two weeks at NASA Langley was flying in a glider in Emporia, Va. During the two weeks, the teachers received a general education on all aspects of aeronautics, so they could teach their students the basics of all types of flight.

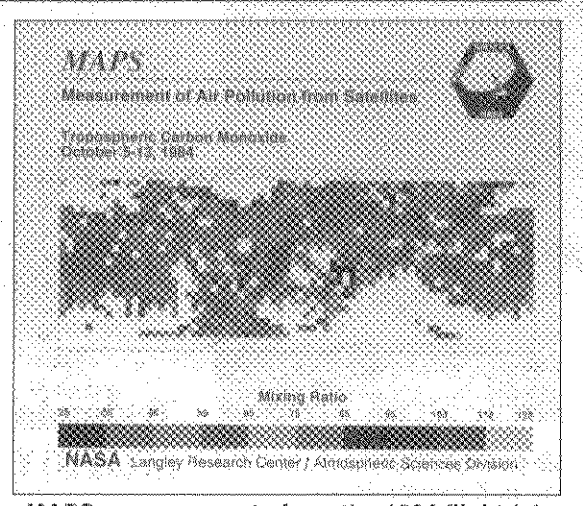
*LARSS student Brian Fowler is a rising senior at Virginia Polytechnic Institute and State University.*

## MAPS

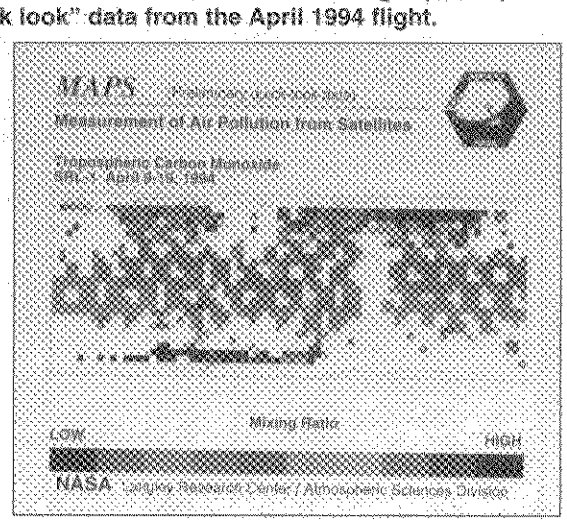
*Continued from Page 1*

Investigator Dr. Henry G. Reichle and Project Manager John C. Fedors of the Space and Atmospheric Sciences Group at Langley. The MAPS Science Team, headed by Reichle, advises the experiment team in the areas of tropospheric photochemical modeling, dynamical and transport studies, data validation and instrumentation, and data inversion. The international science team also assists in the evaluation of MAPS data and includes Langley's Vickie S. Connors, MAPS project scientist, and H. Andrew Wallio, of the Chemistry and Dynamics Branch.

MAPS measurements will be correlated with ground and aircraft-based measurements from some two dozen participants, astronaut observations and photography as well as meteorological data analyses and satellite images. The ground sites include locations in the United States, South Africa, Russia, Germany, Bermuda, Ireland, Hong Kong, Australia, and New Zealand. The aircraft underflights include the NASA DC-8, aircraft from Brazil, Australia, the University of Maryland and the National Oceanic and Atmospheric Administration in Boulder, Colo. To ensure accuracy of the ground and aircraft measurements, all the sites will be using identical gases to calibrate their instruments.




**MAPS measurements from the 1984 flight (above) and "quick look" data from the April 1994 flight.**




### MAPS Heritage

The development of the MAPS experiment has been led by Reichle at Langley since the early 1970s. The experiment, as it exists today, has evolved from studies and testing and its three prior shuttle flights.

The MAPS instrument was originally built for Langley by TRW for the 1981 space shuttle flight on STS-2. The 1981 flight proved surprising because the greatest concentrations of tropospheric carbon monoxide were found in the Earth's tropical regions rather than in the industrialized Northern Hemisphere as had been expected. The 1981 flight also showed that carbon monoxide concentrations vary greatly from region to region.

The MAPS technical team made additional improvements in the operational capabilities of the MAPS instrument after the 1981 and 1984 STS-41G flights. These improvements enhanced the quality of instrument calibration, increased on-board tape recorder capacity, upgraded ground support equipment, and provided real-time downlink telemetry of the MAPS engineering and science data. The 1984 flight confirmed the 1981 finding that the burning of forests in South America and grasslands in Africa is a significant source of global tropospheric carbon monoxide during the Southern Hemisphere spring, the dry season. Preliminary results from the April 1994 MAPS flight aboard STS-59 showed low carbon monoxide concentrations in the Southern Hemisphere with a gradual increase, moving northward. The highest levels of carbon monoxide were present in the Northern Hemisphere.

### STS-64 Operations

The MAPS ground control team in the Payload Operations Control Center (POCC) at Johnson Space Center provides instrument command and control, health and status monitoring, performance stability assessments, crew activity coordination and timeline planning. MAPS real-time doculink telemetry is also processed at the POCC to produce "quick-look" maps of the measured carbon monoxide distribution. The "quick look" maps, along with real-time observations by the astronaut crew, will be used to determine areas of special interest, which may impact mission planning activities. Following the STS-64 flight, the instrument will be returned to Langley for post-flight inspection and calibration if required.

MAPS is being considered for a third SRL mission and as a candidate payload on expendable launch vehicle programs such as the Student Explorer Demonstration Initiative. Techniques pioneered by Langley are also making contributions to the next generation of CO sensors planned for launches in 1996 and 1998.

## McCloud Wins WISE Scholarship

Margaret M. McCloud

Margaret Monique McCloud of Newport News is the winner of this year's NASA Women in Space and Engineering (WISE) program scholarship. McCloud, a 1994 graduate of Hampton Roads Academy, was an honor student who was on the yearbook staff, on the volleyball team and a former Langley Summer High School Apprenticeship Research Program (SHARP) student, as well as a volunteer in community and church-related activities. She was the recipient of numerous awards for scholarship, leadership and service to her school and community, including her school's highest award, the Hampton Roads Academy Navigator Award. The award is given based upon significant scholarship achievement, outstanding leadership, high personal standards and demonstration of sound citizenship.

In the WISE program, McCloud will attend Spelman College for three years, where she will take all of her non-engineering courses. She will then choose to attend Georgia Institute of Technology, Auburn University, Boston University or Rochester Institute of Technology for two years. At the end of five years, she will receive a bachelor's degree from Spelman in her chosen field and a bachelor of science in engineering from the other institution. WISE is sponsored by NASA which provides a 100-percent scholarship to the winner as well as room and board and books during the course of the program.

## FWPC Celebrates Women's Equality Day and Anniversary of the Civil Rights Act of 1964

Senator Yvonne Bond Miller

State Senator Yvonne Bond Miller will speak on behalf of Women's Equality Day and the Commemorative Signing of the Civil Rights of 1964 at the Federal Women's Program (FWP) Awards Ceremony, Thursday, August 18, from 1 to 3 p.m., at the H.J.E. Reid Conference Center. The FWPC will present their awards for "Employee and Supervisor of the Year".

Miller became the first African-American woman in the Virginia House of Delegates when she was elected (unopposed) from the 89th District in 1983 and re-elected (unopposed) in 1985.

Miller was elected over two opponents to the Virginia Senate, 5th District, in 1987. She became the first African-American woman in the Virginia Senate and was re-elected over two opponents to the Senate, 5th District, November 5, 1991. Her current Senate standing committee assignments include: Commerce and Labor; General Laws; Rehabilitation and Social Services; and Transportation.

Miller spent two years at the Norfolk Division of Virginia State College; and earned a bachelor of science degree from the Virginia State College, Petersburg, Va. She holds a master of arts degree from Teachers College, Columbia University, New York, N.Y., and earned a doctor of philosophy from the University of Pittsburgh, Pittsburgh, Penn. She has continued her studies at the Queens College, City College of New York.

Miller is currently a Professor of Education at Norfolk State University. During the General Assembly Session (January-March) she is on leave from the university. Since 1968, she has held the following positions with the University: assistant professor; associate professor; professor; and she served as the head of the Department of Early Childhood/ Elementary Education from 1980 to 1987.

## Fabrication Division Offers Services

The Fabrication Division (FD) has announced that the versatility of vacuum furnace brazing and heat treating is available to all researchers. The art of heating materials in a furnace while in a vacuum environment is relatively new (about 30-years-old). Much of Langley's research and development evolves around new advancements in high-temperature corrosive-resistant materials such as maraging steels, stainless steels, nickel, copper, super alloys, etc. Many of these materials are excellent candidates for vacuum furnace work.

Vacuum furnace technology offers superior results compared to open furnace or torch brazing. Some of FD's capabilities follow:

• Vacuum furnace brazing is a process where metals are joined by fusing a filler metal of a lower melting point into them in a furnace under high vacuum. Using this technique often produces cleaner, stronger and flux-free brazed joints.

• Solution annealing and age hardening with the aid of high-vacuum environment provides clean stress-relieving, annealing, homogenizing or other heat treatments. Subsequent age hardening can often be attained producing specific mechanical properties.

• Cleaning through heat treatments allow material bakeouts that are an added bonus during annealing or brazing operations since flight articles and some research-related projects often require a very clean surface.

• Other services available include vacuum-enveloping brazing techniques, braze-assisted diffusion bonding capabilities and vacuum leak detection services.

During everyday encounters with all research projects, vacuum furnace brazing and vacuum heat treating can play a key role in maximizing a project's success, according to Danny Barrows of the division. During preliminary design reviews, Barrows said, "Ask yourself about the feasibility of incorporating vacuum furnace technology into your material-joining applications and heat treatments."

For additional information, details or project support, call ext. 44535 or ext. 48158.

## SSIP Winner Interns at Langley

**During his internship at Langley this summer, Thomas Sapienza (left), of Shoreham-Wading River High School, Shoreham, N.Y., spent time with scientists and engineers conducting research in aerodynamics using wind tunnels. Sapienza was one of 24 winners in NASA's 14th annual Space Science Student Involvement Program (SSIP) competition. He competed with more than 4,000 entrants using their skills in math, science, technology, art and creative writing. Sapienza's work invoicing wind tunnel testing of anti-ice coatings, was overseen by Don Riley of the Vehicle Dynamics Branch, pictured here in the 30- x 60-Foot Tunnel.**

## *Baldrige Examiners to Visit Langley*

BY SCOTT WAGNER

A team of Baldrige Award examiners will visit Langley from August 30 through Sept. 1 to meet and talk with leaders as well as individual members of the work force. The data they collect will help us assess the Agency's and Langley's progress in our quality management and continual improvement journey. This begins a semiannual continual improvement self-assessment initiated by NASA Headquarters.

A team composed of division chiefs and others prepared the Langley application following the Baldrige Award criteria. An Agency-wide team merged information from the eight Centers, Jet Propulsion Lab and Headquarters to form the NASA application. The completed Agency application was sent to the Baldrige examiners for evaluation against the Baldrige Award criteria. NASA is using the criteria to evaluate our continual improvement culture even though, as a government organization, we are not eligible for this national award.

At Langley, examiners will first meet with several senior staff members for an overview of the Center's research program and our total quality management activities. Then they will schedule meetings with staff members to validate information supplied by the Agency in the written award application. The application addresses seven examination categories:

• **Leadership:** Senior executives' success in creating and sustaining a quality culture.
• **Information and Analysis:** Effectiveness of information collection and analysis for quality improvement and planning.
• **Strategic Quality Planning:** Effectiveness of systems and processes for assuring the quality of products and services.
• **Human Resource Development and Management:** Success of efforts to realize the full potential of the work force to meet an organization's quality and performance objectives.
• **Management of Process Quality:** Effectiveness of systems and processes for assuring the quality of products and services.
• **Quality and Operational Results:** Improvement of quality and operational performance, demonstrated through quantitative measures.
• **Customer Focus and Satisfaction:** Effectiveness of systems to determine customer requirements and demonstrated success in meeting them.

Examiners will want to talk to as many people as possible for data to validate the Agency application. Random visits to work sites will occur on August 30 and conclude Sept. 1. Finally, examiners will meet to prepare a briefing for the senior staff. Information from their visit to Langley will be combined with data from visits to Headquarters, Johnson, and Ames to form the Agency evaluation. Their recommendations for continual improvement will be submitted in the fall to Agency senior staff members. A follow-up article in the *Researcher News* in October will announce results of the on-site visit.

# Happenings

**ATTENTION BOWLERS:** The NASA Tenpin Bowling League will have its first league meeting August 11, in the H.J.E. Reid Conference Center, at 1 p.m. All team captains/representatives should attend. New teams and individuals wanting to join should also attend. For more information, contact Rodney Russell at ext. 42141 or 41221, or J.D. Smith at ext. 47411.

**HOUSE FOR SALE:** Great assumption, Woodcreek, 3 BR, loft, living and dining rooms, fireplace w/gas logs, garage, new heat pump and water heater, all appliances, 20 min. to Langley, only $2,000 to assume eight-percent loan at $711/month. Call 874-3121.

**HOUSE FOR SALE:** Or assume at 7 percent, 3 BR, 1-1/2 baths, laundry, large kitchen, great room with fireplace, deck. Large lot, good schools, Staton Estates, Hampton. Call 828-1611, leave message.

**HOUSE FOR RENT:** Poquoson, 3 BR brick ranch, den, attached garage. Call 838-8111.

**NEED HOUSING:** NASA apprentice wants to rent a two bedroom house or townhouse at an affordable rate w/good schools, available by Oct. 28. Please call Crystal at 877-6110, leave message.

**FOR SALE:** Canon word processor w/built-in Bubble Jet (near-laser quality) printer, excellent condition, uses 3.5-inch disks, w/spell-check, thesaurus, etc. Call 596-7195 after 5 p.m.

**FOR SALE:** Two large fish tanks, 55-gal. and 33-gal. long, w/combo stand for both. Includes complete system set-up, mint condition, $350 o/b/o. Call 722-1124.

**NOTICE:** Due to scheduling problems, the retirement luncheon for Matthew Winston has been canceled. Questions: call Velma R. Martin, ext. 43761.

**BOAT FOR SALE:** 1970 documented custom 35-foot wooden sloop in excellent shape. Beautiful lines, classic Rhodes design; great live-aboard/weekend retreat, well-maintained, $25,000. Call (804) 722-8616.

**AIAA NOTICE:** All Langley employees are invited to a presentation by **James E. French, Director of Standards, American Institute of Aeronautics and Astronautics. The program, sponsored by the Hampton Roads Section, will be held at 1 p.m., Thursday, August 25, in the H.J.E. Reid Conference Center. The metric system as it affects technology transfer and international competitiveness will be discussed. Copies of a just-published AIAA Position Paper on Metric Conversion will be available.**

**TOWNHOUSE FOR SALE:** Hampton, Threechopt Village, 3 BR, 2-1/2 baths, den, living and dining rooms, breakfast nook, cul-de-sac, privacy fence, $75,900. Call 825-1475.

**FOR SALE:** 1987 Chevy Astro van, AC, automatic, tilt-wheel, cruise control, cassette, privacy glass, excellent cond., $5,500. Call 988-0121.

**FORT MONROE FREE TOURS:** Call the Casemate Museum at 727-3391.

**MEMORY WALK:** The 1994 Alzheimer's Association Memory Walk, "Walk With Me," will be held Saturday, Sept. 24, to benefit the association. Walkers are sought for one of two local sites: at the Norfolk Botanical Gardens or the Peninsula Walk at Fort Monroe, Hampton. Registration is at 9 a.m. and the walks are at 10 a.m. Funds raised will benefit the Hampton Roads Chapter's support and education services for the 14,000 patients and families affected by Alzheimer's disease in the area. For more information, contact Heather Sanford, Southside at 459-2405 or Peninsula, 800-755-1129.

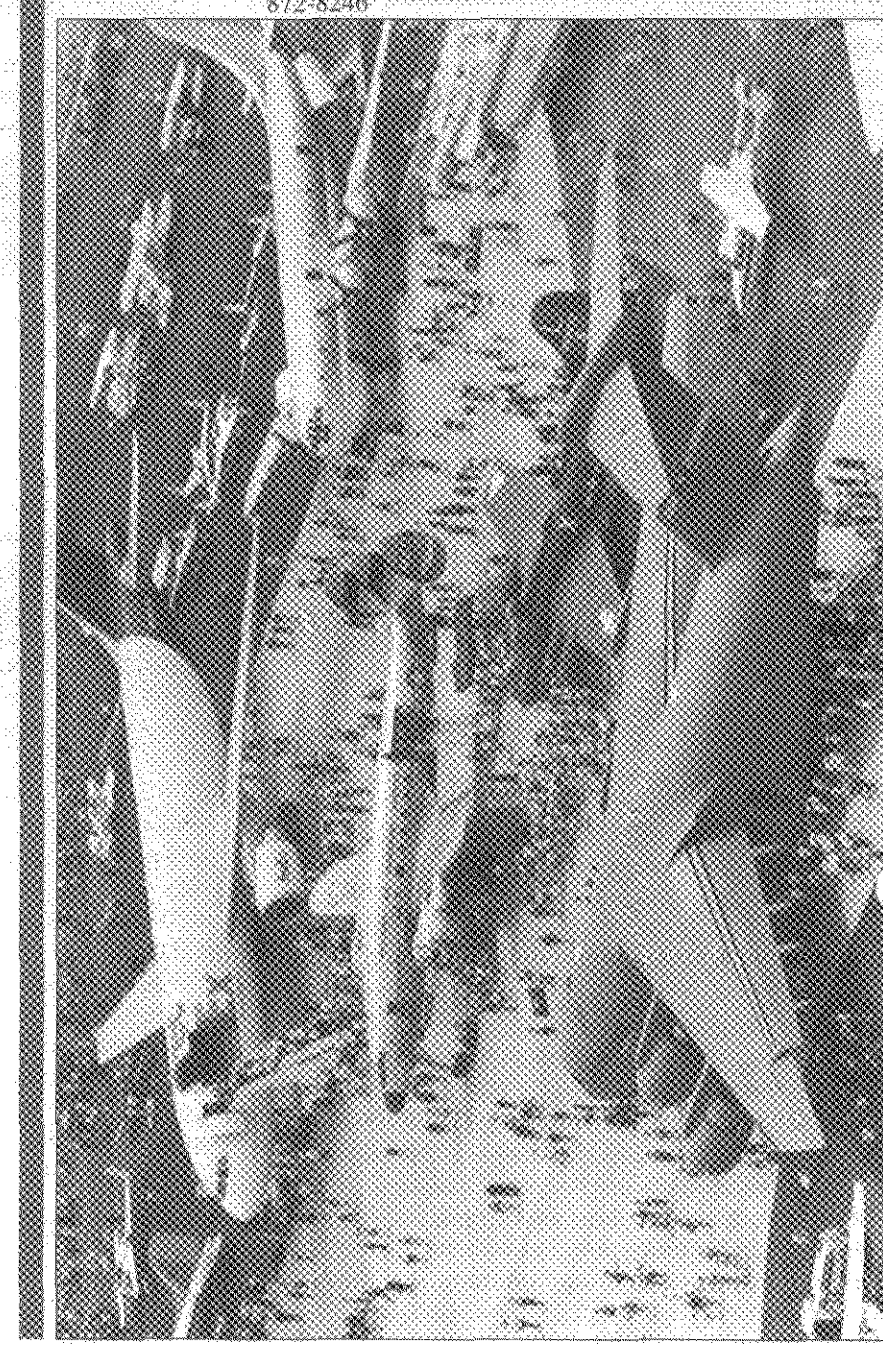
**AEROBICS CLUB PICNIC:** The LAA Aerobics Club is sponsoring a PowerWalk® followed by a cookout with low-fat foods, Wednesday, Sept. 7, at the LAA picnic grounds. The walk begins at 5 p.m. and the cook-out at 6 p.m. Register early. Cost for this event is $4. Call ext. 42295 for more information.

**FOR SALE:** Storkcraft solid wood crib, hardly used with accessories $250. Call 872-8246.

**GWU FALL OFFERINGS:** The George Washington University's School of Engineering and Applied Sciences at Langley offers the following degrees: Master of science, professional and doctor of science degrees in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, structural engineering and structural dynamics, and master of engineering management. Registration period for the fall semester is August 22 to 26. For a complete listing of courses and telephone registration procedures, call the GWU office at ext. 41982.

**FOR SALE:** 1983 Mercedes Benz, 300TD, 87,000 miles, papers, excellent-plus condition, Kelley bluebook priced. Call 874-1827 after 4 p.m.

**FITNESS WITH AEROBICS:** The LAA Aerobics Club meets Tues. and Thurs. from 5-6 p.m., and Sat. from 9:30-10:30 a.m. New PowerWalk® classes are at 4:45 p.m., Tues. and Thurs., and on Saturday from 9:15-10:30 a.m. Call ext. 42295.



*Milwaukee Journal Photo*

**Thousands of people flocked to the 1994 Experimental Aircraft Association Fly-in in Oshkosh, Wisconsin, to check the variety of aircraft.**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Researcher News


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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Directly Employee and Contractor Publication

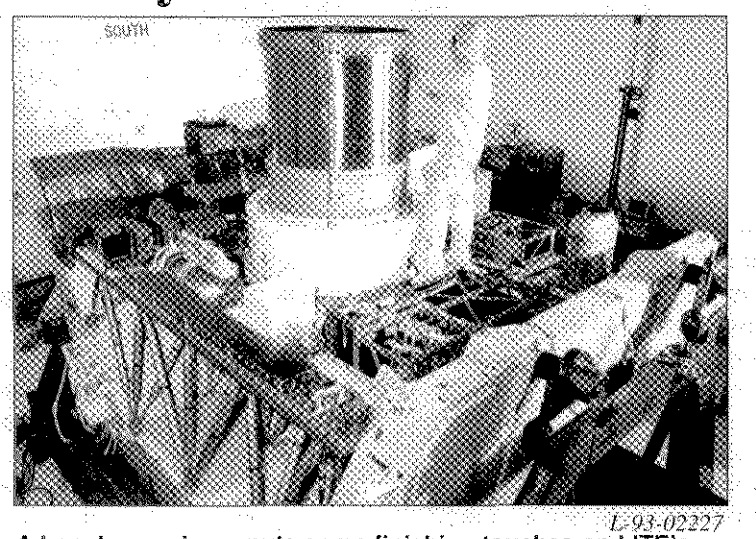
Volume 8 ❖ Issue 17 ❖ August 26, 1994

# LITE Mission: Many Hands and Minds

BY MARCIA WESTMORLAN

The LITE mission marks a new era in atmospheric remote sensing using space platforms. To achieve the optimum results from this first lidar in space, a science steering group was formed consisting of 13 members from across the United States as well as from Canada and Australia. The steering group has provided input to ensure that the LITE instrument has sufficient capability and to determine what atmospheric data will be most useful to collect.

According to project scientist Dr. M. Patrick McCormick, Atmospheric Sciences Division (ASD), the team not only helped give guidance to developing the instrument but also helped put together the correlative measurement plan, develop the mission timeline and will help in the analysis of data collected. In addition, some of the steering group members will be taking part in gathering correlative measurements from lidars in airplanes and at various groundsites.




L-93-02227

**A Langley engineer puts some finishing touches on LITE's telescope to prepare the instrument for the September mission.**

## Steering Committee

The science steering group consists of McCormick; deputy project scientist Dr. David M. Winker, ASD; Dr. C.M.R. Platt of CSIRO, Australia; Dr. Ray Hoff, The Center for Atmospheric Research Experiments, Canada; Dr. Edward V. Browell, ASD; Dr. James Coakley, Oregon State University; Dr. C.S. Gardner, University of Illinois; Dr. G.S. Kent of Science and Technology Corp. in Hampton; Dr. R.T. Menzies of Jet Propulsion Lab; Dr. David Randall, University of Arizona; Dr. S.H. Melfi, University of Maryland, Baltimore; Dr. John Reagan of University of Arizona; and Dr. Tim Suttles, NASA Headquarters.

For example, Reagan will head a group making surface reflectance measurements in the deserts of California and New Mexico. Melfi and Randall will take measurements aboard a heavily-instrumented P-3 over the Caribbean and eastern Atlantic. McCormick's lidar group will also be on board. While Hoff is at JSC, his group will be flying a Canadian aircraft measuring the Los Angeles urban pollution plume as well as marine status off the California coast. Browell's lidar group will fly aboard NASA's Electra over the Caribbean and western Atlantic.

Each member will focus on his particular area of interest when it comes to interpreting the data. Melfi and Browell will work on studies of tropospheric aerosols and the planetary boundary layer. Randall and Hoff will focus on marine stratus clouds and urban aerosols. Platt and Coakley will look at clouds and radiation. Reagan and Menzies will assess surface reflectance characteristics and the sea state. McCormick and Kent will work on stratospheric aerosols and cirrus clouds. Gardner will focus on density variation in the upper troposphere and lower stratosphere caused by gravity wave breaking. McCormick will also focus on aerosols caused by volcanic eruptions.

## Probe the Atmosphere

Suttles said, "With lidar's kind of capability, we are able to probe deep into the atmosphere as never before. We are all familiar with the satellite imagery TV weather forecasters use that show the distribution of clouds over the continental and ocean areas. That information is very valuable in weather forecasting but it gives limited information on the vertical structure of earth's atmosphere for clouds and small particles like aerosols. Lidar capabilities give us very precise information for this vertical dimension."

Information on the vertical structure of atmospheric constituents, such as clouds and aerosols, is extremely important to the climate system, he said. "The information that comes from systems like LITE in the future would give us many new insights into the operations and mechanisms of our climate systems. It is important to all of us because understanding our climate system is going to help us in the near term for things like forecasting the length of the growing season for farmers, to improve their productivity and also, in the long, run in answering questions like, 'what are the burning of fossil fuels going to do to our future climate?'"

## Pollution's Path

LITE measurements will also help atmospheric scienttists track the path of pollution over long distances. Hoff said, "Most people know the problem with air pollution in urban areas. They've been faced with the haze over cities such as Los Angeles. We know a lot about what makes up that haze and those aerosols that are in the air. What we don't know very much about is how far that material is actually moving in the atmosphere."

Atmospheric scientists have located aerosols in the Arctic that traveled from the Soviet Union. "It is fairly clear that pollution travels over long distances," Hoff said. "What we are trying to do with LITE is to be able to map this movement with these aerosols from urban areas over long distances. This is the first time we have been able to do that."

## Gravity Waves

The information LITE gathers on gravity waves is also expected to answer some puzzling atmospheric questions. Gardner describes gravity waves this way, "They are very similar to the kinds of waves that are generated when you drop a pebble into a pool of water. Those waves propagate outward. In the atmosphere, these same kind of gravity waves propagate upward."

One of the major sources of gravity waves is airflow over mountains. "When these waves propagate upward into the atmosphere and they break, they create a drag, which influences the general circulation," Gardner said. "They also heat the atmosphere, which influences the

*LITE, Continued on Page 5*

# *"STS-60: A New Era of U.S. – Russian Cooperation in Space" Will Headline September Colloquium*

STS-60, launched on February 3, 1994, the first space shuttle mission with Russian Cosmonauts, opened a new and very important era in international cooperation in space. The international implications of this historic mission, as well as the mission itself, will be discussed and illustrated at the September Colloquium by mission pilot, Captain Kenneth S. Reightler Jr. The Colloquium is scheduled for Wednesday, September 7, at 2 p.m. in the H.J.E. Reid Conference Center.

**Capt. Kenneth S. Reightler Jr.**

Reightler was born in 1951 in Patuxent River, Md., but considers Virginia Beach, where he grew up and attended Bayside High School, to be his home. He graduated from the U.S. Naval Academy in 1973, and served in Corpus Christi, Texas, and Jacksonville, Fla.

Following his jet transition training, he attended the U.S. Naval Test Pilot School at Patuxent River, and graduated in 1978. Until 1981 he served at the Naval Air Test Center and the Test Pilot School as test pilot, project officer and instructor. After two deployments to the Mediterranean aboard the USS Dwight D. Eisenhower, Reightler attended the Naval Postgraduate School in Monterey, Calif.

After his re-designation as an aerospace engineering duty officer, he made the transition to the F/A-18 and served at the Naval Air Station in Lemoore, Calif. He then returned to the Test Pilot School and served as the chief flight instructor until he was selected as a NASA astronaut in June 1987.

Reightler was mission pilot on STS-48 in September 1991 and on STS-60 in February 1994. He has logged more than 327 hours in space, and is currently the chief of the Astronaut Office Space Station Branch.

The Colloquium is open to all NASA employees and contractors. Civil service personnel should charge their time to Job Order A1980.

If you are unable to attend, all Colloquium Lectures are videotaped and can be checked out from the Technical Library by calling ext. 42389.

## *Reighter Tackles Space Geography for Sigma*

Reightler will also give a Sigma Series lecture entitled "Geography from Space," Wednesday, September 7, at 7:30 p.m. at the Virginia Air and Space Center. Admission is free.

Space offers a unique vantage point to study our planet and its geography, geology, oceanography, and meteorology. Reightler will take listeners on a tour of planet Earth from space. In breathtaking photos taken from orbit, he will show the major land areas of the planet, as well as examples of geologic, oceanographic, and ecological features and processes from space. The Sigma Series is cosponsored by the Virginia Air and Space Center and Langley.

# News Briefs

## Around the Agency

**APOLLO REFLECTORS CONTINUE TO AID STUDIES OF THE MOON** – A quarter of a century ago, Apollo 11 astronauts Neil Armstrong and Buzz Aldrin deployed a variety of scientific experiments in the fine powder of the Sea of Tranquility. Among those devices was a laser ranging retroreflector, which, a generation later, is still yielding fundamental scientific data.

Scientists who analyze data from the Lunar Laser Ranging Experiment have reported some watershed results from these long-term experiments, said team investigator Dr. Jean Dickey at NASA's Jet Propulsion Laboratory, Pasadena, Calif. The team's findings appear in a recent issue of *Science*, which commemorates the silver anniversary of the Apollo 11 lunar landing.

Laser ranging has made possible a wealth of new information about the dynamics and structure of the Moon. Among many new observations, scientists now believe that the Moon may harbor a liquid core. The theory has been proposed from data on the Moon's rate of rotation and very slight bobbing motions caused by gravitational forces from the Sun and Earth. Other recent findings from the laser ranging experiments include: Verification of Einstein's theory of relativity, which states that all bodies fall with the same acceleration regardless of their mass; the length of an Earth day has distinct small-scale variations, changing by about one thousandth of a second over the course of a year. These changes are caused by the atmosphere, tides and the Earth's core; precise positions of the laser ranging observatories on Earth are slowly drifting as the crustal plates on Earth drift. An observatory in Hawaii is seen to be drifting away from an observatory in Texas; ocean tides on Earth have a direct influence on the Moon's orbit; measurements show that the Moon is receding from Earth at a rate of about 1.5 inches (about 3.8 centimeters) per year; lunar ranging has greatly improved scientists' knowledge of the Moon's orbit, enough to permit accurate analyses of solar eclipses as far back as 1400 B.C. Continued improvements in range determinations and the need for monitoring the details of the Earth's rotation will keep the lunar reflector experiments in service for years to come, Dickey said.

## Letters

### Retirement Party Thank You

**From Clarence and Louis "Sam" Brown:** "To our many friends and coworkers that helped make our retirement party a super occasion, fun and truly memorable, our heartfelt thanks. The 40-plus years at Langley has been a truly remarkable journey, full of fun, work and super accomplishments made possible by the fine people at the Center. The party, full of camaraderie, memories and gifts will surely be enjoyed over the years by our family. Especially the video. God bless you all."

### Thanks for the Party

**From Iris Russell:** "I would like to express my thanks and appreciation to all who contributed to and attended my retirement luncheon. It was an honor to have been a part of the Langley team and to associate with such an outstanding group. The gifts and friendship will always be a special part of my memory book."

### Watts' Thank You

**From Claude and Pat Watts:** "We wish to express our thanks to all our family and friends for the wonderful retirement/going-away party. There are no words to express our gratitude and appreciation for you caring about us and sharing our time here at NASA. It was truly overwhelming.

"We want to say a special thanks to the individuals who set up the party, Sylvia Charity, Charlie Harris, Dollie McCown, Suzanne Melson, Kim Duncan, Susan Campbell and all the others who put the event together. There will always be a special place in our hearts for our friends here at Langley. Thank you."

## Announcement

### Retirement Party

A party for Wayne A. Wright, Materials Processing and Development Section, Fabrication Division, will be held Sept. 7 at Sammy & Nick's Restaurant, 2718 W. Mercury Blvd., at 6:30 p.m. Dinner will be ordered from the menu during the party. For information, contact Richard Bennett at ext. 44112 or send gift contributions to Bennett at Mail Stop 397 or at 11 Bosch Lane, Newport News, VA 23606.

# CEBAF Hits the Mark

**BY MARNY SKORA**

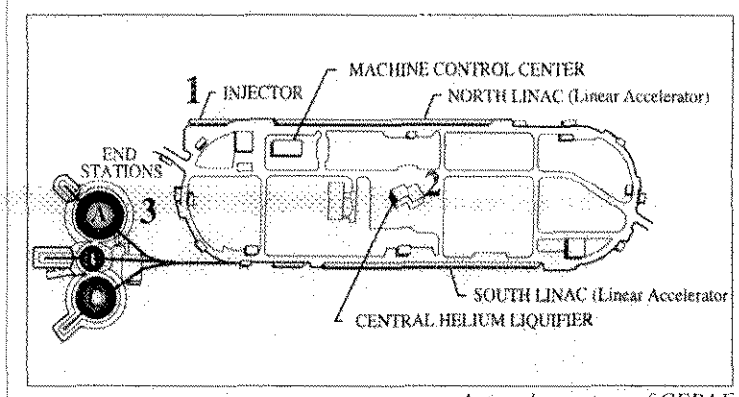
Langley's neighbor, the Continuous Electron Beam Accelerator Facility (CEBAF), is on its way to probing the basic units of matter and is writing history in the process.

Late last month CEBAF's electron beam passed through two linear accelerators and hit the target—a sample of carbon graphite about the size and thickness of a postage stamp. CEBAF Director Hermann Grunder lauded this event as a major accomplishment both for the lab and the physics community.

The beam hit the mark at 4:45 p.m. Sunday, July 24, and continued to run successfully until 9 a.m. the next morning when experimenters determined they had gathered a good amount of data. After the installation of a device used to calibrate the detector, the beam was restored in just five minutes and continued to run until August 5. The Newport News laboratory is unique because it is the first large-scale accelerator in the world to use a continuous, rather than a pulsed, beam of electrons.

CEBAF has been called a time machine intended to simulate conditions moments after the creation of the universe. Built to probe atomic nuclei to learn more about quarks, the fundamental units of matter, CEBAF is conducting basic research that may eventually lead to significant industrial spinoffs. Decades ago atomic research resulted in advancements ranging from televisions to X-rays to atomic power. Who knows what treasures await the scientific community and the general public as our neighbors probe the nucleus?

The laboratory has been under construction for seven and a half years and will begin actual experimentation this fall. CEBAF will join with Langley and the Peninsula Advanced Technology Center for the Peninsula Technology Fair slated for Spring '95.




*Artwork courtesy of CEBAF*

### *How Does CEBAF Work?*

**1.** The electron beam begins its first orbit at the injector (above) and proceeds through the underground racetrack-shaped accelerator tunnel.

**2.** The accelerator uses superconducting radio-frequency technology to drive electrons to higher and higher energies. A refrigeration plant, called the Central Helium Liquefier, provides liquid helium for low-temperature (-456 degrees Fahrenheit), superconducting operation.

**3.** The electron beam can be split for use by three simultaneous experiments in the end stations, which are circular, domed chambers with diameters ranging from 98 to 172 feet. Special equipment in each hall records the interactions between incoming electrons and the target materials. The continuous electron beam is necessary to accumulate data at an efficient rate and yet ensure that each interaction is separate enough to be fully observed.

# Late Summer Reading: *Securing World Class Leadership*

**BY H. SCOTT WAGNER**

### Catch Up on your Reading

Have you read the brochure that Center Director Paul F. Holloway passed out at the all-hands Town Meeting last November when he announced the reorganization? The brochure, entitled *Securing World Class Leadership*, subtitled *Road Map for the Future: Strategic and Quality Directions*, may be used by the Baldrige examiners when they conduct their site visit the end of August.

Want a copy to read before they come? Want to find out more about the Langley Mission, Vision, and Values statements? Feel you need to know what the Center Critical Success Factors are and what Evidences of Success accompany them?

Are you familiar with the seven 1993-94 Areas of Improvement and the Action Teams that are working these improvement projects? The brochure has a complete list of the teams and the name of their senior staff sponsors.

The brochure also contains a single page self-assessment that you might want to use in discussions with your supervisor.

Call extension 44485 and a copy will be sent to you. Or ask one of the TQM Facilitators in your Division for a copy; they can get you one in a hurry.

### Reminder

The Baldrige Award examiners will be visiting Langley from August 30 through September 1. Random visits to work sites and briefings with senior staff members are on their agenda.

## In Memoriam

### Charles A. Hulcher

Charles "Tom" Augustus Hulcher, 83, died Thursday, August 4. Hulcher was a former administrator of NASA's predecessor organization the National Advisory Committee for Aeronautics' apprentice program and was involved with many research projects in the first U.S. attempts to develop guided missiles, including the development the Hulcher 70 High-Speed Sequence Camera that could stop the action of rapidly propelled missiles to observe their flight trajectory.

### Charles W. Phillips

Charles W. Phillips, 73, died Sunday, August 14.

Phillips retired in 1968 after 25 years at Langley where he was an electrician involved in wind tunnel operations with the seven original Mercury astronauts.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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.

## Employees Earn Advanced Degrees

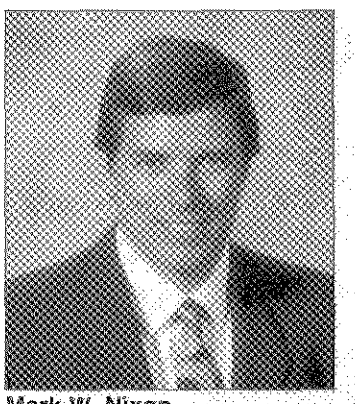
Sixteen Langley Research Center staff members received advanced degrees through the Center's Graduate Study Program.

The program, established in the 1940s, provides Langley engineers, scientists and administrators an opportunity to improve their proficiency in aeronautical, space research and other fields, and earn advanced degrees while working at Langley. To date, 1,425 employees have been awarded masters' or doctoral degrees under the program.

Doctoral degrees have been awarded to six employees: **Kim S. Bey**, Gas Dynamics Division, received a doctorate in engineering mechanics from the University of Texas at Austin; **Allen M. Larar**, Atmospheric Sciences Division, received a doctorate in atmospheric and space sciences from the University of Michigan; **Karen H. Lyle**, Fluid Mechanics and Acoustics Division, received a doctorate in mechanical engineering from Duke University; **Janet M. McKenzie**, Office of Human Resources, received a doctorate in urban services with a concentration in education from Old Dominion University; **Mark W. Nixon**, Structures Division, received a doctorate in aerospace engineering from the University of Maryland; **David G. Shively**, Information and Electromagnetic Technology Division, received a doctorate in electrical engineering from Arizona State University.

Masters' degrees were awarded to the following employees: **Charles E. Cockrell Jr.**, Aerodynamics Division, received a . master of science in aeronautics from George Washington University; **Melinda F. Cagle**, Facility Systems Engineering Division, received a master of science in systems engineering from Virginia Polytechnic Institute and State University; **Pamela A. Davis**, Structures Division, received a master of science in structures and dynamics from George Washington University; **George B. Finelli**, Aeronautics Program Group, received a master of science in public administration from Troy State University; **Grady J. Koch**, Aerospace Electronics Systems Division, received a master of science in electrical engineering from the University of Illinois at Urbana Champaign; **Ruben G. Remus**, Aerospace Electronics Systems Division, received a master of science in computer science from the College of William and Mary; **Kurt Severance**, Information Systems Division, received a master of science in computer science from the College of William and Mary; **Mary Ann Steuck**, Office of Human Resources, received a master of science degree in human resources management from Troy State University; **Michael D. Weisenborn**, Information Systems Division, received a master of science degree in electrical engineering from Georgia Institute of Technology; **Raymond D. Whipple**, Flight Dynamics and Controls Division, received a master of engineering management from George Washington University.

The Employee Development Branch congratulates these individuals for the long hours and hard work necessary for these accomplishments. For information on the Center's Graduate Study Program, please call George D. Allison at ext. 42594.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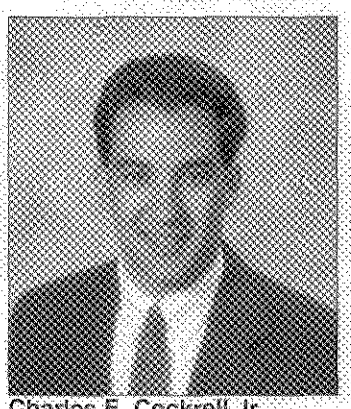
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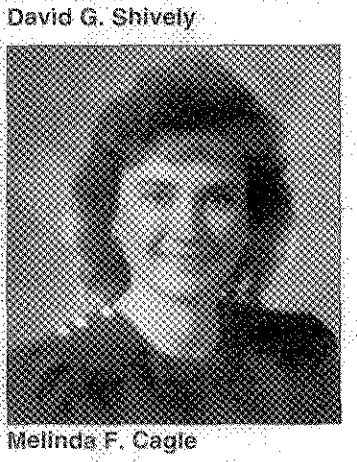
Melinda F. Cagle

Pamela A. Davis

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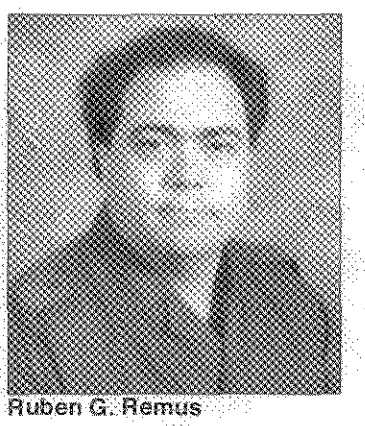
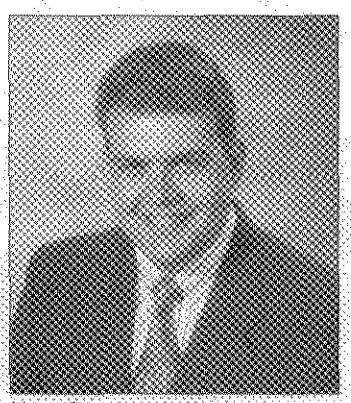
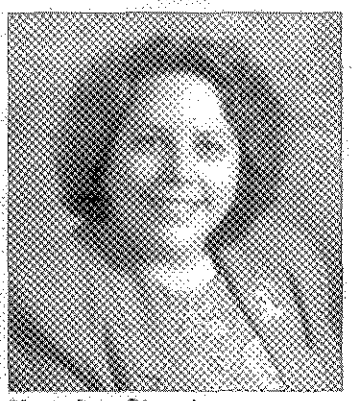
Grady J. Koch


Ruben G. Remus

Kim S. Bey

Allen M. Larar


Kurt Severance


Mary Ann Steuck

Karen H. Lyle

No photo is available for Janet M. McKenzie

Michael D. Weisenborn

Raymond D. Whipple

## Sheets Receives EAA Award

BY KIRSTEN WILLIAMS

The Experimental Aircraft Association recently awarded the EAA Annual General Aviation Award to R. Thayer Sheets, the Center's Small Business Innovation Research (SBIR) program manager.

The aviation industry and the Small Aircraft Manufacturers Association selected Sheets as one of two NASA people who made a major contribution to general aviation. John A. Glaab, Headquarters SBIR program manager, also received the award.

Sheets earned the award for his outstanding and dedicated work to ensure that general aviation played an integral role in NASA's small business innovation and technology transfer research programs. His organizational leadership will help the small businesses in the aviation community develop new technology for the revitalization of U.S. general aviation. This year, 19 competitive NASA SBIR awards were made for general aviation.

Sheets has been the head of the SBIR program since 1985. His NASA career began in 1963, and he has held a number of management positions from development of professional engineering and management programs, administering a nationwide professional college recruiting program, and conducting professional manpower analysis studies, to implementation of the Center's Senior Executive Service Program.

Sheets holds bachelor's and master's degrees from the University of Virginia and George Washington University, respectively.

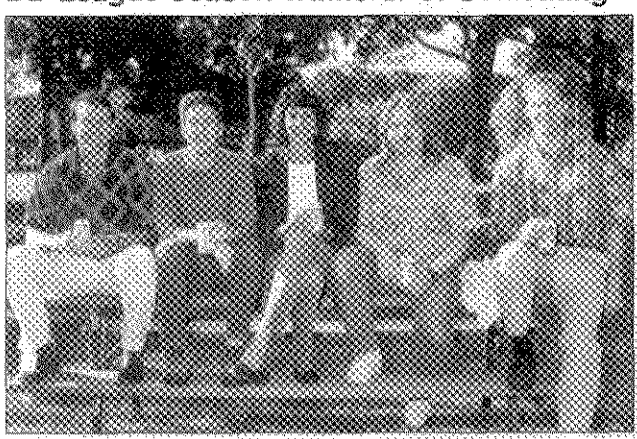
NASA has launched a major effort to support the revitalization of the ailing U.S. general aviation industry over the next ten years and beyond. SBIR programs, in place since 1982 with contracts to 1,490 small companies, are a key element in what should be an expanded NASA general aviation program.

*LARSS student Kirsten Williams is now a senior at the University of Virginia.*

***The Day of Caring Is Sept. 8 – Give One Day for your Community***

# Spring Volleyball 1994 — Final Results

*BB-League Season Winners: Or Something*



Or Something team members, from left to right are Pat Cosgrove, Ron Cabell (captain), Cheryl Rose, Dave Carey and David Dawicke. Not pictured are Laura Brewer, Cathy Perkins and Steve Branford.

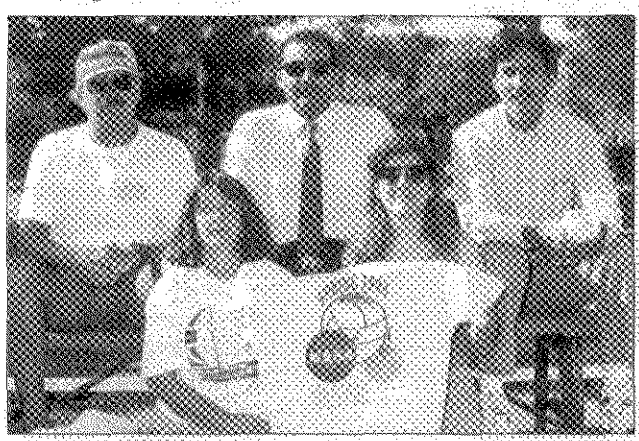
*B-League Season and Tournament Winners: Missed Approach*

Front row, left to right, are Trish Glaab, Jennifer Heeg and Jennifer Hubble. Back row, left to right, are David Barnes, Jim Prince, Steve Williams and David Cooke (captain). Not pictured are Lynda Foernsler and Johnny Mau.

*D-League Season Winners: Wyle Coyotes*

From left to right are Bill Dressler (captain), Craig Sauchenko and Rod Waid. Not pictured are Lisa Kardos, Richard Kardos, Ann Ohmann, Phil Robinson, Kathy Yager, Tom Yager and Ruth Wyatt.

*C-League Season Winners: Time Out*



Front row, left to right, are Jackie Tatum and Ruth Wyatt (captain). Back row, left to right, are Rusty Tatum, Mario Farrow and Bill Villanueva. Not pictured are Joe Granger, Ann Ohmann, Dale Ohmann and Bob Redman.

*D-League Tournament Winners: Enterprise Crew*

Front row, left to right, are Sharon Cady, Harry Snyder and Dianne Snyder. Back row, left to right, are Alan Gibson, Tim Murray and Keith Degnan. Not pictured are Denise Cooper, Kurt Detweiller, Paula Detweiler (captain), Calvin Mackey and Sue Murray.

*BB-League Tournament Winners: Hot Sets*

Front row, left to right, are Amy Whitover-Sandford, Sandie Gibbs, Ellen Brantly and Maylene Hugh. Back row, left to right, Paul Bagby (captain), Russ Rausch, Clements Mayes and Byron Meadows; not pictured is Rod Adams.

*C-League Tournament Winners: Shockers*

Front row, left to right, are Susan Husch, Carl Barnes, Mike Vaccarelli (captain) and Craig Hyle with son, Adam. Not pictured are Felecia Berry and Darlene Hyle.

*Men's League Season and Tournament Winners: Mild Confusion of Unknown Origin*

Front row, left to right, are Dave Gwaltney, Bill Luck, Shelby G. Retriever, John Deaton (captain) and Mike Koch. Back row, left to right, are Bob Moses, Corin Sandford (in for father Steve Sandford), Bill Prosser and Steve Koch. Not pictured are Pat Cosgrove, Dave Dawicke and Steve Sandford.

# GWU/JIAFS Students Work on Two Phases of Magellan Mission

BY BOB TOLSON

George Washington University/Joint Institute for Advancement of Flight Sciences (GWU/JIAFS) students at Langley are calculating maneuvers that will help define the "Termination Phase" of the Magellan mission to Venus.

During the week of October 10, orbital transfer maneuvers will be performed that will drop the Magellan spacecraft lower and lower into the atmosphere of Venus. Before the week is over, communication with the spacecraft is expected to be lost, but not before unprecedented aerodynamic data are recovered. GWU students are involved in the last two phases of the Magellan mission before mission termination when the spacecraft enters the lower atmosphere of Venus. The first phase begins on August 25, when the periapsis altitude of the Magellan orbit will be lowered to begin the atomic oxygen phase of the "Windmill Experiment." During this phase, the solar arrays will be placed at eight different angles of attack in order to produce lift-induced torques as the spacecraft passes through the upper atmosphere of Venus. The solar panel orientations and spacecraft attitude have been calculated by student Ray Espiritu to optimize the scientific value of the experiment and stay within spacecraft constraints on power and attitude control. The results of this phase will be a determination of the free molecular flow accommodation coefficient in the atomic oxygen regime of the atmosphere. Such data are very difficult to obtain in the laboratory because of the high reactivity of atomic oxygen. The second phase of the Windmill experiment will begin October 10 when, over a period of three days, five orbital transfer maneuvers will be performed that will drop the Magellan spacecraft an additional 40 km lower into the atmosphere of Venus. During these maneuvers the composition of the sensed atmosphere will change from mostly atomic oxygen to mostly carbon dioxide.

Four first-year students, Geoffrey Cook, Jay Daniels, Terry Johnson and Katherine Karr, developed a capability to simulate the attitude motion of the spacecraft during this high dynamic pressure phase. A single solar array angle of attack of 45 degrees will be used for this phase and data will be collected at a variety of intermediate altitudes. Data from these tests will provide aerodynamic information for aerobraking at Mars and other planets with $CO_2$ rich atmospheres. Communication with the spacecraft is expected to be lost within a few days due to the eventual inability of the attitude control system to overcome the ever increasing aerodynamic torques.

## LITE . . .

*Continued from Page 1*

temperature. Currently, the effects of gravity waves' are only crudely incorporated into our global circulation models, used to predict climate. It is important for us to more completely understand the gravity wave sources, the amount of energy that they transport from the lower atmosphere into the upper atmosphere, so that we can incorporate these effects in global circulation models and ultimately improve our ability to make weather forecasts and even climate forecasts."

### Landmark Track and Cross-Track Maneuvers

Scientist are also excited about two shuttle maneuvers – the landmark track maneuver and the cross-track maneuver – that will be performed by the astronauts at selected times during the mission. These pitch and roll maneuvers will change the angle at which lidar reflects off targets.

According to Menzies, "The track maneuver will give us information about the surface and cloud reflectance over the oceans and land masses over a wide variety of angles. This is important because future lidars will be scanning lidars and they will be getting information about cloud heights and other atmospheric measurements over a wide swath. We need to know more about what kind of lidar signals we'll be getting as these angles change."

The landmark track maneuver involves the crew orienting the shuttle so that it will point ahead and fix on a particular patch of the surface. As it moves overhead, it will be pitched up at an angle of 30 degrees. The laser beam will be reflected off of a body of water—initially off the Atlantic Ocean. Then, as the shuttle moves, it will rotate, so that the laser beam stays fixed on that one spot on the surface of the earth. The one-minute maneuver will enable measurements of the reflectivity off the ocean's surface at a variety of incidence angles.

Gardner said, "We intend to do that experiment over the Atlantic, the Pacific, the Gulf of California and the Great Lakes. The reason that we have chosen these variety of bodies of water is because the reflectivity depends upon what is called sea state, in other words, the height of the waves.

"In mid-ocean, where wind velocities can be strong, wave heights are very large. Over smaller bodies of water, such as the Great Lakes, the wave heights will be much smaller, and that will affect the reflectivity. So, we are attempting to measure this reflectivity at a variety of wave heights and at a variety of angles."

The cross-track maneuver will involve rolling the shuttle in such a way that LITE's laser beam will point not only directly downward but over a range of angles. Menzies said, "With the shuttle we'll be able to simulate that scanning mode and collect data that will enable us to better understand what kinds of signals we'll get from the clouds, atmospheric particles and the sea surface as a function of angle as we move away from looking directly down. That data will be very important in designing and building the future lidars."

### LITE: Important for Future Endeavors

Suttles said, "A lidar system like LITE is a very complex system. It is a new system. We need to make some fundamental measurements from space before we design a lidar system that we will want to fly for a long-term mission."

Gardner said the logical follow-on experiments to this LITE mission would be to conduct missions at other seasons of the year: "As we all know, weather changes quite dramatically through the year. What we are doing is making observations for one week during the early fall. Logical follow-on missions would be for a winter period, a northern hemisphere winter period, spring, as well as summer. Improvements may also be made to the instrument, in the detectors and even in the lasers that are incorporated on LITE. More sophisticated lasers could be incorporated into the payload to allow us to measure specific atmospheric constituents such as ozone and water vapor, although that will take longer than simply re-flying the existing payload at other times in the year."

Suttles concluded, "LITE is an extremely important part in filling in the overall picture needed to understand the earth as a system. In fact, the LITE mission is a forerunner of missions we will be flying later in the long-term program called the Earth Observing System."

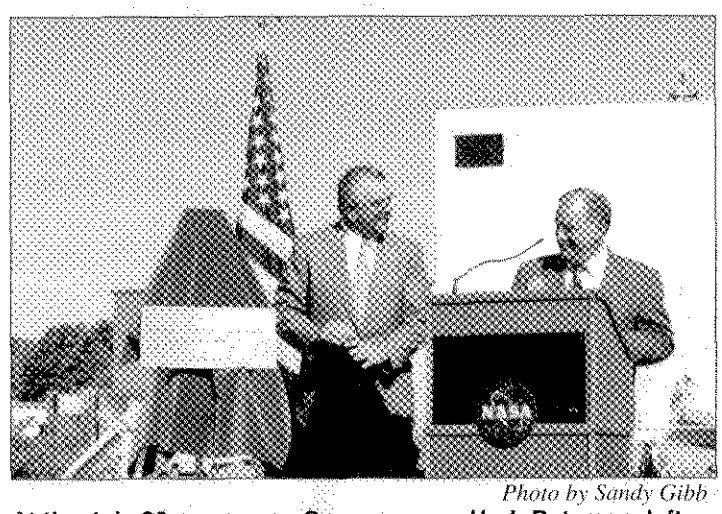


*Photo by Sandy Gibb*

**At the July 20 ceremony, Congressman Herb Bateman, left, and Center Director Paul F. Holloway unveil the sign for the Earth Observing System and Data Information System (EOSDIS) Distributed Active Archive Center (DAAC) presently under construction at Langley. Although the building is still being built, the DAAC is housed in Building 1268A.**

## Langley DAAC Open For Business

**BY SUSAN E. SORLIE**

Langley is one of eight earth science DAACs that comprise the Earth Observing System Data and Data Information System (EOSDIS). As components of EOSDIS, DAACs are institutions that generate EOS standard products and carry NASA's responsibilities for data archival, distribution and management.

The Langley DAAC performs the data archival and distribution functions for the general science community in the areas of radiation budget, clouds, aerosols, and tropospheric chemistry. Langley has a long history of involvement in these areas and a considerable body of relevant scientific expertise. This expertise includes: Playing a primary role in the Earth Radiation Budget Experiment (ERBE), the Stratospheric Aerosol Measurement (SAM II), the Stratospheric Aerosol and Gas Experiments (SAGE I and II), and the Measurement of Atmospheric Pollution from Satellites (MAPS) satellite experiments and in the Global Tropospheric Experiment (GTE) field experiments; serving as the primary location for the Surface Radiation Budget (SRB) data analysis; and participating in both instrument and interdisciplinary investigations for EOS.

The overall goals of the Langley DAAC are to increase the scientific use of existing datasets in the named areas. Langley's DAAC will also be preparing to process, archive and distribute EOS data from the Clouds and Earth Radiant Energy System (CERES), the Earth Observing System Polarimeter (EOSP), the Measurements of Pollution in the Troposphere (MOPITT), SAGE III, the Multiangle Imaging Spectro-Radiometer (MISR), and the Tropospheric Emission Spectrometer (TES) investigations and related data.

The Langley DAAC Information Management System (IMS) is an on-line user interface that is available to the science community. Instructions for logging into the Langley DAAC IMS via the Internet or more information about DAAC can be obtained through the Langley UDS office at (804) 864-8656, by FAX at (804) 864-8807 or electronic mail, userserv@eosdis.larc.nasa.gov. The Langley Distributed Active Archive Center (DAAC) is presently located in Building 1268A.

## New Officers for Toastmasters Club

**Recently, the NASA Langley Toastmaster Club elected officers to serve the club from July 1994 to June 1995. The newly-elected club officers were officially installed during the June 22 meeting. Pictured at right, left to right, are: Vice President of Membership Leslie Holland; Vice President of Education Martha Brown; Vice President of Public Relations Lawrence Meeks; President John Lin receiving the gavel from Past President Nancy Callahan; Secretary Chuck Fleming; Treasurer Bryan Hefner; and Sergeant-at-Arms Kelly Binkley. The club is part of the Toastmasters International organization, a nonprofit organization that teaches members public speaking and leadership skills. It has more than 173,000 members worldwide in about 8,000 clubs. Currently, the Langley Club has more than 30 members.**

## Langley Salutes Secretarial Accomplishment

**BY PATSY CAMPBELL**

Next time you see these names in print, you should see "CPS" behind them: Carol Ficklen, Brenda Graham, Delores Harris and Alberta Reid. They recently sat for the two-day intensive Certified Professional Secretary exam along with 4,500 participants nationwide, and passed all six parts (Behavioral Science in Business, Business Law, Economics and Management, Accounting, Office Administration and Communication, and Office Technology). Very few people pass all six parts on the first sitting. Many of those who want to receive the certification take the exam several times before passing.

Knowledge gained through preparing for the CPS rating provides secretaries and upper level administrative support personnel with knowledge to draw on when faced with difficult office situations, and prepares them to take on broader administrative responsibilities, freeing executives for more crucial duties. Earning the CPS rating proves one's willingness to go above and beyond the norm in the position. It makes a statement that one's role in business is a career—not just a job. The four women prepared themselves for the exam by participating in the CPS Review Series that Langley's Training and Education Section coordinated with Thomas Nelson College.

They have proven, once again, that Langley has the winning edge. These employees were presented plaques at the Federal Women's Program Committee Annual Awards Program, held August 18, at the H.J.E. Reid Conference Center.

## Video Section Receives Award

The Video Section received an award of merit in the 1994 Society for Technical Communication competition. Mike O'Hara was the producer for the award-winning production entitled "Leading-Edge Vortex-System Details Obtained on F-106B Aircraft Using Rotating Vapor Screen and Surface Techniques." The video is a supplement to NASA TP-3374 (technical paper).

# Happenings

**FOR RENT:** Hampton Club condo, studio unit, all appliances included. Weight room, pool, jacuzzi. $350 per month. Call 868-6427

**FOR SALE:** Two large fish tanks (55 gal. and 33 gal.) with combo stand for both. Includes complete system setup. Mint condition $350 or best offer. Call 722-1124.

**FOR SALE:** Dinette set, china cabinet, lamp table, double bed and much more. Call Mrs. Lake at 851-5997.

**FOR SALE:** 1991 Camry DX, excellent condition, maroon, am/fm, automatic, AC, rear defrost, power steering, windows and locks, 65,000 miles, $9,500. Call (804) 693-3729.

**CARPOOL:** Cut your automobile expenses by 75%! Fourth person wanted for carpool from Rt. 636/Rt. 17 area in Gloucester. Call ext.. 43632.

**BINGO:** Everyone is invited to bingo games every Thursday at 7 p.m. in the H.J.E. Reid Conference Center.

**POWER WALK® PICNIC:** The LAA Aerobics Club will sponsor a Power Walk® with instructions for first timers. Following it will be a cookout featuring low-fat foods (such as turkey burgers, corn on the cob, and homemade breads). The event is on Wednesday, Sept. 7, at the picnic grounds with the Power Walk® at 5 p.m. and the cookout beginning at 6 p.m. Register early to guarantee a space in the Power Walk® class or come for the cookout. The cost is $4.00, under 12, $2, and under 5, free. Call ext. 42295 for more information, or send a check (made out to LAA Aerobics Club) to Mail Stop 156 by Sept. 2.

**NASA SKI WEEK IV:** The fourth annual agency-wide ski trip is scheduled for the week of February 25 through March 4 at Banff/Lake Louise in Alberta, Canada. All NASA personnel, contractors, retirees, their family and friends are welcome to participate. For additional information contact Michael Schooley at ext. 48524 or 874-2736 evenings and weekends.

**RIDE NEEDED:** Looking for a ride from the West Ocean View area of Norfolk to Magruder Boulevard, Monday–Friday, from about 7 a.m. to 3:30 p.m. Will adjust schedule to suit driver and pay fuel costs. Call Jim Rhea at 865-0223 or 587-5176.

**MEMORY WALK:** The 1994 Alzheimer's Association Memory Walk, "Walk With Me," will be held Saturday, Sept. 24. Walkers are sought for one of two local sites: at the Norfolk Botanical Gardens or the Peninsula Walk at Fort Monroe, Hampton. Registration is at 9 a.m. and the walks are at 10 a.m. Funds raised will benefit the Hampton Roads Chapter's support and education services for the 14,000 patients and families affected by Alzheimer's disease in the area. For more information, contact Heather Sanford, Southside at 459-2405 or Peninsula, 800-755-1129.

**ANTIQUES FOR SALE:** Mahogany vanity w/ matching chair, $500; accent table/stand, $100; velvet chair w/wood trim, $200. Call Sharon after 5:30 p.m. at 887-2597.

**GALLAUDET DANCERS:** A dance troupe from Gallaudet University in Washington, D.C., will be performing Friday, Sept. 30 from 1:30-2:30 p.m. in the H.J.E. Reid Conference Center. The group is composed of 12 deaf students who will perform modern jazz, ballet, tap and special sign language dances.

**LAA EXEC BOARD ELECTIONS:** Nominating forms for the position of secretary/treasurer and chairperson, socials, arts and crafts will be available at the LAA Office on Sept. 12. Information on specific duties will be given when the nominating form is received. Questions about the elections may be directed to Robert Huffman at ext. 46083 or Andrea Whitesides at ext. 46369.

**COUNTRY WESTERN DANCE:** The next C/W Dance will be held August 27 at the H.J.E. Reid Conference Center. Doors open at 6:15 p.m. and the cost is $3 per person. For more information, call ext. 46369.

**FOR SALE:** 1987 Chevy 4X4 Blazer, 73,400 miles, automatic, A/C, power steering and brakes, mint condition. Asking $5,300, must see. Call 722-0089, leave message.

**FOR SALE:** White satin wedding gown with lace, pearls and sequin accents, long sleeves and detachable train, size 16. Was $1,000; asking $300. Call Sharon at 887-2597, after 5:30 p.m.

**CONDO FOR RENT:** Hampton Club, 1 BR, washer/dryer, ceiling fans, all other appliances, two pools, fitness center, security system, near NASA/Langley AFB, $425/mo. Call 838-8422.

**VOLUNTEERS NEEDED:** Hampton Bay Days needs volunteers for the 12th Annual Bay Days Festival, Sept. 9, 10 and 11. People are needed all three days for merchandise sales, beverage control, sports events, stage and children's areas. Volunteers receive T-shirts, food coupons and invitations to the kickoff and thank-you parties. For information or to volunteer, call Harry Hundley at 851-7862.

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Researcher News

National Aeronautics and
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**Langley Research Center**
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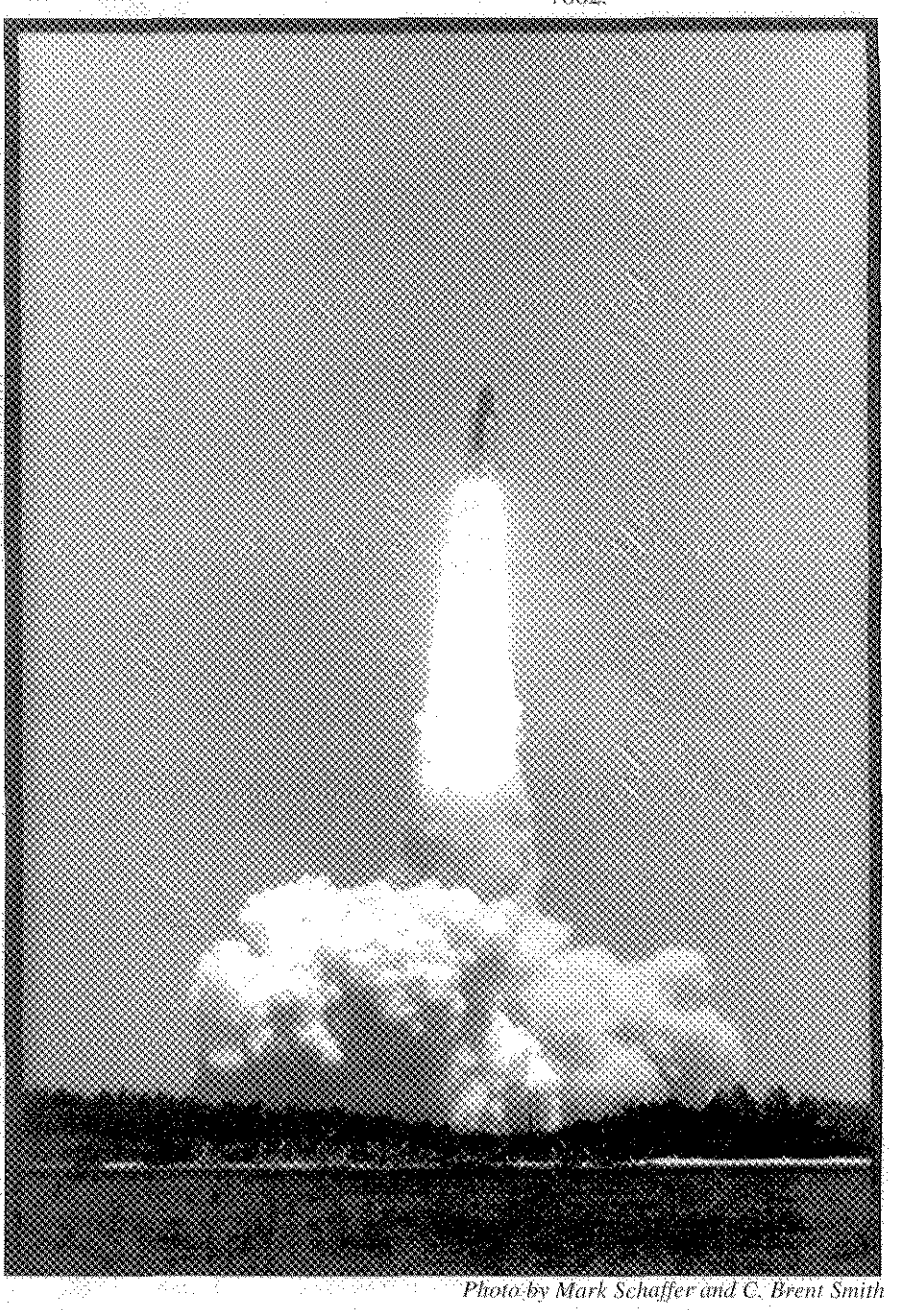


*Photo by Mark Schaffer and C. Brent Smith*

**STS-65, launched July 8, was caught by the lens of Mark Schaffer, a LARSS student who spent the summer at Langley, and friend C. Brent Smith.**

National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 18 ❖ September 9, 1994

# Langley Receives Three R&D 100 Awards

BY BRIAN FOWLER

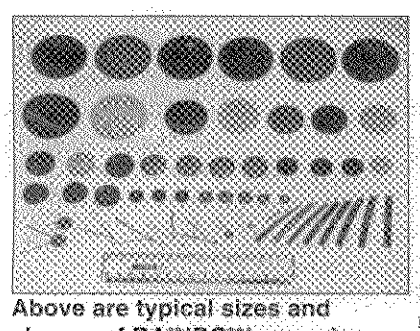
Langley researchers have received R&D 100 awards for three of the most significant new technical products of 1994. This is the second time Langley employees have won three awards; 1986 was the first. Winners are Dr. Stephanie A. Wise, a research engineer in the Environmental Interactions Branch; Dr. Min Namkung and K. Elliott Cramer, both of the Nondestructive Evaluation Sciences Branch.

### More Efficient Actuator

Dr. Stephanie A. Wise

An award, for the Reduced and Internally Biased Oxide Wafer (RAINBOW) High-Displacement Actuator, a material that could make speakers and pumps smaller and more efficient, was presented to Wise, formerly of the Electro-Optics Branch, and to Dr. Gene H. Haertling of Clemson University, Research Corporation Technologies and Aura Ceramics, Inc.

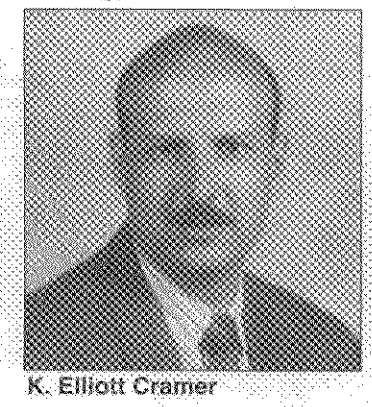
RAINBOWs are a type of ceramic that act as actuators by creating mechanical movement when an electric field is applied. When mechanically strained, they generate an electric charge, making them useful as sensors. Prior to RAINBOWs, stacks of these ceramics, called piezoelectrics, were needed to obtain the movement caused by one RAINBOW. One RAINBOW can create a displacement 100 times greater than any previously available actuator materials.


Above are typical sizes and shapes of RAINBOW ceramics.

This increased efficiency in creating mechanical movement will allow audio speakers and pumps to be made smaller without sacrifice of important characteristics. In addition, RAINBOWs make several devices possible that were formerly impractical. Other applications for RAINBOWS include use in microphones and in noise and vibration suppression systems for aircraft and automobiles. RAINBOWS can be used in devices currently employing piezoelectric actuators.

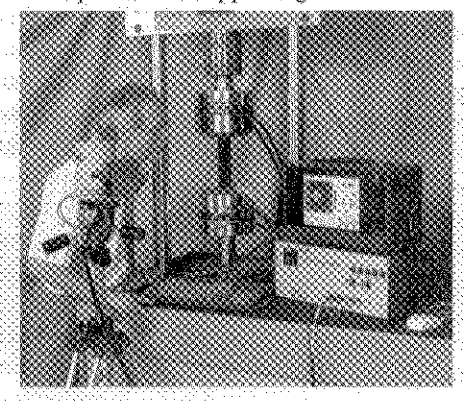
### Stress Imaging Instrument

The second R&D technology is the DeltaTherm 1000, developed by Brad Boyce of Stress Photonics, Inc., with technical oversight by Cramer.


K. Elliott Cramer

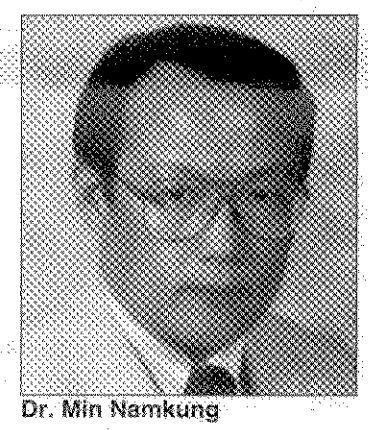
Using differential thermography, DeltaTherm can detect temperature changes in a solid caused by stress when the solid is compressed or expanded. DeltaTherm almost instantaneously turns these temperature changes into images, detailing the areas of mechanical stress. This process is referred to as thermoelastic stress analysis. DeltaTherm's major advantage over its competitors is that it is 100 times faster at conducting this analysis. Previously, collecting thermoelastic stress images took one-half hour to one hour per image. This drastic improvement in speed means that the collection of thermoelastic stress analysis images is dramatically more efficient.

The principle application of DeltaTherm is stress analysis in the development of vehicles. It can also be used for assessing the strength of steel bridges. In orthopedics, DeltaTherm can be used in the analysis of implants and supporting bone.


Dr. Bela Sandor of the University of Wisconsin, co-owner of the DeltaTherm, checks out the apparatus.

### Metal Flaw Detector

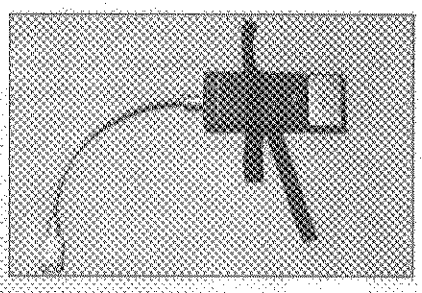
The third R&D 100, the Self-Nulling Eddy Current Instrument, was developed by Namkung with John W. Simpson of Lockheed Engineering and Sciences Company, and research scientists at Analytical Services and Materials, Inc.


Dr. Min Namkung

The instrument uses a magnetic field to detect flaws in metallic surfaces. It is designed so that, when placed over unflawed material, the output signal is practically null, or none. When the instrument is placed in the presence of surface breaking fatigue cracks, there is a strong output signal.

Unlike previous devices, no user training is necessary for testing and interpretation of test results. In addition, minimal power and signal display requirements combine to make the instrument extremely durable and portable.

While the principal application is detecting cracks in metallic surfaces, the instrument can be used for thickness gauging and corrosion detection for certain metals.


The Self-Nulling Eddy Current Instrument netted an R&D 100 Award for Namkung.

### The R&D 100 Award

R&D 100 Awards are presented annually by *Research and Development* magazine to 100 scientists or engineers who have contributed the most significant products for advancing science and technology throughout the year. In the 25 years of NASA's participation, 99 NASA developments have been selected, 28 of them from Langley. Winners will be honored at an awards banquet at the Museum of Science and Industry in Chicago on September 22.

*Brian Fowler was a LARSS student this past summer.*

# A Message from the Director

On August 1, Langley announced the dates for the Technology Opportunities Showcase for 1995 (TOPS '95) to be April 4-6. This event is an opportunity for the Center to highlight NASA's multiple-use technology as a cornerstone in strengthening U. S. competitiveness in the world marketplace. Successful applications of Langley technologies to stimulate U.S. industry is very important to our future. The first TOPS was a powerful conduit for identifying requirements and educating industry about our technical abilities. Our goal is to invite the private sector –aerospace and non-aerospace industry, large and small firms, minority businesses and universities– to profit from the government's aeronautics and space research. TOPS is a concrete example of the Center's commitment to aggressively promote government-industry partnerships. I would like to challenge the Langley team to assess their respective research fields. If you can envision an industrial application of your work, submit an exhibit proposal. TOPS '95 will continue the tradition of excellence that is Langley's trademark.

Paul F. Holloway

# *CFC Strives to 'Make a World of Difference'*

### *Langley Sets Challenging Goal*

Times can be tough. Regardless of personal fortune or misfortune, daily newspapers and nightly news reports bombard us with the plights of those who are suffering. Illness, poverty, hunger, homelessness -- these are just a few of the problems we see in our own community, our country and around the world. It is natural to want to help, but

*CFC continued on Page 4*

# LITE's Day-to-Day Mission

BY MARCIA WESTMORLAN

September 9 is the day Space Shuttle Discovery launches with Langley's long-awaited LITE experiment on board.

About eight hours into the mission during orbit six at about 1 a.m., the shuttle will be almost directly over Hampton taking atmospheric data over LITE's hometown. Simultaneously, a ground-based lidar at Langley will take measurements in nearly the exact column of atmosphere. The ground-based measurements will be used to validate LITE's measurements. These are called correlative measurements. A very detailed correlative measurements plan has been developed for the LITE mission.

LITE will measure the atmosphere over Hampton at a latitude of 37 degrees north and a longitude of 76 degrees west during orbits 22, 53, 54, 85, 86, and 117.

During LITE's nine-day mission a variety of atmospheric phenomena will be investigated each day over specific geographic locations.

*LITE continued on Page 6*

# News Briefs

## Around the Agency

**BOEING AND DOUGLAS TEAM UP IN HIGH-SPEED AERO CONTRACT** – NASA announced the award of a $440-million contract that marks the first time America's two leading airplane manufacturers have teamed up to develop technologies for a potential future High-Speed Civil Transport.

This precedent-setting action joins Boeing Commercial Airplane Group, Seattle, Wash., with McDonnell Douglas Aerospace, Long Beach, Calif., and other companies to develop airframe technologies for aerodynamics, flight systems and materials and structures.

"Developing the technologies for a future supersonic airliner that will be environmentally friendly and economically successful presents a major challenge and opportunity," said Louis J. Williams, director of NASA's High-Speed Research (HSR) program. "This contract effectively combines the expertise and capabilities of U.S. industry to accomplish this goal," Williams said.

By working under a single contract, the two companies will be able to reduce redundancies, lower costs and accelerate research, ensuring that the United States remains at the forefront in commercial aerospace competition.

The HSCT, a commercial supersonic aircraft, could fly 300 passengers across the Pacific or Atlantic Oceans at 2.4 times the speed of sound, cutting travel time by more than half. The new aircraft will fly faster than the Concorde, go nearly twice as far and be able to carry three times as many passengers.

NASA's Office of Aeronautics, Washington, D.C., directs the High-Speed Research program. Langley is the Agency's lead center for overall technical project implementation with Lewis Research Center, Cleveland, leading the propulsion technology development.

## Health Corner

### Bloodmobile Visit Coming Up Soon

The next bloodmobile visit will be Wednesday, Sept. 28, from 9 a.m. to 3 p.m. in the H.J.E. Reid Conference Center. For more information, call ext. 43194.

### Physical Therapy: Its Role in Injury Prevention

Sport stars discovered it first; the more you use physical therapy as preventative maintenance the less downtime you may face with injuries. This new approach to physical therapy has a common sense approach to help active individuals stay active. By identifying weak muscles one can concentrate and work on those muscles which need to be built up before they tear or get strained in an injury.

Preventative physical therapy is gaining favor with professional and amateur athletes as well as adults who switch or start an exercise program. With a quick exam the physical therapist can evaluate the body looking for any lack of flexibility, joint movement or muscle strength. The main problems which usually surface are muscle weakness and lack of joint mobility. The latter usually stems from prior injury but could be the result of insufficient flexibility. At this point the physical therapist can give specific exercises to address the potential problem areas.

Adults either entering a new program, switching activities, or simply having repeated injuries can benefit from preventative physical therapy. In an upcoming brown bag seminar, physical therapist Lisa Moeller will talk about the role of physical therapy in preventing injury and maintaining a healthy body. The seminar will be hosted in the cafeteria September 20th at noon and will last 30-45 minutes. Please plan to attend and bring your questions.

***Correction:*** *A thank you letter printed in the August 26 issue of the Researcher News was from Clarence and Lois Breen.*

## In Memoriam

### William M. Moore

William McKay Moore, 68, died Monday, August 22. He was a native of Hampton and a Peninsula resident for 61 years.

Moore retired from Langley as an engineer after 28 years of service.

## Hispanics: Partners for Progress

In observance of National Hispanic Heritage Month, the Office of Equal Opportunity Programs is sponsoring a one-hour program entitled "Hispanics: Partners for Progress." It will be held Friday, September 23, at 1 p.m. in the H.J.E. Reid Conference Center. The guest speaker is Col. Frank Alvarez, commander, Fort Monroe Health Clinic. Ivette Gonzalez, wife of Langley's Guillermo Gonzalez, will perform two musical selections, accompanied on guitar by Langley's Carlos Perez-Ramos. All employees are invited to attend and civil servants should charge their time to Job Order A1619.

## Speakers Bureau Report

**Dr. Karen Jackson** spoke at Clair Brubaker School in Williamsburg about "Crash Test Research."

**Bruce D. Fisher** spoke to the Smithfield Kiwanis Club about "Storm Hazards and Lightning Research."

**Pamela Davis** spoke at the Zuni Woods Ruritan Club about "Paper Airplanes."

**Veloria Martinson** spoke at Chesapeake General Hospital - Asthma Program about "Paper Airplanes."

**William Vogler** spoke at St. Frances Nursing Home, Newport News about "Space Week '69, '74 and '94 — Reasons to Celebrate."

**Dr. Joel Levine** addressed the ASEE Summer Faculty Fellowship Program participants, the Langley Aerospace Research Summer Scholars (LARSS) Program students and the Graduate Student Researchers Program (GSRP) students on the topic "Earth on Fire: The Atmospheric, Climatic and Biospheric Implications of Global Burning." Levine also spoke to the Governor's School for Science students about "A Planet at Risk."

## FWP Honors Employee and Supervisor of the Year

**BY SUSAN A. SMIGIELSKI**

"The world is full of beautiful, gifted and talented people and half of them are women," said Virginia State Sen. Yvonne Bond Miller at the Annual Federal Women's Program Committee awards ceremony August 18.

Miller was the guest speaker at the ceremony that presented Sharon E. "Cheri" Tanner, Acoustics Division, with the Federal Women's Program Employee of the Year Award and Andrew J. "Jerry" Hansbrough, chief of the Scientific and Technical Information Division, with Supervisor of the Year award. The program also commemorated Women's Equality Day, which gave women voting rights, and the 30-year-anniversary of the Civil Rights Act.

Sharon E. Tanner

Andrew J. Hansbrough

Tanner was recognized for her career accomplishments and volunteer contributions. As a research engineer, Tanner is leading a group that hopes to apply thin film technology to acoustic applications. She was one of four people who conducted a follow-up climate survey for her division. For nine months, she mentored a stay-in-school employee.

Outside of her job, her contributions include giving numerous presentations to schools. She was a featured speaker for the National Engineers Week workshop and the "Take Our Daughters to Work" program. Tanner chaired the Pre-College Education Committee of the AIAA Hampton Roads Section; performed on a NASA educational television program; coordinated joint programs between Women in Aerospace and AIAA; and serves on the Board of Directors for the Virginia Peninsula Council on Domestic Violence.

Hansbrough was recognized for keeping his employees informed about Federal Women's Program events and encouraging them to attend. He also motivates his employees to seek developmental assignments in and outside the division.

By hiring and promoting qualified females, Hansbrough supports the Center's affirmative actions goals. Of 14 division management positions, half in the Scientific and Technical Information division are filled by women. The Cooperative Education program in the division has had many successes under Hansbrough's direction. Currently there are two female graduate students working in the Technical Library and an undergraduate student who is studying to be a scientific and technical photographer.

Other nominees for the employee award were Deborah L. Carraway, Brenda F. Spencer, Nancy M.H. Kruse and Virginia B. Marks. William W. Fernald, head, Aeronautical Systems Engineering branch, was also nominated for the supervisor award.

**Also honored as "Certified Professional Secretaries," at the FWP event were, left to right, Delores Harris, Brenda Graham, Carol Ficklen and Alberta Reid.**

**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor. . . . . Marny Skora

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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's LASE Flies on ER-2 from Wallops Island

LASE, the Lidar Atmospheric Sensing Experiment, is set to fly several engineering flights beginning in mid-September from Wallops Island, Va., on one of NASA's ER-2 aircraft. LASE successfully completed a mandatory Qualification Test Flight on an ER-2 at Ames Research Center in Mountain View, Calif., May 11. Although the test was intended to ensure that the instrument did not interfere with the aircraft operations or the pilot's safety, excellent backscatter aerosol lidar data was obtained.

According to Dr. Edward V. Browell, LASE experiment scientist from the Atmospheric Sciences Division, the instrument obtained the most sensitive and extensive vertical measurement of tropospheric aerosols obtained by an airborne lidar system during the test flight.

## What is LASE?

LASE is a Differential Absorption Lidar (DIAL) instrument for measuring vertical profiles of water vapor and aerosols and their effect on atmospheric processes. It accomplishes this with a high vertical resolution across an altitude range of 0 to 10 kilometers (0 to 6 miles) during daytime and nighttime.

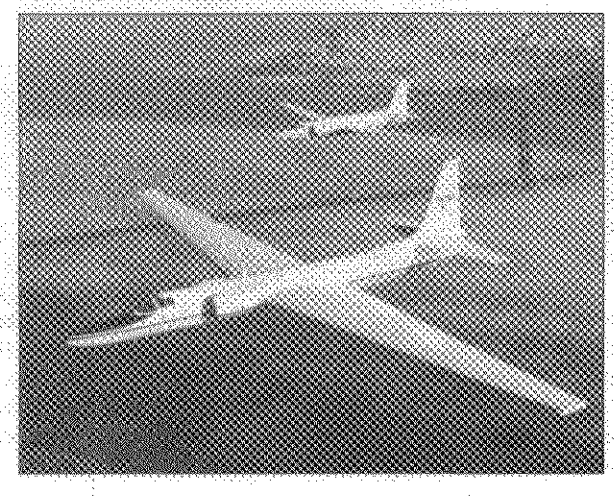
Unlike a regular lidar instrument, such as Langley's Lidar In-space Technology Experiment (LITE), a DIAL system sends two pulses of laser energy, closely spaced in time and wavelength, to measure the desired parameters (properties). The wavelength of the first pulse coincides with the center wavelength of a selected water vapor absorption line; the second occurs very soon (for LASE, within 400-microseconds) after the first at a wavelength that doesn't correspond with an absorption line. These pulse pairs are repeated every 250 milliseconds. The difference between the two signals is used by scientists to infer the amount and profile of water vapor in the atmosphere. The LASE instrument can be tuned in wavelength to 16 different water vapor lines, each one having different absorption strengths. This feature permits the measurement of water vapor at various altitudes within the troposphere.

## The LASE Transmitter

LASE uses a laser transmitter, an optical receiver and associated electronics to perform its measurement tasks. The measurement of tropospheric $H_2O$ profiles and column content with the LASE instrument can be used in many areas of the atmospheric sciences including studies of mesoscale meteorology (like cloud patterns and wind circulation), the atmospheric radiation budget, climate change and the hydrologic cycle (the properties, distribution and circulation of water).

The simultaneous measurement of aerosol and cloud distributions can provide important information on atmospheric structure and transport," Browell said. "Many meteorological parameters can be inferred from the data collected as well. In addition, the impact of sub-visible and visible aerosol/cloud layers on passive satellite measurement and radiation budgets can be assessed."

**In the photo below, the ER-2, in front, is an aircraft adapted for the "earth resources" vehicle. Here it flies over San Francisco Bay with a U-2 airplane (also adapted for earth resources work) during its test flight from Ames Research Center.**



## LASE: Autonomous Operation

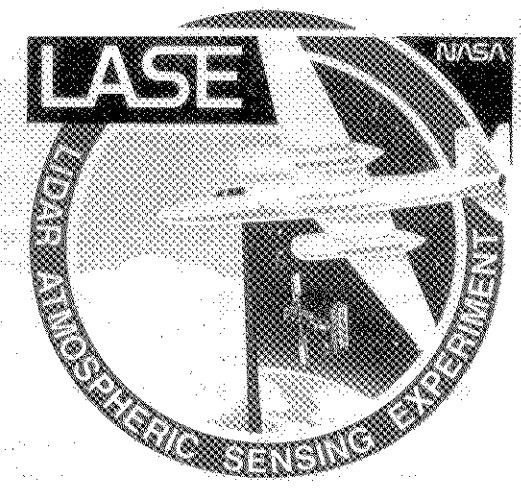
The LASE instrument is operated continuously when the ER-2 aircraft has reached its mission operation altitude of 65,000 feet. Since the instrument is designed to be autonomous, there is minimal pilot interaction in its operation. For instance, the pilot, guided by a flight plan, can select either of two water vapor absorption line wavelengths that are pre-programmed into the LASE on-board computer. This feature offers the experimenter an opportunity to measure water vapor at two different levels within one flight. The pilot can also power the instrument on and off, put the instrument into standby or operative status, and select the appropriate filter within the Receiver Subsystem to spectrally tune it to the transmitter wavelength. Signals from the instrument to the pilot's control panel indicate if a mission should be aborted for conditions that might affect the safety of the pilot, the aircraft or the instrument. An abort condition can also occur because of an inoperative instrument or malfunction within the instrument.

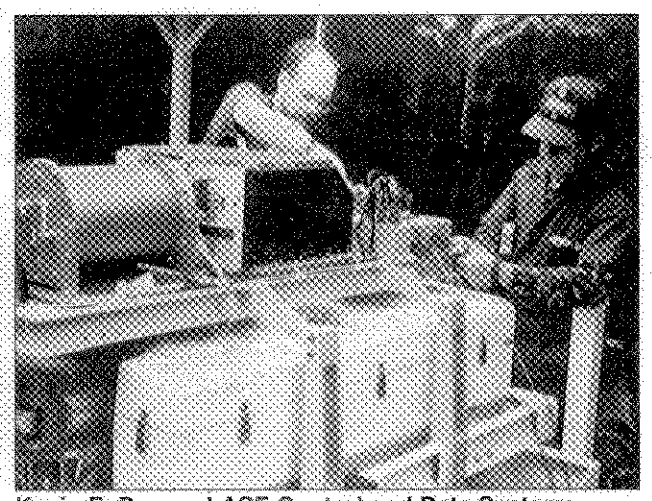
Much of the LASE instrument pushes the state of contemporary technology. A prime example is the transmitter portion of the instrument. It has been derived from in-house applied research and consists of three lasers: a Nd:YAG laser, used to pump a solid state laser (the Ti:Sapphire laser, consisting of two bricks of titanium-doped sapphire); a tunable, solid state laser diode that is used to injection seed the Ti:Sapphire to make it emit energy at a specific wavelength within the spectral interval chosen for LASE; and the Ti:Sapphire laser that provides the energy for the experiment. The complexity of the transmitter design is increased by the requirement that the instrument operate autonomously.

## Assessing LASE Performance

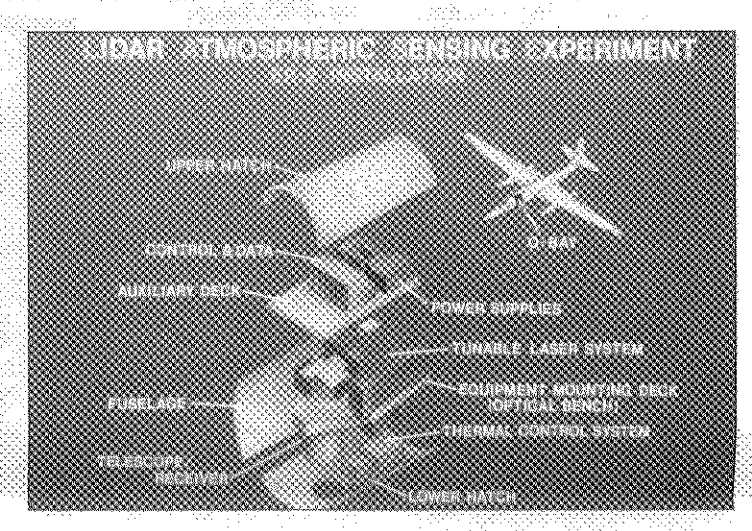
After the LASE instrument returns from Wallops in October, its performance will be carefully studied to determine what, if any, changes need to be made before it returns to Wallops in January 1995. From April to June 1995, the instrument will participate in validation flights at Wallops. Once it is determined that the LASE instrument meets the science and engineering requirements, it is considered to be "validated" and ready for transfer to the science team as an operational instrument.

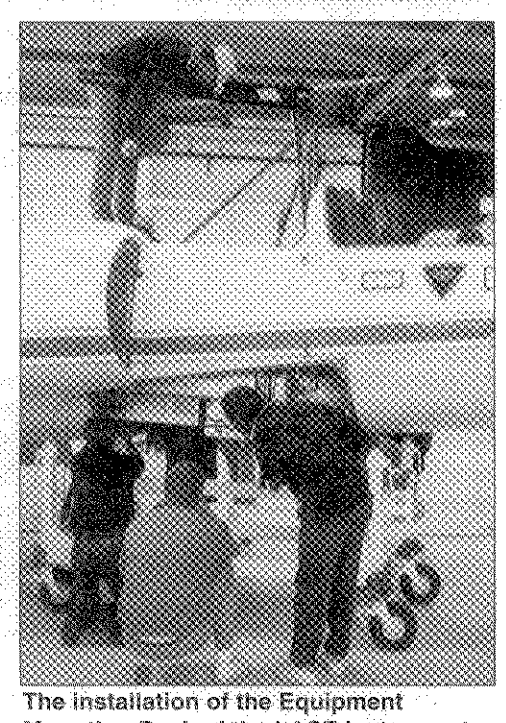
"LASE is a very complex instrument," said Dwayne E. Hinton, project manager. "Its development has required the efforts of highly-skilled and dedicated people, many of whom have put their career plans on hold to meet the challenges and to complete this project. The dedication of the LASE team members epitomizes the Langley tradition of the consummate work ethic and technical excellence. In spite of the challenge of a vast amount of new technology that LASE demands, the cooperation among the various divisions at Langley, other NASA centers and NASA Headquarters has been exceptional."



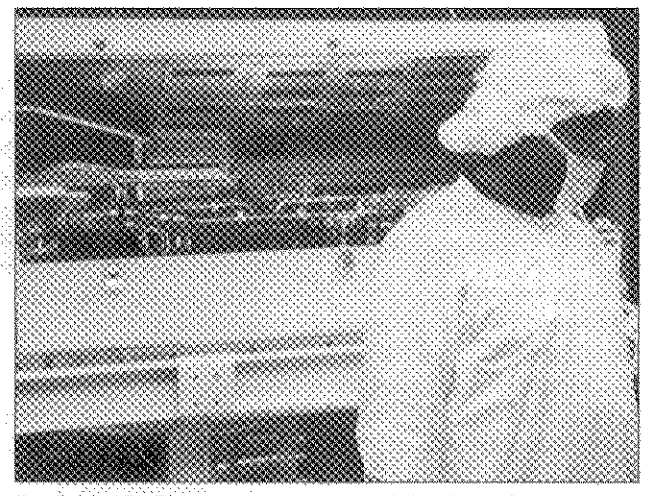



**Kevin E. Brown, LASE Control and Data Systems manager, of the Spaceflight Electronics Branch, and David S. Coombs of the Advanced Machining Development Section, connect the upper rack of the LASE instrument to the Equipment Mounting Deck.**



**The installation of the Equipment Mounting Deck of the LASE instrument into the ER-2 requires help from above and below the aircraft.**



**Dr. Larry B. Petway, a laser physicist from Science Applications International Corp., makes final optical adjustments to LASE's Tunable Laser Subsystem.**

# Gardens LINK Needy to Food, Help and Hope

Newport News LINK or Living Interfaith Network, is a three-year-old coalition of 37 Christian, Jewish and Muslim congregations. It helps clients with bills, like rent and utility, employment leads, food pantries, referral services and transportation. LINK operates from St. Paul's Episcopal Church in Newport News.

Larry L. Harvey Sr., a team leader in the Electronics Technology Branch, has been involved with LINK since its beginning and has served on its Board of Directors for two years. Harvey has been a volunteer who has participated in many of LINK's outreach programs, including a community garden.

"LINK has been allowed the use of a vacant lot in downtown Newport News. Volunteers have tilled the soil, seeded and weeded, fed and harvested vegetables. Other volunteers cook and distribute the food through several outlets to those in need."

One man who is unemployed and staying in a homeless shelter in downtown Newport News, heard about the garden project while picking up a free lunch at St. Paul's Church. Within a few hours he was bent over the garden, dropping beans into the earth. "I feel good with these beans in my hand," he said. "It keeps me out of trouble."

Executive Director Betsy Randolph is the only paid staff member and she oversees and trains many volunteers who keep the offices open three days a week. Through its referral services, LINK helps people get in touch with other helping agencies like the Salvation Army, Peninsula FoodBank, American Red Cross, Homebase, Peninsula Rescue Mission and Denbigh Outreach Christian Ministry.

LINK is also involved in advocacy programs and has developed groups to help research the issues that are causing some of the problems for people in need: transportation, housing and utilities, food pantries, medical and legal concerns and consumer awareness.

**Larry Harvey, Electronics Technology Branch, holds some of the vegetables harvested from LINK's community garden, planted to help the hungry of Newport News.**
**Below right, Harvey assists a parent "shop" the tables of clothing and toys for children at the "Share the Spirit" gift display last December at St. Paul's Episcopal Church, Newport News.**

"LINK doesn't make direct payments to clients nor does it duplicate existing services," Harvey said. "It reaches out with care and dignity to people in need." The organization depends on volunteers and donations and some annual fund-raisers for its existence. Donations go to help people in need and LINK does not stockpile funds.

Clients are mostly single women, ages 20-35 with two or three children, according to Randolph. The second largest group is single men in need of food, work, transportation and sometimes, medical assistance," Randolph said.

Each year LINK sponsors a "Share the Spirit" celebration in mid-December, of which Harvey was one of the organizers. LINK congregations donate new, unwrapped toys and clothing for children from infants to 10 years. Needy parents are screened by LINK and given vouchers according to their need. Parents are then allowed to "shop" from displays set up in a church basement. "In 1993, we had hundreds of toys that parents could choose," Harvey said. "It is really overwhelming to see the generosity of LINK congregations."

"One of our best fund-raisers is our annual 'Anniversary Celebration,'" Harvey said. "We have a noted guest speaker and an auction. Local businesses help support the function. The dinners are donated, and local businesses buy tables of 10 tickets as well as donating items for the auction. Last year's speaker was nationally-syndicated columnist William Raspberry and the year before that, it was prominent New York rabbi, James A. Rudin."

In a letter to LINK's office, one man wrote "LINK does care and share, and above all, directly help when there is a need you cannot handle alone."

Newport News LINK is a Combined Federal Campaign (CFC) designee and a member of United Way. LINK is growing rapidly and many large agencies are entrusting the organization to administer their grants. Employees at Langley and other federal installations can designate LINK on their CFC pledge cards distributed each year. All donated money is used locally.

# Virginia Air and Space Center News

### *LITE News Center*

A daily briefing will be held during the LITE mission (September 9-19) at the center's Orientation Theater. For details, call Catherine Watson at ext. 46122.

*Virginia Air and Space Center*
*Hampton Roads History Center*

### *Bay Days Film Marathon*

September 11 and 12 the center will offer a Bay Days IMAX® film marathon. The marathon will include special sneak previews of the newly-released *Destiny in Space* which opens Oct. 1 at the center. Two other giant-screen films will be offered at this time: *Search for the Great Sharks* and *Titanica*. Coupons will allow viewers to see *Destiny* and *Search* for $3.50 each and *Titanica* for $7.

The schedule is as follows:

- *Search for the Great Sharks*, 9:30 and 10:30 a.m., 12:30, 2:30 and 6:30 p.m.
- *Destiny in Space*, 11:30 a.m. , 1:30 and 3:30 p.m.
- *Titanica*, 4:30 and 7:30 p.m.

Children should visit the center's booth at the festival which will feature an astronaut space suit, hands-on gliders and helicopters, make and take crafts, and models of a space shuttle, aircraft and satellites. For more information, call 727-0900.

### *Plastic Modeler's Society Competition*

More than 100 exhibits will be competing for prizes Sept. 17 in the East Coast International Modeler's Society Competition. Modelers will display a variety of expertly-completed kits. Continuous demonstrations will offer the opportunity to get advice from experts. Basic modeling skills such as filing, sanding, fitting parts, painting and decal application will be demonstrated and reference materials, such as books, photos, and drawings will be shown. This is a free event with regular admission charge. It is free for children accompanied by a paying adult; limit two children per paying adult.

# For Goodness Sake

**BY JACK CLOUGH**

Stuff happens; problems occur; life is uneven in its rewards and challenges. In any given day, we don't know what is going to happen to us. Events of both joy and cruelty overwhelm us, wash over our strengths routinely. And we sink or swim depending on our ability to handle difficult situations, and to be healed.

It's true that healing takes place in a community. We all need, as the song says, "a little help from our friends."

Enter the Peninsula Combined Federal Campaign (CFC). Beginning this month, you will be asked to join in community with others to give a practical expression to your caring. You will be asked to give dollars so goodness will be available to those of us who will surely need it. I say "us" because you or I or a loved one could be overtaken with a problem that will require CFC-funded help.

Thank goodness I have always been able to depend on the reliability of my beating heart. It is a miracle I seldom pause to appreciate . . . until it skips a beat. CFC's systematic payroll gift to ourselves, our families and our significant others is analogous to our pumping hearts. A good CFC year is the good heart beat of a caring and healing Peninsula community.

We at the Peninsula CFC look forward to the continued support of the Langley Research Center community.

*Jack Clough is the Peninsula Combined Federal Campaign Manager.*

# CFC

*Continued from Page 1*

how can we really make a difference? For over 30 years, a powerful solution has been the Combined Federal Campaign (CFC). The CFC unites federal employees, providing an avenue to civil servants all over the country who are choosing to "make a world of difference."

Langley employees will have the opportunity to make a difference when the Center's CFC campaign kicks off early next month. Center Director Paul F. Holloway has appointed a committee headed by Dr. Kristin A. Hessenius, director of the Internal Operations Group, to lead the effort to raise $310,000.

The Center will conduct a one-day solicitation in October. This is the time during the year that government employees are asked to consider the needs of others by contributing to the many health, welfare and community service organizations mobilized to help those who need help most. CFC represents hundreds of nonprofit agencies working to solve today's problems.

Langley has always exceeded the goal set by the Director. When your key person approaches, please be generous. The CFC is an opportunity for the Langley family to help our friends and neighbors right here on the Peninsula, those in need all over the state of Virginia and even those we may never meet all over the world.

CFC
Virginia Peninsula

# Scientific and Technical Photography Crosses Digital Frontier

BY DR. THOMAS E. PINELLI

Photography, long an integral part of the Langley research process, is going digital. Digital photography will benefit researchers by increasing the speed of image processing and enabling the electronic storage and retrieval of images. This technology will also help Langley's engineers and scientists transmit research results to aerospace and non-aerospace customers quickly and efficiently.

As the first step in a three-year plan to implement digital photography, the Scientific and Technical Photographic and Laboratory Processing Section (STP & LPS) of the Visual Imaging Branch (VIB) has begun the transition away from conventional, environmentally sensitive, wet chemical photographic processes to digital imaging technology.

## What is Digital Photography?

In conventional photography an image is captured using a camera and film. The film is chemically processed to produce a negative from which a variety of photographic products (e.g., prints, slides and viewgraphs) are made. In digital photography, work flow centers around three stages: image capture, processing and output. Images may be captured (input) with a digital (filmless) camera, scanned from either original artwork (i.e., reflective copy) or a photographic image (i.e., print or negative), or generated with a computer workstation anywhere and imported over a network to electronically produce traditional photographic products such as negatives, color slides or computer-generated image files. An image captured digitally can be enhanced to remove degradation caused by capture, to add text to the image or to increase its graphic effectiveness. Because the image exists digitally, it can be moved around on computer networks anywhere in the world as well as stored and retrieved electronically. A major benefit of digital imaging is the increased quantitative accuracy of visual data. Engineers and scientists should be able to acquire images from the archive and actually take measurements of past research.

## Setting Up the System

A specialist in digital photography, Jack Holm, an ASEE summer faculty fellow, worked with a team from Scientific and Technical Information Division (STID) and Information Systems Division (ISD) to implement digital photography and imaging at Langley. Two LARSS students from the Rochester Institute of Technology, Ian Grob and Melanie Krisantz, assisted in the digital photography initiative. They worked with a diverse group of Langley personnel, including Rick Hoff and Alton Moore of STP & LPS, members of the Graphic and Design Section, the Research Publishing and Printing Branch (RPPB) and the Langley Image Scanning Archiving and Retrieval (LISAR) group in ISD. Teams drawn from STID and ISD have focused on five major areas of development:

- Electronic image capture and output
- Digital image enhancement
- Image reconstruction and output processing algorithms
- Image cataloguing to include a database master file archive
- Standard protocols for image management

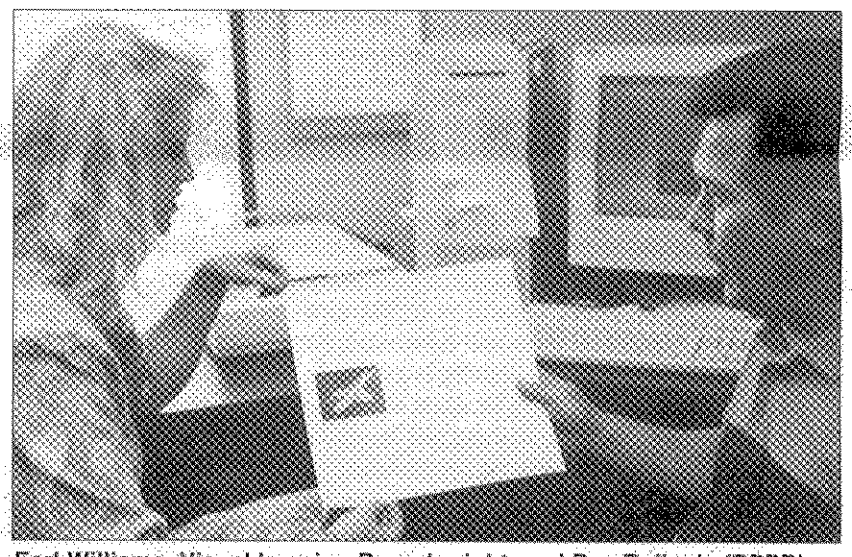
Donna Roper, right, a technical editor from the Research Publishing and Printing Branch (RPPB), and LARSS student Ian Grob, Rochester Institute of Technology, view on-line images for the *Research and Technology Highlights* in Mosaic.

*Photos by J.J. Miller*

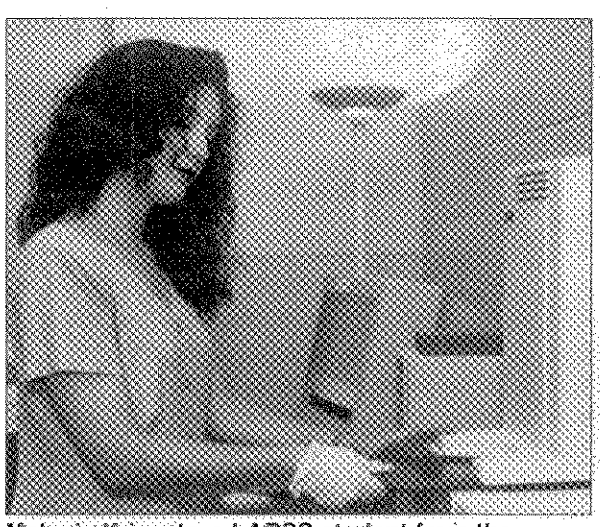
## Looking to the Future

Experts agree that applications for digital photography will expand, especially in research. However, both chemical and digital photography will co-exist for a number of years. Langley's three-year plan calls for the establishment of a digital imaging laboratory in which photographic images can be captured electronically, film images can be converted to digital images, and digital images can be accepted to create conventional photographic products (e.g., halftones, slides and prints). These digital photographic images allow for electronic enhancement, storage and retrieval. The STP & LPS's digital imaging laboratory will begin operations in October on a limited basis.

The introduction of digital imaging provides Langley's award-winning scientific and technical photographers with leading-edge tools to enhance the visual acquisition, analysis, and documentation of research. This capability, coupled with the newly-acquired state-of-the-art Visual Imaging Studio, Building 1145, increases the ability of the STP & LPS to support the Center's research mission well into the 21st century.

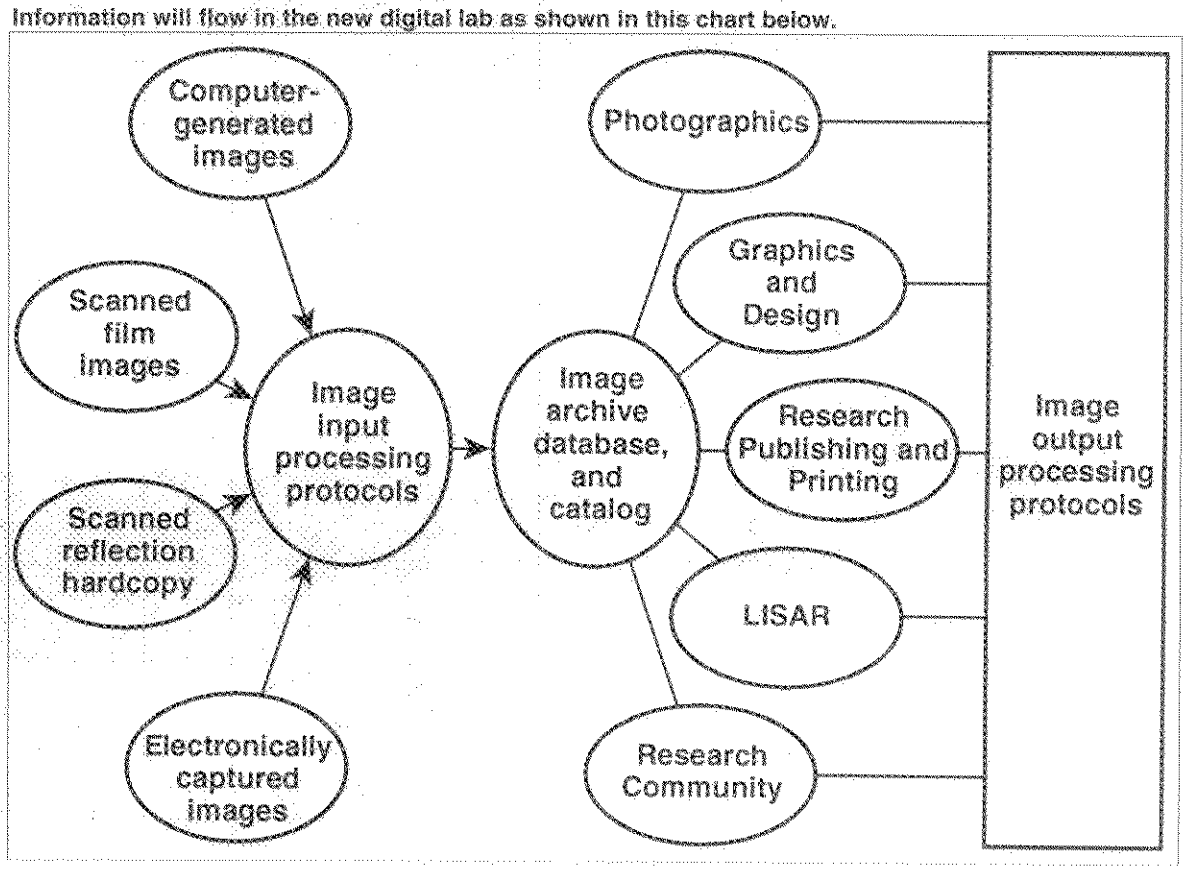


Earl Williams, Visual Imaging Branch, right, and Dee Bullock, (RPPB), display a final product produced using digital technology. With the new capabilities, images, text and art are laid out together in a simple process, producing camera-ready final products.



Melanie Krisantz, a LARSS student from the Rochester Institute of Technology, scans a color negative in the Leafscan film scanner. The image will be displayed on the screen and the image can be enhanced using Adobe Photoshop software.

Information will flow in the new digital lab as shown in this chart below.



# LITE . . .

*Continued from Page 1*

## Launch Day

Today, which is referred to as day zero, engineers and scientists will perform a checkout 2-1/2 hours into the mission during orbit two to ensure the instrument is working properly. An orbit takes about 1-1/2 hours to complete. During these tests, the shutters in front of the detectors will remain closed and the laser will not send out pulses.

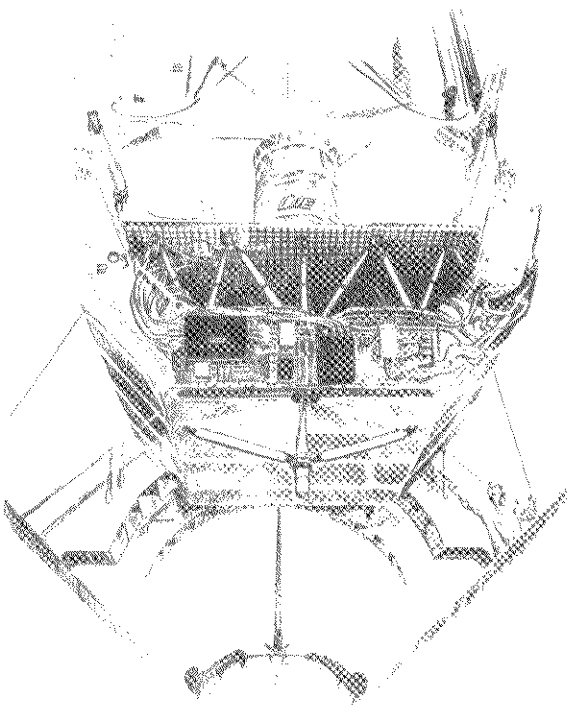
Atmospheric data will be collected for the first time during orbit five beginning about 6-1/2 hours into the mission. This, too, is referred to as a checkout and is not an official data-take. During this nighttime checkout, data collected will be used to check the instrument's performance. Darkness ensures the highest signal-to-noise ratio or best measurement conditions. A boresight alignment will be conducted to check alignment of the laser and telescope during this same period. Engineers will also electronically observe the effects of the launch on the instrument's functions and settings.

During orbit five and orbit six, the shuttle will take measurements while passing over the Great Lakes area, Hampton, Va., central Canada, the Atlantic and south of Africa. These first LITE checkout measurements will end during orbit six at about 8-1/2 hours after launch.

According to project scientist Dr. M. Patrick McCormick, during the period between the checkouts and the first data-take, "We will compare LaRC lidar measurements, study signal levels versus instrument settings and study background signal levels and their global variability. This will confirm our simulations and prepare us for subsequent measurements."

## The First Data-Take

The first official data-take or measurement will occur during the dark portions of orbits 13, 14 and 15 of day zero. Measurements will be taken over central and eastern Russia, through China, Korea and Japan, over Indonesia, through Australia and New Zealand between 18 to 22 hours after launch. The primary objectives during these passes will be to take measurements of clouds over Asia and the western Pacific warm pool where convective activity is great. Correlative measurements will be made with lidars in Japan during orbit 13, New Zealand and Australia during orbit 14, and Russia and Australia during orbit 15. Comparisons will also be made with ground-based in situ and remote measurements of aerosols over Tasmania. Other objectives during these orbits will be to measure reflection properties of snow over the Himalayas and deserts over China and to measure stratospheric volcanic aerosols over all latitudes between 57 degrees north and 57 degrees south.



*Artwork by Jim Wilson*

## Day One

On day one, the first measurements will be taken during dark passes over the Western Hemisphere from the east coasts to the west coasts of the United States and South America during orbit 22 to orbit 24. The objectives will be to study tropospheric and stratospheric aerosols and clouds over major validation sites. Ground-based lidar measurements will be made under the shuttle during orbit 22 in Toronto and Hampton.

Also during orbit 22, lidars in two NASA aircraft, flying underneath the track of the shuttle, will take measurements of tropospheric and stratospheric aerosols over the Atlantic Ocean from Virginia to Barbados.

During orbit 23, tropospheric aerosol correlative measurements will be made over the Department of Energy's Atmospheric Radiation Measurement site in Oklahoma. During the entire mission, lidars and other instruments in five aircraft from the United States, Canada and Europe will take correlative measurements many times under the path of the shuttle at a variety of geographical locations.

On the first part of orbit 24, the LITE instrument will be reconfigured to take its first daytime checkout measurements. These will begin over the Malay Peninsula and continue over the west coasts of China, Russia and Korea. LITE will also measure density variation in the stratosphere over the Andes. McCormick said, "The daytime measurements will serve as a checkout to determine gain settings and noise levels for subsequent autonomous data-takes that include the full orbits of day and night lighting conditions."

## Day Two

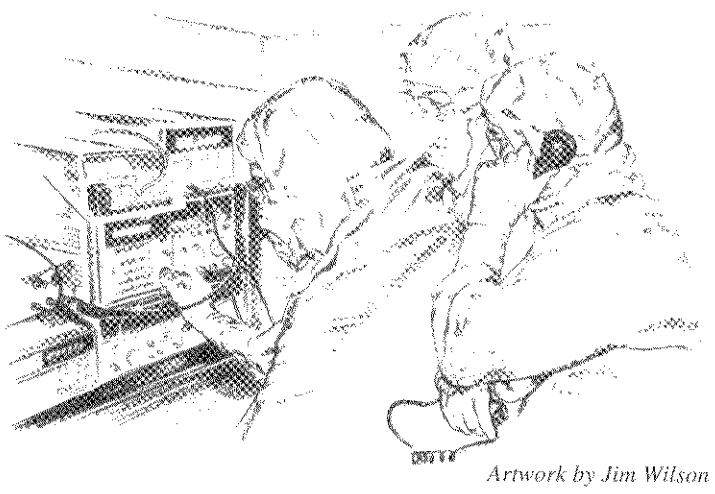
During day two, the first autonomous day/night data-takes will be made. During orbits 32, 33, 34 and 35 measurements will be taken over India, the United States, Europe, Africa and various ocean regions. Reflectivity measurements will be made over the Caspian Sea in Russia. The planetary boundary layer (the region of atmosphere where we live, up to one mile from the Earth's surface) will be studied during orbit 32. Other measurements will focus on biomass burning in central and southeast Africa and in Madagascar. Comparisons with two instrumented European aircraft and a number of ground sites in Europe will take place. Finally, a comparison of marine stratus clouds off the coast of California will be made between an instrumented Canadian aircraft and LITE.

## Day Three

On day three, LITE will automatically adjust itself for day and night conditions in the atmosphere. During orbits 46, 47 and 48, LITE will study clouds over the Pacific Ocean and marine stratus clouds off the west coast of South America, small industrially generated particles over Europe and desert dust in Australia. The first cross-track maneuver will occur over the Sea of Timor and Sumatra, Indonesia, where the shuttle will roll plus or minus 30 degrees as LITE scans the atmosphere below.

The first landmark track maneuver will be performed over the Society Islands and the Gulf of California. During landmark track maneuvers the shuttle will fly wing-forward, roll up plus 30 degrees and fix on one target on the surface and hold that fix until the shuttle rolls to minus 30 degrees. This will yield data on any surface reflectance properties. Atmospheric correlative measurements will be taken over Australia, China, New Zealand, Russia and Taiwan.

During orbits 53, 54 and 55 LITE will study clouds and the lowest altitude aerosols over the United States, South America, Indonesia and China. NASA aircraft with on-board lidars will again make comparative measurements as they travel from Barbados to the Ascension Islands and from San Juan to Venezuela. Ground-based correlative measurements will also be made over Wyoming, Canada, Brazil, Utah and New Mexico.



*Artwork by Jim Wilson*

During orbits 60 and 66, LITE will take short duration "snapshot" measurements for about 15 minutes each over the African rain forest, the Western Sahara desert and marine stratus clouds and aerosols over Los Angeles. A snapshot is a shorter period of time, about 15 minutes, during which LITE will collect data. These short snapshot periods have been planned over specific geographical areas to allow information to be collected that could not be included in the longer 4-1/2 hour data-takes.

The SPARTAN payload will be deployed on this day.

## Day Four

During orbit 71, a surface calibration test will occur as LITE flies over White Sands, N.M. Also, LITE will attempt to observe density variations in the stratosphere over the Andes. During orbits 72, 73 and 74 of day four, LITE measurements are planned for the snow fields during daytime in the Himalayas; biomass burning in southeast Africa; and the Arabian desert. Important cloud studies are planned off the African coast to the east. Correlative measurements will be made over Mauna Loa, Hawaii.

At the beginning of orbits 78, 79 and 80, data-takes of stratospheric volcanic aerosols will be taken over Europe while European aircraft correlative measurements are being made. Multi-scatter experiments will be made over cirrus clouds along with photography by crew members to support data interpretation. Clouds will be studied off the coast of Peru. Landmark track maneuvers and their LITE measurements will be made over the Atlantic and South Pacific.

## Day Five

During orbits 84, 85 and 86 of day five, three passes will be made during local daylight over the Pacific warm pool to study high clouds. Also, surveys will be made of volcanic stratospheric aerosols from 57 degrees north latitude to 57 degree south latitude. These data will provide atmospheric scientists with a large-scale, north-to-south aerosol structure. One of the NASA aircraft will underfly orbit 84 off the coast of Africa to validate the stratospheric aerosol measurements.

Correlative underflights will also be made over the western United States to study the Los Angeles urban air plume as it moves inland.

Late in day 5, Spartan will be retrieved.

## Day Six

During orbits 103, 104 and 105, large latitude survey measurements will be taken during the daytime to study clouds over Africa, the Indian Ocean, the Himalayas, central China and eastern Russia. In addition, during these long surveys, biomass outflow will be studied over the African rain forest.

On the dark side of the orbits, aerosol surveys will be made over the eastern Pacific. Also, density variations over the Andes will be investigated. Correlative measurements will be made in the United States across central California and over Edwards Air Force Base.

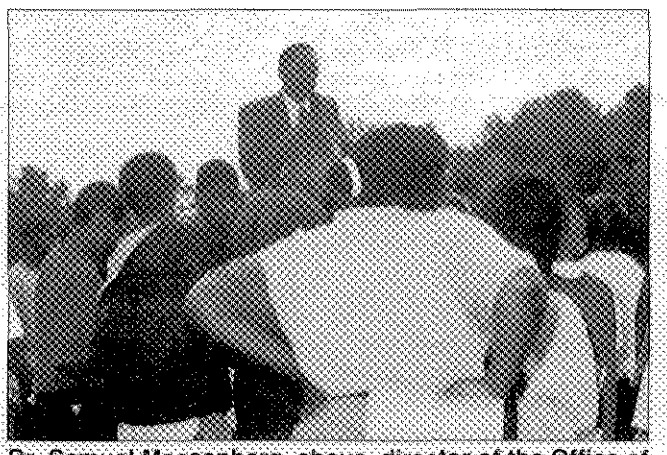
*Continued on Page 7*

# Langley Hosts "Earth to LA" Project Tour

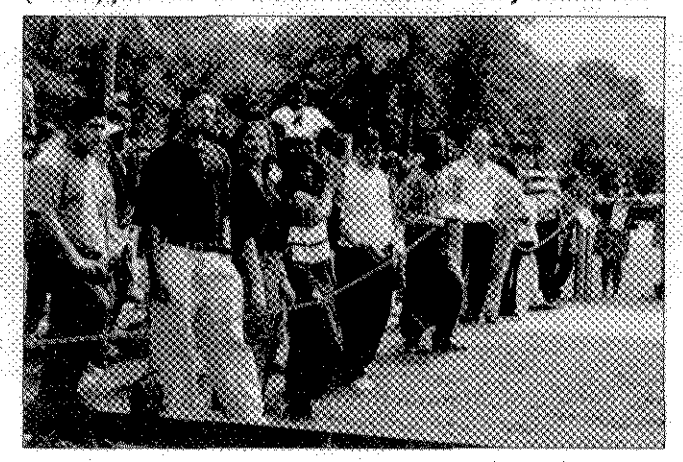
BY PAT LINK

Two buses full of inquiring young minds arrived at Langley in late August to explore the Center's facilities and research. The "Earth to LA" students were welcomed by Dr. Samuel Massenberg, director of the Office of Education, who encouraged them to achieve in math and science.

The 80 students from Southern California are high school students participating in "Earth to LA," a project aimed at promoting career awareness in science and engineering fields for inner city ethnic minorities, young women and disabled students. The program chose Los Angeles at the request of U.S. Representative Maxine Waters. The project is part of government efforts to help the city recover from the riots that swept through the metropolis last year.

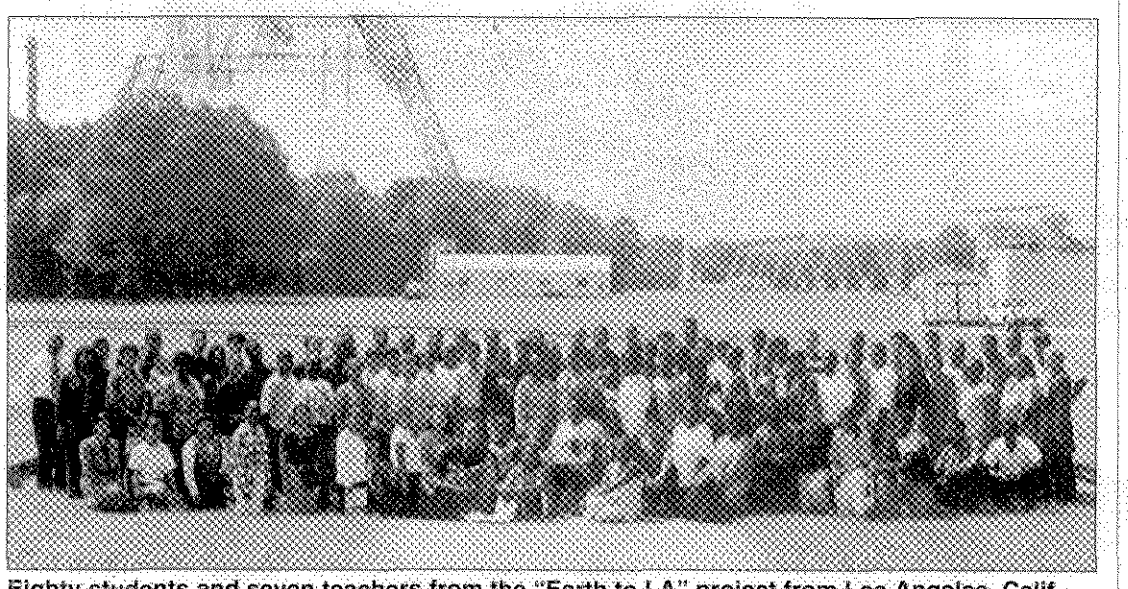


Dr. Samuel Massenberg, above, director of the Office of Education, welcomes "Earth to LA" students to Langley.
Below, Veloria Martinson explains to students the Workings of the Aircraft Landing Dynamics Facility (ALDF) prior to the demonstration test they witnessed.



Students toured the Langley hangar with several test pilots, saw an Aircraft Landing Dynamics Facility (ALDF) demonstration narrated by Veloria Martinson and participated in a round table discussion hosted by the Office of Education's Pete Thomas and Pat Link. Panel members Dr. Christine Darden, Aeronautics Program Group; Terry Morris, Systems Integration Branch; Rosa Oseguerra, Research and Technology Group; Dr. Waldo Rodriquez, Research and Technology Group and Roger Hathaway, University Affairs, kept students asking questions past the allotted time.

Accompanying the tour were Art Gooden from the Minority University Research and Education Division in the Office of Equal Opportunity Programs at NASA Headquarters, and Dr. Diane Love, program director for the "Earth to LA" project. NASA Administrator Daniel S. Goldin, Rep. Waters, two astronauts and Yvonne Freeman, associate administrator for NASA's Equal Opportunity Programs Office in Washington, D.C., helped to dedicate the educational project in ceremonies held in July at the California Science Museum in Los Angeles. The students attended four weeks of lectures in math, computer sciences and planetary/environmental studies at Central State University in Ohio. The group has toured minority-oriented colleges and universities, Langley and several other NASA centers, NASA Headquarters as well as other sights in Washington, D.C.



Eighty students and seven teachers from the "Earth to LA" project from Los Angeles, Calif., toured Langley in late August.

## Gallaudet Dance Company Will Visit Langley

A dance troupe from Gallaudet University in Washington, D.C., will be performing Friday, Sept. 30 from 1:30-2:30 p.m. in the H.J.E. Reid Conference Center. The group is composed of 12 deaf students who will perform modern jazz, ballet, tap and special sign language dances.

The Gallaudet Dance Company was established in 1955 by Dr. Peter Wisher, professor emeritus of Gallaudet University's Department of Physical Education and Recreation. The company performs about 30 to 34 performances a year. The troupe has danced all over the United States as well as in France, Israel, Brazil and Egypt.

Honorees are, front row, left to right, Norma F. Davis, Andrew G. Hagemann, Henry L. Livas Jr., Daniel N. Petroff, Dennis E. Fuller, Charles C. Laney Jr., Lowell C. Keel, and Robert J. Wallis; second row, Kenneth W. Mort, Dr. George W. Ivey Jr., Carl E. Horne, Dr. Seun K. Kahng, John T. Taylor, Tricia L. Romanowski, Philip B. Stich and Terry C. Lusby; third row, Thomas J. Quenville, Harry L. Morgan, Earl R. Booth Jr., Brenton W. Weathered, Blair B. Gloss, James M. Corliss and Travis W. Binion; and back row, Kenneth L. Jacobs, Henry S. Wright, James Y. Parker and Sammie D. Joplin.

## NASA Honor Awards Ceremony

At a ceremony in late August, Sammie D. Joplin, deputy director of the Internal Operations Group, and former head of the Facilities Study Office, presented a NASA Agency Group Achievement Award certificate to each of the members of the Facilities Study Office (FSO) "for their exemplary performance in the development of cost for the National Wind Tunnel Complex."

A National Facility Study Task Team Group Achievement Award was also given to the FSO and to other Langley personnel who performed various activities relating to the National Wind Tunnel Study. This award was presented to the members of the FSO by Dr. H. Lee Beach Jr., Langley's deputy director. To accompany these awards, Langley gave Superior Accomplishment Awards to the NASA employees of the FSO, presented by Joplin.

## LITE . . .

*Continued from Page 6*

### Day Seven

During orbits 115, 116 and 117 on day seven, clouds will be studied over the Pacific warm pool and over the Atlantic Ocean. Correlative underflights with NASA aircraft will be made from Detroit to Wallops and off the coast of West Africa. Ground-based lidars will take measurements at Hampton and southeast Brazil.

Tropospheric aerosols and the planetary boundary layer will be studied during a snapshot opportunity in orbit 119 down the California coast from Big Sur to Baja. The Canadian airplane will underfly the shuttle taking correlative measurements when the tropospheric aerosols from the Los Angeles plume are studied.

If the necessary power resources are available aboard the shuttle, measurements can extend late into day seven during orbits 123, 124 and 125. The shuttle crew will take photographs to support surface measurements over snow over the Andes and during multi-scatter measurements off the Peruvian coast. Correlative measurements of urban aerosols will be taken during the daytime over Europe.

### Day Eight

If power is still available, LITE will have two snapshot opportunities during orbits 135 and 137 to study clouds over Alaska and Manchuria and of stratospheric aerosols and density over Hawaii.

McCormick said, "An exceedingly large variety of measurements have been packed into the 45 hours of data-taking which the shuttle office has allotted us. These measurements along with the corresponding worldwide correlative measurements will validate the ability of spaceborne lidars to provide crucial data for Earth science studies. The experience gained will help ensure future spaceborne lidars tailored for specific applications."

The data collected from LITE aboard STS-64 will be archived at Langley to be used initially in various studies by the science team and correlative measurement scientists. It should be ready for open distribution to the science community in late 1995.

# Happenings

**FOR SALE:** Couch, $250. Call 864-5247 or 596-2144 after 6 p.m.

**FOR SALE:** Water ski, O'Brien exhibition, 66 inches, hydroslide kneeboard, America's Cup vest, $200. Call 898-9880.

**HOUSE FOR SALE:** Hampton, 4 BR, one bath, eat-in kitchen w/appliances, hot water heat, laundry room, detached large garage w/ workshop, fenced-in yard, new rugs, mini-blinds and fans. Call (804) 722-7883.

**FWP NOTICE:** Lynda Sampson, NASA Headquarters Federal Women's Program, will make an official visit to Langley September 29. All Center and contractor women are invited to join Sampson for lunch (12:00-1:00 p.m.) in the Cafeteria Private Dining Room. RSVPs are requested for attendance purposes. Call Patsy Campbell at ext. 43291.

**AMATEUR RADIO LICENSE EXAMS:** Sunday, Sept. 18, from 8:30 a.m. till noon, all levels of Amateur Radio exams will be given at the Radisson Hotel, 1900 Pavilion Drive, Virginia Beach. Exams cover International Morse Code, rules, regulations, operating practice and radio theory in accordance with the Federal Communication Commission. The Novice exam is free; all others cost $5.75. Call for information and licensing requirements, 898-8031.

**LANGLEY KARATE CLUB** invites one and all to discover Cuong-Nhu Oriental Martial Arts. Classes are held at the Langley Gymnasium on Mondays and Wednesdays from 5 to 7 p.m.. NASA employees, co-ops, contractors and their immediate families 12 years and older are welcome. A new beginner class will start Sept. 12 and new students will be accepted until Oct. 5. For more information, stop by the gym during class time or call Roy Albang at ext. 46160 or 596-7736 between 7 and 10 p.m.

**NASA SKI WEEK IV:** The fourth annual agency-wide ski trip is scheduled for the week of February 25 through March 4 at Banff/Lake Louise in Alberta, Canada. All NASA personnel, contractors, retirees, their family and friends are welcome to participate. For additional information contact Michael Schooley at ext. 48524 or 874-2736 evenings and weekends.

**MEMORY WALK:** The 1994 Alzheimer's Association Memory Walk, "Walk With Me," will be held Saturday, Sept. 24. Walkers are sought for one of two local sites: at the Norfolk Botanical Gardens or the Peninsula Walk at Fort Monroe, Hampton. Registration is at 9 a.m. and the walks are at 10 a.m. Funds raised will benefit the Hampton Roads Chapter's support and education services for the 14,000 patients and families affected by Alzheimer's disease in the area. For more information, contact Heather Sanford, Southside at 459-2405 or Peninsula, 800-755-1129.

**FOR SALE:** Moving, must sell pine dining set w/four chairs and lighted hutch, $250; Three piece pecan wall unit, $200 for all three pieces or may separate; Antique piano $100. All prices negotiable. Call 850-1422.

**FREE TO GOOD HOME:** Adorable male sheltie mixed breed, indoor dog, very lovable and loving. Call 850-4122.

**FOUND:** Eyeglasses w/ silver metal frames, in dark brown eyeglass holder. Found at the corner of Durand and Langley Blvd. on August 23. Owner can pick up eyeglasses from Suzanne Barnes, Security Services Branch, Bldg. 1151, Room 120.

**FOR SALE:** Timeshare in Clarion Resort, Va. Beach. Red week includes Memorial Day weekend, only five-star resort in Va. Beach, overlooks ocean, all amenities. Must sell, going back to school. Call 766-3859.

**VOLUNTEERS NEEDED:** The Satellite Committee for People with Disabilities is looking for additional volunteers to be a point of contact for people with a particular disability. Volunteers should have a desire to learn about a disability and where people can receive help or equipment pertaining to that disability. If interested, call Diane Forrest at ext. 47718.

**VIRGINIA SYMPHONY TICKETS:** The 75th anniversary kickoff with first Masterworks concert is Sept. 9 and 10 in Chrysler Hall and Sept. 11 at the College of William and Mary. The concert includes Beethoven's *Symphony No. 9*, *Tannhauser Overture* and more. Pops tickets with the 5th Dimension at Hampton Coliseum Sept. 24 are also available. Tickets at Langley Exchange Shop at ext. 41585 or call the ticket office at 380-0040.

**LAND FOR SALE:** Gloucester, Lees Neck Farm 5+ acres, surveyed, septic approved for 3 BR. Asking $19,000. Call 874-1484 after 5 p.m.

*NASA Photo*

**Operations, security and other personnel escort the orbiter Discovery from the Orbiter Processing Facility to the Vehicle Assembly Building (VAB) at Kennedy Space Center. OV-103 spent about five working days in the VAB where it was mated with the external tank/twin solid rocket booster assembly. The fully-assembled Space Shuttle, STS-64, containing Langley's LITE experiment, was then rolled out to Launch Pad 39B.**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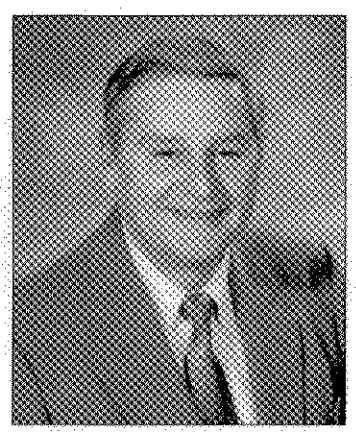
# News Researcher

Bi-Weekly Employee and Contractor Publication

Volume 8 ❖ Issue 19 ❖ September 23, 1994

## *Bowles Named 1994 AIAA Engineer of the Year*



The American Institute of Aeronautics and Astronautics (AIAA) selected Dr. Roland L. Bowles of Langley's Wind Shear Program Office as the 1994 recipient of the AIAA Engineer of the Year Award. The award was presented yesterday to Bowles who has distinguished himself in aerospace engineering, most specifically, for his studies of wind shear hazards and their solutions.

Bowles was the manager of Langley's Wind Shear Program Office. During his 35 years at Langley, he has held a number of positions. These include supervisory mathematician and aerospace engineer for Theoretical Simulation Techniques. He was appointed manager of the Wind Shear Program Office in 1991. The highly successful wind shear program has been hailed as a model for future cooperative development efforts involving NASA, the Federal Aviation Administration and the aviation community.

Bowles has taught at the George Washington University, Embry-Riddle Aeronautical University, the University of Virginia and the University of Richmond. He received his bachelor of science degree in physics from Randolph-Macon College; his master of science degree in physics from the University of Richmond and his doctorate in applied mathematics from the University of Virginia. Bowles is also the recipient of numerous honors and awards, including a 1993 R&D 100 award for one of the top inventions of 1993 for his wind shear work and a National Space Act Award.

The 1994 AIAA Engineer of the Year Award presented to Bowles is inscribed: "For contributions to improved aircraft safety through characterizations of the wind shear hazard, and for leadership in developing forward-look sensors for microburst hazard detection."

Bowles was honored Sept. 22, during the AIAA Aircraft Systems Conference in Anaheim, Calif.

AIAA is the largest professional technical society, principal voice and information resource devoted to the progress of engineering and science in aviation and space.

## October Colloquium Features Innovations in Materials Science

### The Interrelationship of Materials Science with Other Scientific Disciplines

Materials science is the link that connects all avenues of tangible human endeavor. A materials science and engineering colloquium Tuesday, Oct. 4, at 2 p.m. in the H.J.E. Reid Conference Center will include examples in old as well as new art and science and is offered as a platform for innovative thinking and experimentation. The speakers are Dr. Robert E. Green Jr., Professor Robert B. Pond and Dr. Robert B. "Rob" Pond Jr.

Green is a professor at Johns Hopkins University and a co-founder of their Materials Science and Engineering Department. He is the director of the Center for Nondestructive Evaluation and the Theophilus Halley Smoot Professor of Engineering. Professor Pond worked for Bethlehem Steel Corp. before joining the Mechanical Engineering Department at Johns Hopkins. He holds many U.S. and foreign patents and with Green is co-founder of the Materials Science and Engineering Department where he is Professor Emeritus. "Rob" Pond holds a doctorate in metallurgy and materials science and engineering, and is principle engineer in the Materials Science and Engineering Laboratory at the Baltimore Gas and Electric Company.

A Sigma Series lecture, co-sponsored by Langley, entitled "Fun in Metals," will be Tuesday, Oct. 4, at 7:30 p.m. at the Virginia Air and Space Center.

## Early LITE Data Dazzles

**BY MARCIA WESTMORLAN**

Future textbooks on meteorology will contain information on the data collected during the STS-64 LITE mission just concluded, predicts project scientist Dr. M. Patrick McCormick. "I'm happy to report that, for the first time ever, the world has an operating lidar in space," McCormick reported to the *Researcher News* from Johnson Space Center during the mission.

### Keep Window Open!

McCormick said the moments were tense right before the shuttle took off almost two hours after the scheduled launch time.

"We had just a little opening in the sky," McCormick said, describing the launch window. "It was just enough to get through launch constraints. It was well into the middle of the launch window. If mission control had waited a few more minutes, thunderstorms would have been a threat," he said.

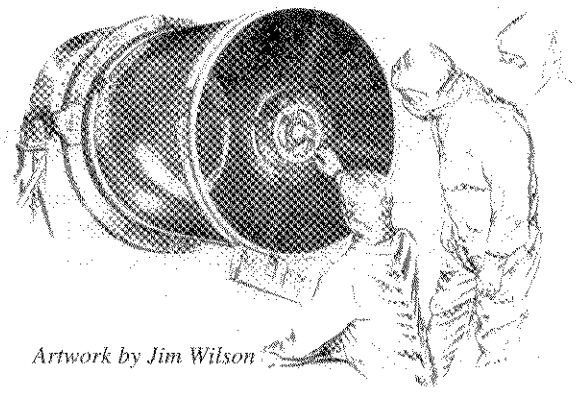
Preliminary examinations of data collected from Langley's Lidar In-Space Technology Experiment (LITE) have "far exceeded" the expectations of scientists and engineers involved in the project. "It is doing better than we ever imagined," said LITE project manager John Rogers.

Approval was given for an additional day which expanded the mission to 10 days. LITE's laser has been able to "penetrate multiple layers of clouds and get ground return. It is really impressive," Rogers said.

### Plenty of Data

During an early orbit, LITE was able to measure clouds associated with tropical storm Debby which was located in the Caribbean southeast of Cuba. The information retrieved, McCormick said, "tells us this instrument can very accurately display multiple layers of clouds. That is very important for understanding the intensity of that storm."

According to Dr. Chet Gardner, a LITE science steering group member who worked at mission control during the mission, "The data is nothing short of remarkable."



*Artwork by Jim Wilson*

LITE is the first remote sensing instrument to allow a view of structure in the profiles of clouds. "You can't achieve the superb vertical resolution that we are now achieving with LITE with passive instruments," Gardner said. "With satellite images we see cloud tops — we don't know the altitude or the thickness of these clouds. Now, with LITE, we can see cloud tops and the cloud layers underneath."

Gardner, a University of Illinois professor who has been working with lidars for the past 20 years, said he has already seen 10 years worth of lidar data collected during the few days of the LITE mission. "We are getting beautiful global data of the planetary boundary layer. We've measured backscatter from cirrus clouds and Saharan dust. Near the equator, the data from biomass burning and smoke plumes are just spectacular."

According to McCormick, "We've gotten excellent quality data throughout the world including Typhoon Kinna off the coast of Japan and biomass burning in Africa and South America."

Rogers exclaimed, "It is unusual when the instrument's performance exceeds simulations. We are just ecstatic."

### A Little Nuisance

The only "nuisance" in the mission has been the inability to retrieve data on the high data rate recorder, which is onboard Discovery.

"We have not confirmed that we can record on the high data rate recorder. We haven't been able to downlink it," Rogers said.

However, the data are being recorded at mission control at Johnson Space Center in Houston except during brief periods when the shuttle loses contact with the TDRSS satellite.

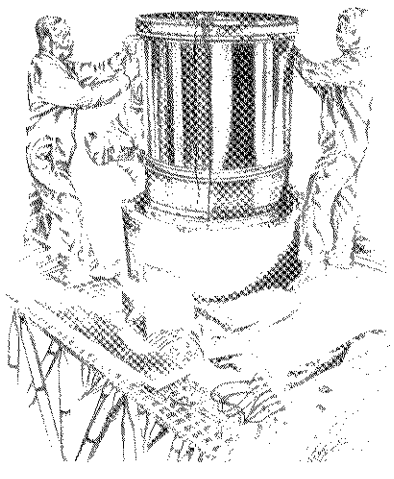
We are downlinking when we have the KU band, (TDRSS microwave transmission band)," Rogers said. "We are getting a pretty high percentage of data."

In addition, all of the data, with less resolution at two of the three laser colors, are transmitted to the ground through an S-band telemetry, retrieved from every 100 pulses of the laser, as opposed to every single pulse with the high data rate recorder, that averages them.

The LITE team has taken steps to enhance the KU coverage in order to get maximum data recordings. The extra day of the mission will also help to fill the gaps of unrecorded data. "It is not going to keep us from meeting our mission success," Rogers said. "We are trying to identify the problem. It appears to be in a link. A connectivity issue appears to be the problem." During end-to-end tests, the high data rate recorder, which is a Marshall Space Flight Center instrument, operated well.

McCormick said that our inability to record and play back high rate data has been the only disappointment in the mission so far. "It applies more stress and takes more effort," he said. "We are glad we had the backup of the S-band and real time data."

Gardner said, "This is a pioneering experiment, the first time a lidar has flown in space to study the Earth's atmosphere. What has impressed me is the quality of the instrument. Langley engineers have done a superb job of designing and building an instrument that operates flawlessly and is yielding science data of exceptional quality."



# News Briefs

## Around the Agency

**SPACE SHUTTLE CREW NAMED FOR SECOND MIR DOCKING MISSION –** NASA's second space shuttle mission to rendezvous and dock with the Russian Space Station Mir, scheduled for October 1995, will be commanded by U.S. Marine Corps Colonel Kenneth D. Cameron. Joining Cameron on the STS-74 mission are U.S. Air Force Lieutenant Colonel James D. Halsell Jr., pilot, and USAF Colonel Jerry L. Ross, U.S. Army Lieutenant Colonel William S. McArthur, Jr., and Canadian Air Force Major Chris A. Hadfield. The primary objective of the six-day flight is to attach a permanent Russian docking module to an orbiter docking system using the shuttle's robot arm, before placing the docking module onto the Mir Space Station, where it will remain for use during future joint U.S.-Russian missions. Throughout the flight, various life sciences investigations will be performed.

Cameron has flown twice before on the Shuttle, during STS-37 in April 1991 and STS-56 in April 1993. Most recently he was NASA director of operations, Russia, where he worked with Russian trainers, engineers and flight controllers to support the training of astronauts at Star City and to enhance continued cooperation between NASA and Russia's Space Agency. Halsell flew on the STS-65 mission in July. Ross has flown four previous times aboard the Shuttle, during STS-61B in November 1985, STS-27 in December 1988, STS-37 in April 1991 and STS-55 in April 1993. Ross has conducted four spacewalks on two of those missions. McArthur flew on the STS-58 mission in October 1993. Hadfield grew up in Milton, Ontario. STS-74 will be Hadfield's first shuttle mission. He is a member of the astronaut class of 1992.

**NASA AND BOEING REACH AGREEMENT ON SPACE STATION CONTRACT –** NASA and the Boeing Company have announced agreement on the key elements of the prime contract for the International Space Station. The agreement establishes, for the first time, a joint position by NASA and its prime contractor on the scope of work, program schedule, cost ceiling and fee arrangement by fiscal year and at completion; establishes contractual terms and conditions; and clears the way for finalizing the contract before the end of the year. Space Station Program Director Wilbur Trafton said the agreement reinforces NASA's confidence that the station will be completed on schedule and within the budget limits set by the President and ratified recently by both Houses of Congress. "The agreement is a testament to months of intensive effort by the joint NASA/contractor teams which have reviewed every facet of the program in search of the efficiencies and cost savings needed to keep the program on schedule and within budget," Randy Brinkley, Space Station program manager, said. The next major milestone for the International Space Station Program is the Interim Design Review scheduled for March 1995. Launch of the first element of the station, the FGB propulsion and control module, remains on schedule for November 1997.

## Health Corner

### *Special Health Seminar*

"The New Guidelines for Mammography and Importance of Breast Self-Examination" will be presented by Pam Gephart-Cline, an X-ray technologist and certified mammographer with the Riverside Regional Medical Center on Thursday, Sept. 29 at 1:30 p.m. at the H.J.E. Reid Conference Center. Gephart-Cline will discuss the new guidelines for mammography, the risk factors for breast disease and the importance of breast self-examinations. Call Karen Ridlon at ext. 43194 for information.

### Early Detection Saves Lives — *Mammography Screening Scheduled*

The Office of Occupational Health Services announces the scheduling of mammography screening for 1994. As in past years, the Riverside Mobile Mammography van will be located in the Health Clinic parking area. Dates for the van are Oct. 24, 25, 26, 27 and Nov. 1, 2 and 4. The cost this year is $60. Payment may be made by cash, check or Visa/MasterCard. A receipt will be provided for insurance purposes. The American Cancer Society states that breast cancer will strike one in nine women during their lifetime. Early detection through breast self-exam and screening mammography is the best "medicine."

This service is open to all NASA employees and their family members, and retirees and their family members. Call ext. 43191 to make an appointment.

### *Blood Drive Reminder*

The next Bloodmobile visit will be Wednesday, Sept. 28, from 9 a.m. to 3 p.m. at the H.J.E. Reid Conference Center. Everyone is invited to donate blood — it can help save lives.

# Langley EEO Counseling Program Honored

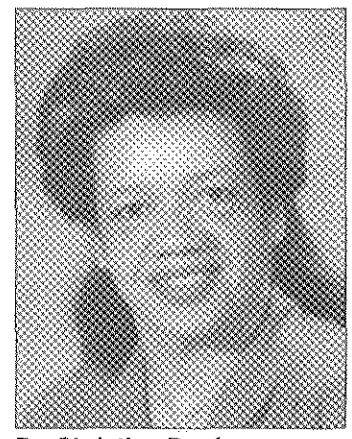
**NASA Headquarters recently awarded certificates of appreciation to Vivian Merritt, Discrimination Complaints Program manager, and the Langley Equal Employment Opportunity counselors for their Agency record of having achieved 100 percent resolution of all potential formal complaints over the past nine years.. The Langley Team, counseling an average of 54 employees annually, has been exceptionally successful in resolving complaints in the informal stage. Pictured in the photo above, left to right, are Elijah Kent, Roderick Harvey, Dollie McCown, Merritt, June Howell, Matthew Winston and Al Shearin. Not pictured is Juliet Pao.**

## Retirement Picnic

A picnic for Charlton (Charlie) Mann will be held Wednesday, Oct. 12, from 4 p.m. until ? at the Activities Shelter #1. Cost is $10 per person and includes a gift. Gift-only contributions are welcome. Call Vicki Boyer at ext. 46294, or Mike Raiford at ext. 47197 for more information. Make checks payable to Mike Raiford and send to Mail Stop 166A by Oct. 3.

# *Darden Given WIA Lifetime Achievement Award*

**BY SUSAN A. SMIGIELSKI**



**Dr. Christine Darden**

Dr. Christine M. Darden, senior project engineer in the Aeronautics Systems Analysis Division, was presented with the 1994 Lifetime Achievement Award from the national organization, Women In Aerospace, at a ceremony in Washington, D.C., earlier this month.

Darden serves as leader of the Sonic Boom Group and is also the Agency technical leader for the Sonic-Boom Area in the Aerodynamics Element of the High-Speed Research Program. She is an internationally recognized expert in sonic-boom prediction and minimization.

An author of more than 50 technical publications involving sonic boom, Darden pioneered research to develop a new computational method to improve sonic-boom prediction, reduce boom strength, and analyze the coalescence of shocks including three-dimensional effects.

For several years, she has managed the research to reduce the environmental concerns associated with the sonic-boom generated by a High-Speed Civil Transport at cruise speed.

Darden has also served as the lead investigator for high-lift wing design. Along with a fellow researcher, a successful procedure was developed to design attached-flow, high-lift flaps for both subsonic and supersonic maneuvers.

Darden is no stranger to awards and honors. She received the NASA Langley Technical Excellence Dual Career Ladder Award in 1991; NASA Equal Opportunity Medal in 1992; NASA Fellowship Program for Developing Executives at Simmons College Graduate School of Management in 1993.

Outside of NASA, in 1994, Darden earned the National Council of Christians and Jews Sisterhood Award for Voluntarism. She was recognized by the Career Communications Group as a "Prominent African-American in Space Technologies."

Darden is a frequent speaker at career day programs and science fairs in area schools. This contribution earned her the NASA Langley Speaker of the Year Award in 1993. For the Fairfax, Va., County Schools, Darden was featured in a film segment entitled "Women in Non-Traditional Careers."

An Associate Fellow in the American Institute of Aeronautics and Astronautics, Darden also served as secretary of the Technical Committee on Aeroacoustics. She is a member and past national secretary of the National Technical Association which is composed primarily of black technical professionals. She served as a discussion leader in the 1994 Leadership Conference for Women Scientists and Engineers sponsored by the Association for Women in Science.

## In Memoriam

### Duval Hudson Jr.

Duval Adams Hudson Jr., 73, a native of Hampton and a lifelong Peninsula resident, died, Thursday, August 16. He was a Langley retiree.

### Charles T. West Sr.

Charles Thomas West Sr., 91, died Saturday, Sept. 3. He was a native of York County and lifelong Peninsula resident.

West retired from Langley in 1973 after 30 years of service.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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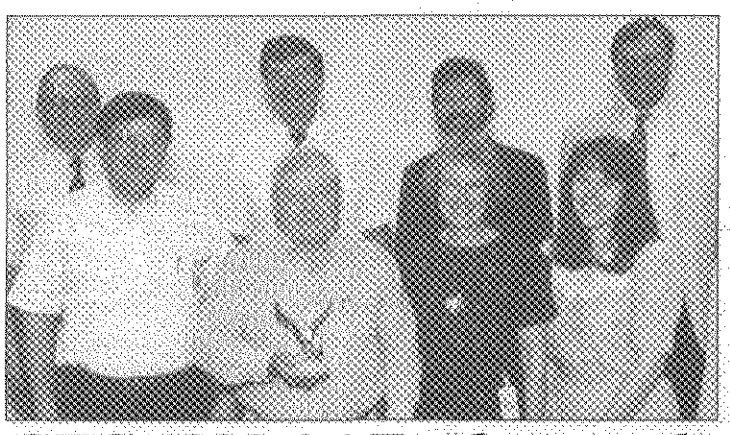
The privilege of advertising in this publication is restricted to the employees and retirees of the Langley Research Center. Articles advertised here must be offered without regard to race, color, religion, sex or national origin.

All materials are subject to editing.



## CFC 1993-94 Eagle Awards

**Pictured are winners of a ceramic eagle for their contributions of $1,000 or more to the 1993-1994 Combined Federal Campaign. In the front row, from left to right, are Charles Dunton, Joseph Drewry, Susan Voight and Kelly Hayhurst. In the second row is the co-chairman for the 1994-1995 CFC Irving Abel, awardees Richard Russell and Preston Carraway, and the 1993-1994 CFC chairman Dr. Douglas Dwoyer, who awarded the statues to the contributors.**

## A CFC Message from the AFGE

What makes America great? Why do people from other countries place themselves in great peril to reach this place we call home? One reason surely must be the opportunity for a better life. Many of us have benefited from one of America's most alluring attractions, our educational system. Higher education is the surest route we have to provide ourselves and our families with a safe and comfortable standard of living.

Another critical element of the American experience is our tradition of caring for those less fortunate than ourselves, and supporting causes for the common good through voluntary contributions. Langley employees have demonstrated their generosity over the years by participating in the Combined Federal Campaign (CFC). In the past three years alone, we have cumulatively contributed nearly $1 million to the organizations supported by CFC. Virtually every worthwhile cause imaginable is represented to receive funds via the CFC framework.

As representative for the American Federation of Government Employees (AFGE) to the 1994 CFC Committee, I want to share some of the issues that have been discussed during our meetings. This year, we have paid special attention to promote your willingness to give, not just in this campaign, but in the future. Among those employee that do participate, the average contribution is quite commendable. To ensure the long-term health of the CFC, we needed to address the reasons people have decided not to participate. One in four employees do not contribute anything to the CFC's annual solicitation.

Please don't hesitate to seek answers to your questions about the CFC. Many people want to become involved in their communities and this is one of the best opportunities to do so. Comments and suggestions to improve the CFC will be welcomed by your co-workers as they distribute campaign material in early October. Thank you for supporting the CFC.

**— James High,**
**AFGE Representative**

# Message from the Director:

### "Keep the dream alive for those less fortunate"

Today's communication is instantaneous and worldwide — and often makes us painfully aware of the suffering of those around us. Whether it's the family down the street, our fellow Americans encountering floods or forest fires, or our global neighbors in Rwanda or Bosnia, there are homes destroyed, people suffering and dying, homeless and sick who need our help.

Closer to home, the local economy has suffered from cut-backs and down-sizing, resulting in loss of jobs.

For all of the people mentioned, the needs are very basic: food, clothing, shelter, safety, medical care. These are things that many of us at Langley take for granted, because we are very fortunate.

These are also just a few of the reasons to contribute to the 1994 Combined Federal Campaign (CFC). Your past generosity has helped many needy people. As Director and longtime supporter of and contributor to the CFC, I urge your renewed commitment to the 1994 campaign. Langley's excellence includes caring; we have always delivered when the need was great.

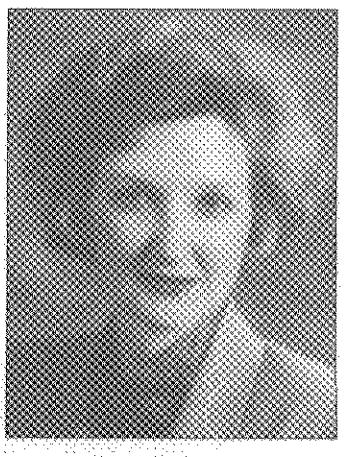
This year's goal is $310,000. I am certain that we will not only meet this goal but exceed it.

I encourage those who have never given before to consider giving during this year's CFC campaign. And I urge those who give so selflessly each year to continue their strong support. Langley has always had one of the highest per-employee donation records of any major organization on the Peninsula. And I encourage you to give your gift to the organization of your choice by designating it on your pledge card.

Many excellent service and volunteer agencies need our support. Please be as generous as you possibly can — let's shoot for 100 percent participation. Together we will make a world of difference.

**— Paul F. Holloway**
**Director**

## The Langley CFC: A Newcomer's View



Even though I have been a member of the Langley Team for a relatively short period of time, I have come to appreciate the manner in which the Team pulls together to achieve its worthwhile goals. As a newcomer, I am particularly honored to serve as the 1994 Chairperson for the Langley Combined Federal Campaign. I believe the CFC is one of those worthwhile goals where NASA Langley provides leadership for the community. I'd like to use this space to share some of my personal views on the importance and impact of CFC and the purpose it serves.

All around us, we, as employees, are experiencing change: reorganization, rightsizing, and reengineering. During this time of change we have the opportunity not only to remove the ineffective, but to retain and reinforce the effective. There are many values and traditions that are important and which should be kept, for they are the foundations to which we hold fast in times of uncertainty.

One value that we within the Langley community hold dear is our commitment to sharing. Sharing is a natural for us. Sharing is a fundamental building block to a teaming environment, an environment that we at Langley cherish and demonstrate on a daily basis.

Next month, we in the Langley community have the opportunity with the kickoff of the Combined Federal Campaign to demonstrate our strength and belief in the value of sharing. The Center this year has set a goal of $310,000, a sizable commitment. Last year 70.3 percent of the Center made contributions averaging $143 per person. This equates to approximately nine hours of work time for a salary of $30,000 per year, or just nine hours out of a total work year of 2,080 hours. Even though we have lost some of our fellow employees to retirement, we can meet our new goal through an increase in the percentage of employees contributing, or through an increase in personal pledging. Personally, I think of my CFC giving as providing health benefits for someone less fortunate. I adjust my giving to reflect the rising costs of health care.

The Combined Federal Campaign has an impact far beyond the local area in which it is conducted. The hundreds of nonprofit agencies, organizations, and related causes answer needs on a regional, national, and even international scale. A contribution designated by an employee can help relieve hunger in an African nation, support scientific research aimed at perfecting a cure for cancer, and provide enriching growth experiences for the youth of our own community.

Your Key Persons will be around shortly to answer any questions that you may have concerning the CFC. This year provides yet another opportunity for the Langley community to team to meet a challenge. The slogan for this year's Peninsula CFC is "Sharing: A Defining American Value to Keep." It's a value that we embrace so well at Langley.

**— Kristin A. Hessenius**
**Director, Internal Operations Group**

# Combined Federal Campaign

# We Can All Help "Keep the Dream Alive" in 1994

This year, the employees of NASA Langley really have the power to "Keep the Dream Alive for Those Less Fortunate." Along with thousands of Federal employees from all over the United States, you are invited to show how much you care, as you have so generously in the past, by contributing the 1994 Combined federal Campaign (CFC).

This annual solicitation enables the agencies shown on this page to make a difference in peoples' lives: You will be providing housing for the multitudes of homeless, feeding hungry children, counseling families, finding cures for diseases, digging wells for clean water, comforting the dying, saving the environment and improving the lives of millions of human beings.

This year more than 1,100 local, regional, national and international agencies will benefit from your generosity.

Langley will hold its annual solicitation during the week of October 3, when employees may give their "Keep the Dream Alive" gift — a donation or payroll deduction pledge to the worthy cause of their choice.

If you choose, your contributions will be distributed among the 21 federations listed on these pages. Each of these organizations gives funds directly to their subsidiary agencies. You may also contribute to local and national agencies not affiliated with one of these federations. For complete information, a brochure listing the recipients of your gifts and describing each of their programs is available.

### American Red Cross

*Represents itself*

The Red Cross provides worldwide emergency communications to military and their families; disaster relief; services to Federal personnel, veterans; health and safety courses, including AIDS education; international aid; and blood services.

### Animal Funds of America

*Represents 17 agencies*

The funds are used in protecting pets, wildlife and endangered species as well as for teaching people to treat animals with respect. Humane training of animals as helpmates and companions to people in need is also part of their programs.

### Children's Charities of America

*Represents 91 agencies*

Children's Charities believes all children are our future, and they are in need of our help. Reach out and feed, teach, protect, and care for children in America and around the world.

**Big Brothers/Big Sisters provides one-to-one friendships to children of single-parent households. Your contribution helps them, and hundreds of other local, national and international agencies, make the world a better place.**

### Christian Service Organizations of America

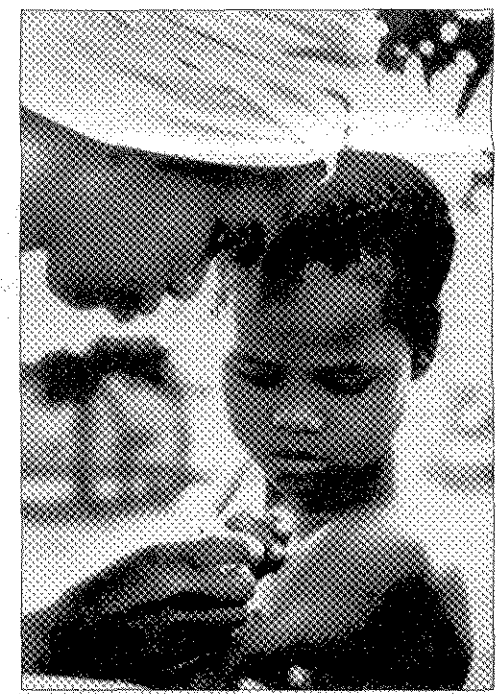
*Represents 29 agencies*

By giving through these service organizations, you are opening your heart in love and compassion to those in need, sharing yourself through your generosity.

### How to Make a Contribution

There are several ways for employees to contribute to the 1994 Combined Federal Campaign:

- You may contribute to a specific agency
- You may contribute to specific federations that represent a broad range of agencies
- You may contribute to one of four pools of federations/agencies:
  - The AAAA pool, for distribution to all local and national federations/agencies
  - The IIII pool, for distribution solely to all international organizations/agencies
  - The LLLL pool, for distribution solely to all local federations/agencies
  - The NNNN pool, for distribution solely to all national federations/agencies
- For those who do not designate their contributions, gifts will go, by regulation, to the AAAA pool.



**International Service Agencies (ISA) train nurses, doctors and village health care workers to immunize millions of children each year against polio, diphtheria and other diseases. ISA agencies depend on the support of the CFC to help them bring lifesaving emergency aid to victims of disaster, providing critically needed food, medicine, water and shelter.**

### Earth Share

*Represents 41 agencies*

Your gift helps 41 organizations protect America and the world's health and natural resources, and provides educational programs that teach people how they can help.

### Human and Civil Rights Organizations of America

*Represents 25 agencies*

By donating, you help stop racial discrimination, fight religious bigotry, prosecute hate crimes, end unfair sex bias, defend democratic principles and promote equality, freedom and justice for everyone.

### Independent Charities of America

*Represents 108 agencies*

Feeding the hungry; sheltering the homeless; protecting children and healing the sick — America's independent agencies work with you to share with others — the American way.

### International Service Agencies

*Represents 53 agencies*

These cost-effective, charities help save lives, sheltering refugees and disaster victims, creating jobs, preventing blindness, strengthening communities and promoting peace throughout the world.

### Medical Research Agencies of America

*Represents 29 agencies*

AIDS, arthritis, cancer, diabetes, heart disease and herpes — fight back by supporting medical research, and help discover the prevention and cure for these and other diseases.

# Keep the Dream Alive

### World Service Organizations of America

*Represents 44 agencies*

These organizations need your help to end poverty and hunger, fight disease, increase economic opportunity without destroying the environment, and preserve peace in the global neighborhood.

### Women's Charities of America

*Represents 20 agencies*

Join women working to end sex-based discrimination, injustice, poverty and abuse — and to empower women to make a better world for themselves and their children.

### USO

*Represents itself*

The USO provides programs for the military community that include foreign language classes, libraries, educational workshops, child care, entertainment, scholarship funds, volunteer recruitment and children and family programs.

### United Way of the Virginia Peninsula

*Represents 44 agencies*

This is a local federation of charities that supports programs for families and children at risk by providing day care, shelter, family and crisis counseling, food and youth programs.

### United Way of South Hampton Roads

*Represents 60 agencies*

This federation of local charities provides a variety of needed human services, including day care, family counseling, homeless shelters and programs for at-risk children.

The CFC can put clothes on people's backs: Some children start school each fall without adequate clothing — no coats, hats or mittens for cold weather or boots for rainy days. The Clothes Closet serves more than 200 children annually, distributing thousands of articles of clothing to needy children and adults in the Peninsula area. Your one contribution to the CFC can help a child be fully-clothed all year long.

You're never too old to have fun: CFC is more than just a group raising money for worthy causes. 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-four human care agencies rely on the United Way of the Virginia Peninsula, and the United Way relies on you. By giving to the CFC, you are reaching out to someone who needs you.

## CFC Committee Announced

Dr. Kristin A. Hessenius, director of the Internal Operations Group, is this year's chairperson for the Combined Federal Campaign (CFC). She has announced the committee that will help the Center reach its 1994 CFC goal of $310,000.

Irving Abel, chief of the Structures Division, serves as vice chairman.

Tammy Spellman, Internal Operations Group, is recorder.

Sammie Joplin, deputy director of the Internal Operations Group, serves in an ex-officio capacity.

Bert Rockey of the Office of Public Services is publicity chairperson.

Sandy Favor of the Financial Management Division is the financial chairperson.

Rockey Edge from the Office of Human Resources serves as labor relations officer.

Bill Fogle of the Fabrication Division is the representative for the International Association of Machinists (IAM).

James High, Fabrication Division, is the representative for the American Federation of Government Employees (AFGE).

Donna Speller of the Information Systems Division is this year's CFC loaned executive from Langley.

**October 3 Begins CFC Kick-Off Week!**

### United Way of Greater Williamsburg

*Represents 21 agencies*

One gift supports more than 39 human service programs served by the 21 agencies in Greater Williamsburg. A United Way Helpline provides information and referrals.

### United Way of America

*Represents 20 agencies*

In association with local United Ways, the agency works in helps people in need and solves community problems such as AIDS, hunger, homelessness, illiteracy, child care and alcohol/drug abuse.

### Military, Veterans and Patriotic Public Service Organizations of America

*Represents 15 agencies*

Help to keep America strong, safe and free, and remember and honor veterans, those who serve today and their families by giving through these organizations.

### National Black Federation of Charities

*Represents 23 agencies*

This organization is the only national Black federation of charities organized to help national and regional groups obtain resources to provide for the critical needs of African-American communities.

### National/United Service Agencies

*Represents 67 agencies*

Your support helps people throughout the nation, around the world and in your community, supporting people, programs and issues you care about.

### National Voluntary Health Agencies

*Represents 64 agencies*

This federation of 64 respected national voluntary health organizations provide research, patient/community services, and public/professional education for Federal employees and their families worldwide.

### National Voluntary Health Agencies of Virginia

*Represents 20 agencies*

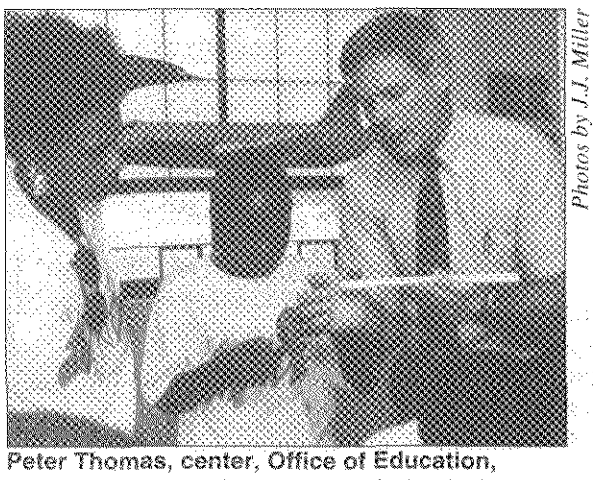
A federation of Virginia health agencies focused on improving the quality of life through the delivery of health services, provision of health education and sponsorship of research.

# *Project "PRIDE" Students Learn about Transportation*

What do you do with 100 students for three weeks each summer?

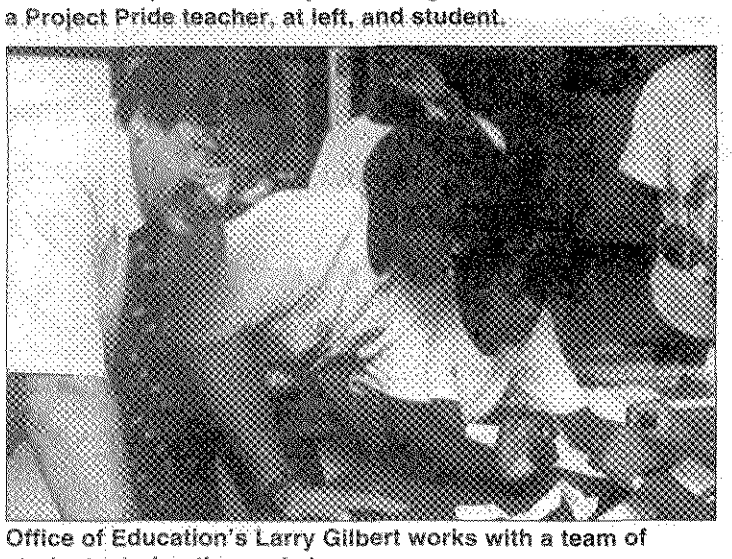
If they are part of Project Pride, you teach them mathematics, reading and writing skills for 12 hours each day and a half-day on Saturdays, take them on field trips and keep them very, very busy in the camp-type program. This summer, 100 students from the Hampton Roads area, were mentored by volunteers from local business as part of such a rigorous program.

The theme: "Transportation — Land, Water and Air," was emphasized during the academic skills portion of the program as well as the field trips. Langley employees Larry Gilbert and Peter Thomas of the Office of Education and Holly Smith, who leads the Center's NASA Education Workshop for Elementary School Teachers (NEWEST), helped wrap up the summer program with a workshop, emphasizing the principles of flight. The event was held at Huntington Middle School in Newport News and involved the design and building of flyable aircraft.

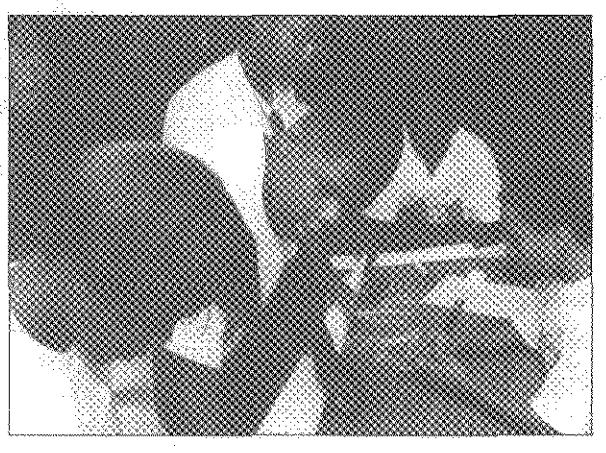


Photos by J.J. Miller

Peter Thomas, center, Office of Education, discusses a part of the airplane being built with a Project Pride teacher, at left, and student.



Office of Education's Larry Gilbert works with a team of students during the workshop.



Project Pride students work on their aircraft in teams.

## U.S. Team Wins Math Olympiad

Six American high school students brought the U.S. Team a perfect score in the International Mathematical Olympiad held in Hong Kong this summer. The six winners, who were chosen from among 340,000 students in the United States, scored highest in the American High School Mathematics Examination. They won in a field of 69 countries that included China and Russia.

The Olympiad is sponsored by the Mathematical Association of America, and is of concern to NASA and its Administrator Daniel S. Goldin because of its pertinence to the *Goals 2000* program. *Goals 2000* encourages U.S. students to be first in the world in science and mathematics.

# Langley and Lear Astronics Corp. Sign Cooperative Agreement

### Consortium to Develop Autonomous Landing Guidance System

Langley Research Center signed a cooperative, cost sharing agreement, valued at $16 million, with a consortium of manufacturers, airlines and other government agencies, led by the California-based Lear Astronics Corporation. The agreement is for the development of an Autonomous Landing Guidance (ALG) system for commercial air carriers and military aircraft.

David L. Dallob, president of Lear Astronics Corporation, signs the cooperative agreement with Langley, the executing agent for the Advanced Research Projects Agency (ARPA). Standing center is Tom Campbell of Langley's Electromagnetics Research Branch and Langley program manager and Col. Michael Francis, ARPA program manager.

The ALG system will permit aircraft landings in low visibility conditions at unmodified runways around the world. Using an ALG system, it is estimated that U.S. airlines could reduce direct operating costs due to weather and volume-related delays by more than $1 billion per year. It will also increase the all-weather operating capabilities of military aircraft including low-visibility taxi and takeoff. The program is an outgrowth of a Federal Aviation Administration/U.S. Air Force initiative to improve all-weather landing systems.

The ALG program, which could total as much as $42 million over the next few years, is part of the White House's Technology Reinvestment Project (TRP) aimed at developing new technologies with dual-use applications for military and civilian users. The TRP program is managed by the Advanced Research Projects Agency (ARPA).

Tom Campbell of the Electromagnetics Research Branch and executing agent for ARPA said, "It is important for Langley to be involved in the development of this technology due to its potential for so many applications in aeronautics." Jeremy Becker-Welts of Langley's Office of Chief Counsel developed the framework for the legal documentation necessary for the initiation of this program. The documents were then approved by ARPA program management and legal representatives.

The Center facilitated negotiations between ARPA and Lear Astronics for the ALG technology and will support ARPA in the technical evaluation of the program.

Lear Astronics Corporation will serve as the lead member of the ALG consortium with responsibility for system integration and coordination. Northwest Airlines, United Airlines, the U.S. Air Force and the Maryland Advanced Development Laboratory are members of the ALG consortium. They will participate on an operations requirements board responsible for the development of operational and evaluation criteria for the new technology and its evaluation on commercial and military aircraft.

## AIAA Meeting Announced

Dr. Thomas P. Gielda, principal product design engineer for Alpha Simultaneous Engineering at the Ford Motor Company, will speak Monday, Oct. 3, at the H.J.E. Reid Conference Center, sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA).

Gielda will provide a different perspective on the application of computational fluid dynamics (CFD) during the dinner meeting that begins with a social from 6 to 7 p.m., with dinner and program to follow.

Reservations are required for the event by noon Thursday, Sept. 29. Contact Beth Lee-Rausch at ext. 42269 or e.m.lee@larc.nasa.gov or Dan Vicroy at ext. 42022 or d.d.vicroy@larc.nasa.gov

## Joint Meeting of Helicopter Groups Slated for Langley

The Colonial Chapter of the Army Aviation Association of America (AAAA) is presenting a joint meeting of rotorcraft societies, co-sponsored by Langley and the Army's Vehicle Structures Directorate. The meeting is on Center, Wednesday, Oct. 5.

Members of the American Helicopter Society, the AAAA and the Naval Helicopter Association, the U.S. Army, Air Force and Navy, the Virginia State Police and private industry will be on hand to display various rotorcraft vehicles.

The day will include the rotorcraft display at Langley. A presentation on "The History of Rotorcraft Research at Langley" will be give by retiree Bob Huston.

A guided tour of Langley facilities is scheduled for the afternoon with attendees going to the Impact Dynamics Facility, which includes a demonstration of a catapult sled; the 30- X 60-Foot Wind Tunnel; the Transonic Dynamics Tunnel; the 14- X 22-Foot V-Stol Tunnel and the Spin Tunnel.

Some of the vehicles expected for the display are the Army National Guard CH-47 Chinook; the Air Force UH-1N, the Navy CH-53 Echo, Ch-46 and SH-3; the Virginia State Police Bell 222, Bell 206 and BO-105; a Nightingale Air Ambulance and a privately-owned R-22.

For information about the event, please call John Cline at ext. 43966.

# Day of Caring Mobilizes Volunteers

BY MARNY SKORA

Nearly 100 Center employees were among the 650 volunteers who distributed food; painted interiors and exteriors; weeded and planted; constructed shelves, tables, even a home; packaged school tools; visited with veterans, school children and senior citizens during the third annual community Day of Caring September 8.

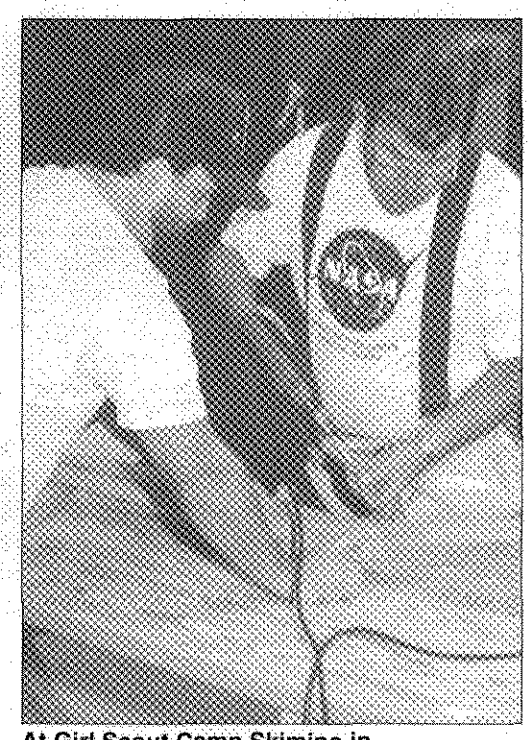
Research and Technology Group's Kelly Hayhurst, a three-year Day of Caring participant, concludes, "I thoroughly enjoyed my assignment at the Foodbank. It's really great to see Langley take a more active role in community service. I certainly hope this trend continues."

Fellow volunteer Sharon Fairheart, Space and Atmospheric Sciences Group, was a bit more specific. "The Langley group moved 15,227 pounds of salvageable food," she reports. Fairheart doesn't want to see any more beans or soup for a while.

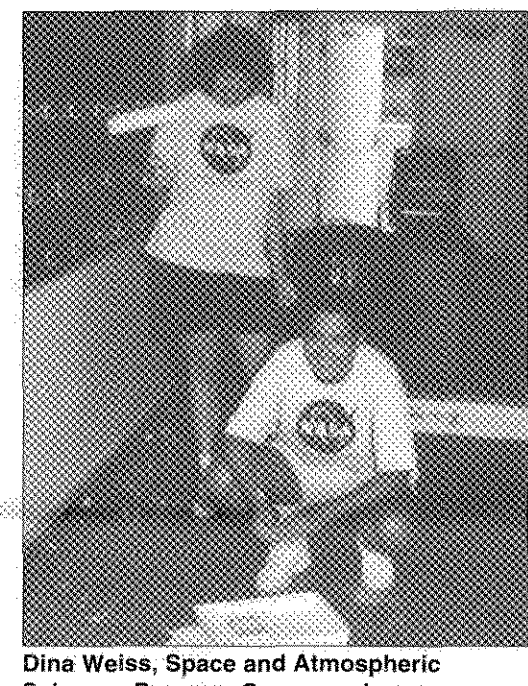
Dave Duxbury, Internal Operations Group, made his volunteer assignment a family effort. Tasked with landscaping at the Hampton-Newport News Community Services Board, Duxbury called in his wife, a landscape designer and master gardener, for some expert advice.

Anne Rockey, Office of the Director, feels the Day of Caring is "a nice way to repay the community." Rockey painted the interior of the Boy Scout headquarters, Colonial Coast Council, where son Dave earned his Eagle Scout credentials. This day-long effort helps even the score, she said. Hers was a prevailing sentiment.

Rise Ramsey, Nondestructive Evaluation Sciences Branch, center, Ed McErlean, Langley retiree, left, and Alda Hicks help with the paperwork for food distribution at the Hampton Coliseum

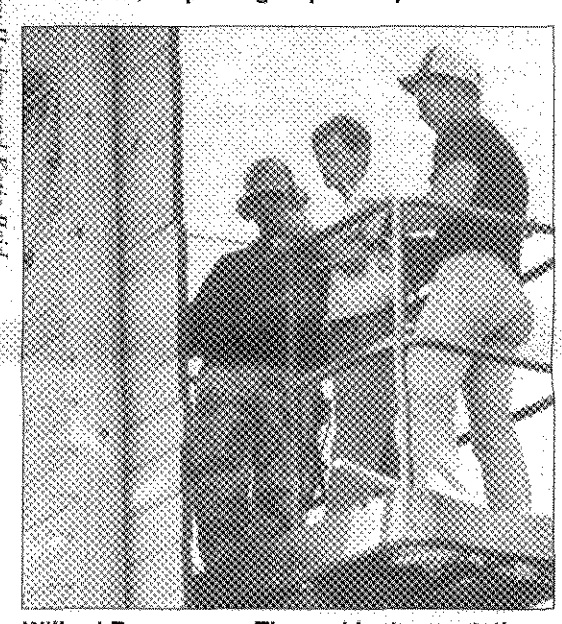


At Girl Scout Camp Skimino in Williamsburg, Gene Monroe, Electronic Technology Branch, left, and Allen Langford, Electromagnetics Research Branch, helped a group build picnic tables.

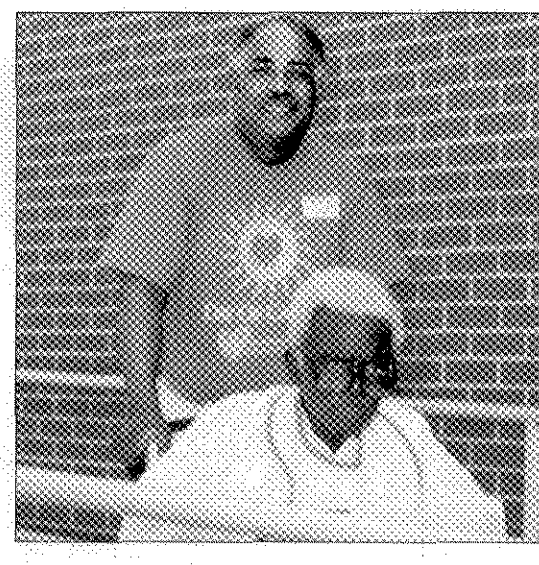


Photos by Peggy Hopkins and Katie Reid

Dina Weiss, Space and Atmospheric Sciences Program Group, and co-op Bobbie Moss of the National Transonic Facility painted all the walls at Girls, Inc. in Newport News.



Willard Bauserman, Thermal Instrumentation Section, works on a new wooden training structure for the Abingdon Volunteer Fire Department.



Burnie Peters, left, head of the Office of Equal Opportunity Programs, took time from his busy schedule to spend time with some of the clients at the Veterans Hospital in Hampton.

## A Big "Thank You" to all of our Day of Caring Volunteers

**Abingdon Volunteer Fire Department**
Willard Bauserman
**American Lung Association**
Karen Roane
Velma Martin
Sandra Hurst
**American Red Cross**
Bert Rockey
Larry Cooper
**American Red Cross, York/Poquoson Chapter**
Penny Murphy
**Boy Scouts of America, Colonial VA Council**
Larry Huebner
Joann Harris
Karen Freidt
Beth Tanner
Robert Spruill
Anne Rockey
Pamela Schmidt
Robin Elder
**Child Development Resources**
Bill Wood
Bob Berry
George Parker
Barry Price
Richard Chase
**City of Hampton**
Betsy Kennedy
Carl Horne
Brenda Sullivan
Ginger Freeman
Robin Land
Scott Bartram
Carolyn Carey
**Contact Peninsula**
Patricia Williams
Connie Jones
Mary D. Thomas
Cynthia Dea
Mary Ann Steuck
**Downtown Hampton Child Development Center**
Ruth Amundsen
Geraldine Tucker
Marilyn Aldrich
**EDMARC Hospital for Children**
Nancy Kruse
**Foodbank of the Virginia Peninsula**
Kelly Hayhurst
Scott Martinson
Belle Lynn Wood
Louise Sykes
Sharon Fairheart
Gail Temple
Charlotte Tyeryar
Angela Brown
Sandra Zumbrun
Prina Russell
Carmen Torres-Nisbet
**Girls Inc. of the Greater Peninsula**
Bobbie Moss
Dina Weiss
**Girl Scout Council of Colonial Coast**
Gene Monroe
Allen Langford
John Lamar
**Hampton Department of Social Services**
Ida Collins
Helen Bruce
Rudeen Smith-Taylor
Rise Ramsey
Anne Mackenzie
**Hampton Newport News Community Services Board**
Henri Fuhrmann
Lloyd Nelson
David Duxbury
**Peninsula Agency on Aging**
Connie Smith
**Peninsula AIDS Foundation**
Thomas Jordan
June Howell
**Peninsula Habitat for Humanity**
Russell DeYoung
Jim Miller
**Peninsula Institute for Community Health**
Yvonne Dellapenta
Laura Smith
**Peninsula Family Services**
Wes Goodman
**Safehaven, Inc.**
Susie Henriksen
**Salvation Army Peninsula Command**
Bessie Nicholson
Jeanette George
Lisa Peckham
**Old Hampton Community Center**
Randy Woolard
Lorelei Gibson
**USO of Hampton Roads**
Artistine Lethcoe-Reid
Charlene Farquharson
Lynda Foernsler
Betty Lane
Burnie Peters
Carolyn Eby
Cathy Dunn
Brenda Spencer
Weldon Staton
JoAnn Woodcock
**Virginia Peninsula Council on Domestic Violence**
Harriet Dismond
Gwen Leach
Patsy Campbell
Karen Credeur

**Special thanks to *Researcher News* editor Ann Gaudreaux, photographers Katie Reid and Peggy Hopkins and photo technician Margie Whitehurst for recording this year's Day of Caring. Langley Research Center is proud to have been a sponsor of this effort.**

Bob Berry of the Fabrication Division, at left, and George Parker of the Aeroacoustics Operations Section, cut sections of pipe used to build an activity wall and sandbox at Child Development Resources in Williamsburg.

# Happenings

**DEAF AWARENESS EVENTS:** Dancers: The Gallaudet University Dance Troupe will perform Friday, Sept. 30, in the H.J.E. Reid Conference Center from 1:30 to 2:30 p.m. All are invited to attend. Dr. Yerker Andersson, president of the World Federation of the Deaf, will speak Friday, Oct. 21, from 9 to 10 a.m. Everyone is welcome to attend.

**FOR SALE:** Full-size Panasonic microwave oven, $75; round oak dining room table/four oak chairs, $100; Little Tike's playhouse, $75; roll-away bed, $25. Call 874-3121.

**ERBE CELEBRATES:** The ERBE Project celebrates its 10th anniversary with a social Wednesday, Oct. 5, from 5:15 to 8:15 p.m. at the H.J.E. Reid Conference Center. The cost is $3 per person for hors d'oeuvres. There will be a cash bar. Reservation deadline is Sept. 29. For information, call Alberta Reid at ext. 45386.

**YOUNG EAGLE FLIGHTS:** The Experimental Aviation Association Chapt. 339 is having their 24th annual Fly-in at Franklin, Va. October 8 (rain date Oct. 9). Young Eagle flights will be given from 10 a.m. to 4 p.m. for children between 8 and 18 years old who have parental permission. The location is J.B. Rose Airport in Franklin. Food and drinks will be available. Chapter 339 is raffling off a new Magellan Skyblazer Moving Map GPS. Drawing to be at the Fly-in. For additional information, call Bill Adkins at ext. 45506.

**TIDEWATER CLASSIC GUITAR SOCIETY** will open its season with *The life and times of Elizabeth I*, featuring Robert Spencer on lute and Jill Nott-Bower, voice. Concerts are Friday, Sept. 23, at the Chrysler Museum, Norfolk, and Saturday, Sept. 24, at the Williamsburg Regional Library Arts Center; both concerts are at 8 p.m. Tickets are $7 to $10 and are available at the door or from the Theater Connection in Williamsburg. For information, call 625-2411, Southside, or 566-3304 on the Peninsula.

**NASA INTERCENTER COMPETITION:** Fall races are scheduled as follows: 10K races are Oct. 4, 13, 17 and 27 and two-mile races are on Oct. 6, 11, 20 and 24. Nov. 2 will be the Turkey Trot two-mile race sponsored by the Langley Fitness Center and the Langley Runners' Club. This race will count as the Intercenter race. Races start at 5 p.m. on Doolittle Road. All Langley employees can earn points for the Center in this NASA-wide competition. Walkers are welcome. For more information about the races and the club, call Richard Shearer at ext. 47036.

**SYMPHONIA '94-'95 SEASON:** The Williamsburg Symphonia announced plans for its "Flights of Discovery" season: Nov. 27, and March 6 and May 24, 1995. For information, call 229-9857.

**FREE TO GOOD HOME:** Male Pekingese dog in need of someone to care for him. Two young children would like to visit occasionally. He will be three-years-old in November. Call 865-6391.

**FOR SALE:** Moving, must sell pine dining set w/four chairs and lighted hutch, $250; Three piece pecan wall unit, $200 for all three pieces or may separate; Antique piano $100. All prices negotiable. Call 850-4122.

**FREE TO GOOD HOME:** Adorable male sheltie mixed breed, indoor dog, very lovable, loving. Call 850-4122.

**FOR SALE:** Waterbed, California king size, 85 percent baffles mattress, $200. Call Vicky, evenings at 825-6319.

**VA SYMPHONY:** Pops tickets with the 5th Dimension, Sept. 24, 25 and 26; Masterworks concerts, Sept. 30 and Oct. 1, are available at the Langley Exchange Shop, ext. 41585, or the Symphony ticket office at 380-0040.

**RETIREE NOTICE:** Retirees may request a copy of *Airborne Trailblazer, Two Decades with NASA Langley's 737 Flying Laboratory* by calling the Public Mail Center at (804) 864-3293.

**LANGLEY ACTIVITIES ASSOCIATION:** Country Western Dance: the next C/W dance will be Saturday, Sept. 24, at the H.J.E. Reid Conference Center. Doors open at 6:15 p.m. and the cost is $3 per person

**Bingo Fun:** Every Thursday at 7 p.m., at the Activities Center, Bingo games are held. All are welcome.

**LAA Social Hour:** On Sept. 23 at the Activities Center, from 4 to 8:30 p.m., there will be a social. Entertainment by DJ "Willie K" Williams begins at 4:30 p.m. There is no cover charge. For information on these and other LAA events, call ext. 46369.

**FOR SALE:** 55-gal. and 33-gal. fish tanks w/combo stand to hold both. Includes pump and complete system setup, mint condition, $350 o/b/o. Call 722-1124.

**NOTICE:** Interested in learning more about the Bible? A group meets weekly to study people, places, and history in the Bible. If you are interested in attending or would like additional information call Mike at 867-7169.

*Photo by Peggy Hopkins*

**YET ANOTHER WAY TO DO THE JOB. Robin C. Elder, an aerospace engineer in the Space Systems Engineering Branch, "engineers" a system to clean the windows at the Boy Scout headquarters in Newport News during the Day of Caring. Langley was a sponsor of this year's community service effort.**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Researcher News

National Aeronautics and
Space Administration
**Langley Research Center**
Hampton, Virginia 23681-0001

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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 20 ❖ October 7, 1994

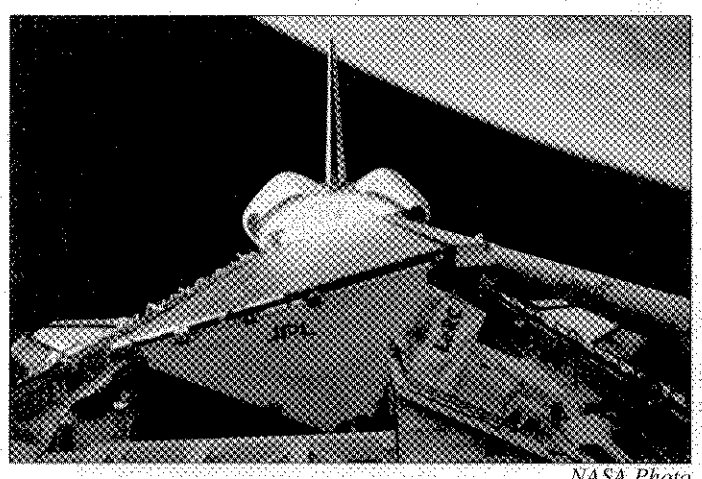
## MAPS Flies on STS-68

BY CATHERINE WATSON

For the second time this year, on September 30, the Langley Measurement of Air Pollution from Satellites (MAPS) instrument was launched aboard the Space Shuttle Endeavour. During the 10-day mission, the MAPS instrument will measure global carbon monoxide concentrations in the lower atmosphere (approximately two to 10 miles above the surface of the Earth). Carbon monoxide (CO) is a pollutant created by the burning of fossil fuels such as gasoline, and by the burning of forests and grasslands. Scientists will compare the CO values measured during this September/October MAPS mission (STS-68) to the CO values obtained during the April 1994 (STS-59) and October 1984 (STS-41G) MAPS missions.

The MAPS experiment is conducted by a team led by Principal Investigator Dr. Henry G. Reichle Jr. of Langley's Atmospheric Sciences Division and Project Manager John C. Fedors, of the MAPS Project Office. The MAPS science team, headed by Reichle, advises the experiment team in the areas of tropospheric photochemical modeling, dynamical and transport studies, data validation, and instrumentation and data inversion. The science team also assists in the evaluation of the MAPS data.

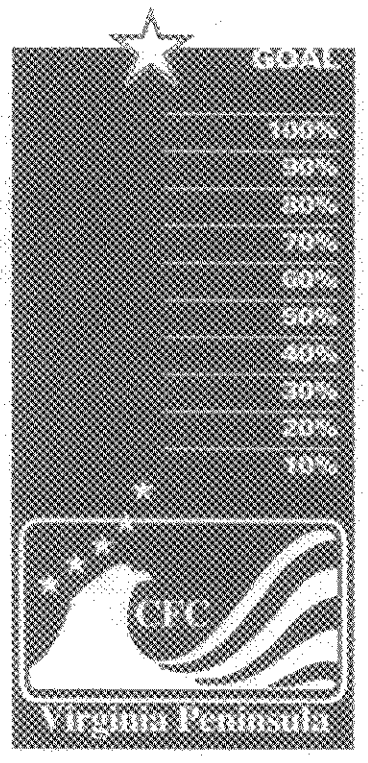
Team members are Langley's Vickie S. Connors, project scientist, and H. Andrew Wallio of the Chemistry and Dynamics Branch; W. Hesketh of SpaceTec, Inc., Hampton, Va.; P. Kasibhatla of the Georgia Institute of Technology; V. Kirchhoff of Instituto Nacional de Pesquisas Espacias in Brazil; J. Logan from Harvard University; R. Newell from the Massachusetts Institute of Technology; R. Nicholls, of York University in Canada; L. Peters of Virginia Polytechnic Institute and State University; and J.W. Seiler from the Fraunhofer-Institut fur Atmospharische Umweltforschung in Germany. After the mission, the MAPS instrument will be returned to Langley for post-flight inspection and calibration. MAPS is being considered for a third mission. The experiment has already provided a wealth of data for application to future Mission to Planet Earth experiments.



NASA Photo

**The MAPS (Measurement of Air Pollution from Satellites) instrument is shown in the payload bay of the Space Shuttle Endeavour (STS-59) in April 1994. The MAPS instrument is at the bottom right of the picture with LaRC written on its side. The instrument is facing the Earth below to measure carbon monoxide concentrations in the lower atmosphere.**

## Let's Kick Off the 1994 CFC in Great Style!




See Page 3

## Crash Dynamics Tests Held at Langley

During September, crash testing of a Lear Fan airframe took place at the Langley gantry. The test focused on determining how composite aircraft structures react to dynamic loads to yield new data for the design of floor structures and improved seats for general aviation aircraft.

The tests, at the Impact Dynamics Research Facility, were aimed at obtaining dynamic load data directly from full-scale composite aircraft, not sub-scale test articles, according to Huey Carden, senior researcher in the Structural Mechanics Branch.

"Langley's series of crash investigations focuses more on developing composite structures that will absorb crash loads reducing the risk of fatal injuries for aircraft occupants," Carden said.

This first test was of an unmodified Lear Fan test airframe. Installed in the plane were three energy-absorbing seats and four regular seats. A bulkhead airbag was also onboard as well as seven crash dummies. The Lear Fan was impacted on a concrete surface at approximately 88 feet per second along a -20.6 degree flight path. The planned impact attitude was flat with no yaw. The test weight of the aircraft was 7,000 pounds.

According to Carden, prior to the recent test, crash tests of unmodified Lear composite floor structures were made to obtain baseline information on how the design might react to dynamics loads. Testing of new subfloor materials is underway.

According to Lisa Jones, project engineer for the test, preliminary assessment of results of the September test showed that non-survivable loads occurred and occupant loads in the standard seats were well above survivable limits. More thorough assessment will be made of all the data before much more can be said concerning the test results.

These tests were done as a baseline for the second phase of testing scheduled for 1995 or early 1996. For the second test, the aircraft will be modified; metal subfloor structure will be replaced with energy-absorbing floor composite structures.

The second test will focus on the performance of the new subfloor design. The impact conditions of the second test will repeat those of the first test.

"We would like to have composite subfloor structures that are capable of reducing vertical loads by greater than 50% of what the original structure produces," Carden said. "in addition, we want to provide crushing capability in the seats to further help alleviate occupant loads."

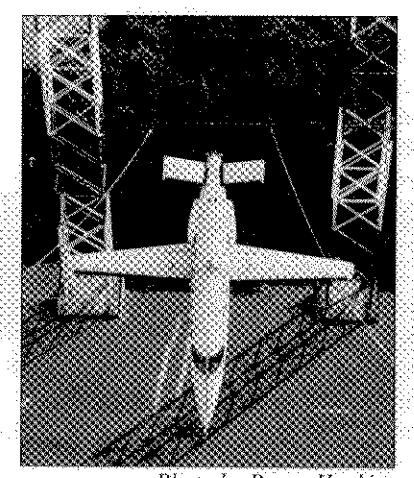


Photo by Peggy Hopkins

**The Lear Fan airframe is suspended 146 feet above the ground from the gantry prior to testing.**

"Beech Aircraft Corp. and Wichita State University in Kansas, are developing new seat designs for general aviation aircraft. They are developing a lower seat frame design and evaluating improved materials for seats that are designed to minimize loads on occupants through proper cushion design," he said.

During a developmental stage, evaluation helped determine minimum load transmission through the seat 'pan' to the occupant. The new seats were mounted in the Lear Fan airframe for the full-scale crash test.

The test information, in addition to being valuable data for Langley, would provide the aerospace industry with concepts for future designs of seats and floor structures and could form the basis to improve advanced composite structures, according to Carden.

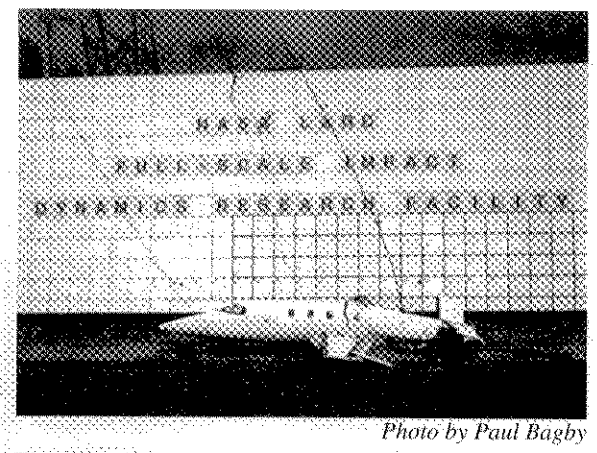


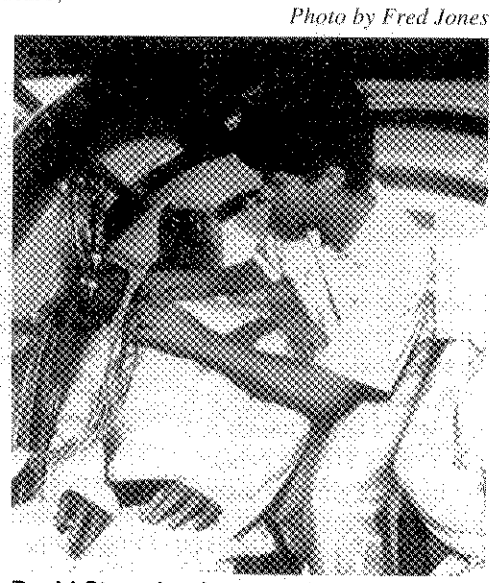

Photo by Paul Bagby

**The Lear Fan test airframe at impact at the Full-Scale Impact Dynamics Research Facility.**

The Federal Aviation Administration (FAA) is also interested in the results of the Lear Fan crash investigations here at Langley not just because of the safety implications. The FAA can also assess the adequacy of certain certification regulations and modify them to improve safety.

In the future, Langley will be conducting tests with two prototype composite Starship 1 airframes provided under an agreement with Beech Aircraft Corporation.

Photo by Fred Jones



**David Stang hooks an anthropomorphic dummy into a seat in the test vehicle.**

# News Briefs

## Around the Agency

### VSGC RECEIVES GRANT TO HELP TEACHERS EXPLORE VIRTUAL REALITY

The Virginia Space Grant Consortium (VSGC) has been awarded a grant by the U.S. Department of Energy's Argonne National Laboratory to oversee development of video tape support material and associated teacher training and museum field trips for a PBS-broadcast production on virtual reality research, *Beyond the Looking Glass*. *Beyond the Looking Glass* examines research being conducted by various organizations in the field of virtual reality, the emerging technology that allows humans to enter and manipulate computer-generated worlds and images.

Virginia Space Grant Consortium (VSGC) member institutions, the Mathematics and Science Center and the Science Museum of Virginia, have developed classroom material for grades seven through 12 that examines the science and technology behind virtual reality. The Mathematics and Science Center is identifying 50 teachers from the Richmond area who were trained to use the material and videotape in the classroom. "At the Mathematics and Science Center we are already working on bringing multimedia, computer graphics and 3-D imaging to the teachers and students of Central Virginia, so this project on virtual reality fits in well with what we're doing," says Center Director Dr. Julia Cothron.

The teachers and their classes will make field trips to the Science Museum during the fall and winter to explore virtual reality-related exhibits on visual perception, optical illusions and computer science. "This project joins Virginia teachers, schools and a museum to produce materials that will be used and referred to all over the United States," said Science Museum's Deputy Director for Science/Education, Dr. Elizabeth Blatt. "The Science Museum is proud to be a member of this collaborative effort."

Educators on the tape support materials development team have received advice from technical, scientific and educational experts at NASA Ames Research Center, NASA Headquarters, NASA Langley Research Center, the University of North Carolina - Chapel Hill, the University of Virginia and Virginia Tech. The goal of the Department of Energy's Science Explorers Program, which supports development of similar material for each of the 39-program New Explorers Series, is to introduce students to science as a career possibility for their own lives. Material developed through this project will be available for purchase by teachers nationwide through the NASA's Central Operation of Resources for Educators (NASA CORE). The material also contains ideas for creating a related field trip in other communities that don't have access exhibits at the Science Museum of Virginia.

The Virginia Space Grant Consortium is a coalition of Virginia colleges and universities, the state community college system, NASA, various members of private industry, state government agencies and other institutions with wide-ranging aerospace interests.

## Announcements

### Retirement Party

Friends and associates of David B. Middleton are invited to a party in his honor on Friday, October 21, at the Fort Monroe Officers' Club. Social hour begins at 6 p.m. with a buffet dinner at 7 p.m. Cost is $16 per person and includes a gift. For reservations call Tracy Jones at ext. 44013, Mail Stop 489, by October 14. Gift only contributions are welcome.

### Retirement Picnic

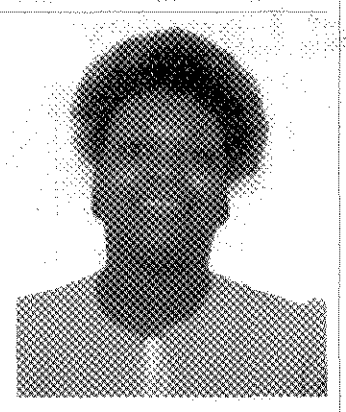
A picnic for Charlton (Charlie) Mann will be Wednesday, Oct. 12 beginning at 4 p.m, at Activities Shelter #1. The cost is $10 per person and includes a gift. Gift only contributions are welcome. Call Vicki Boyer at ext. 46294 or Mike Raiford at ext. 47197, for more information. Make checks payable to Mike Raiford and send to Mail Stop 166A.

### Retirement Party

Friends and associates of Claude Keckler are invited to a party Thursday, Nov. 3, at the Fort Monroe Officers' Club. Social hour begins at 6 p.m. with a buffet dinner at 7 p.m. Cost is $16 per person and includes gift. For reservations, call Linda Rowell at ext. 41721, Mail Stop 479, by Oct. 27. Gift only contributions are welcome.

## In Memoriam

### Carolyn D. Reaves



Carolyn D. Avent Reaves, an employee relations assistant in the Office of Human Resources, lost her long battle against cancer on Friday, September 23. Reaves joined the staff of the Personnel Division October 24, 1973 as a clerk typist in the Stay-in-School Program.

"Throughout her 20 years of service at Langley, Carolyn gained a solid reputation for the advice and guidance she provided to Center employees about the various health plans under the Federal Employees' Health Benefits (FEHB) Program," said John Cox of the Office of Human Resources.

Center employees donated many hours of their time, as well as their resources, to raise funds for special treatments through the Carolyn Reaves Cancer Treatment Fund. Reaves is survived by her husband, Ronald, and daughter, Shanda.

### William W. Stalnaker

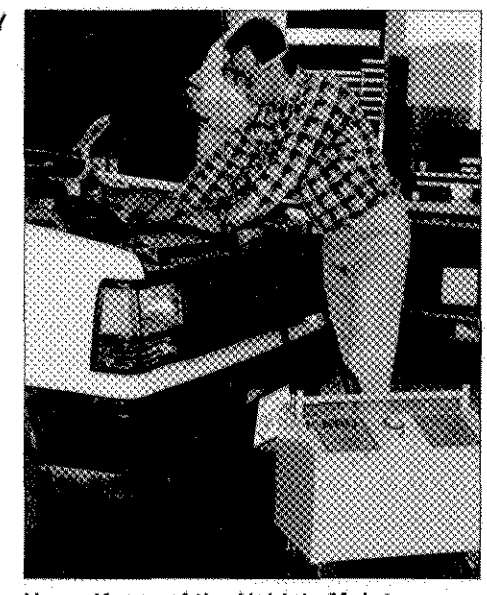
William Wilson Stalnaker Jr., 78, of Portsmouth, died Friday, August 26. Stalnaker began his career at NACA in 1937 and worked in the Research Facilities Division on several projects such as the construction of the Free Body Dynamics Facility and the Spin Tunnel Support Facility. He retired from the Plant Engineering Division in 1977 after 40 years of service.

### Flying Circus Air Show

Each Sunday through Oct. 30, the All American Barnstorming Airshow and Museum presents *The Flying Circus Air Show*, on Route 17 in Bealeton, Va. The show was the recent gathering place for NASA alumnus Jesse L. Kent and fellow alumni who gathered for the 55th anniversary of the Farmville School of Aeronautics. Kent has been an active Farmville alumnus and NASA retiree who helps organize such events. "Thomas Collins of Independence, Va., and Gene Lawson of Frederick, Md., sponsored this year's gathering," Kent said, "but I like to keep active in aeronautics, too." He said this year's group enjoyed the air show immensely, particularly Charles Kulp Jr., the last "Flying Farmer," and "Scoopie and the flying lawnmower" presented by the Washington, D.C. Radio Control club.

## Center's Pollution Prevention Project Is in Full Swing

**BY KELLY BINKLEY**



**Harry Kyzer of the Vehicle Maintenance Facility uses antifreeze recycling equipment as part of the Center's Pollution Prevention Project.**

Today, Langley employees are conducting a variety of activities to reduce waste and environmental impact.

Langley Pollution Prevention projects will be the focus of a series of brief highlights in the *Researcher News*, beginning with a summary of antifreeze recycling efforts at the vehicle maintenance facility and led by Charlie Harris.

### Project: Antifreeze Recycling

Langley's vehicle maintenance facility generates several hundred gallons of waste antifreeze each year in the course of servicing about 700 vehicles. Used antifreeze is a hazardous waste that is costly to manage and dispose.

In August 1993, the Office of Environmental Engineering purchased an antifreeze recycling unit to filter impurities from used antifreeze so that it could be reused by Langley's vehicle fleet. According to Charlie Harris of the Transportation and Warehouse Team, recycling antifreeze will eliminate disposal of more than 220 gallons of waste antifreeze annually, representing a significant monetary savings for the Center. In addition, recycling the fluid is better for the environment and reduces Langley's regulatory liability.

In 1992, the Office of Environmental Engineering conducted a Centerwide pollution prevention survey and developed a written Pollution Prevention Plan. The plan, which identified 52 unique pollution prevention projects, set the stage for a Centerwide pollution prevention program. Some of the earliest projects included reducing the generation of electroplating wastes, the reduction and recycling of used oil, and the recycling of antifreeze. These projects demonstrate the benefits and feasibility of reducing wastes at the source and recycling wastes.

### More Projects Underway

Antifreeze recycling is just one example of how Langley employees are reducing waste. The Office of Environmental Engineering hopes this example will encourage other waste reduction and recycling opportunities on Center. For more information about this recycling project or the Pollution Prevention Program, contact Bob Brown at ext. 43609.

## AIAA Nauticus Luncheon

The Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA) announces a joint meeting sponsored by the Tidewater Association of Service Contractors and the Norfolk Chapter of the National Contract Management Association. The meeting, on Wednesday, Oct. 19, from 11 a.m. to 3 p.m. will be at Nauticus, The National Maritime Center and will cost $12. The theme of the meeting is "Building Better Relationships between Contracting Professionals." To make reservations, call Keith Boyer at 865-0501.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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.

# CFC Co-Chair Urges "Keep the Dream Alive"

"Keep the Dream Alive for Those Less Fortunate" is the theme for the Center's Combined Federal Campaign (CFC) this year. "Keep the Dream Alive" is a commonly used theme for the NASA space program. It brings to mind a picture of the space shuttle piercing through the clouds after being launched from the Cape as this country takes another step in the destiny of mankind. It also brings to mind the excellence, enthusiasm and dedication of the NASA family in this endeavor.

For the CFC campaign, it signals to the Langley family that now is the time to create a similar enthusiasm for helping others. Participation in the campaign is a Langley tradition that has been taken very seriously in the past. It is once again time for us to look at local, national and international needs to see how we can help people here on earth.

"For those less fortunate" brings to our attention that we are indeed the fortunate. This has been a hectic year for the Langley family. The words National Performance Review, reorganization, dual-use technology, total quality management, reductions in program support, facility closures and "right sizing" have echoed in our ears and resulted in significant impacts on each of us. Step aside for one moment and look at the problems faced every day by many people: hunger, illness, poverty, drug addiction, homelessness, terminal illness of a loved one, abused children and spouses, and families in crisis—the issues at Langley somehow seem minor in comparison. We continue to perform the exciting and challenging work we have been doing for many years. We are indeed the very fortunate!

How can you help? The campaign is in full swing. "Key people" are contacting each of us to spread the message of the campaign. Each of us is being asked to reassess the community needs and our ability to help meet them. The campaign has set a very ambitious goal of $310,000 for this year. To meet this goal we are trying to increase employee participation and to encourage increased individual contributions both by at least 10%. With the recent buyouts and early retirements of some of our staff, it is imperative that everyone reevaluate their giving habits if we are to meet our goal . . . a tradition at Langley.

Think for a moment what our dollars provide:

- $15 immunizes 240 children against tuberculosis (a serious and rising health concern in America today)
- $25 provides a hand-held shower for a disabled patient
- $50 provides emergency electric or fuel relief
- $100 provides 600 meals to hungry people (about five million American children under age 12 go hungry each month)
- $145 provides CPR training for 12 people
- $200 provides eight hours of substance abuse intervention services
- $250 provides reading evaluation/tutoring to an adult
- $500 provides seven days of emergency shelter for a battered spouse
- $1000 provides two weeks of camp for a young terminally ill patient

Many service and voluntary agencies need our support. Please be as generous as possible when a volunteer comes to you with your pledge card. Help keep the dream alive with your gift. Thank you,

**— Irving Abel**
**CFC Co-Chairperson**

# Q & A About the 1994 Combined Federal Campaign

## Virginia Peninsula

*In an effort to better familiarize Langley employees with the Combined Federal Campaign (CFC), the* ***Researcher News*** *presents some questions frequently asked by Langley employees, with their answers. Additional questions may be addressed to any member of the CFC committee (see list in the Sept. 23* ***Researcher News****).*

**How much of contributed funds goes directly to beneficiary agencies?**

CFC monies are used very efficiently. Ninety-two cents of each dollar contributed through the CFC is given directly to listed agencies. Each agency seeking funds through the CFC is required to file reports with the Internal Revenue Service detailing their aggregate fund raising and administrative costs. Because of the outstanding oversight efforts of the Federal employees on the Local Federal Coordinating Committee (LFCC), only seven cents of each dollar raised nationwide are spent on things such as printing materials, for training volunteers, and auditing contributions.

**How does an agency become eligible for contributions from CFC donors?**

All agencies included in the *Official '94 for '95 Eligible Agency Listing Brochure* have both applied and been approved by the proper authorizing groups.

Charitable organizations make application to the CFC either at the national or local level. National organizations, that is, those with programs in 15 or more states or several foreign countries, apply directly to the Office of Personnel Management. Local organizations that help residents in this area of adjacent counties applied to the LFCC, the local "board of directors" of our campaign.

**What if I prefer to give to the charity of my own choice?**

Listed in the CFC brochure that you received at the time of Langley's solicitation are hundreds of human service agencies that could benefit from your CFC contribution. All employees are encouraged to designate where their contributions go and may specify this on their contribution card.

For those who prefer not to designate a specific agency or federation, there are four general designation options, found in the brochure. Undesignated gifts will be added to All Agency – Designation Option AAAA and distributed accordingly.

**How accountable are the CFC agencies for their funds?**

Besides meeting the standards set by the Office of Personnel Management and, in turn, the local LFCC, each agency can provide information about its finances, services, benefits or programs. Employees may contact the agency directly by calling the telephone number provided in the *Agency Listing*.

**What are the benefits of contributing through payroll deduction?**

Payroll deduction is the key to substantial "painless" giving by allowing givers to spread contributions across an entire year. Last year, more than 87 percent of all CFC funds were contributed through payroll deduction.

Payments on payroll deduction pledges begin on the first pay period in January. Because there is no simpler way to make so many good things happen for so many people, payroll deduction ensures our continuing role in the care and stewardship of our community and our world.

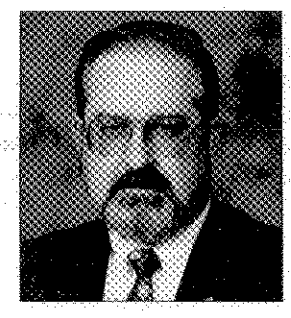
**Why should employees give to the CFC?**

You can trust that your dollars are well spent to make our community, our nation and our world a better place to live, work and raise a family. The CFC represents a tradition of commitment to the community through the selfless efforts of Federal employees and is a uniquely effective way for Federal employees to help those in need.

TOPS
TECHNOLOGY OPPORTUNITIES SHOWCASE
NASA LANGLEY RESEARCH CENTER

**What:** TOPS '95 Technology Opportunities Showcase
**When:** April 6-8, 1995
**Where:** Langley Research Center
**Why:** Langley will showcase its technology in a proactive approach to seeking partnerships with American industry.

TOPS is Langley's opportunity to identify multi-use applications of the technology developed at the Center and to facilitate its transfer to industry through partnerships and cooperative agreements. TOPS will also provide a chance for Langley researchers to discuss technologies, applications and needs one-on-one with industry representatives seeking new business opportunities.



Leading this effort is TOPS Implementation Manager Jim Raper. As he did for TOPS '93, Raper is working with each of the group committees individually and collectively to ensure that all tasks are addressed and timelines met, for making TOPS '95 an even more successful event.

Raper said, "This is Langleys' primary outreach effort to the non-aerospace community. It offers a unique opportunity for Langley researchers to develop new and closer ties with those interested in using our technologies. It is also a time-efficient means for identifying those in industry who are ready for licenses and cooperative agreements."

Goals for TOPS '95 include "at least doubling our attendance from TOPS '93," he said. "We also want to significantly improve the effectiveness of our exhibit materials and find a way to answer visitors' follow up requests quickly and efficiently." The TOPS Implementation Office plans to handle routine requests for information, leaving exhibitors free to concentrate on license and Space Act Agreement requirements, according to Raper.

Each division and group on Center has a representative on the TOPS '95 Committee. For the name of the contact person in each group/division, call the TOPS office at ext. 48886. More TOPS '95 information will be carried in future issues of the *Researcher News*.

# ERBE and SAGE II - Ten Years of Discoveries

BY CATHERINE E. WATSON

On October 5, 1984, the Earth Radiation Budget Satellite (ERBS) was deployed from the Space Shuttle Challenger (STS-41G) by Astronaut Sally Ride. Ten years later Langley scientists are still gleaning information from the two instruments aboard ERBS: the Earth Radiation Budget Experiment (ERBE) and the Stratospheric Aerosol and Gas Experiment II (SAGE II).

## ERBE-Understanding the Earth's Climate

The ERBE instrument aboard ERBS is part of a three satellite system designed to study the exchange of energy between the Sun, the Earth and space. The primary goals of the ERBE instrument when it was launched 10 years ago were to determine for at least one year: the Earth's average monthly energy budget and its monthly variations, the seasonal movement of energy from the tropics to the poles, and the average daily variation in the energy budget on a regional scale (about 620 miles).

The energy received from the sun is at short wavelengths while the energy emitted by the surface of the Earth and clouds is long wavelength radiation. Gases which absorb longwave radiation are known as greenhouse gases. Increases in the amount of these gases can lead to a warming of the atmosphere, according to Ed Harrison, Head of the Radiation Science Branch, which can, in turn, cause changes in the Earth's daily and long-term weather. Some of the shortwave radiation from the sun is reflected back into space by clouds and small particles in the atmosphere called aerosols. The ERBE instrument aboard ERBS has helped scientists worldwide better understand how clouds and aerosols, as well as greenhouse gases, affect the Earth's daily and long-term weather.

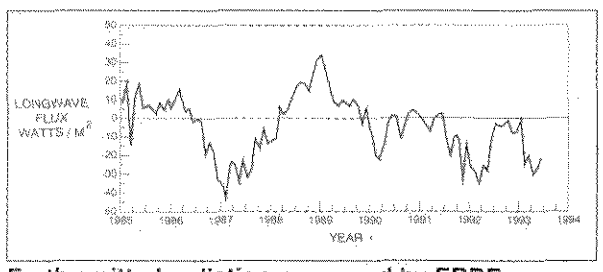
## Balancing the Earth's Radiation Budget

The Earth's daily weather and climate is controlled by the amount of sunlight which reaches the Earth and the amount of energy emitted by the Earth into space. Scientists have been trying to understand the balance between the solar energy into the Earth and atmosphere and the energy going out for decades. The ERBE instrument aboard ERBS measures the solar energy received by the Earth, the energy emitted by the Earth, and the amount of solar radiation which is reflected into space.

This ERBE data has helped scientists better understand something as simple as how the amount of energy emitted by the Earth varies from day to night. These diurnal changes are very important aspects of our daily weather and climate.

## Clouds and Water Vapor Affect Climate

One of the most intriguing questions facing climate modelers today is how clouds affect the climate and vice versa. Understanding these effects requires a detailed knowledge of how clouds absorb and reflect both incoming shortwave solar energy and outgoing longwave Earth emissions. "Analysis of the ERBE data have shown that clouds which form over water are very different than clouds which form over land," said Dr. Bruce Barkstrom, principal investigator and leader of the ERBE science team. "These differences affect the way clouds reflect sunlight back into space and how much longwave energy from the Earth the clouds absorb and re-emit. For example, ERBE has provided data for investigating the significant decrease in Earth's emitted radiation due to increased cloudiness over the equatorial Pacific Ocean during El Niño events, which occur when the ocean becomes considerably warmer than normal. The ERBE results are very important to scientists working to improve climate and weather prediction models."




**Earth emitted radiation measured by ERBE on ERBS over the equatorial Pacific Ocean: The variations in the longwave flux are derivation from the five-year (1985-1990) monthly mean values. These ERBE results indicate major El Niño events in 1987 and 1992. El Niños occur when the ocean becomes considerably warmer than normal. There was an El Niño starting in 1990 that continued through 1993, which represents the longest El Niño period in the past 50 years. El Niños have a significant influence on our weather in the United States as well as on weather around the world. These results were derived by Ed Harrison and his Langley colleagues.**

## Water Vapor Measurements

Water vapor in the atmosphere also affects our daily weather and climate, though scientists are only beginning to understand how these complex mechanisms work. Water vapor acts like a greenhouse gas, absorbing outgoing longwave energy. Because water vapor makes up clouds, an increase in water vapor in the atmosphere may increase the amount of clouds. Using the ERBE data, scientists have begun to understand the effects of water vapor and how its variability affects clouds and ultimately, the energy balance of the Earth.

During the past 10 years, ERBE has provided invaluable datasets for studying the interactions between radiation energy from the Sun, clouds and Earth, and the effect of this radiation on our weather and climate. More than 140 peer-reviewed scientific journal papers have been published based on ERBE data. "ERBE satellite measurements have provided new information on Earth's radiation at the top of the atmosphere including the important radiative effect of clouds on our climate," Harrison said. "A new experiment called Clouds and the Earth's Radiant Energy System (CERES), based on the highly successful ERBE, is currently being developed. CERES will extend the important ERBE measurements to include the top of the atmosphere, in the atmosphere, and global surface radiation, which are critical for advancing our understanding of the total climate system and improving climate prediction models." CERES will be flown on multiple satellites starting with a launch on the Tropical Rainfall Measuring Mission in 1997, followed by a launch on the Earth Observing System (EOS)-AM satellite in 1998 and the EOS-PM in 2000.

## SAGE-Understanding Earth's Stratosphere

The SAGE II instrument measures sunlight through the limb of the Earth's atmosphere in seven spectral wavelengths (from 0.385 to 1.02 micrometers). The measured sunlight, which was scattered and absorbed by trace gases and aerosols, is converted into vertical profiles of ozone, water vapor, nitrogen dioxide, and aerosol concentrations. The SAGE II instrument vertically scans the limb of the atmosphere during spacecraft sunsets and sunrises (fifteen sunsets and fifteen sunrises each day). The 57° inclined orbit of the ERBS spacecraft evenly distributes the SAGE II measurements every 24° of longitude along a slowly shifting latitude circle.

## The Antarctic Ozone Hole and Polar Stratospheric Clouds

Measurements by SAGE II have played a crucial role in understanding the causes and effects of the Antarctic Ozone Hole. SAGE II has been used to measure the decline in the amount of stratospheric ozone over the Antarctic since the ozone hole was first noted in 1985. The high resolution SAGE II measurements allow scientists to study the vertical structure of ozone in the Antarctic and, more importantly, allow scientists to study the correlations between various trace gases.

SAGE II measurements showed that the loss of water vapor in the region of depleted ozone was due to the formation of Polar Stratospheric Clouds (PSCs). PSCs were first noted by Dr. M. Patrick McCormick and a team of Langley scientists using another Langley satellite data set (Stratospheric Aerosol Measurement II). PSCs play a major role in the destruction of stratospheric ozone by providing a surface on which chemical reactions that activate chlorine can occur. SAGE II measurements showed that PSCs were also present unusually far south of the Arctic region during certain meteorological conditions, meaning ozone destruction similar to that over the Antarctic was possible at lower latitudes.

A study of the SAGE I (precursor to SAGE II) and SAGE II data sets showed that ozone decreased in the upper stratosphere over the high latitudes of the Southern Hemisphere and in the lower stratosphere over most of the globe. This information is very important for scientists studying global stratospheric ozone depletion mechanisms. SAGE II was the only instrument to show ozone loss below 20 kilometers globally.

## Stratospheric Aerosols

Stratospheric aerosols scatter and absorb incoming solar and outgoing Earth-emitted energy, affecting the energy balance of the atmosphere. Three months after the 1991 Mt. Pinatubo eruption in the Philippines, scientists found that the stratospheric region at latitudes near Mt. Pinatubo had warmed 2.5-3-degrees Centigrade due to the increased concentrations of aerosols. Also, large concentrations of aerosols in the stratosphere can cause global surface cooling by reflecting sunlight back into space before it has a chance to warm the Earth's surface. Aerosols can also enhance ozone destruction in the stratosphere by acting as a surface for chemical reactions, as do PSCs.

SAGE II aerosol data have also been used to study the large-scale motions of the stratosphere. After Mt. Pinatubo, SAGE II measurements showed the transport of volcanic aerosols across the entire tropical stratosphere and into the middle and high latitudes in the months following the eruption. Scientists believe volcanic aerosols cause the destruction of nitrogen dioxide, an important player in many stratospheric chemical cycles. This theory was verified by SAGE II measurements.

SAGE II aerosol measurements have also been used to study cirrus clouds in the tropics which are important to the understanding of cloud effects on global climate.

*Continued on Page 6*

# Attention Langley Women

### Mammography Screening

The Office of Occupational Health Services announces the scheduling of Mammography Screening for 1994. As in the past, a Riverside Mobile Mammography Van will be located in the Health Clinic parking area on October 24, 25, 26, 27 and November 1, 2 and 4. The cost is $60 and payment may be made by cash, check or Visa/MasterCard. A receipt will be provided for insurance purposes. The American Cancer Society states that breast cancer will strike one in nine women during her lifetime. Early detection through breast self-exam and screening mammographies is the best 'medicine.'

This on-site service is open to all Langley employees, contractors and retirees, and their family members. Call 864-3191 to make an appointment.

### Women's Health Seminar

A women's health seminar will be presented by Riverside Regional Medical Center at their Riverside Conference Center, Monday, Nov. 7, from 7 to 9 p.m. The topics covered will be estrogen, PMS and menopause. The seminar is free and open to the public. For reservations and information, call Ask-A-Nurse at 595-6363.

### Peninsula FWPM Network

The Federal Women's Program Manager's Fourth Annual Fall Training Program will be held at the Fort Eustis Club, from 7:30 a.m. to 4:30 p.m., October 26. Registration fee is $5. Training sessions will cover leadership skills, self esteem, legal issues affecting women, and healthy communication skills. For registration and transportation information, please contact your group's FWPC representative or Patsy Campbell, ext. 43291, at QuickMail Zone Bldg. 1152 or e-mail p.l.campbell@larc. Deadline for registration is October 14.

### Peninsula Women's Network

Women who are questioning their career paths or would like to meet others facing similar workplace challenges are invited to the Peninsula Women's Network (PWN) 15th anniversary celebration. Richmond attorney Sylvia Clute will be the keynote speaker at a luncheon and series of workshops entitled "Options in '94: Starting Out – Staying Put – Starting Over." The event is Sunday, Oct. 29 from 9 a.m. to 1:30 p.m. at the Radisson Hotel in Hampton. For information or reservations, call Paulette Culbert at 898-8110 or the PWN voice mail number 873-7066 by Oct. 26.

# WFD's Andersson to Speak at Langley

Dr. Yerker Andersson, president of the World Federation for the Deaf (WFD), will speak at Langley Friday, Oct. 21, from 9 to 10 a.m., in the Executive Dining Room of the cafeteria. A professor of sociology at Gallaudet University in Washington, D.C., he will address employees on the sociological aspects of deafness and the cross-cultural comparative study of deafness.

A native of Sweden, the Gallaudet alumnus holds a doctorate in sociology from the University of Maryland. He has served as president of WFD since 1983, was a consultant to the United Nations in briefings related to disabled people, and participated in workshops sponsored by the World Health Organization during the Decade of the Disabled.

Andersson is currently an interpreter in Gestuno, the international sign language, and serves as assistant director for the National Association of the Deaf Centennial Convention Policy Committee. All are welcome to attend.

# Cray-2 Production Ends

The Cray-2 computer (VOYAGER) will end production services on Oct. 31, 1994. Users should move any VOYAGER home directory files or scratch files that need to be retained to another location prior to the end of the production date. Anyone with questions should contact Joe Drozdowski at ext. 46535 or the Operations Control Office at ext. 46562. E-mail inquiries should be addressed to droz@eagle.larc.nasa.gov

# Mail Delivery Changes Are in Effect

Beginning Oct. 3, mail delivery was reduced to one mail delivery per day Centerwide. Mail will be sorted by mail stop number but the number of mail drops for some buildings has been consolidated into centralized locations in each building. Special cluster boxes will be placed in these centralized areas.

For any questions or concerns, please call Margaret Hall at ext. 48159.

# Space Research Advances Contact Lens Technology

Preliminary results from the Gas Permeable Polymeric Materials (GPPM) experiment, the first of its kind to be conducted on the space shuttle, indicate that the microgravity of space can provide an environment to produce polymers that are more uniform and permeable than those produced on Earth. In addition, polymers made from materials that are immiscible (incapable of mixing) in gravity provide the possibility for entirely new polymers that cannot be made on Earth.

Plastic materials made of very large molecules, called polymers, are used in many ways. Through the GPPM flight experiment, Langley and Paragon Vision Sciences, Inc., of Mesa, Ariz., are working to develop highly permeable polymer materials. These will be used to develop new sensors needed for space research and for extended wear contact lenses.

The current contact lens market is comprised of two categories: soft flexible lenses and gas-permeable (GP) lenses. Soft lenses command approximately 80 percent of the U.S. market, with GP lenses making up the remainder. "The demand for GP lenses, however, is rapidly increasing," said Fred Allamby, the GPPM project manager. "Internationally, GP lenses comprise almost 60 percent of all contact lenses sold."

Soft lenses, while more comfortable to wear, require greater maintenance, tear more easily, and are more prone to collect bacteria and other contaminants, thus increasing the possibility of infection. GP lenses are less flexible making them initially less comfortable to wear, but they provide increased durability with decreased health risks and easier maintenance. Gas permeable lenses are capable of correcting vision problems that cannot be corrected with soft lenses.

Gas permeable lenses are made of polymers that allow specific gases to easily pass through. Oxygen permeability directly influences the amount of oxygen available to the cornea, which is essential to prevent swelling. The permeability of gas permeable lenses currently on the market ranges from 10 to 150 DK or relative permeability units, with values greater than 60 being considered suitable for extended wear.

The first GPPM experiment was carried out in the Spacehab onboard STS-57 in July 1993. A second flight experiment is scheduled to be flown in February 1995. If the experiment produces a far superior material, as it is hoped, Paragon will apply for approval from the Food and Drug Administration to test the materials as soon as analysis of them is complete. Once approval is granted, Paragon could be ready to market lenses from material produced commercially in space as early as 1998.

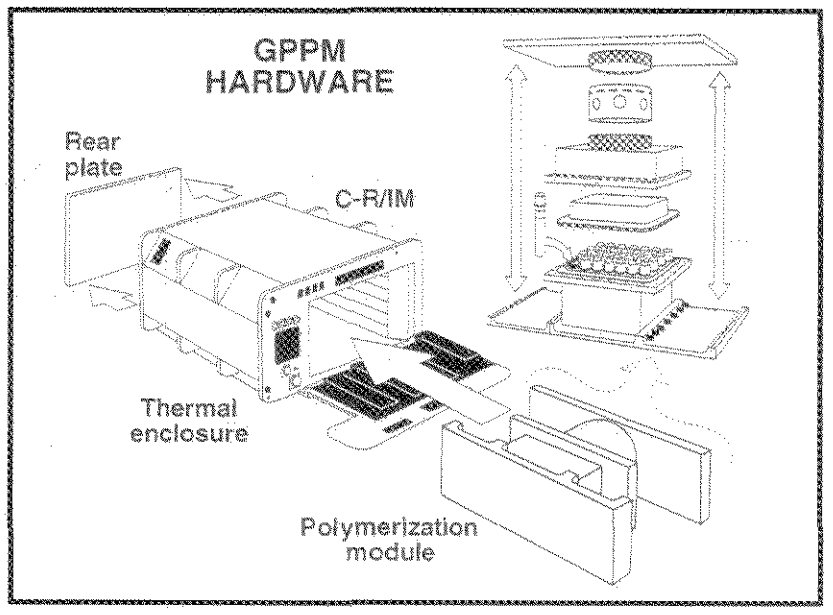
Allamby said, " This NASA and Paragon partnership is a perfect example of 'dual-use technology.' Other than the advantage of the technology for contact lens improvement, the technology will benefit Langley in the areas of gas analysis instrumentation, control and monitoring of spacecraft atmosphere, selective gas sampling devices and instrumentation for measurement of gas permeability. For future experimentation in this area, GPPM will be looking for potential commercial partners in the food and beverage production and processing areas and medical partners for consideration of dialysis and blood gas monitoring."

### Dual-Use of GPPM-Developed Technology

The GAS Permeable Polymeric Materials (GPPM) project is focused on the development of highly permeable polymer materials. These materials will be used to develop new sensors needed for space research and improved products for commercial applications. Specific applications of GPPM-developed technology are listed below:

**Commercial Applications**
- extended wear contact lenses
- selective membranes for blood gas monitoring
- other medical applications such as dialysis, oxygen enrichment
- manufacturing process control

**NASA Applications**
- gas analysis instrumentation
- specific gas sensor development for measure ments in wind tunnel and other NASA facilities
- oxygen regeneration for piloted space flight




**The GPPM hardware, illustrated at right, flew on the shuttle in July 1993, to produce new polymers that could not be produced on Earth.**

# NASA's Continual Improvement Plan Published

BY GARY STEINBERG AND CHRIS WILLIAMS

Earlier this month, NASA's first "Corporate" Continual Improvement (CI) Plan was issued. This plan was produced by the Agency Quality Steering Team (QST) members based on contributions from a large and diverse group of people across NASA. This plan is important because it provides the foundation that allows NASA to integrate its goal of "faster, better, cheaper and safer," into every program and project throughout the Agency by using a systems approach. Equally important is that it incorporates the principles and goals of the President's initiative to reinvent government.

A CI systems approach is not a revolution but an evolution. It builds on our past accomplishments by integrating new tools and techniques into our operations and processes. This approach allows us to save what is best in our agency while building on it, thereby allowing us to become more efficient, cost effective, flexible and competitive.

The CI Plan demonstrates NASA's constancy of purposes for improvement – an enduring vision of our agency as a world wide leader in top-quality science, technology, and management practices. The CI Plan provides both our long-range road map, in the form of guidance, and our beginning steps, in the form of first year actions or objectives for improvement. The Plan also provides the strategies needed to cascade these goals and objectives throughout our agency. Most importantly, it gives everyone at NASA guidance needed to improve their own programs and projects and continue to create excellent organizations.

### Continual Improvement

Continual Improvement, or Total Quality Management (TQM), is a collection of sound management and business practices that focus on process and common causes of process failure, rather than on problems and the U.S. National Quality symptoms. Customers' needs and expectations drive the system in which processes are systematically analyzed and continually improved. NASA's Continual Improvement approach is defined by an award framework, known as the Baldrige Award. The approach encompasses both "Kaizen," or gradual incremental improvements, sometimes referred to as Continual Process Improvement, and breakthrough improvements, such as quantum leaps through innovation and reengineering. Chapter 5 of the CI Plan shows this as a continuum of approaches. Under NASA's Continual Improvement approach, different CI tools are selected for use by individuals or process improvement teams based on the state of the process being addressed, and/or changed in the external environment.

### Approach to Plan Development

NASA's CI Plan is based on the Malcolm Baldrige National Quality Award criteria, the standard by which all government agencies will eventually be judged. These criteria are divided into seven areas: Leadership, Information and Analysis, Strategic Planning, Human Resource Development and Management, Management of Process Quality, Quality and Operational Results, and Customer Focus and Satisfaction. Because we need to focus on our suppliers, an eighth category of "Supplier Quality" was added to our plan. The implementation of the goals in each of the chapters are designed to move NASA ultimately to an overall state of excellence.

### CI Training and Development

NASA has successfully used the full continuum of CI tools and techniques. Vice President Gore, during his June 15 visit to NASA Headquarters, congratulated NASA employees for many of our successes. He stated that our challenges have, in many ways, just begun. Declining budgets and streamlining have made it more important than ever for us to provide every employee with access to knowledge about CI and the reinventing government initiative, as well as CI tools and techniques. To enhance our CI capabilities, new CI training courses will be made available to NASA employees. One set of training, required of employees by the Vice President is a course called "Creating a Customer Driven Government." This course explains all aspects of government reinvention and helps people understand what to expect and what part they play. Another example of new CI training is a course that focuses on a specific set of tools associated with Business Process Reengineering. This training will initially support an initiative to achieve dramatic changes to the Agency's internal directives systems. It will then be applied to selected processes that require dramatic change to meet customer requirements.

The NASA CI Plan will be improved and updated on an annual basis. All employees are encouraged to read the plan, support and participate in its implementation, and help identify ways to improve it. Copies of the CI Plan have been distributed to the Group Offices as well as to the Division Offices. If you would like a copy of the CI Plan, please contact Sally Lindberg at ext. 46110 or Irwin Schauer at ext. 42552.

*Steinberg and Williams are from the Internal Office of Total Quality Management at NASA Headquarters.*

# New CSCC Mid-Range Computing Cluster Onboard

BY LUCIA L. LEE AND AGNES B. EVANS

The Information Services Division (ISD) is establishing a new mid-range computing service within the Supercomputing Network Subsystem (SNS) of the Central Scientific Computing Complex (CSCC). The CSCC, located at 15 Langley Boulevard, provides centralized mid-range computing and supercomputing facilities for the Center.

The new service, the SNS Cluster, will initially consist of a group of seven computers. These will be IBM RISC System/6000 POWERstation 58H systems, running AIX version 3 (a UNIX-based operating system). The new systems will provide greatly enhanced processing power for users of the current CSCC mid-range computing environment, the NOS CYBER-Y, and SNS *eagle* and *mustang*, and will also support some jobs currently running on the SNS Cray-2 (until Oct. 31) and Cray Y-MP supercomputers (VOYAGER and *sabre*).

A recent study of the speeds of various computers found that one IBM 58H Central Processing Unit (CPU) achieved an optimized, best-effort "Theoretical Peak Performance" ("TPP") of 197 Mflop/s (millions of floating point operations per second). On the same tests, a single-CPU Convex 210, similar to the SNS eagle computer, achieved a "TPP" of 44 Mflop/s, and an eight CPU Cray Y-MP/832 (similar to the SNS *sabre* computer) achieved a "TPP" of 2144 Mflop/s.

The SNS Cluster will be the base platform for distributed computing within the CSCC. The cluster will use new and emerging technologies, such as the Distributed Computing Environment (DCE) and the Distributed File System (DFS), products of the Open Software Foundation (OSF), an industry leader in open systems technology. These new products provide a greater degree of interoperability between differing computer hardware, while also providing enhanced security in a highly networked environment.

A distributed batch job queuing system will also be available to support batch job load-leveling, and to distribute jobs to computers with the appropriate resources. The SNS cluster integration team is currently evaluating the Distributed Queuing System (DQS), the Network Queuing Environment (NQE), and the Load Sharing Facility (LSF). The SNS cluster will also support coarse-grained parallel processing through utilities such as the Parallel Virtual Machine (PVM), and will be compatible with the new IBM SP-2, a scalable parallel computing platform which is arriving at the CSCC as part of the High Performance Communications and Computing Program (HPCCP).

The cluster will participate in the Integrated Computing Environment (ICE). The goal of ICE is to provide a common set of software tools over an expanding set of workstation types. For more information on the Integrated Computing Environment, refer to the *ICE Home Page* (http://ice-www/ICE/ice.html), accessible from the *NASA Langley Research Center Home Page* on the World Wide Web.

The SNS Cluster is scheduled to be fully configured and ready for general use by December 1. Between September 1 and November 30, a limited configuration will be available for user assisted testing. There will he no charge for processing performed during this test period.

To participate in this user-assisted testing, please notify R. Bowen, at ext. 47372, or e-mail to e.r.bowen@larc.nasa.gov. For more information on the SNS Cluster, refer to the NASA Langley Clustering Home Page (http://www/org/cluster/cluster.html), Accessible from the Information Systems Division home page on the World Wide Web.

# SAGE II/ERBE Celebrate 10 Years of Discoveries . . .

*Continued from Page 4*

### Atmospheric Water Vapor

Atmospheric water vapor plays an important part in the Earth's radiation balance, in many chemical cycles, and can also be used to trace the exchange of material between the upper and lower atmosphere. SAGE II has provided chemical and climate modelers with 10 years of high resolution water vapor measurements, helping these scientists to better understand both the chemistry and motion of the atmosphere. Scientists are also studying how varying water vapor concentrations can affect the global climate. By studying SAGE II water vapor profiles, scientists can determine the long and short-term effects of variable water vapor concentrations on the temperature of the atmosphere.

The next generation of SAGE instruments, SAGE III, will include additional wavelengths (from 0.28 to 1.55 micrometers) which will improve aerosol measurements and the retrieval of ozone, water vapor, and nitrogen dioxide concentrations. In addition, SAGE III adds the capability to make measurements during moonrises and moonsets, permitting observations of night time chemical species like chlorine dioxide and nitrogen trioxide. SAGE III is scheduled for launch 1998 aboard a Russian METEOR spacecraft and then on NASA's international space station Alpha in about 2000.

# LASE, LITE and Aircraft Go for a "Grand Slam"

BY MARCIA WESTMORLAN

Atmospheric scientists hit a "lidar grand slam" Sept. 16 when three lidars made simultaneous atmospheric measurements under the path of the shuttle carrying the fourth lidar, Langley's Lidar In-Space Technology Experiment (LITE). Lidar stands for light detection and ranging.

Correlative measurements were taken by Langley's Lidar Atmospheric Sensing Experiment (LASE) aboard an ER-2, a multiple-wavelength lidar on the Wallops Electra aircraft, and a ground based lidar at Langley while LITE's lidar was taking measurements from space.

According to Dr. Ed Browell, principal investigator for LASE and a co-investigator and science steering group member for LITE, "Testing the same atmosphere from four different platforms was quite an accomplishment. To get that many lidars testing simultaneously will provide us with excellent data.

"It would have been a tremendous loss in our ability to evaluate how well LITE was making its measurements if we would not have had the aircraft," Browell said.

The data collected from the three validating lidars is expected to provide one of the best cross-sections of correlative atmospheric data collected during the 10-day shuttle mission.

*Photo by Carole P. Chapman*

**Dr. Ed Browell, Langley principle investigator for the Lidar Atmospheric Sensing Experiment (LASE), poses in front of the ER-2 at 4 a.m. on September 17. The aircraft, carrying LASE, had just landed at Wallops Flight Facility, Wallops, Va., after the instrument's first fully operational flight. Measuring both water vapor and aerosols, the LASE flight coincided with the Shuttle Discovery's 117th orbit during the LITE mission. LASE intercepted LITE's orbit about 25 miles southeast of Langley. In addition, lidars at Langley (ground-based) and on the Electra aircraft collected corroborating data in the same air mass at about the same time that night. Browell is also a co-investigator for LITE.**

## It's Serendipity!

One of the most significant aspects of the evening was the serendipitous under-flight of LASE aboard the ER-2. The measurements taken from LASE will most closely correlate to those taken with LITE because of the ER-2's ability to fly at the high altitude of 65,000 feet compared to a maximum of about 20,000 feet of the Wallops Electra.

The LASE lidar took measurements from right beneath the aircraft to the earth's surface.

According to Browell, "This is the region of the atmosphere that LITE was seeing most. This is the only aircraft in the world that was flying at this altitude to make measurements over the entire altitude range with a lidar system."

According to Dwayne E. Hinton, LASE project manager, "It gives more confidence in both measurements (LITE's and the correlative measurements).

"After looking at the data, if there is a significant difference in the two, we would look hard at why. If we see a trend in aerosol data, we can look at both sets and say with confidence what was there."

The unique lidar aboard the Wallops Electra directed laser beams out of both the top and bottom of the plane. Its lidar took measurements at the same wavelengths as LITE. These measurements provided a good cross-section from the earth's surface and into the upper atmosphere.

"It was a big night for the whole lidar field," Browell said. "The information on water vapor will give more information about the state of the atmosphere which is the main objective of LASE."

## LASE: A Test Platform for Technology

LASE is a Differential Absorption Lidar (DIAL) instrument. It is a very complex lidar system that is precisely tuned to measure vertical profiles of water vapor and aerosols and their effect on atmospheric processes.

According to Browell, "Water vapor is very important in many different atmospheric processes. Meteorology is very dependent on water vapor for the formation of clouds, precipitation and storms. It is critical in meteorology. It is also fundamental to the radiation balance and climate change."

LASE, which has been in the works for more than 12 years, was designed as a test platform for technology and techniques that will ultimately be taken into space.

It completed its qualification flight at Ames in May. The LITE under flight came during its engineering test flights. Coincidentally, the LITE under flight marked the first time LASE achieved successful water vapor measurements.

LASE's complex technology forces the laser to tune very precisely to a given wavelength to within one picometer, (one trillionth of a meter), Hinton said.

"That is a requirement," he said. "A regular lidar system transmits a fixed laser wavelength. They are not tuning to a specific wavelength the way we are. They are just looking at scattered energy.

"In our case, we have to tune exactly to the center of a water vapor line so it can be absorbed in the atmosphere."

The stringent requirements placed on the detection system allows for quick recovery to within 10 microseconds if the pulse hits a cloud in its path. The tremendous burst or energy from the cloud would take a regular lidar much longer to recover.

"That gives us higher resolution," Hinton said. "It makes the measurement more exact in terms of atmospheric backscatter."

LASE's ability to measure water vapor to such a high spatial resolution will contribute to the understanding of the weather system in the troposphere, both men predict.

"We will start getting some understanding of the energy of systems because it is stored in water vapor," Hinton said. "All of meteorology looks at water vapor to understand the transport of weather systems across the country."

The measurements will contribute to the understanding of how water vapor content changes across cold fronts, during daytime and nighttime.

"We will start getting more detailed information to help us understand the hydrologic cycle and the movement of weather fronts," he added.

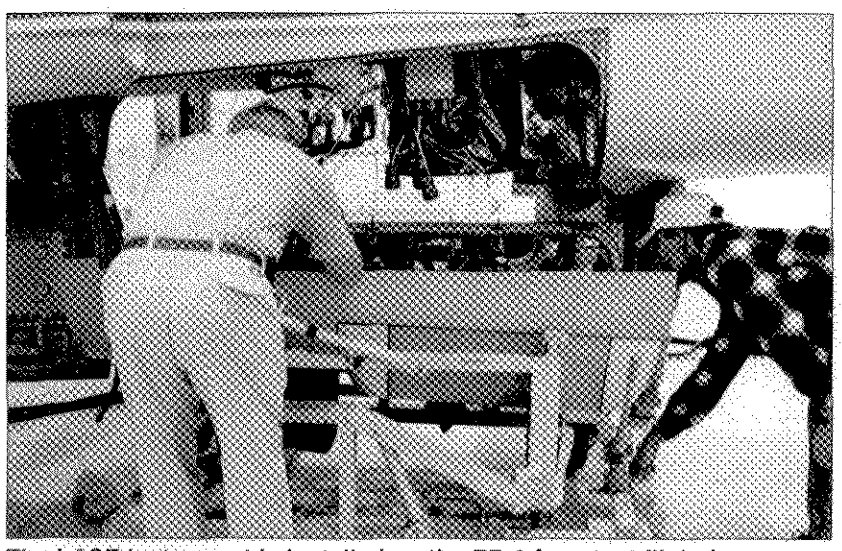
The measurements will allow scientists to put together plots of how the water is distributed in the atmosphere.

This is the reason we want to make measurements of water vapor, aerosols and clouds from space," Browell said. "It does impact so many important global atmospheric processes.

LASE's under-flight of LITE is an important critical step in preparing the technology for going to space and making these measurements globally," Browell said.

If LASE's lidar does become a part of a space shuttle flight or the space station, "it probably would not require a lot of modifications," Hinton said. "It would just have to be environmentally conditioned to fly in space."

The under flight "helped the LITE program and it is giving the LASE program additional visibility," Browell said.



**The LASE instrument is installed on the ER-2 for a test flight in California before being flown during the LITE mission.**

## Virginia Air and Space Center News

Virginia Air and Space Center
Hampton Roads History Center

### *Destiny in Space*

**Beginning in October, prepare to explore the universe while watching the new IMAX® film, *Destiny in Space*. It will be shown Monday through Sunday at 10 and 11 a.m., noon, and 1, 2 and 3 p.m.**

**Narrated by Leonard Nimoy, the film features never-before-seen footage of the space shuttle in flight around the Earth as well as scenes on Mars, Jupiter and Venus returned by robotic scouts dispatched across the solar system. Scenes from the Hubble Space Telescope servicing mission are also included. Cost is $5.50 for adults, $4.50 for seniors and $4 for children, ages four to 12.**

# Happenings

**FOR SALE:** Encyclopedia Britannica 1994, 32 volumes and yearbook, still in sealed boxed, never used. Was $1,600; asking $1,100. Call 867-9079.

**LAA AEROBICS CLUB:** Join the club this month for a full aerobics program: low-impact, step, power walking and weight training classes are given. Members receive free body composition and nutrition analysis. Open to all employees and their families. Classes are Tuesday/Thursday from 5 to 6 p.m., and Saturday from 9:30 to 10:30 a.m. in the LAA Gym. Call ext. 42295 for more information.

**TOWNHOUSE FOR RENT:** Elegant two-story townhouse with two master suites, vaulted ceilings in living room, dining room, ultra-modern kitchen, fireplace w/marble hearth, washer/dryer hook-up, garage and carport: 10 min. to Langley. $750/month plus deposit. Call 988-1630.

**VA SYMPHONY:** Dance series opens with Miami City Ballet, Oct. 13, and the symphony accompanies silent film classic Phantom of the Opera, Oct. 22 and 23. Tickets at the Exchange Shop, ext. 41585, or at the Symphony office at 380-0040.

**FOR SALE:** Five-piece contemporary bedroom suite, black lacquer/gold trim, headboard fits all sizes, mattress, $400; brass/glass dinette set w/four chairs, $75. Call Kevin at 722-3729.

**RAINBOW FOR GIRLS:** The local assembly is looking for current and former members of the International Order of the Rainbow for Girls. Contact Mrs. Judy Wipperman at 826-8205 or Mrs. Shirley Tweed at 851-8602.

**FALL SAVINGS** at selected hotels in Bermuda. Call Judy at ext. 48008 for all your personal travel needs.

**FOR SALE:** Genuine mink stole; fake fur coat; and Persian lamb coat in excellent condition. Call 827-5082.

**PICNIC:** The Acquisitions Division will have its annual picnic Oct. 21 at 4:30 p.m., featuring an old-fashioned pig-pickin', at Activities Shelter #1. Other assorted food and beverages will be available. All former division members are invited. Call Sandi Ray at ext. 42428 or Michelle Sample at ext. 46771, for information.

**WILLIAMSBURG PLAYERS:** The 1994-95 season will include *Camelot*, Nov. 10-Dec. 10; *Dancing at Lughnasa*, Jan. 26-Feb. 18; *Out of Order*, March 30-April 29; and *Wait Until Dark*, June 8-July 1, all performed at the James-York Playhouse in Williamsburg. For reservations and information, call 229-0431.

**HABITAT FOR HUMANITY** needs volunteers on the Peninsula each Wednesday and Thursday from 8 a.m. until 1 p.m. to do light construction work on new homes. No experience is necessary. Orientation sessions will be Wednesday, Oct. 12 and 19. For information and registration, call 596-5553.

## Apollo 13's Lovell To Visit Gloucester

James Lovell, NASA astronaut and co-author of *Lost Moon: the Perilous Voyage of Apollo 13*, will be in Gloucester, Sunday, Oct. 16 from 1 to 3 p.m. for a book-signing hosted by Twice Told Tales, Ltd. Lovell joined NASA in 1962 and flew on four missions before retiring in 1973. Co-author Jeffrey Kluger is a contributing editor at Discover magazine and an instructor at New York University's graduate journalism program. Copies of *Lost Moon* may be reserved in advance by calling 693-9209. Twice Told Tales, a bookstore and coffee shop in Gloucester, is located at Main Street and York Avenue.

**BROWN BAG SEMINAR:** How much exercise is enough — to lose weight, improve one's health or provide protection from disease? Physical fitness will be the topic of a seminar, sponsored by the Langley Fitness Center, Tuesday, Oct. 18 at noon in the Executive Dining Room of the Cafeteria.

**TURKEY TROT:** Langley Fitness Center and the Runner's Club are co-sponsoring a run/walk for the turkey. Registration begins Nov. 2 at 4:15 p.m. on Doolittle Street and the two-mile run/walk begins at 4:45 p.m. Call the Fitness Center at ext. 46387 or Richard Shearer at ext. 47036, for more information.

*NASA Photo*

**At Launch Pad 39A, NASA quality inspector Robert Saulnier (left) polishes the windows of the Space Shuttle Endeavour as shuttle craft operator Glenn Davis of Lockheed Space Operations Co. removes switch covers inside the orbiter cockpit. Endeavour flew Sept. 30, carrying the MAPS instrument and the Space Radar Laboratory-2 on Mission STS-68.**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Researcher News

National Aeronautics and
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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 21 ❖ October 21, 1994

# *Shuttle Runway Modifications Completed*

Research has been ongoing at Kennedy Space Center (KSC) Shuttle Landing Facility (SLF) by a team from Langley and Johnson Space Center (JSC) with support from KSC personnel. Langley's team members Tom Yager and Bob Daugherty of the Structural Dynamics Branch report, "If this research is successful, higher crosswind limits for shuttle landings will be acceptable."

When shuttles launch and land at KSC in Florida, they do so with certain restrictions, according to Yager. Weather conditions play a major role in the decision to launch and/or to land. For example, the current shuttle crosswind limit for launch and landing operations is 15 knots.

With future shuttle launch and landing windows reduced to allow for space station rendezvous, the Shuttle Program Office wants to increase crosswind limits and safety margins, and that involves more research and testing on KSC's runway surfaces.

### Team Conducts Research at KSC

Surface modifications to the runway that would allow crosswinds to top out at 20 knots have been studied. This speed would potentially reduce the number of launch delays and scrubs due to high winds in case of a Return-to-Launch-Site abort and, therefore, increase the number of on-time shuttle launches.

"Results of the Instrumented Tire Test Vehicle (ITTV) tire wear study at KSC earlier in the year indicated a roto-peening technique and a grinding treatment combined with shot blasting of the runway would best enable the orbiter to land under increased crosswind limits," Yager said.

Manager of the project is Dick Tuntland of JSC's Operations Integration Office while Yager leads the engineering efforts. Five Langley personnel, Yager, Daugherty, Bill Vogler, Gerry Alexander and Ricky Martin operated Langley's ITTV that evaluates tire friction and wear by simulating conditions of orbiter landings.

"The most significant problem in landing at the SLF in high crosswinds is excessive tire wear," Yager said. "Our goal has been to modify the runway surface in such a way that cornering wear on the tires will be reduced. Simulated shuttle 20-knot crosswind landing tests conducted last fall at Kennedy with a specially modified CV-990 test aircraft from Dryden Research Center revealed unacceptable tire wear performance."

*Photos: Kennedy Space Center*

**Tom Yager of the Structural Dynamics Branch, Astronaut Steve Nagel and Johnson Space Center's Dick Tuntland discuss runway modifications at Kennedy Space Center's Shuttle Landing Facility.**

### Different Surface Treatments on Trial

Yager said his team studied four surface treatments and evaluated 16 test strips from 20 inches to six feet in width and up to 400 feet in length at the north runway end interface between the longitudinal corduroy and the traversely-grooved sections. Of the runway treatments under consideration, the ITTV, equipped with T-38 aircraft test tires, has yielded comparative wear values on each of the surfaces tested and identified the two best candidate treatments.

*Continued on Page 6*

# A Message from the Director:

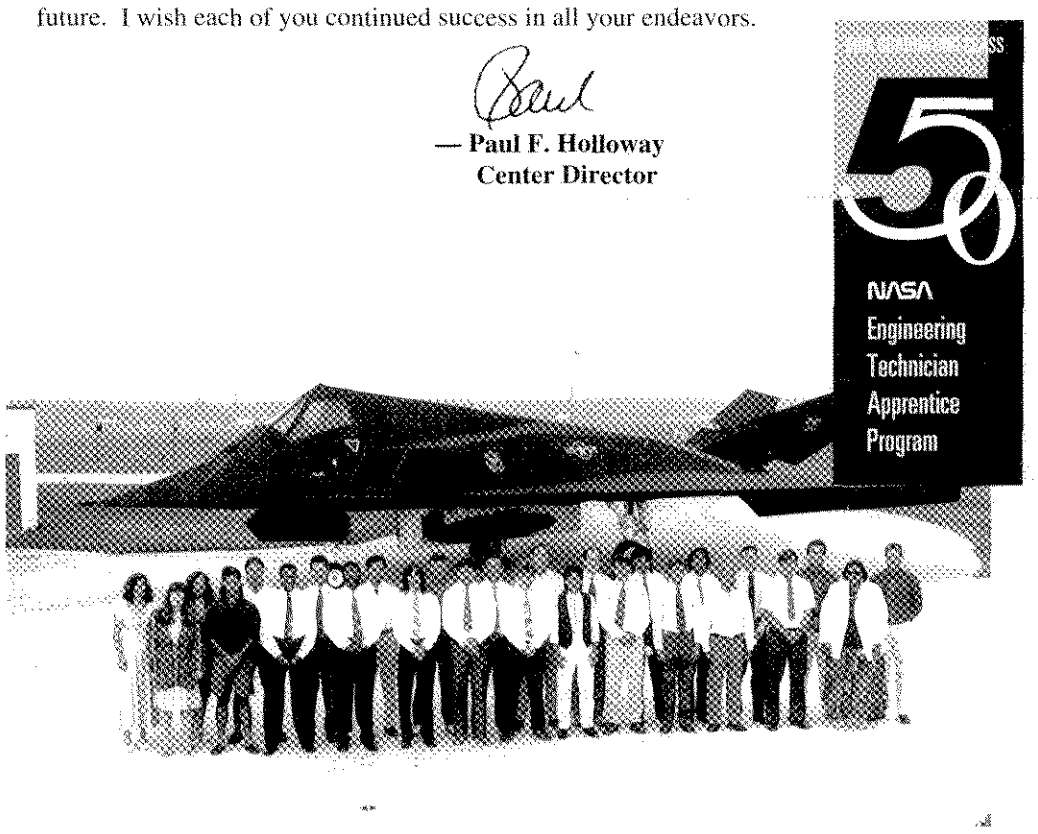
I take great pride in congratulating the men and women of the Apprentice Class of 1994. You have distinguished yourselves through your outstanding performance in assignments all over the Center.

The Apprentice Program and the technician work force are a vital part of Langley and are two of the things that make us different and such important contributors to the Nation's aerospace research program. The energy, motivation and creativity of our technicians have been among the primary reasons for Langley's success over the past 77 years. We are extremely proud of you and your colleagues, and we are committed to the Apprentice Program and its growth.

As members of the 50th graduating class, you have met the challenges of a very demanding program. A most impressive number of you — 86 percent — are graduating with honors. You have accumulated an overall grade point average of 3.44 out of a possible 4.0. And I want to extend special congratulations to Beverly Taylor, who was elected class speaker by her peers, and to Steve Nevins, James Dempsey, T. Earl Harris, Jesse C. Midgette and John Swartzbaugh who graduated summa cum laude, with highest honors.

The Class of 1994 carries on a tradition of excellence. You are our heritage and our future. I wish each of you continued success in all your endeavors.

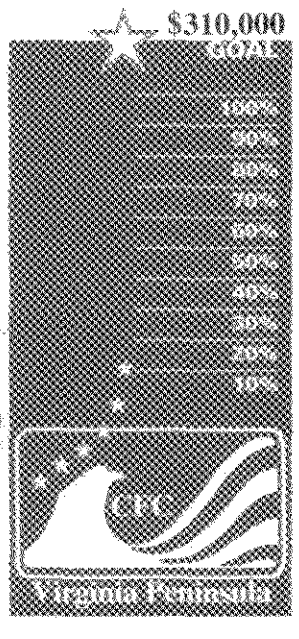
**— Paul F. Holloway**
**Center Director**




**Members of the Engineering Technician Apprentice Program Class of 1994, the 50th graduating class, pose for a class picture in front of a Stealth fighter at Langley Air Force Base.**

**Operation Support Division's Ricky Martin and Gerry Alexander make adjustments to the Instrumented Tire Test Vehicle's test fixture yaw angle prior to a run at the Shuttle Landing Facility in Florida.**

*Let's Support the 1994 CFC!*



# News Briefs

## Around the Agency

## Legislative Update

BY LEE RICH, LANGLEY CONGRESSIONAL AFFAIRS OFFICER

With the November 8 Election Day rapidly approaching, campaigns for seats in the U.S. House of Representatives —11 in Virginia — and 34 seats in U.S. Senate — one in Virginia — are well underway. With campaigning in mind, many people are puzzled by the provisions of the 1993 revised Hatch Act: the rules concerning the political activities of Federal and Postal employees. This data, provided by the Office of Personnel Management, helps sort out the "dos" and "don'ts."

### Hatch Act Rules

#### Federal Employees can:

**Contributions**

– **Contribute money** to political organizations. May attend political fund-raising functions.
– **Solicit, accept, and receive** political contributions for the multi-candidate political action committee (PAC) of a Federal labor or employee organization from an employee who is not a subordinate and who belongs to the same Federal labor or employee organization.

**Volunteer Work, Phone Banks**

– **Solicit, accept and receive** uncompensated volunteer services from any individual who is not a subordinate employee.
– **Stuff envelopes** with campaign literature that includes an appeal for political contributions.
– **Participate in telephone bank solicitations** for individual, uncompensated volunteer services.

**Fund-Raising**

– **Give a speech** at a fund-raiser, as long as the speech does not include an appeal for political contributions.
– **Be identified** as a guest speaker on an invitation to a fund-raiser as long as the reference in no way suggests that the employee is soliciting or encouraging contributions.

**Official Duties**

– **Serve as treasurer of a campaign or political organization** if the duties are limited to such activities as preparing financial disclosure forms and giving advice.
– **Serve as an officer or chairman** of a political fund-raising organization or PAC as long as he or she does not personally solicit, accept or receive political contributions.
– **Help organize a fund-raiser** as long as he or she does not personally solicit, accept or receive political contributions.

#### But they cannot:

– **Solicit, accept or receive** political contributions from the general public, except under specifically defined circumstances.
– **Coerce another employee** to make a political contribution.
– **Become personally identified** with fund-raising activities.

– **Solicit personal services**, paid or unpaid, from a business or corporation.
– **Sign campaign letters** that include a solicitation for political contributions.
– **Participate**, even anonymously, in phone bank solicitations for political contributions.

– **Solicit political contributions**, in speeches given at fund-raisers.
– **Otherwise allow** the use of his or her name on an invitation to a fund-raiser, as a sponsor or point of contact for a fund-raiser.

– **Serve as treasurer** if the duties include solicitation, acceptance or receipt of political contributions.

## An Afternoon with Nikki Giovanni

BY VIVIAN MERRITT

The Office of Equal Opportunity Programs is sponsoring a series of multicultural enrichment seminars in fiscal year 1995. The first one will be Monday, October 31, in the H.J.E. Reid Conference Center from 1 to 3 p.m. featuring Dr. Nikki Giovanni.

Giovanni is an internationally renowned poet, activist, social commentator, best-selling author and essayist. During the past 25 years, her candor, in person and in her writing, has brought her worldwide attention. As one of the nation's most widely read American poets, she describes herself as "a black American, a daughter, a mother, a professor of English." Despite the dramatic changes that have taken place in American society since she emerged from the Black Arts Movement, Giovanni remains as determined and committed as ever to the fight for civil rights and equality in education.

Giovanni has authored 20 books. She recently illustrated a children's book, *Knoxville, Tennessee*, and edited a multicultural anthology *Grandmothers*. A recording of her poems was one of the best-selling albums in the country. Throughout her career, she has received numerous awards and honorary doctorates and was named "Woman of the Year" by three magazines.

In 1987, under the Commonwealth Visiting Professor Program, Giovanni began teaching writing, poetry and literature at Virginia Polytechnic Institute and State University. She is an inspirational speaker and writer, not only to her students but to readers and audiences nationwide.

All employees are encouraged to attend and should charge their time to Job Order A5236. For more information, call ext. 43290.

## Announcements

### Retirement Party Postponed

The retirement party for David B. Middleton has been postponed until a later date. For questions, please call Tracy Jones at ext. 44004.

### Retirement Party

Friends and associates of Tim Suttles are invited to a retirement party in his honor October 28, 1994, at the H.J.E. Reid Conference Center. Social hour begins at 6 p.m. with a cash bar, followed by dinner at 7 p.m. Cost is $13.50 per person (includes gift). For reservations call Jennifer Hubble, ext. 48333, Mail Stop 420, by October 21, 1994.

### Retirement Party

Friends and associates of Claude Keckler are invited to a party in his honor Thursday, Nov. 3, at the Ft. Monroe Officers' Club. Social hour begins at 6 p.m. with a buffet dinner at 7 p.m. Cost is $16 per person (includes gift). For reservations, call Linda Rowell at ext. 41721, Mail Stop 479, by Oct. 27. Gift only contributions are welcomed.

## Langley, NSU Sign Research Agreement

BY SUSAN A. SMIGIELSKI

Langley and Norfolk State University (NSU) have joined together to increase student awareness about the problems of the Earth's atmosphere.

Center Director Paul F. Holloway, Dr. Harrison Wilson, president of NSU and Congressman Robert C. Scott (D-3rd District) commemorated the partnership. "There is a push agency-wide for education interest," Holloway said. Wilson added, "The relationship with NASA Langley is critical to NSU. We have worked on many projects in the past nine years, and there is a great need for minorities in the sciences."

As part of the partnership, data from Langley's Distributed Active Archive Center (DAAC) will be sent to a center at NSU. The information will be analyzed by NSU scientists, teachers and students. Research conducted at the university will be distributed in the form of classroom curriculum materials and via television. Education modules on the Earth's atmosphere will be developed. The grant will fund approximately 50 students and faculty who will be responsible for the research and education programs.

"It is exciting because students will be analyzing the data," said Dr. Tina Marshall-Bradley of NSU. Marshall-Bradley, who worked on Center during the summer, suggested the partnership.

The project's director and NSU scientist Floyd Miller said videos will be distributed to classrooms in about a year.

Langley atmospheric scientist Dr. Joel Levine said that there have been increased changes in the Earth's atmosphere in the past 50 years. He added that, since students are the future, they need to be aware of the altering composition of the Earth.

Up until now, Levine said, atmospheric scientists have not done a good job conveying the changes in the Earth's atmosphere. This agreement between NSU and Langley will provide an opportunity for more information to be distributed through more outlets.

*Photo by Sandy Gibb*

**Dr. M. Patrick McCormick, left, of the Atmospheric Sciences Division, explains some of the early findings of the recent Lidar In-Space Technology Experiment (LITE) mission to Congressman Robert C. Scott and his chief of staff Joni Ivey. Scott was given a two-hour tour following the signing of the Langley/Norfolk State University partnership.**

## In Memoriam

### Joseph A. Shortal

Joseph A. Shortal, of Hampton, died Friday, Sept. 30, in Savannah, Ga.

A native of Lufkin, Texas, Shortal was a Peninsula resident for many years. He retired from NASA as chief of the former Pilotless Aircraft Division. He had also served as the assistant chief of the Wallops Flight Facility, Wallops Island, Va.

### William T. Slaughter

William Thomas Slaughter, 84, died Oct. 8. A native of Gordonsville, he was a Peninsula resident for the past 65 years. Slaughter retired from Langley in 1973 after 25 years of service.


News Researcher

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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 Class of 1994

## Davis Was Keynote Speaker

James L. Davis was the keynote speaker for the 50th graduating class of Langley's Apprentice Program. The title of his speech was "Apprenticeship: What It Means." He defined apprenticeship, its role in building business and industry, and how graduation from an apprentice program would shape and affect the lives of the graduates.

Davis is an apprentice field supervisor for the Virginia Department of Labor and Industry. He is involved in the promotion, development and maintenance of apprentice programs in Southeastern Virginia.

Davis served for 30 years in the U.S. Air Force as an intelligence officer, weapons controller, instructor pilot and a fighter pilot. He fought in Korea and flew more than 100 missions over Vietnam as an F-105 Wild Weasel pilot. His final tour of duty was as director for Intelligence Applications at Tactical Air Command Headquarters, Langley Air Force Base.

His second career as an interviewer for the Disabled Veterans Outreach Program for the State of Virginia began in 1983. There he helped newly-discharged veterans find employment. He holds a masters degree in public administration from Central Michigan University.

50 NASA Engineering Technician Apprentice Program

## Taylor Addressed Fellow Graduates

Beverly Taylor was chosen by her peers as Speaker of the Class of 1994.

In her address to fellow graduates she outlined a historical perspective of the Apprentice Program and highlighted the accomplishments of the graduates during the past 50 years.

Taylor entered the Apprentice Program through the Growth Opportunity Program at Langley. She is assigned to the Models and Materials Technology Branch. Taylor has given technical support to various Langley projects, including the National Transonic Facility Fan Blade, Long Duration Exposure Facility (LDEF) and the 8-Foot High-Temperature Tunnel. She is currently working on Optical Stimulation of Electron Emission (OSEE).

Taylor received an award for a Tech Brief for the invention of a prepreg slitter and has a patent pending for it. She received an award for exceptional support to the Oxygen Cleaning and OSEE cleaning.

Taylor is listed in the 1988-89 edition of the National Dean's List. She graduated from the Apprentice program cum laude.

# Langley Apprentice Class of 1994

COMPILED BY STEVE MCCOY AND JODY CHANDLER

**Stephan Clark Appleby** is an mechanical engineering technician in the Metal Application Technology Branch. He attended Old Dominion University (ODU) prior to entering the co-op program at Thomas Nelson Community College (TNCC). Upon graduating with an associate in applied science degree in mechanical engineering technology, he entered the Apprentice Program at Langley. He has worked on the Controls-Structure Interaction and Lidar In-Space Technology Experiment (LITE) projects and a skin friction sensor for supersonic combustors. Appleby has also worked on the EX-PARE ribbonizing process for the fabrication of polymide matrix composites. He graduated from the program cum laude.

**Michael Troy Carmine** is an electrical engineering technician in the Experimental Testing Technology Division. He entered the Langley community through the co-op program at TNCC, and was accepted into the Apprentice Program upon completion of the co-op term. He has worked on the Anemometer System Operation project at the 0.3-Meter Cryogenic Tunnel, the Unitary Wind Tunnel, and 1/2M Quiet Tunnel. Carmine graduated from the Apprentice Program magna cum laude.

**Jody L. Chandler** is an engineering technician in the Aerospace and Flight Dynamics Research Support Branch. She is a graduate of Tidewater Community College (TCC) with an associate in applied science degree in mechanical engineering technology. Chandler came to Langley via their co-op program. She graduated from the Apprentice Program cum laude. She has worked at several tunnels, including the 30-X 60-Ft. Full Scale, 20-inch Sub- sonic Wind Tunnel, 8-Foot Transonic Pressure Tunnel and 8-Foot High-Temperature Tunnel (HTT). Chandler has received two Superior Accomplishment Awards for her work on the 8-Foot HTT shakedown.

**William G. Culliton IV** is an electronics engineering technician in the Measurement Science and Technology Branch. He began as a co-op at TNCC where he received an associate degree in electronics technology. Currently, he designs and fabricates digital and microprocessor embedded circuits and works in the development of laser and optical measurement systems. He has also designed a laser timing and control system and a computer interface to upgrade a Hewlett Packard Acquisition System. Culliton received a Superior Accomplishment Award for his work on the Laser Velocimeter Auto-covariance Buffer Interface (LVABI) interface and a Group Achievement Award for LV capabilities. He graduated magna cum laude.

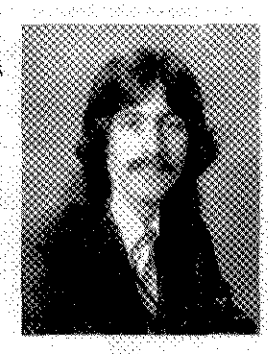
**Donald L. Day** is an engineering technician in the Aerospace and Flight Dynamics Research Support Branch. He entered apprenticeship at Langley through the co-op program at TNCC where he received an associate degree in applied science in mechanical technology. In his position, Day is involved in equipment and tunnel operations, model installation and test section hardware installation at the 8-Foot Transonic Pressure Tunnel. He received a Superior Accomplishment Award and several performance awards for support provided to that facility.

**James A. Dempsey** is an engineering designer with the Electrical Systems Branch. He joined Langley through the co-op program at TNCC. After graduating summa cum laude with an associate in applied science degree in electronic technology, he entered the Apprentice Program. He worked on the Lidar In-Space Technology Experiment (LITE) and Early Lunar Rover Mission studies. He is currently working with engineering staff members on the Jitter Attenuation and Dynamics Experiment (JADE) and a high-voltage driver for smart structures. He is also pursuing a bachelor of science in applied dynamics and electronics at Christopher Newport University (CNU). He graduated summa cum laude.

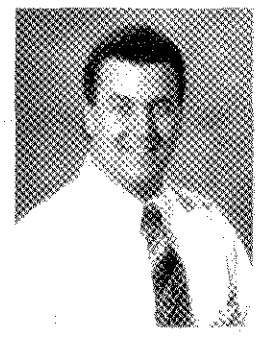
**Vernon E. Dyke Jr.** is an electrical engineering technician in the Flight Instrumentation Branch. He entered the Langley community by way of the co-op program at TNCC. He graduated with an associate in applied science degree in electronics. He has worked on the Drop Model Project, the Tracking Antenna System and the F-16XL project. Dyke is currently pursuing a bachelor of science degree in electrical engineering. He graduated cum laude.

**Lois A. Forbes** is an engineering technician for the Structures and Materials Research Support Branch. Forbes began working at Langley in the co-op program at TNCC. After graduating with an associate in applied science degree in mechanical engineering technology, she entered the Apprentice Program. Forbes has worked on a variety of material testing equipment and has participated in chemical and laser projects. She is pursuing further studies in personnel management. A special note: Forbes is the only grandmother in the Apprentice Program. She graduated cum laude.

**Tonya Grigsby** is an engineering technician in the Laboratory Operations Branch. Upon completion of her co-op work at TNCC, Grigsby joined Langley as an apprentice. She has worked in the Atmospheric Studies Branch on various projects including the Global Tropospheric Experiment (GTE), PEM-WEST B Expedition and the Airborne Emission Spectrometer project. She has received an On-the-Spot Award for her exceptional performance in repairs to the CF4 Facility, Building 1275. Grigsby graduated from the Apprentice Program magna cum laude.



**David A. Hare** is an electronics engineering technician in the Model Instrumentation and Systems Branch. He came to Langley through the co-op program at TNCC where he received an associate in applied science degree in electronics technology. Hare has provided extensive instrument support to the National Transonic Facility (NTF). He now works on an optical scanning system that will be used at the Materials Research Laboratory and for which he has received a Superior Accomplishment Award. Hare is also pursuing a bachelor of science degree in electrical engineering through the Professional Entrance Training Program. He graduated from the Apprentice Program cum laude.



**T. Earl Harris** is an engineering technician for Aerospace and Flight Dynamics Research Support Branch. Harris came to Langley via the co-op program at TNCC. There he received two associate in applied science degrees, one in mechanical engineering technology and the other in drafting and design. Harris has receive a Group Achievement Award for his work at 16-Foot Transonic Facility, as well as two Superior Accomplishment and one Outstanding Achievement Awards. He is currently attending ODU in pursuit of a bachelor of science degree in mechanical engineering. Harris graduated summa cum laude from the Apprentice Program.

**Joseph Havens** is a mechanical engineering technician in the Metal Application Technology Branch. Havens entered Langley through the co-op program at TCC. After graduating with an associate in applied science degree in drafting and design, he began his apprenticeship. He has been working as a machinist on such projects as LITE, Lidar Atmospheric Sensing Experiment (LASE), Crew Evaluation and Training Aid (CETA), Area Rule Model, Adaptive Air Foil and, most recently, the Thrust Reverse Concepts project.

**Lee Hester** is an engineering technician in the Aerospace and Flight Dynamics Research Support Branch. He came to Langley through the co-op program at TCC with an associate in applied science degree in drafting and design. He has worked on projects such as the HL-20, National Aero-Space Plane (NASP), High-Speed Civil Transport, the F-18A, the X-29, and the McDonnell Douglas C-17. During the past five years, he has been assigned as a wind tunnel technician to the Unitary Plan Wind Tunnel, the 31-Inch Mach 10 Tunnel, the 7- X10-Foot Tunnel, 14-X 22-Foot Tunnel, Jet Exit and the National Transonic Facility. Hester graduated from the Apprenticeship Program magna cum laude.

**Michael G. Houseknecht** is an electrical engineering technician working in the Electronic Systems Branch. He joined the Langley community upon completion of his co-op term through TNCC where he graduated with an associate in applied science degree in electronics engineering technology. He has worked on various projects including the clean-up of lead at Building 1275 and the installation of power to the High-Speed Transport. He also worked on the 8-Foot High-Temperature Tunnel rehabilitation.

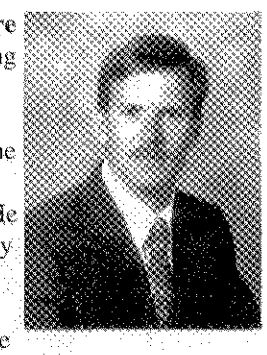
**Robert C. Hudgins** is a fluids engineering technician for the Center Operations Support Branch. He is a graduate of the co-op program at TNCC with an associate in applied science degree in mechanical engineering. As part of his duties, Hudgins assesses, calibrates and helps maintain control systems supporting hydraulic and pneumatic systems associated with the Center's research facilities. He completed a course in hydraulics technology at the University of Wisconsin. Hudgins received a Superior Accomplishment Award for his work on the PCB survey, and an On-the-Spot Superior Accomplishment Award for his support of the Combined Loads Test Section (COLTS) project. He graduated from the Apprentice Program cum laude.

**Craig D. Jones** is an engineering designer in the Aeronautics Systems Engineering Branch. Jones entered Langley by way of the co-op program at TNCC. After graduating with an associate in applied science degree in mechanical engineering technology, Jones entered the Apprentice Program. He has worked on the UH-1H helicopter Tail Gear Project, the X-31 Drop Rig Flight project, OV-10A Wake Vortex Penetration Flight and the B-737 High-Lift Flight Project. Jones has received a Superior Accomplishment Award for his work on the NTF Model Support Wall Limit Switch Hardware Project. He graduated cum laude from the Apprentice Program.

**Tran T. Kham** is a mechanical engineering technician in the Experimental Aero Development Section. He entered Langley through the co-op program at TNCC. Kham earned an associate in applied science degree in mechanical engineering technology from TNCC. Some of Kham's achievements include working with the F-18 Nose, Active Control Nozzle, and the F-16XL Model Programs. Kham graduated from the Apprentice Program magna cum laude.

**Pete M. Kjeldsen** is a mechanical engineering technician in the Aerospace and Flight Dynamics Research Support Branch. Kjeldsen came to the Langley community as a co-op through TNCC. He was accepted into the Apprentice Program upon completion of his co-op term. During his apprenticeship, he received a Superior Accomplishment Award for fabricating parts for a unique focusing schlieren system that was developed to visualize the compressible flow field over a space-shuttle model tested at cryogenic conditions. The research program was conducted at the 0.3M Cryogenic Transonic Tunnel. Kjeldsen holds a bachelor of arts degree in political science from CNU. He graduated from the Apprentice Program cum laude.

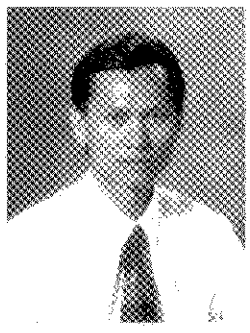
**Denise Kuftic-Linthicum** is an electronics technician in the Electronic Systems Branch. She graduated from TNCC with an associate in applied science degree in electronics engineering technology. She entered Langley via the co-op program and spent the majority of her apprenticeship in support of LITE, as well as briefly working with the LASE experiment. She participated in the Johnson Space Center (JSC) mission training, simulations and operations as an instrument engineer for the September 9 LITE launch. She received an Outstanding Job Performance and a Superior Accomplishment Award and is pursuing a bachelor of science degree in applied physics engineering at CNU. She graduated magna cum laude.



**Kevin Laferiere** is an engineering technician in Facility Operations at the 16-Foot Transonic Tunnel. He came to Langley through the co-op program at TNCC where he earned an associate in applied science degree in mechanical technology. He worked on various projects, including the Advanced Tactical Fighter (ATF), High-Speed Civil Transport (HSCT), 65-Degree Delta Wing, C-17 Transport, and X-31 Concept Aircraft. He received a Team Excellence Award while working at the 16-Foot Transonic Tunnel, a Superior Accomplishment Award for his work at the 31-inch Mach 10 Tunnel and a Suggestion Award for an oil replenishment system implemented at the 31-Inch Mach 10 Tunnel. He is pursuing a bachelor of arts degree from St. Leo College and graduated magna cum laude.

# 50th Graduating Class

**Ronald R. Long Jr.** is a mechanical engineering technician in the Structures and Materials Research Support Branch. Long entered the co-op program at TNCC and entered the Apprentice Program after graduating with an associate in applied science degree in both mechanical engineering technology and drafting and design. He is assigned primarily to the Combined Loads Test Section (COLTS), and is also working in the mechanical testing area in the Structures Operations Section, supporting research for the Aircraft Structures Branch and Applied Sciences Branch. He received a Superior Accomplishment Award for his work on the High-Speed Research (HSR) Project.



**Hoa H. Luong** is an engineering technician in the Structure and Materials Research Support Branch. He came to Langley as a co-op from TNCC. He has an associate in applied science degree in mechanical technology and graduated from the Apprentice Program magna cum laude. He is assigned to the HSR Project, Polymeric Materials Branch, in the Composite Fabrication Developing Lab. He received two certificates of appreciation for outstanding accomplishment for the Controls-Structures Interaction (CSI) program Evolutionary Model Development Team and the Space Structures Research Development Team. Luong earned a Superior Accomplishment Award for support to the HSCT Project.

**Steve W. McCoy,** a fluids engineering technician for the Center Operations Support Branch, joined Langley in the co-op program with TCC, graduating cum laude with an associate in applied science in drafting and design, and a certificate in Auto-CAD. He works on the upkeep and calibration of controls equipment for the hydraulic and pneumatic equipment at various research facilities. He has worked in support of NASP, HSCT and the Space Station Freedom Free Floating Model. He received an On-the-Spot Superior Accomplishment Award for designing and fabricating a control system for the NASP Flutter Panel Project. He is a senior at ODU pursuing a bachelor of science degree.

**Jesse C. Midgette** is an engineering technician for Aircraft Support Branch. He joined the Langley community by way of the co-op program. Midgette entered the Apprentice Program after graduation from TCC with an associate in applied science degree in drafting and design. Prior to his current assignment on the B-737 aircraft, Midgette had worked at various tunnels including 30- X 60-Foot Full-Scale Tunnel, 8-Foot HTT, and 8-Foot TPT. Midgette has received a Superior Accomplishment Award for support of the 8-Foot HTT, and a Suggestion Award. He graduated summa cum laude from the Apprentice Program with a 4.0 grade point average.

**Steve Nevins** is an engineering technician in the Models and Materials Technology Branch. He entered the Langley community as a co-op from TNCC. Prior to his arrival here, Steve had received a bachelor of arts degree in business administration at Christopher Newport University. He has participated in the fabrication of models for various projects, including the HL-20, LITE, HSCT, Multi-Layer Insulation Blanket and the F-16 Basic Aerodynamics Research Tunnel model. Nevins graduated summa cum laude from the program with a 4.0 grade point average.

**Michael T. Oliver** is an electronic engineering technician in the Electronics Technology Branch. He entered the Langley co-op program through TNCC. Oliver earned an associate in applied science degree in electronics technology. He is the assistant audio, video and radio contract monitor working with Raytheon Support Services. He is also the work control leader for the engraving section of the printed circuit board laboratory. During his co-op term, Oliver received a Certificate of Recognition for his work in multiple layer dielectric, hot film sensors.

**Rolando F. Padilla** is an engineering technician in the Space and Facility Support Section. He came to Langley through the co-op program at TCC and, upon graduating cum laude with an associate in applied science degree in mechanical technology, began his apprenticeship. Padilla has worked on various projects, including the Boeing-737 Wind Shear Project, the Boeing-737 High-Lift Project, as well as the fabrication of the 75th Year Anniversary Time Capsule Project. He has received commendations for his work, including a Certificate of Outstanding Performance and a Superior Accomplishment Award for his work on the NTF fan blade faring box. Padilla graduated cum laude form the Apprentice Program.

**Rodney A. Robertson** is an electrical engineering technician for the Electrical Systems Branch. Robertson joined Langley through the co-op program at TNCC. After graduating with an associate in applied science degree in electronic engineering technology, he entered the Apprentice Program. He has worked on several projects, including the rewire work for the Plum Tree Tracking Trailer, 8-Foot HTT rehabilitation and on high-voltage electrical maintenance.

**Steven C. Seider** is an engineering technician for Gas, Fluid and Acoustics Research Support Branch. He is a cum laude graduate of TNCC with an associate in applied science degree in mechanical engineering technology. Seider came to Langley by way of the co-op program and graduated from the Apprentice Program magna cum laude. He has worked extensively at the 8-Foot High-Temperature Tunnel. There, he worked on liquid oxygen and hydrogen systems in support of the NASP project. He has recently received a Group Achievement Award for his work in the 8-Foot High-Temperature Facility.

**John W. Swartzbaugh** is a mechanical engineering technician for Gas, Fluid and Acoustical Research Support Branch. He worked on NASP and Supersonic Jet Noise Reduction for the HSCT. Swartzbaugh joined Langley via the co-op program. He received an associate in applied science degree in mechanical engineering technology, electronics engineering technology and engineering, all cum laude. He received a Group Achievement Award for his work on the Supersonic Noise Reduction Team, an On-the-Spot Superior Accomplishment Award for design of a model cart, and a Superior Accomplishment Award for support of High-Frequency Jet Noise Tests. He is pursuing a bachelor of science degree at ODU. He graduated summa cum laude with a GPA of 4.0.

**Dominic R. Trombetta** is an electronics engineering technician in the Micro-electronics and Sensor Development Section. He is a cum laude graduate with an associate in applied science degree in electronics technology from TNCC. Trombetta has designed, fabricated and tested electronic devices including sensors on such projects as LASE, LITE and Pegasus. He received a Superior Accomplishment Award for his contributions in microelectronics fabrication. He graduated from the Apprentice Program magna cum laude.

**Charles S. Washington Jr.** is an electronics engineering technician in the Electronics Technology Branch. He entered the co-op program at TNCC and, upon receiving his associate in applied science degree in electronic technology, he entered the Apprentice Program here at Langley. He has worked on several projects including LITE, Measurement of Air Pollution from Satellites (MAPS), Cloud Physics, the Advanced Research Manipulator Robot Arm, the Large Gap Magnetic Optical Measurement System, the 16-channel, 16-bit Gain Frequency Domain Controller and the SAFIRE-EP Space FTI Laser Control System. Washington graduated magna cum laude.

# LARSS Student "Dug" Her Langley Work

BY DIANA POPE

Many Langley researchers study space and sky in detail, yet it is unlikely that they often ponder the mysteries of the ground they are treading. However, as Langley Aerospace Research Summer Scholar (LARSS) student Karen Holmberg knows, the land on which the Center sits has a rich and varied past.

Holmberg, an archeology major at the University of Virginia (UVA), has helped create the basis for an historical resource management plan. The plan will help Langley to comply with federal mandates for archeological and historical properties management. "NASA Langley has been a responsible manager of its historical resources," said Holmberg. "However, it has done so on a case-by-case basis. The creation of an overarching archeological strategy, incorporated into the Facilities Master Plan, will improve efficiency and avoid unexpected delays and expenditures in construction of facilities."

*Photo by Fred Jones*

**Karen Holmberg, a LARSS student at Langley this past summer, digs for artifacts on Center. She recorded her findings as part of an archeological strategy that will be part of the Center's Facilities Master Plan.**

### Surveying Archaeological Sites

A team from the archeology firm of Gray & Pape is surveying Langley property for archeological sites. Holmberg and her LARSS mentor Facility Master Planner John Mouring provided local direction to the team and will incorporate the team's findings into the historical resource management plan.

"The team recently discovered a wampum bead made of cobalt blue glass. This bead, along with pottery and projectile points which have also been discovered, represents the Native American habitation of the area. The Kecoughtan tribe, under the Powhatan chiefdom, was once prominent in this area. Today, however, little remains to evidence them," she said.

The archeological team also discovered more artifacts and features of known colonial sites. Landholders such as Benjamin Syms, who donated his land for the first free school in America, and Thomas Wythe, Declaration of Independence signer and teacher of Thomas Jefferson, held large tracts of land at Langley. Augustine Moore owned the land, once called Cloverdale Plantation, that is now used as the Langley picnic area and playground.

### Langley's History

Of course, Langley has also significantly contributed to the land's "historical resources." The historical resource management plan includes the five National Historic Landmarks at Langley — the Variable Density Wind Tunnel, the Full-Scale Wind Tunnel, the 8-Foot High-Speed Wind Tunnel, the Rendezvous Docking Simulator and the Lunar Landing Research Facility.

Mouring encouraged Holmberg to compete for a LARSS scholarship in order to research and create an outline for this plan. "I heard about Karen, and she sounded like an excellent scholar with a good background in archeology," Mouring said.

### About the Student

Holmberg, an Echols Honor Scholar, is president of the UVA Anthropology Association and has been involved in numerous volunteer service projects, such as benefits for AIDS relief and for Muscular Dystrophy support. She has also modeled in the fashion centers of New York, Paris and Miami Beach, during a two-year UVA leave of absence.

Holmberg's archeology experience is extensive, but one of her most intense experiences was a National Geographic-sponsored excavation of Mayan ruins in Central America. While in Belize, she was bitten by a poisonous spider, stalked by a jaguar, and threatened by a wild boar! She and her cohorts also worried about guerrilla activity and malaria.

Back in the more tame and familiar environment of Tidewater, Virginia, where she grew up, Holmberg is enjoying her experience with a different side of archeology – the administrative side.

"My main purpose here was to increase efficiency," Holmberg said. "But the rest of the office was always wondering why I didn't come to work dressed like Indiana Jones." On Center, she divided her time between visiting the Langley excavation sites and drafting the plan. "It's unusual to get to work with historical preservation as an undergraduate," she said. "And I've had a great deal of autonomy. It's not like sitting in a class with 300 people who are all writing a term paper on the same subject."

### Records for the Future

Holmberg finished her plan draft as she prepared to return to college for the fall. "The pieces are all falling into place. However in archeology, things are always popping up," said Holmberg.

After she left, Mouring continues to work on the historical preservation plan. "My office will develop and formalize Karen's plan," says Mouring. "It will be a continuous action this year." The plan will be sent to the State Historical Preservation Office and the President's Advisory Council for Historic Preservation as required by the National Historic Preservation Act of 1969. Once it is approved, it will potentially evolve into a Langley management document.

Holmberg is pleased with the opportunity that the LARSS program gave her. "This was an opportunity to get good, solid, empirical knowledge and be productive at the same time," says Holmberg. "Langley has extremely good Geographic Information System (GIS) capability — the hot new wave in my field. I also enjoyed the caliber of people here at NASA, as well as unique experiences like watching the ALDF launch, watching the Space Shuttle launch at Kennedy Space Center, and touring CEBAF with the LARSS program."

After graduation from UVA, Holmberg plans to attend graduate school. Later, she hopes to work as an archeologist at a museum or university.

*Diana Pope was a LARSS student at Langley this past summer. She is a junior at Vanderbilt University, Nashville, Tenn.*

## *Shuttle Runway . . .*

*Continued from Page 1*

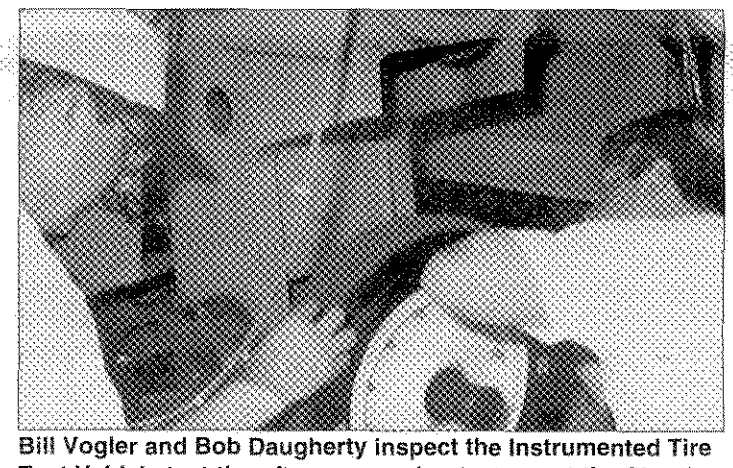
According to Tuntland, the aim is to maintain the grooving for wet conditions while making the overall corduroy and surface between the grooves smoother.

### Testing and Results

In July, the two selected treatments were installed in test strips 10 feet wide and the entire 15,000-foot length of the runway, and the CV-990 aircraft was used to verify the expected tire wear and friction performance.

After nearly a month of flight testing with the CV-990 aircraft, the tire wear results under simulated 20-knot crosswind conditions indicated the shot blasting treatment provided the most acceptable wear performance of the three treatments evaluated. A contract was awarded to Humble Equipment Company of Rustin, La. in early September. Work to modify the 300-foot-wide, 15,000-foot-long runway began on Sept. 12. Despite delays due to rain and the expected shuttle landing at KSC Sept. 19 and 20, this modification effort was successfully completed Sept. 22. "It will be very interesting," Yager said, "to inspect the shuttle tires after the next landing at KSC."

**The CV-990 test aircraft with shuttle test tire installed (center) after landing on the shuttle runway at Kennedy Space Center.**



**Bill Vogler and Bob Daugherty inspect the Instrumented Tire Test Vehicle test tire after a cornering test run at the Shuttle Landing Facility.**

# TQM Rollout Team Activity Report Available

BY RUTH M. AMUNDSEN

The Total Quality Management (TQM) Rollout Quality Action Team (QAT) was formed under the sponsorship of Dr. Belinda Adams in May 1993 to develop plans for maintaining and enhancing the TQM and continual improvement (CI) processes at Langley. The Rollout QAT was a pathfinder team that collected ideas for improving all processes on Center.

Some suggested improvements are to enhance electronic access to improve communications; to standardize electronic and software interfaces; and to provide training and support for desktop computer users.

The final report from the team's activity is available to all employees. For a copy, contact Sally Lindberg at ext. 46110 or by e-mail at s.s.lindberg@larc.nasa.gov, or by QuickMail. The report will soon be available electronically on Mosaic.

# Langley/Industry Cooperative Agreements Implemented in Record Time

A new Agency standard for efficiency in completion of major research and development procurements may have been established recently through the efforts of a multi-Center team which included personnel from a diverse group of Langley organizations. As a result, Langley has initiated cooperative agreements for research and development work to be performed in separate cooperative partnerships with McDonnell Douglas Aerospace and Rockwell International. The total time consumed by the procurement process leading to these agreements, from release of the Request for Proposals to the issuance of letters authorizing the start of work, was less than 90 calendar days.

**Gathered for the signing of the first Cooperative Agreement with McDonnell Douglas are: Seated left to right, Jim Taylor, Agreement Officer, and Norb Smith, McDonnell Douglas; and standing left to right: Wayne Sawyer, Structures Division, Neil Price and Tracy Spruill, Acquisition Division, Charles Camarda and John Shideler, Structures Division, and David Throckmorton, Space Transportation Thrust Office.**

The cooperative agreements resulted from a NASA Research Announcement soliciting proposals for development and demonstration of reusable cryogenic tank systems, composite primary structures, and durable thermal protection systems technologies, applicable to a next-generation reusable space launch vehicle. The Research Announcement was issued by the Marshall Space Flight Center (MSFC) management, as part of the Agency's Advanced Launch Technology Program. MSFC has program management responsibility for this multi-Center activity.

### Langley's Key Players

Langley people played key roles in all phases of the procurement process. Dr. Charles J. Camarda, Structures Division, led the team which evaluated composite primary structures proposals; Marvin Rhodes and Tom Freeman, Structures Division, were members of that team; John Wagner and Tim Towell, Materials Division, served as members of the evaluation team for cryogenic tank systems proposals; and John Shideler, Structures Division, was a member of the evaluation team for durable thermal protection systems. Three proposals were selected for leadership and negotiation by Langley. Two of the resulting cooperative agreements will result in the design, fabrication and testing of advanced composite primary structural components, and the third will include similar activities for advanced metallic thermal protection system components.

### Team Negotiation

Upon selection of the winning proposals, a Langley team began the process of negotiation of the actual cooperative agreements. This team included personnel from the Space Transportation Thrust Office and the Acquisition Division, as well as technical leaders from the Structures Division. The negotiation process was performed in close cooperation with MSFC personnel who were conducting similar negotiations involving agreements in technical areas for which MSFC has lead responsibility. Tracy Spruill and Neil Price, Acquisition Division, were Langley's lead procurement specialists for this unique negotiation process.

Key Langley personnel involved in this procurement activity recently gathered for a formal signing of the first of these cooperative agreements, which was a McDonnell Douglas Aerospace agreement for durable thermal protection systems technology development.

## TOPS '95 Is in the Works!

The Technology Opportunities Showcase (TOPS) is dedicated to featuring technologies developed at Langley. Special emphasis will be given to strengthening existing industry partnerships and cultivating new strategic partnerships.

### Goals and Objectives

TOPS '95 also seeks to expand technology opportunities with non-aerospace, minority businesses and small industry; look for ideas to improve the technology transfer process; and to showcase critical aerospace research and technology.

The emphasis for TOPS '95 is on developing ties with industry. TOPS '95 objectives, focused on the Langley culture, are to: demonstrate the Center's relevance to the U.S. economy; to show Langley's commitment to successful technology transfer; to cultivate a "grass roots" awareness of the importance of technology transfer as part of the Center's mission; and to provide an opportunity for Langley's researchers to network with potential customers.

### TOPS '95

April 6 to 8, 1995, are the dates set for TOPS '95. The event will be held in Langley's flight hangar and will be a major part of a larger EXPOTECH, hosted by Langley, CEBAF and the Peninsula Advanced Technology Center. Each host organization will have its own exhibits at various Peninsula locations and provisions will be made for all attendees to visit all sites.

The primary theme will again be to build and expand communications between Langley researchers and U.S. industry. The success of TOPS '95 will be determined by how many Langley technologists' will reach out to ascertain industry needs and seek agreements with industry to commercialize Langley-developed technology applications or processes. The number of exhibits will depend on exhibitors' proposals accepted for TOPS.

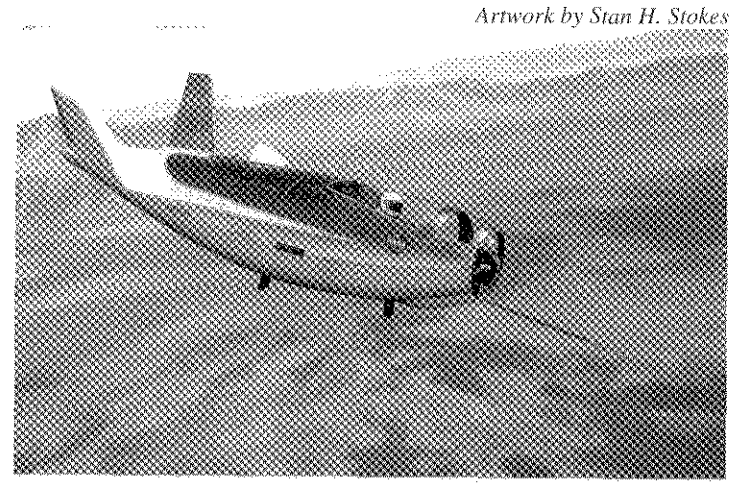
TOPS '93 exhibits will be considered for inclusion again if the technology has matured, new applications are evident, and/or cooperative agreements are still sought. Efforts are being intensified to identify new attendees to invite who have interests or problems related to Langley's core competencies. The final day of TOPS '95, April 8, 1995, will be an open house for the Peninsula and Langley communities. Exhibits are still being accepted. For exhibit proposal forms or more information about TOPS, contact the TOPS Implementation Office at ext. 48886, Mail Stop 213.

## HL-10 Marks Anniversary

"Lifting Body," a painting by Stan H. Stokes, shows the HL-10 (horizontal landing #10) built by Northrop. The HL-10, a product of Eugene Love's work at Langley, was among the most successful of the lifting bodies. This vehicle contributed to the decision to design the space shuttle without landing engines.

October 27 marks the 25th anniversary of a record flight made by the HL-10 lifting body, piloted by Bill Dana. He flew the HL-10 at a speed of Mach 1.6 to 60,500 feet, a record at that time. The HL-10 holds the maximum speed and altitude records for lifting bodies: Mach 1.86 (1,228 mph) and 90,300 feet. There were 144 test flights from July 12, 1966, through Nov. 26, 1975. The HL-10 was the highest flying, fastest and most liked by pilots of all the lifting body vehicles.

*Artwork by Stan H. Stokes*



## Open House at the Virginia Air and Space Center

To celebrate the 25th anniversary of the Apollo 12 spacecraft's trip to the moon, the center and Langley Federal Credit Union invite Langley employees and their families to an open house, Sunday, Nov. 13.

By presenting a NASA identification card, employees and their families will receive free admission to the exhibits and $1 off a ticket purchase for the newly released giant-screen IMAX® film *Destiny in Space*. For more information, call 727-0900.

## Bloodmobile Report

The bloodmobile visited Langley Sept. 28 and, according to Langley coordinators Karen Ridlon and Pete Edgette of the Occupational Health Services and Red Cross representative Barbara Thomas, 299 people donated blood.

Thanks to first-time donors: Andrew Giacobe, Jimmy Powell, Tim Miante, Ken Woodman, Edward Naddeo, Benjamin Borman, Sandra Stroble, Alice Thompson, Angela J. Osborne, Ordell Magee, Kelly Lawson, Charles Player and Deborah Burke.

Multiple gallon donors receive a special thank you. They are: 15 gallons, Victor E. Delnore; 14 gallons, Billy Beasley; 12 gallons, Eric Madaras; 11 gallons, Doyle T. Arboneau; 10 gallons, Richard L. Herndon; 9 gallons, Hugh Gentry III and Carl S. Larsen; 8 gallons, Ronald Lewis, Michael Fleck and John H. Cline; 7 gallons, David Terray; 6 gallons, Wayne Geouge, Mark S. Wampler, Kathryn A. Smith, James L. Dillon and John G. Wells Jr.; 5 gallons, Wayne Davis and Jeffrey D. Singleton; 4 gallons, Dennis Mowrey; 3 gallons, Ed Townsley and Keith M. Sobczak; 2 gallons, Ben Copeland, Paul Daspit, Bruce South, Richard E. Martin, Robert E. Jordan, Jeffrey Flamm, Andrea Whitesides and Harriet Dismond; 1 gallon, Craig Ohlhorst.

The next bloodmobile visit will be the last one in 1994, Wednesday, Nov. 23 at the H.J.E. Reid Conference Center. For more information, call ext. 43194.

# Happenings

**SKI:** Seven days in Quebec, Canada, at Mont Tremblant, January 15-21; six nights at Chalet des Chutes, includes dinner and breakfast, round trip transportation, $643 per person. Call Norman Willey at 482-9559.

**BEGINNER STEP WORKSHOP:** The LAA Aerobics Club will sponsor a free step-aerobics class for beginners Monday, Dec. 5, from 5 to 6 p.m. in the H.J.E. Reid Conference Center. Burn fat and tone up with safe, low-impact activity. Register by Dec. 2. Call ext. 42295 for more information.

**LAA AEROBICS CLUB:** Join this month for a full fitness program. Free body composition and nutritional analysis given to members. Open to all Langley employees and their families. Classes are Tuesday and Thursday from 5 to 6 p.m. and Saturday from 9:30 to 10:30 a.m. in the LAA Gym. Call ext. 42295 for more information.

**NASA TRAVELERS:** On Dec. 22, new charter air service starts from Norfolk to Cancun and Cozumel. Call Judy at ext. 48008.

**ASTRONOMY NIGHT:** The Skywatchers Astronomy Club will host telescopic viewing Friday, Nov. 4, from 8 p.m. until midnight at the observatory in Building 1231. Several telescopes will be set up for the event which is free and open to the public. Rain/cloud date is Nov. 5. For more information, call Marilyn Ogburn at ext. 41175.

**AT FT. MONROE:** Personal affairs management and recent legislative changes affecting military retirees are program topics Oct. 22 during Retirees Day and Open House at the Officers' Club. Registration begins at 8:30 a.m. in the club's Casemate Room and activities end at 1:30 p.m. To register, call the Retirement Services Office at 727-2093.

**FOR SALE:** Moving, must sell dining table and chairs, $100; king waterbed, $100; coffee table, $20; end tables and lamps, $25; two file cabinets, $10 each; dresser, $25; easy chair, $25; Atari 600XL computer w/modem — free; and glass dome clock, $20. Make an offer for any item. Call Mark at 826-7814.

**TURKEY TROT:** Langley Fitness Center and Runner's Club are cosponsoring this year's run/walk for the turkey. Registration for the event will begin at 4:15 p.m. at Doolittle Street and the run begins at 4:45 p.m., following a two-mile loop course. All participants have a chance to win Thanksgiving dinner just for entering. Runners and walkers are invited. Call the Fitness Center at ext. 46387 or Richard Shearer at ext. 47036 for more information.

**AIAA:** The Hampton Roads Section of the American Institute of Aeronautics and Astronautics is sponsoring its Annual Oyster Roast, Monday, Oct. 24, from 4:30 to 8 p.m. at the H.J.E. Reid Conference Center picnic grounds. For information, contact Beth Lee-Rausch at 42269, e.m.lee @larc.nasa.gov, or Dan Vicroy at ext. 42022, d.d.vicroy@larc.nasa.gov

**FOR SALE:** Spacious custom home in Williamsburg, 1,820 sq. feet, custom cabinets, gas heat and water and living, dining and family rooms. Asking $126,900. Call 877-2186.

**LAA ACTIVITIES:** The **Social Hour** will be a pre-Halloween celebration Oct. 21 at the H.J.E. Reid Conference Center, 4 to 8:30 p.m. It will feature recording artists The Mann Sisters with a Boots and Lace Band performance to begin at 4:30. No cover charge to hear one of the hottest country western groups in the area. **Bingo Fun:** Every Thursday at the conference center, bingo games begin at 7 p.m. **Country Western Dance:** The next dance will be Oct. 22 at the conference center. Doors open at 6:15 p.m. and cost is $3 per person. **Annual Turkey Shoot:** the LAA annual shoot will be Saturday, Nov. 5, from 9 a.m. until dusk. Further updates will be in *LaRC This Week* or call ext. 46369 for more information.

**VIRGINIA SYMPHONY:** The symphony accompanies the silent film classic "Phantom of the Opera," Oct. 22 and 23. The "Halloween Party" concert opens the Family Series Oct. 29; and MasterWorks concerts, Nov. 11 and 12. Tickets at the Exchange Shop, ext. 41585 or the symphony office at 380-0040.

**PENINSULA LITERACY COUNCIL** is sponsoring a "Word Series," with baseball as its theme, and fun and prizes are the game. Monday, Oct. 24, at 6:30 p.m, the first word will be pitched. Phil Niekro, all-star pitcher and manager of the female baseball team the Colorado Silver Bullets will autograph baseballs purchased at the event. Competing teams for the series represent local businesses. There will be a silent auction and refreshments as well. Tickets are $5 and are on sale at the Exchange Shop. For more information, call Joe Drewry at ext. 45842.

**FOR RENT:** Two-story townhouse with two master suites, vaulted ceilings in living room, dining room, ultramodern kitchen, fireplace w/marble hearth, washer/dryer hookup, garage and carport: near Langley; $750/mo. plus deposit. Call 988-1630.

**FOR RENT:** Townhouse, Mallard Point, 2 BR, 1-1/2 baths, living/dining room combo, all appliances, central heat and air, storage, many pluses. Available Nov. 1, $525/mo. Call 727-9187 after 5 p.m.; weekends anytime.

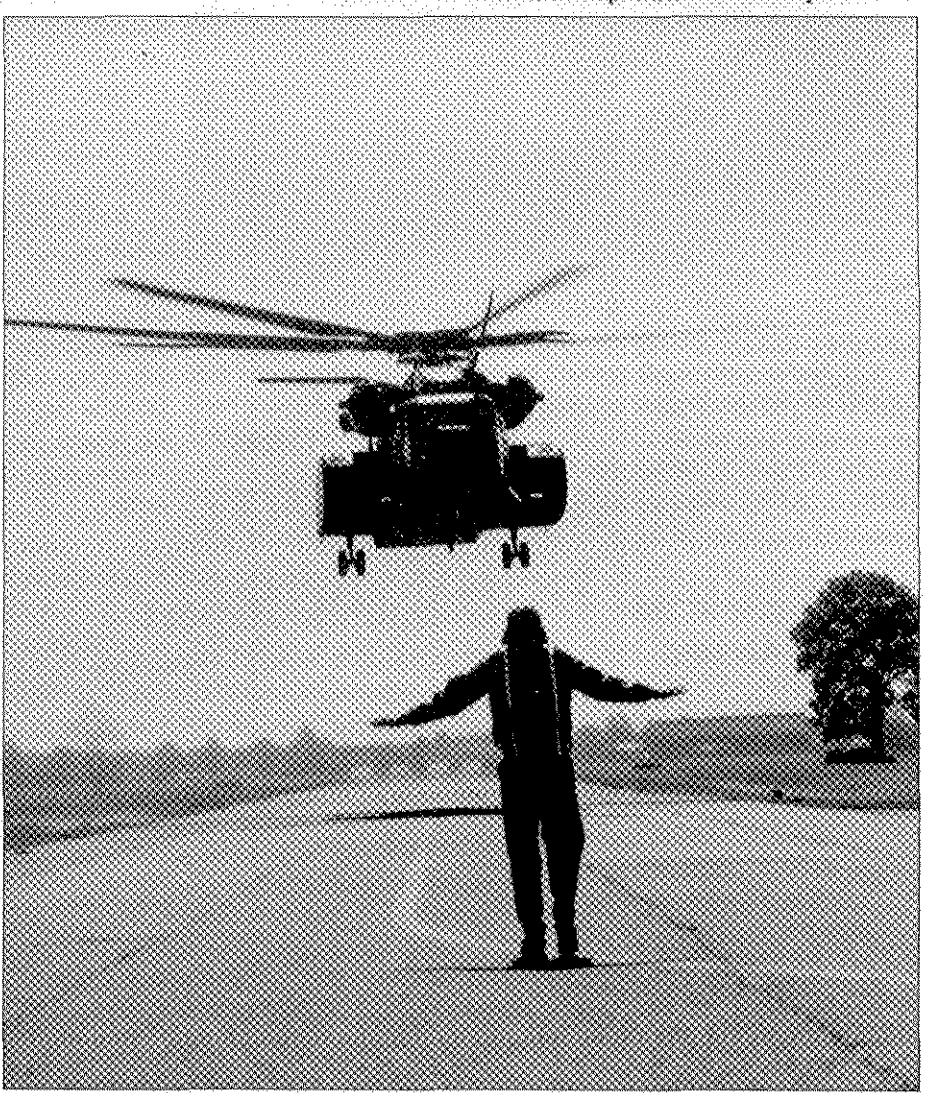


*Photo by Fred Jones*

**HELICOPTER DISPLAY AT LANGLEY OCT. 5 — Civil and military rotorcraft were on display at Langley's hangar as part of the annual meeting of local rotorcraft societies. The joint meeting was sponsored by the Colonial Chapter of the Army Aviation Association, Langley and the Army's Vehicle Structures Directorate. On display were rotorcraft from the military services, the state police and private industry. They included the Army National Guard CH-47 Chinook; the Air Force UH-IN; the Navy HM-14 Sea Stallion (above), CH-53 Echo, Ch-46 and SH-3; the Virginia State Police Bell 222, Bell 206 and BO-105; a Nightingale Air Ambulance and a privately owned R-22.**

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Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 22 ❖ November 4, 1994

## Langley and Ford to Share Technologies

TOPS
TECHNOLOGY OPPORTUNITIES SHOWCASE
NASA LANGLEY RESEARCH CENTER

BY KEITH HENRY

Langley and Ford Motor Company have agreed to a two-year cooperative agreement for the transfer of Langley-developed technology that will improve the design and engineering of Ford vehicles.

"This is a perfect example of Langley-developed technology being used to enhance the competitive advantage of a major U.S. industry," said Dr. Woodrow Whitlow Jr., director of the Critical Technologies Division, Office of Aeronautics, NASA Headquarters.

Langley and Ford designated several technology areas after assessing more than 60 Langley technologies. These technologies will include computational fluid mechanics, flow measurement techniques, antenna measurements and advanced materials to improve manufacturing processes. Langley technology will be applied to advanced automotive studies in the areas of adhesive bonding, emissions, fuel economy, vehicle wiring and airflow, paint calibration and electrical and cooling systems.

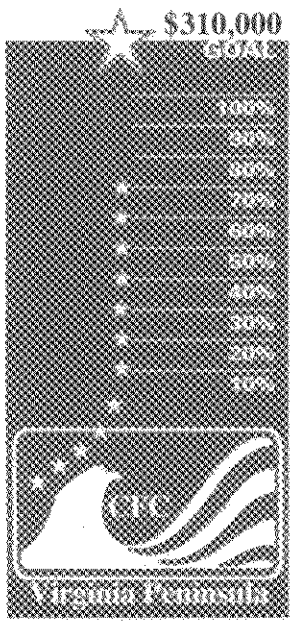
The memoranda of agreement for this initiative is the first broad technology transfer process between Langley and any automotive manufacturer. In addition, the agreement allows Ford to continue development of Langley technologies for application after the program's two-year duration. Some of the continuing developments will be performed at Ford and some will be performed at Langley.

Center Director Paul F. Holloway led the Langley delegation that included Dr. Kristin A. Hessenius, director, Internal Operations Group, Charles P. Blankenship, director, Technology Applications Group, and Dr. Douglas L. Dwoyer, director, Research and Technology Group, in the signing ceremony at the Ford Motor Company in Dearborn, Mich. The Ford delegation was led by David F. Hagen, general manager of Alpha Simultaneous Engineering, Technical Affairs.

Dave Hagen left, Ford Motor Company general manager of Alpha Simultaneous Engineering, Technical Affairs presents Center Director Paul Holloway with a plaque commemorating the signing ceremony. Below, Signing the agreements with Ford are, seated, Dr. Douglas Dwoyer, director, Research and Technology Group, and Dr. Kristin Hessenius, director, Internal Operations Group. Standing are, l-r, Charles P. Blankenship, director, Technology Applications Group, Hagen and Holloway.

Photos courtesy of Ford Motor Company

## Your Contribution Can Help Langley Reach Its CFC Goal




**Big Brothers/Big Sisters of the Peninsula, Inc. is just one of many agencies Langley employees can help support through contributions to the Combined Federal Campaign (CFC). *(See story, Page 4).***

**Contributions are still being accepted. Request forms from your key worker and make a contribution to the 1994 campaign.**

## *Inaugural Eastman Jacobs Lecture Will Honor Dr. Richard Whitcomb*

A colloquium, "Research on Methods for Reducing the Aerodynamic Drag at Transonic Speeds," will be given by Eastman Jacobs Lectureship Award winner Dr. Richard T. Whitcomb, Monday, Nov. 14, 2:00 p.m. in the H.J.E. Reid Conference Center.

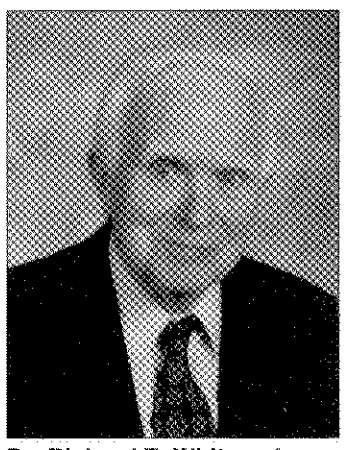
The methods to be discussed — the Area Rule, the NASA Supercritical wing and winglets — resulted primarily from experimental research conducted in the wind tunnels of the Transonic Aerodynamics Branch at Langley during the period from 1950 to 1980.

The background for this research, flow studies used to clarify the phenomena, basic concepts and selected comparisons of measured drags, will be presented during the colloquium. In addition, the flight tests conducted at the NASA flight test center to verify the wind tunnel drag results, as well as applications of these methods to the design of production aircraft, will be described.

Whitcomb earned a bachelor of science degree in mechanical engineering (aeronautical) from Worcester Polytechnic Institute in 1943. That same year he began his career in the Transonic Aerodynamics Branch at Langley, then under NASA's predecessor agency, the National Advisory Committee for Aeronautics (NACA). He became head of the branch in 1958, and supervised development of ways to improve aerodynamic performance of aircraft at transonic speeds until his retirement in 1980. He authored more than 30 technical reports on transonic aerodynamics, and he was an instructor for several years in Langley's graduate study program.

Whitcomb has received many awards for his contributions to the advancement of flight in the United States, including the Collier Trophy in 1954 for that year's "greatest achievement in aviation in America;" the Exceptional Service Medal of the Air Force in 1955; the first Distinguished Service Medal to be presented by NACA in 1956; the NASA Scientific Achievement Medal in 1969; the 1969 Sylvanus Albert Reed Award by the American Institute of Aeronautics and Astronautics (AIAA); and the National Medal of Science from the President of the United States in 1973. He is a Fellow of the AIAA and a member of the National Academy of Engineering.

There will be a reception following the colloquium which is open to all NASA employees and contractors. If planning to attend, please contact Emily Todd of the Institute for Computer Applications in Science and Engineering (ICASE) at ext. 42175 or send e-mail to emily@icase.edu.



Dr. Richard T. Whitcomb

### *The Jacobs Lectureship Award*

The Jacobs Lectureship is a biennial award sponsored by ICASE and Langley to recognize individuals who have contributed significantly to the advancement of engineering design and development throughout their careers.

It is in that spirit that Eastman Jacobs conducted his career at NACA and the Langley Memorial Aeronautical Laboratory. The impact of his contributions to many subjects has been sustained for many years at Langley, in the twin legacies of ideas and facilities. The recipient of this award is one who shares the same innovative and creative talents and has contributed to the understanding of a variety of engineering problems.

### *Sigma Lecture Will be November 15*

The Sigma Series lecture, "Exciting Developments in the Pursuit of Transonic Flight," will be presented by Whitcomb, Tuesday, November 15, at 7:30 p.m. at the Virginia Air and Space Center. The series is free and no reservations are required.

As an aircraft approaches the speed of sound, the drag due to the resistance of the air increases very rapidly. This phenomenon presents a barrier to supersonic flight that was first broken by jet aircraft in 1950. Even then, many experts doubted that supersonic flight could be sustained with a reasonable degree of efficiency. A breakthrough occurred when Whitcomb, working at Langley, conceived the area-rule for reducing the drag at supersonic speeds by changing the cross-sectional area of the fuselage.

The resulting coke-bottle shape had a dramatic effect. The first aircraft on which this was tried, which had previously not been able to break the sound barrier, did so while climbing. Following this discovery, Whitcomb worked on wing designs to improve the efficiency of transport aircraft operating near the speed of sound. The result of this effort was the supercritical wing, now used by commercial airliners, and the winglets (upward curving wingtips) seen on many advanced aircraft. In this talk, Whitcomb will recall the frustrations and excitement of discovery during his years at Langley in pursuit of efficient transonic flight.

# News Briefs

## Around the Agency

**HUBBLE YIELDS SECRETS OF STAR BIRTH IN THE EARLY UNIVERSE** – The Hubble Space Telescope has provided new insights into how stars might have formed many billions of years ago in the early universe. Hubble observations of a pair of star clusters suggest a new link in the stellar evolution processes. The pair of clusters are 166,000 light-years away from Earth in the Southern Hemisphere constellation, Doradus, within the Large Magellanic Cloud (LMC). The clusters are unusually close together for being distinct and separate objects, according to Hubble astronomers. A preliminary assessment of the observation indicates that these two compact clusters contain many more massive stars than expected. "If this were also the case billions of years ago, it could have altered drastically the early history of the universe," says Dr. Nino Panagia of the Space Telescope Science Institute (STScI) in Baltimore, MD, and the European Space Agency (ESA). Panagia and his co-investigators used Hubble's unique capabilities --- ultraviolet sensitivity, ability to see faint stars, and high resolution — to identify three separate populations in this concentration of nearly 10,000 stars.

## Announcements

### Retirement News

With the holiday seasons coming up, the Employee Relations Office (ERO) is requesting special assistance. For those planning to retire between now and January 3, 1995, please advise the ERO at ext. 42605, as soon as possible. This will ensure that there is sufficient time for retirement counseling and preparation of retirement estimates and required retirement forms.

## *Health Corner*

### Required HIV/AIDS Education

President Clinton signed a directive September 30 instructing all Federal departments and agencies to provide HIV/AIDS training in the workplace for their employees.

The President has committed his administration to a leading role in the fight to end the HIV/AIDS epidemic.

The Office of Occupational Health Services, in consultation with the American Federation of Government Employees (AFGE) and the International Association of Machinists Local Lodge, Pattern Makers (PM2829), will sponsor the required training for all of the Center's Federal employees.

HIV/AIDS workplace training will begin in December. The training will address awareness, prevention and personnel policies. Advance class notices will be sent to each employee concerning dates, times and locations of classes.

**— Peter J. Edgette, Health Manager**

"AFGE supports HIV/AIDS training. It is a safety issue; one that could save a life. Participants learn and live healthily."

**— Ben Schlichenmayer, President, AFGE Local 2755**

"As society changes, so must the work force. We must continue to understand the impact to ourselves and our co-workers. The International Association of Machinists Local Lodge, PM2829 fully supports the education on HIV/AIDS being offered. This knowledge will improve the working conditions by dispelling myths and untruths about AIDS. We encourage all to attend and learn how to cope with the current threat to our society's well-being."

**— Tom Vranas, President, PM2829**

### Langley's Bloodmobile — A Valuable Community Asset

Langley continues to give to the community through a very important activity during the year — donating blood through the American Red Cross Bloodmobile. The last opportunity to give blood in 1994 will be Wednesday, Nov. 23, at the H.J.E. Reid Conference Center from 9 a.m. to 3 p.m. The holiday season is a special and busy time of the year but it is also a time when the need for blood is greater.

### A Special Invitation for Retirees

Retirees are a valuable part of NASA's history and an important part of the Langley community. Many retirees no longer live in the area and are, therefore, unable to participate in Langley's blood drives. But for those retirees in the surrounding communities, a special invitation is being issued to join friends and former colleagues for the November bloodmobile.

During the November drive, there will be a drawing for all those who donate blood for tickets to the Virginia Air and Space Center and IMAX® theater tickets.

For those unable to participate at this time, the following bloodmobile visits are scheduled for 1995: January 25, March 22 and May 24.

### Native American Heritage Observed

The month of November has been proclaimed Native American Heritage Month.

To celebrate the occasion, the Office of Equal Opportunity Programs is sponsoring a "Meet Langley's Native American Employees" coffee, Tuesday, Nov. 15, from 2 to 3 p.m. in the Langley Room of the H.J.E. Reid Conference Center.

All employees are invited to share in this informal interchange. Attendees should charge their time to Job Order A5006. For more information, call ext. 43290.

### Retirement Party

A party for D. Vic Chretien will be held Nov. 9 at the H.J.E. Reid Conference Center. Social begins at 6 p.m. with dinner at 7 p.m. The cost is $14, gift included. Make checks payable to Mary Beth Wusk, Mail Stop 257, or call ext. 43830. Gift only contributions are welcome.

## In Memoriam

### William H. Forrest

William Hugh Forrest, a lifelong resident of Poquoson, died Friday, Sept. 9. Forrest worked on SCOUT and the lunar orbiter before retiring from Langley's Project Management Systems in 1982.

### Donald Brown

Donald Brown, 67, died Friday, Oct. 14. He retired from the Analytical Computer Division after 32 years at Langley.

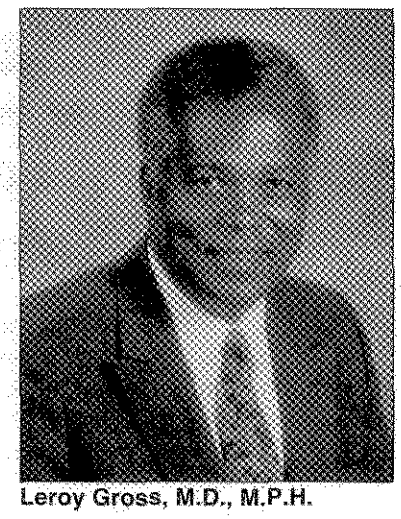
### Ophelia H. Taylor

Ophelia Hubert Taylor, a native of Montgomery, Ala., and Peninsula resident for 52 years, died, Wednesday, Sept. 28. She was a Langley retiree.

### Nelson B. Harris

Nelson B. Harris, 79, died Friday, Oct. 14. Born in Sanford, Ind., he had been a Peninsula resident since 1945. Harris was very active in community service in York County and retired from Langley in 1979 after 34 years of service.

# New Medical Director Named



Leroy Gross, M.D., M.P.H.

Leroy Gross, M.D., M.P.H., has been named the new medical director for Langley's Occupational Medicine Center. Located at the Office of Occupational Health Services, he will oversee Langley's health needs, including preventive medicine and educational outreach programs. Gross plans "to use the principles of Total Quality Management to bring the continuous improvement process to his staff to help serve their Langley customers.

"The emphasis now," he said, "will definitely be on preventive medicine." Despite dwindling Federal funds, he wants to make employees' physical exams more comprehensive including special testing to target those who may need extra help to keep healthy. "We need to reassess what can be done through cross-training of the staff to make their jobs multifunctional. That way, I think we will be able to improve services and still maintain our bottom line," Gross added.

Other plans the doctor has in mind are keeping permanent records on CD-Rom, getting the clinic hooked into Langley's informational networks, e-mail and QuickMail, setting up an outreach program in the community for preventive health issues and health awareness, and upgrading the clinic's overall appearance.

Gross also seeks input from Langley's employees so that he and his staff will know how to redirect the resources that they have. "We plan to produce a questionnaire to see where we are now and help us plan where we want to go with our health issues," he said.

Gross received his bachelor of science degree in zoology and his doctorate of medicine from Howard University in Washington, D.C. He earned a master of public health degree from Johns Hopkins University School of Hygiene and Public Health in Baltimore, Md. He received his commission from the Air Force Reserve Officers Training Corps, is a designated pilot/physician and served as a clinician, command pilot and physician before retiring with the rank of colonel from the Air Force in 1993.

Prior to his appointment here, he was associate chief of staff for geriatrics and extended care at the Veterans Affairs Medical Center in Hampton.

Gross is an associate professor of Family Practice and Community Medicine at Eastern Virginia Medical School, a fellow of the American College of Preventive Medicine and the Aerospace Medical Association, a diplomate of the American Board of Preventive Medicine in Aerospace Medicine and a member of the National Medical Association.

## Letters

### Thank You Note

**From Cal Forrest:** "The family of William Hugh Forrest Sr. would like to sincerely thank our friends for the thoughts and prayers during our recent time of mourning. Your kind expression of sympathy is gratefully acknowledged and deeply appreciated. All support given was a tremendous help and comfort. God bless you all."

## In Memoriam

### William Burgess

William G. Burgess, 71, died Sunday, Oct. 9. An Army retiree and a Peninsula resident since 1950, he retired from Langley as a contract stationary engineer.


**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor. . . . . Marny Skora

Editor. . . . . Ann C. Gaudreaux, The Bionetics Corp.

Assistant Editor. . . . . Susan A. Smigielski, The Bionetics Corp.

Photojournalist . . Carole Petrachenko Chapman, The Bionetics Corp.

Photographer . . . . . Fred Jones

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.

# Vann Receives NASA Medal

A. Vernon Vann, head of the Acquisition Support Branch, was awarded a NASA Exceptional Achievement Medal. He received the award from NASA Administrator Daniel S. Goldin during NASA's Minority Business Awards Ceremony, held during Minority Enterprise Development Week in October. Vann was recognized for "significant achievements in fostering contracting with Small Disadvantaged Businesses (SBD) at Langley."

Vann has been instrumental in encouraging and developing small contractors by providing them an opportunity to learn about contracting with the government," said Ralph C. Thomas III, associate administrator for Small and Disadvantaged Business Utilization, NASA Headquarters. "His efforts have resulted in many of Langley's direct contract dollars being awarded to SBDs."

Through Vann's work in the Acquisition Division, Langley exceeded all its socioeconomic goals for contracting and subcontracting to small and small disadvantaged businesses in both 1992 and 1993. The Center received two plaques in recognition of its contributions to the SBD Program during those two years.

Vann joined Langley in 1977 as a contract price analyst and was made head of the Acquisition Operations Branch in 1980. He has served in several Agency-wide acquisitions efforts, among them Headquarters' Configuration Control Board for the Agency's Procurement Management Technology Program. He now serves as the Center's small business specialist responsible for the implementation and execution of Langley's efforts to assist small business and SBDs participating in NASA's

A. Vernon Vann

procurement programs. He was instrumental in developing the Center's policy designed to increase awards to SBDs.

Center Director Paul Holloway, who nominated Vann for the award, said, "The Agency and Langley, including its contractors, have received numerous awards and recognition as a direct result of Vann's outstanding efforts, contributions and involvement. His dedication and personal commitment to success in making NASA's Socioeconomic Program the very best in the Federal Government is notable."

# AIAA Digital Avionics Award Given to Spitzer

The American Institute of Aeronautics and Astronautics (AIAA) presented Cary R. Spitzer with the 1994 AIAA Digital Avionics Award. The award was presented Nov. 2 during the AIAA Digital Avionics Systems Conference in Phoenix, Ariz. The award was inscribed "In recognition of outstanding contributions to the field of digital avionics throughout a career as a NASA engineer, an industry visionary and educator and technical advocate."

Cary R. Spitzer

Spitzer joined Langley in the early 1960s after serving in the Air Force. During his 30-year career here, he became known for his pioneering work in digital avionics, publishing two books, lecturing on the subject, and receiving numerous awards for his work. He holds degrees from Virginia Polytechnic Institute and State University and George Washington University and is an associate fellow of the AIAA.

After his retirement from Langley in 1993, Spitzer founded AvioniCon, Inc., an international avionics consulting firm. He currently serves as its president.

AIAA is the world's leading professional society in the areas of aeronautics and astronautics and a worldwide aerospace information source.

## 1995 CALENDARS AVAILABLE FROM STOCK

Requests for the 1995 calendars may now be submitted to the Stockroom, Mail Stop 382, using NASA Form 55. Stock numbers for the calendars are:

Calendar Pad, flipover, 3" X 3-5/8", #7510-01-363-3703

Calendar Pad, executive flipover, 3-5/8" X 5-7/8", #7510-01-363-3708

Wall Calendar, displays three months at a time, 11-5/8" X 8-7/8, #7510-01-337-4705

Looseleaf Appointment Book Refill, daily and monthly calendar sheets, 6-/12" X 5-1/2", #7530-01-363-6705

Weekly Appointment Book, two pages per week, columns for appointments and reminders marked in 15-minute intervals, 8-1/2" X 11", #7530-01-337-4696

Desk Blotter, monthly sheets ruled and squared for each day, 17" X 22", #7510-01-337-4710

Each branch secretary should submit branch and section requirements to reduce the number of requests. Other stock supplies *cannot* be ordered on the same form as the calendar requests.

# Peer Recognition Awards Go to Tracy and Hallissy

BY SUSAN A. SMIGIELSKI

Maureen Tracy of the Transonic/Subsonic Aerodynamics Branch and Jim Hallissy of the Research Facilities Branch received a Peer Recognition Award from members of the Orbital Launch Services Project at Goddard Space Flight Center (GSFC) for their work last year to correct problems with the Lockheed 1011 aircraft set to carry the Pegasus XL satellite launch rocket.

The carrier aircraft was modified to carry the Pegasus XL. However, flight tests revealed significant unsteady aerodynamic flow around the configuration which resulted in airframe buffet and damage to both the Pegasus rocket and the L-1011 carrier aircraft. High acoustic loads on the rocket skin generated by airflow around the configuration also raised concerns about possible degradation of the rocket's payload environment. The problems were severe enough to prevent completion of the flight certification test program.

Tracy and Hallissy went to Marshall Aerospace of Cambridge, England, where the carrier aircraft was being modified, after GSFC Director John M. Klineberg made a request to Langley Center Director Paul Holloway for assistance.

In a letter about the award, Klineberg wrote to Holloway, "The timely appearance of Jim Hallissy and Maureen Tracy and the continued application of their expertise to the problems at hand were an essential contribution to the successful qualification of the carrier aircraft."

Tracy has been employed at Langley since 1985 working in the areas of unsteady flow phenomena at transonic speeds and acoustics. She has been involved in several experimental studies that relate to transonic store carriage and separation. Prior to her present assignment, she was a member of the High Reynolds Number

Maureen Tracy

Jim Hallissy

Aerodynamics Branch and the Transonic Aerodynamics Branch. She also worked as a contractor in support of the Acoustics Division. Tracy worked for five years at the Naval Surface Warfare Center-Carderock Division prior to coming to Langley. She earned her bachelor of science degree in physics from Loyola College and her master of science degree in mechanics/materials science from Johns Hopkins University.

Hallissy began working at Langley in 1969 at the 8-Foot Tunnels Branch. While there, he participated extensively in the development of the F-111 TACT and Mission Adaptive Wing aircraft configurations. He conducted drag reduction studies for the F-18 aircraft as well as other aircraft. Hallissy also served a principal investigator for the F-106 Vortex Flap Flight Experiment. He earned his bachelor of science degree in aerospace engineering from the University of Virginia.

*Photo by Maureen Tracy*

**This photo shows the L-1011 carrier aircraft with Pegasus XL rocket fitted underneath for testing.**

# FWPC Sponsors Career Development Training Workshop

The Federal Women's Program Committee is sponsoring a series of career development training workshops. The first, "Enhancing Individual Effectiveness through Leadership Styles Analysis & Development of Negotiation/Influencing Skills" will be offered in three one-day sessions, Nov 8, 9 or 10, by Martin Kormanik and Tina Chindgren of Organization Development Systems, Inc. Each session is limited to the first 30 participants who sign up. The training will be in Building 1229, Room 120.

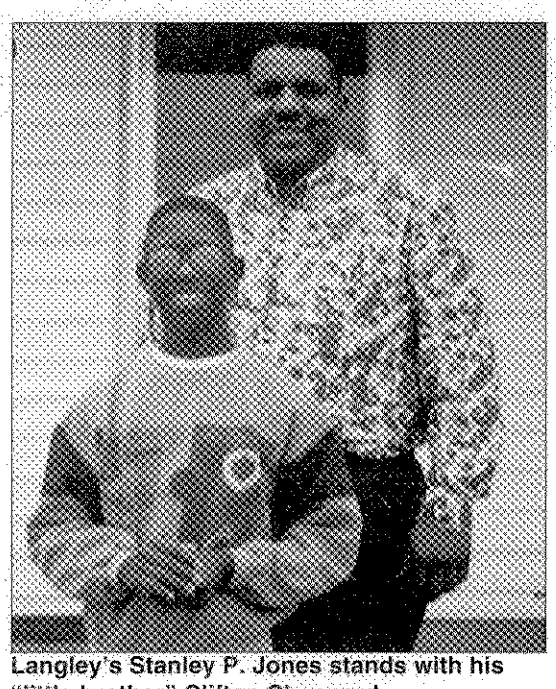
The training has two purposes: to provide participants with an opportunity to assess their individual leadership styles and to learn how to work more effectively with individuals whose leadership styles are different; and to develop principled negotiation skills for resolving workplace conflicts wisely, efficiently and in a manner which improves, or at least does not damage, the relationship between conflicting parties. Call Patsy Campbell, ext. 43291, or Sandra Zumbrun, ext. 44548, to sign up or for more information.

# *There's No Substitute for a Big Brother*

BY MARNY SKORA

Stanley P. Jones, Langley Aerospace Education Specialist, is one of nine children in a family recognized nationally as the 1994 Black Family of the Year. But it has taken his volunteer involvement for Jones, the youngest of the family, to realize a dream — to be a big brother!

Jones has been involved with the Big Brothers/Big Sisters organization since 1979. "He's an outstanding volunteer and exceptional role model," says Kathleen Mansfield, the CFC-supported organization's executive director. "We need dozens more like Stanley to befriend boys between the ages of 6 and 12 who — due to divorce, death or abandonment — have no father."



Langley's Stanley P. Jones stands with his "little brother" Clifton Sheppard.

Jones and his current "little brother" Clifton Sheppard have been like family for four years. "We share the same birthday," explains Jones. "I think that's one reason our relationship has really clicked. Clifton and I joke we can read each other's mind."

Regardless of a busy work schedule, Jones makes time for Clifton. "The guidelines suggest spending 4 hours per week with your 'little,'" notes Jones. "Clifton, his mother and I agreed early on that Clifton and I would spend whatever time we could together — some weeks more, some weeks less than the prescribed 4 hours. What we aim for is the flexibility that being a family demands."

Apparently, their plan is working. Jones helps his little brother with his studies, especially science. And Clifton is succeeding — he has won first place in the science fair in his category for the past four years and has garnered first place in the city meet the last two years.

Jones has also gotten Clifton involved in Upward Bound, a program at Hampton University for young people who are aspiring to be successful. "The kids go to classes on Saturdays, hear speakers from colleges and universities, and take field trips," says Jones.

Clifton does his part too. When Jones is not on travel, his little brother calls him each morning with "Wake up, Stanley, it's time to go to work!" That's Clifton's way of saying good morning and doing his part to spend quality time with his big brother.

Of course, the two go to movies and go bowling, but Jones reports that just doing things together — errands, household chores, etc. — is the norm.

"The perception can be that is takes more time than people have," says Mansfield. "But these pairings are not about elaborate outings."

Jones seconds that statement. "I've felt no financial pressure and we work out the time commitment based on our work and school schedules. The benefit to me has been watching Clifton grow from a shy sixth grader lacking confidence to a confident tenth grader, a young person with positive self esteem."

Big Brothers/Big Sisters board member Rob Kudlinski has had three little brothers over the past 10 years. "Serving on the board of directors has been very rewarding for me," explains Kudlinski. "It allows me to apply my technical and management skills to directly benefit children in our community who need a helping hand. Unfortunately, though, we need many more volunteers to meet the need."

"For the first time ever," reports Mansfield, "we've had to close the files on 100 boys because they had been on our waiting list for over two years. And we still have 100 boys anxiously awaiting a match."

## HERE'S HOW YOU CAN HELP

Big Brothers/Big Sisters serves boy, girls and the community. Volunteer "Bigs" do not replace an absent parent, but give their "Littles" a sense of belonging, of being special, and of having their very own best friend. By committing time and involvement, "Bigs" provide "Littles" much needed self-esteem and incentive to grown into productive adults.

The community is urgently in need of **male volunteers** to be Big Brothers. Almost 100 boys, between the ages of 6 and 12, need a match. These boys have no father. They need help with their school work, they need someone to show them how to throw a ball, they need a friend of their own.

If you can share a little time to make a difference in the life of a child, contact **Rosemary Burke** at 827-0110. You'll not regret the call.

## ASK SOMEONE WHO KNOWS

The following employees are current or former Big Brothers or Big Sisters. For more information on the program, feel free to give any of them a call:

**Carol Fowler**
Visual Imaging Branch
864-9455

**Stanley Jones**
Office of Education
864-3302 or 202-358-1520

**Robert Kudlinski**
Informations Systems Division
864-6716

**Scott Martinson**
Acoustical Optical Chemical Measurement Branch
864-4664

**Veloria Martinson**
Structural Dynamics Branch
838-4561

**Mary Ann Steuck**
Office of Human Resources
864-2564

**Support the 1994 Combined Federal Campaign!**

CFC
Virginia Peninsula

# Pilot Technical Paper Process Claims Success

One of the Center's initial Total Quality Management (TQM) "demonstration projects," to improve the method for putting out technical papers, has reported success.

In mid-1992, a team in the Fluid Mechanical Division (FldMD) was given the task of streamlining the technical paper approval process within the Computational Fluid Dynamics (CFD) Lab in the division, while improving quality.

Sponsored by Dr. Douglas Dwoyer, then the division chief, with Dr. Chris Rumsey as facilitator, the team was made up of researchers, managers and secretaries from the branch and division levels.

### Initial Steps Taken

Several changes were adopted in September 1992 in FldMD. The following action was taken first at the branch level: the writing and approval process was outlined and communicated to all authors and potential authors along with a definition of a quality technical paper. Next, the technical editor and illustrator were placed in the CFD Lab on a trial basis for optional use by researchers. A list of words and phrases, particular to CFD research, with their correct spelling and hyphenation, was collated and reference materials for technical writing were collected.

To streamline the process, the second step called for the elimination of two approvals at the division and directorate levels for unclassified U.S. abstracts, conference papers and journal articles only. These papers account for 60 percent of papers produced by the division (20 percent are classified or foreign conference and journal papers and 20 percent are NASA publications). This step empowered the author and branch head with the responsibility of ensuring a quality technical paper. Division and directorate levels, in addition to the Research Information Office, were given "for information" copies of each paper. As a result, papers could leave the Center upon branch head approval. The idea of the new system is to build quality into the technical paper process up front rather than relying on inspection after the fact.

### Surveys Conducted

After 18 months of operating in this mode, a follow-up survey was conducted among researchers in the CFD Lab. Results were compared with results from a survey taken prior to beginning the changes.

The delegated approval process was rated, on average, "clearer" by 18 percent of those polled and "more effective" by 22 percent among those using the streamlined techniques.

Authors used the technical editor's help heavily during the trial period. The editor performed 166 jobs for 44 individuals during the 18 months, while the illustrator did 130 jobs for 27 people during a six-month period.

Finally, the average rating of overall quality of the technical papers themselves increased by three percent, while the percentage of papers given an approval rating by an independent reviewer in the division office increased from 65 percent to 86 percent.

### Reading the Results

Although results from this pilot initiative substantiate the satellite technical editor's and illustrator's value, this process still works well when they are not available on-site. The Technical Editing Branch offers quality editing service with a reasonable turnaround time. Many of the Center's secretaries are also qualified to perform grammatical reviews as well as consistency and legibility checks.

Several branches in FldMD not located in the CFD Lab have been operating in this way for two years. Dave Stephens, division chief for the new Fluid Mechanics and Acoustics Division (FMAD) decided in August to adopt these procedures for the merged FldMD and Acoustics divisions.

"The real issue here is empowerment," said Rumsey. "Equip the researcher and branch head with the tools and specific expectations to produce a quality technical paper, then trust them to do it every time. It's the new way of doing business in a TQM environment."

Details about the procedure can be obtained by calling Rumsey at ext. 42165.

**AIAA Hosts Energy Expert:** The American Institute of Aeronautics and Astronautics (AIAA) is hosting Matt Tackett of Virginia Power's Energy Efficiency Dept., Nov. 9, from 5 to 6:15 p.m. in the Hampton Room of the H.J.E. Reid Conference Center. For information, call ext 45104.

# Baldrige Examiners Send Wrap-Up Report

The Malcolm Baldrige Quality Award examiners' report provides a baseline by which Langley can measure future success and is a springboard to develop specific areas of improvement for the years ahead.

In mid-October, all employees received a copy of the Baldrige Feedback Report. The report provided an assessment of Langley's Continuous Improvement effort in seven targeted areas: leadership, information and analysis, strategic quality planning, human resources development and management, management of process quality, quality and operational results, and customer focus and satisfaction.

The examiners "found the beginning of a systematic approach to addressing the primary purposes of the various items in the [seven targeted] categories." They also reported finding "early stages of a transition from reacting to problems to preventing problems" and "developing trend data."

### Reaction to the Examination

Center employees were involved in the Baldrige examination process, from application writing to late August/early September luncheon meetings and sessions with the examiners during their on-site review. A sampling of their interactions with the Baldrige representatives follows.

Dr. Kristin A. Hessenius, director of the Internal Operations Group, saw great value in the visit. She said "Langley has developed a pervasive awareness of quality principles but our application is in the infancy stages. We, as managers at the senior staff level, need to pick up the mantle of leadership for the application of these quality principles to our main focus, products and services."

Director of the Research and Technology Group (RTG) Dr. Douglas L. Dwoyer said the examination process was very beneficial. "I learned that we at the senior management level at the Center are not personally involved with Total Quality Management (TQM) to a sufficient degree." As an example, he said, the examiners criticized senior managers for delegating the writing of Langley's Baldrige application, saying that the writing process is a great tool for deepening management's understanding of and involvement in TQM. "This process again confirmed my knowledge that senior managers are too isolated from the rest of the Center. Finally, I learned that we have a very long way to go on clearly defining our products and developing metrics for them," he added.

Dwoyer also thinks that the recommendation that senior managers become more involved in TQM and Langley's day-to-day operations is very valid. "We must get out of Building 1219 more often," he said. "In addition, I am working very hard to put in place the definition of and a management structure to support Total Quality in research. This involves defining our products and learning to measure their quantity and quality. People in RTG will be hearing a lot about this during the coming year."

### Process Captures Langley Essence

American Federation of Government Employees union leader Ben Schlichenmayer also met with the examiners. He answered questions and presented information about Langley's operations. "I think that the process Baldrige uses to capture the essence of Langley in its working environment is a good one," he said. "Their evaluation process helps determine how management is structured and how managers respond to given situations."

"I derived a lot of satisfaction from participating in the examination process, and I have high expectations that, through the process, Langley will react to improve the way it does business." Schlichenmayer also thought that, although the decision to allow the Baldrige examiners to evaluate the Center's continuous improvement process left management vulnerable to criticism, senior staff learned a lot. "Weaknesses may have become apparent, but the staff will be able to turn them into strengths by dealing with them. Management is to be applauded for this move."

### The Need for Training/Follow-Up

Aerodynamics and Acoustic Methods Branch's Dr. Christopher L. Rumsey, a TQM facilitator, attended a luncheon meeting with the three examiners. "I learned that one-time, isolated or anecdotal TQM efforts don't count. It's the systematic approach, such as these continual improvements efforts, that works to change a culture." Rumsey also thinks TQM facilitators require more training to be part of that systematic approach to change. "We need core courses for facilitators, then more training to reach certain levels of expertise. Training must be an integral part of the continual improvement process." Training needs are being examined at Langley, according to Rumsey, and recommendations for more TQM training will be forthcoming.

The Acquisition Division's Allison Ballew, also a TQM facilitator, was glad to have an opportunity to answer examiners' questions during the luncheon. "They made us dig down deep to think about how TQM is impacting the people of Langley. I think our answers helped present a clearer picture for them to do their assessment." Her impression during their visit reinforced her ideas that Langley needs more follow-up training for those who are not TQM facilitators. "People get excited about TQM during their first round of classes. I'd like to see that excitement build back up. We need more opportunities for follow-on training, more encouragement for new ideas and more support, both upward and downward.

What did she learn from the examiners' visit? "We taught 'empowerment' but we all need direction, too, from our managers," she said. "Managers need to provide guidance to their workers. Empowerment doesn't allow employees to push the burden of all the thinking onto the managers, either. We will all need to learn to delegate and accept responsibility for Langley's success."

### Members of the Application Team

Leonard R. McMaster, Aerospace Electronics Systems Division, and H. Milton Holt, Information and Electromagnetic Technology Division, were both part of the application writing team. Each team member wrote a section of the application responding to the Baldrige Award criteria categories listed earlier.

McMaster helped write the section on customer focus and satisfaction. "What I learned from the writing was that we have difficulty here at Langley assessing who our customers are and tracking our performance with those customers," he said. "We have made a good start, but the examination was an important lesson for us all. We need to produce better metrics, coordinated by one organization on Center, to compile the statistics and measure the progress, not just in customer service, but in all areas."

Holt, who led the application team for the information and analysis category, echoed some of McMaster's ideas. "I learned a great deal about the things we are doing at Langley to collect information and use it to help satisfy customer needs. From the examiners' feedback, I also learned that we aren't there yet. We now have good insight into the kinds of steps to take to ensure that we continue to gather quality information, analyze it and tie it into other areas on Center. The Center collects information in a large number of categories but we must improve the way we disseminate it for employees to use toward the goals of continuous improvement."

### What Comes Next?

The information from the Baldrige examiners report characterizes an organization in the beginnings of its quality journey, according to Scott Wagner of the Planning and Resource Management Office who was the Center focal point of the Baldrige Review.

"Langley is in the early stages of developing systematic approaches to quality management concepts," he said. "We have some data in place now to help validate this progress."

"Self-assessment using the Baldrige criteria is a continual process that will be used throughout the Agency every other year to evaluate improvement trends," he stated. The next cycle will begin again late next summer.

## Contact the TOPS '95 Committee

TOPS

TECHNOLOGY OPPORTUNITIES SHOWCASE
NASA LANGLEY RESEARCH CENTER

The TOPS '95 Group Representatives Committee has been working to assemble exhibits, help with proposals and organize the April 1995 event. For specific questions about the Technology Opportunities Showcase (TOPS), please contact one of the people listed: Note: All e-mail suffixes are @larc.nasa.gov

**Christine M. Belcastro**, Flight Dynamics and Controls Division, Mail Stop 489, ext. 44035, Fax 47795, e-mail christinem.belcastro; **Celeste M. Belcastro**, Information and Electromagnetic Technology Division, ext. 46182, Fax 44234, e-mail celestem.belacstro; **A.M. Cary Jr.**, Gas Dynamics Division, ext. 45594, Fax 47923, e-mail a.m.cary; **Robert V. Doggett Jr.**, Structures Division, ext. 42434, Fax 47792, e-mail r.v.doggett; **Bob Graham**, Operations Support Division, Mail Stop 481, ext. 46307, Fax 47896; **Duane Melson**, Fluid Mechanics and Acoustics Division, Mail Stop 128, ext. 42227, Fax 46134, e-mail n.d.melson; **Bruce Conway**, Planning and Resources Management Office, 44757, Fax 48292, e-mail b.a.conway; **John Connell**, Materials Division, ext. 44264, Fax 48312, e-mail j.w.connell; **Bob Witcofski**, High-Speed Research Program Office, ext. 45251, Fax 47794, e-mail r.d.witcofski; **Sharon Fairheart**, Space and Atmospheric Sciences Program Group, ext. 46055, Fax 48190, e-mail g.s. fairheart; **Jack Pennington**, Information and Electromagnetic Technology Division, ext. 46677, Fax 48821, e-mail j.e.pennington; **Dave Reubush**, Hypersonic Vehicles Office, ext. 43749, Fax 48319, e-mail reubush; **Charles Laney**, Aerodynamics Division, Mail Stop 236, ext. 44611, Fax 45023; **Howard Puckett**, Internal Operations Group, ext. 46067, Fax 48196, e-mail h.r.puckett; and **Jim Raper**, Technology Applications Group, ext. 48880, Fax 48885, e-mail j.l.raper

The TOPS Implementation Office can be reached by contacting ext. 48886 or Mail Stop 213.

## Tennis Team Thunders to Victory

The Peninsula Tennis Patrons Association's (PTPA) Senior (50 and over) Men's Doubles League recently completed their 1994 match schedule. Langley's Team Thunder rumbled to victory with a perfect, undefeated, 10-0 season. Other teams in this league represented Village Green, Fort Monroe, Williamsburg, Riverside Wellness and Fitness Center and another Langley team, Team Lightning.

*Photo by Carol Wilson*

**PTPA Senior League Champions, Langley Team Thunder, are, from left to right, Captain Tom Yager, Bob Smith, John Wilson, Frank Ridley, Maynard Sanford, Leonard Credeur and Charles Bryant. Not pictured is George Lawrence.**

# Happenings

**NASA SKI WEEK IV:** The fourth annual Agencywide ski week is scheduled for Feb. 25 to March 4, 1995, at Banff-Lake Louise in Alberta, Canada. Space is limited. Anyone interested should call Michael Schooley by Nov. 10 at ext. 48524 or 874-2736, evenings and weekends.

**RIDE NEEDED:** From Queen's Terr. Apts., Hampton, located off Pembroke and LaSalle Avenues, to the Technical Library. Prefer hours 8 a.m. to 4:30 p.m. Call Evelyn Green at ext. 42369 or at home, 722-7518.

**LOST:** A silver dolphin pin, Oct. 5, in the vicinity of Buildings 1300, 1244, 1192 or cafeteria. Call ext. 43742.

**NEED HOUSING:** German researcher, 28, seeks roommate/housesitting/small apt., Nov. through mid-Jan. E-mail Klaus G. Paul at kpaul@asterix.lrt.mw.tu-muenchen.de, or contact Janice Houston at 766-8973, jdh@svengali.larc.nasa.gov

**VA SYMPHONY:** Classical Masterworks concerts Nov. 11 and 12 feature *Sheherazade* and Tchaikovsky's *Symphony No. 5*. Tickets at the Exchange Shop, ext. 41585, or call 380-0040.

**FOR SALE:** 1982 Mazda 626, $300 or best offer. Formal country dining room suite, maple, table w/leaf, 6 chairs, hutch, $500. Call 887-2597 after 6 p.m.

**AGA SEMINAR:** The Association of Government Accountants/American Society of Military Comptrollers will present a Professional Development Seminar titled "Leading the Way in Financial Excellence," Nov. 17, at the Holiday Inn Hampton-Coliseum. Speakers will present timely material such as: Activity Based Costing, Federal Accounting Standards Advisory Board Update, and Chief Financial Officer's Act Implementation, etc. The cost for the seminar is $55 for AGA/ASMC members, $65 for non-members. To register or for information, call Pat Link at ext. 48102.

**FOR SALE:** 55-gal. and 33-gal. fish tanks w/combo stand that holds both. Includes pump and complete system set-up, mint condition. Asking $275 o/b/o. Call 825-0669.

**LANGLEY KARATE CLUB** offers lessons for juniors (age 7 and up) through November, at Poquoson Elementary School. Call James Brown, 688-9905 or 898-3516, for details.

**COLLOQUIUM NOTICE:** Dr. France Cordova, NASA Chief Scientist, will visit Langley in the near future to give a colloquium about the importance of space science on the American economy, competitiveness, and education. All Langley personnel are strongly encouraged to attend this colloquium. Further information on the date and time will be distributed in the next *Researcher News*, *LaRC This Week* and via e-mail.

**WRITERS SPEAK AT LUNCHEON:** The Fourth Annual Peninsula Area Writers' Luncheon will be Saturday, Nov. 12, 11:30 a.m. at Christopher's, Christopher Newport University, Newport News. Featured speakers are Suzanne Coffman, Linda Wirkner and Lisa Reinhard, as well as 20 local authors. Cost is $15 which includes a $5 tax-deductible donation to the American Association of University Women Education Foundation. Mail checks to AAUW Writers' Luncheon, 200 Harwood Drive, Yorktown, Va. 23692. For more information, call 898-3556.

**NOTICE:** The King Street Bridge at Langley Air Force Base, which had been closed for repairs, is now open.

**MACINTOSH USERS GROUP:** The Peninsula Apple Core (PAC) meets the first Wednesday of each month. The meetings are held at the Hampton Public Library, at 7 p.m. Everyone is welcome to learn and grow with the group. Next meeting is Dec. 7. Call Ken Sisitka at 851-6695 for more information.

**LAA ACTIVITIES:** Social Hour, Friday, Nov. 4, at 4 p.m. and Thanksgiving Social Hour, Friday, Nov. 18 – Entertainment by DJ Mark Bradley. Bingo is held every Thursday at 7 p.m. The Annual Turkey Shoot will be on Nov. 5, from 9 a.m. until dusk; $1 per shot. A Country Western Dance will be held Nov. 5 at 6:15 p.m. Cost is $3 per person.

**VIRGINIA CHORAL SOCIETY** will present the *Saint John Passion* by J. S. Bach, in two concerts: Friday, Nov. 18, 8 p.m. at Gloria Dei Lutheran Church, Hampton, and Saturday, 8 p.m., Nov. 19 at First United Methodist Church, Newport News. Call 1-800-400-4VCS for ticket and other information.

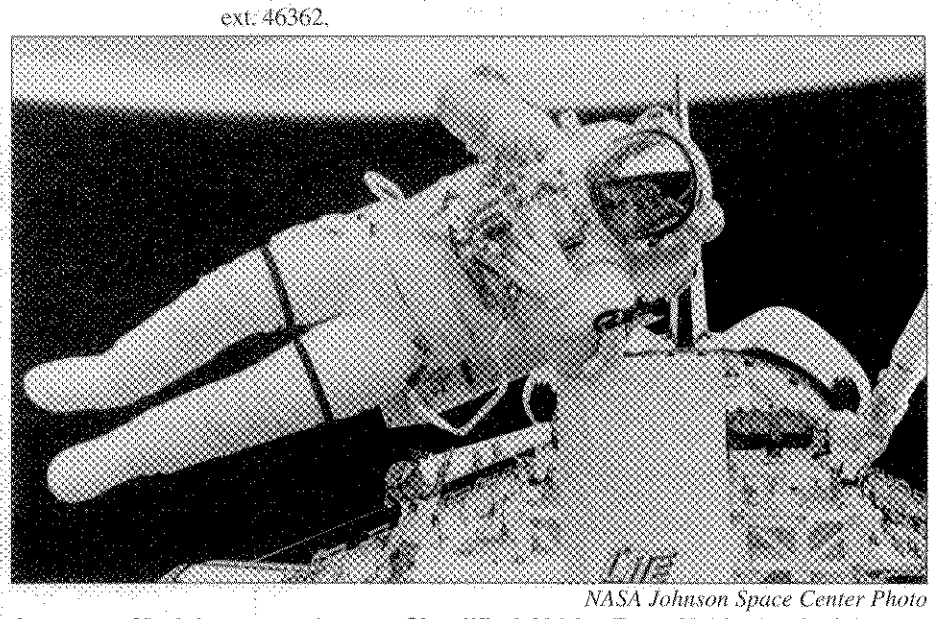
**FOUND:** A watch was found Sept. 28, during the Bloodmobile drive in the H.J.E. Reid Conference Center. To claim, call ext. 46362.

**LAFB VICTORY RUN:** The Air Force Association announces its second annual 8-K and 1-mile Fun Run, Saturday, Nov. 5, at Langley Air Force Base. There are several categories for runners and teams as well as fees and prizes. Call Staff Sgt. Steve Pivin at 764-5791 or Nikki Butler at 825-9270 for more details.

**FREE WORKSHOP:** A free Beginner's Workshop for Safe and Effective Exercise will be given Dec. 5 from 5 to 6 p.m. at the H.J.E. Reid Conference Center. Register by Dec. 2 by calling ext. 42295 or mail your request to Mail Stop 128. The club also gives Aerobics and Power Walking classes in the LAA Gym. Aerobics: Tuesday/Thursday from 5 to 6 p.m. and Saturday from 9:30 to 10:30 a.m.; Power Walk, Tuesday/Thursday, 4:45 to 6 p.m. and Saturday from 9:15 to 10:30 a.m. Call ext. 42295.

**FOR SALE:** 1979 Blazer parts for sale (have all parts). Prices negotiable. Call 868-4608, leave message.

**FOR SALE:** Townhouse, 3 BR, 2-1/2 baths, gas heat and water, many pluses. Asking $74,000. Call 474-4610.




*NASA Johnson Space Center Photo*

**Astronaut Mark Lee tests the new Simplified Aid for Extra-Vehicular Activity Rescue (SAFER) system 130 nautical miles above Earth. The forward cargo bay is reflected in Lee's helmet visor in the 35mm frame, exposed through the Space Shuttle Discovery's aft flight deck windows. Part of the hardware for Langley's Lidar In-Space Technology Experiment (LITE) is in the center foreground. Astronauts Lee and Carl Meade took turns using the SAFER hardware during their shared space walk Sept. 16. The STS-64 test of SAFER is the first phase of a larger SAFER program whose objectives are to establish a common set of requirements for both space shuttle and space station program needs, develop a flight demonstration of SAFER, validate system performance and, finally, develop a production version of SAFER for the shuttle and station programs.**

## Astronauts Due at Langley November 28

### LITE Reception Scheduled for that Evening

Astronauts who flew the STS-64 mission in September, in which Langley's Lidar In-space Technology Experiment (LITE) was a primary payload, will speak at a colloquium at 2 p.m., Monday, Nov. 28, in the H.J.E. Reid Conference Center.

A reception for the participants in the Lidar In-Space Technology Experiment (LITE) project will be Monday, November 28, from 5 to 7 p.m. at the H.J.E. Reid Conference Center. Those interested in attending should call Nita Langford at ext. 48383 for more information.

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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 23 ❖ November 18, 1994

## *Special Colloquium: The STS-64 (LITE) Mission*

Mission Specialist Col. Mark Lee, a member of the astronaut crew that flew the STS-64 mission in September, will give a colloquium at 2 p.m. Monday, Nov. 28, in the H.J.E. Reid Conference Center. Langley's Lidar In-space Technology Experiment (LITE) was the primary payload.

LITE was a tremendous success for atmospheric sciences in demonstrating the utility of a lidar system in space.

In addition to LITE, STS-64 carried SPARTAN-201 (Shuttle Pointing Autonomous Research Tool for Astronomy) which was deployed for 48 hours to measure solar coronal properties and then retrieved, SPIFEX (Shuttle Plume Impingement Flight Experiment) which measured shuttle RCS plume impingement loads, and Safer (SIMPLIFIED AID for EVA Rescue) which involved EVA operation.

Lee will share the astronauts' involvement in shuttle maneuvers, target selection, experiment operation, and photographic support. He will also show video and photographs taken during the nearly 11-day flight.

## Special Colloquium Features NASA Chief Scientist

### *Topic Is Space Science as a Driver for the U.S. Space Program*

A special colloquium, featuring NASA Chief Scientist Dr. France Anne-Dominic Cordova, will be held Wednesday, Nov.30 at 1 p.m. in the H.J.E. Reid Conference Center.

NASA spends about 24 percent of its budget on science programs and another six percent on the launches and communications for its science missions. NASA science programs include Mission to Planet Earth, planetary science, astrophysics, solar and space physics, life science in space, and microgravity research. Cordova will speak about how space science maintains American leadership in science and space; continues making profound discoveries about the universe and our place in it; and deepens our knowledge base, leading to new concepts and new technologies. She will explain how space science improves the American economy and competitiveness; strengthens the quality of American education; and develops a more scientific and technologically literate society. Cordova's talk will also cover the role of NASA and the NASA centers in space science, the productivity of NASA's investment in science, and NASA's relationship with the public in science.

Cordova was selected as NASA's Chief Scientist in 1993. From 1989 to 1993, she was head of the Astronomy and Astrophysics Department at the Pennsylvania State University. From 1979 to 1989, Cordova was first staff scientist, Earth and Space Science Division, and then deputy group leader, Space Astronomy and Astrophysics Group, at the Los Alamos National Laboratory. She participated in a number of NASA space science missions, including the Roentgen X-ray Observatory (ROSAT), the Extreme Ultraviolet Explorer (EUVE), and the Hubble Space Telescope. Cordova has authored or co-authored more than 90 scientific papers and reports. She received a bachelor of arts degree in English from Stanford University and a doctorate in physics from the California Institute of Technology.

## Carbon-carbon Piston: New Engine Technology for the 21st Century

*Photo by Fred Jones*

**Researcher H. Kevin Rivers holds a Briggs and Stratton Vanguard engine block with a carbon-carbon liner as Dr. G. Burton Northam places the carbon-carbon piston inside the liner.**

TOPS
TECHNOLOGY OPPORTUNITIES SHOWCASE
NASA LANGLEY RESEARCH CENTER

Several years of work and research by Langley employees on carbon-carbon pistons have paid off for Center engineers H. Kevin Rivers, Aircraft Structures Branch, Philip O. Ransone, Applied Materials Branch, and Dr. G. Burton Northam, Hypersonic Airbreathing Propulsion Branch. Ford Motor Company, General Motors Corp., Briggs and Stratton Inc., the lawn mower engine makers and K & B Manufacturing, makers of engines for model cars, boats and planes, are all interested in their research. All four companies have "working agreements" with Langley to use the research and technology developed here to improve the pistons that are used in their respective engines.

### Aluminum Pistons

Pistons, mostly made of aluminum today, are used in compressors, pumps and in a wide variety of internal combustion engines.

The current aluminum pistons used in automobiles today, for instance, are lightweight, compared to earlier cast-iron pistons. And they are inexpensive to make; about $5 each. However, aluminum pistons lose their strength at 350 degrees Fahrenheit and they expand when they heat up. If the piston expands too much, the lubricating oil film is destroyed, and the engine overheats and seizes due to increased friction.

### How It All Began

In 1986, trouble with overheating pistons in surveillance planes caused the Army to contact Langley to work on the dilemma. Materials Engineer Allan H. Taylor, who died in 1990, began the research on carbon pistons. His background in structural materials and his hobby as a race car driver gave him the foundation for his work. Rivers said, "Taylor would like to see how far we've come with his research. The carbon pistons have been shown to have the edge over their aluminum counterparts."

### Teamwork Research

Rivers, Ransone and Northam have been working since 1990 to continue the developments that Taylor began. Northam said, "This is a technology that we need to concentrate on maturing and bringing to market as soon as possible."

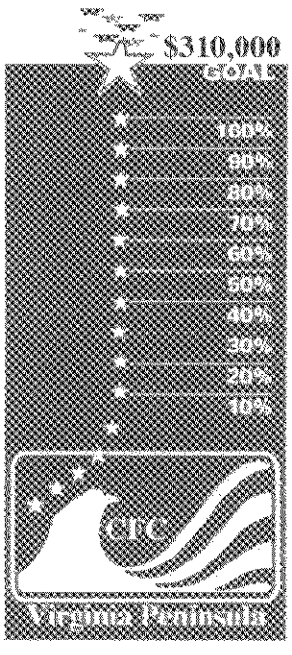
Some of the advantages of the carbon pistons are that they are lighter than aluminum and therefore, they stress engines less as they move because the engine has less weight to support. Unlike aluminum, the carbon piston strengthens as it heats up, and it expands only slightly, even at temperatures over 2,500 degrees Fahrenheit. "Engines won't even work at those temperatures, but the carbon piston will," Rivers said. Another possibility, as yet unproved, is that the carbon piston may help improve fuel mileage.

One disadvantage to the carbon piston is its cost. According to a recent NASA Langley report (CR4595, May 1994), they presently cost $200 each. Rivers thinks that the price could be reduced to between $10 and $20 each if they were mass produced. "The technology is too new right now, though, for anyone to have figured out how to mass produce them," he said.

The four companies will get to use the Langley piston technology if they decide to make the pistons and Langley will learn how each company designs pistons and will earn royalties if they are ever mass produced.

Rick Ruth, an engineer who evaluates new technologies for Ford is hopeful about the use of the Langley-developed piston. "They've made a quantum leap improvement in pistons," he said, "but even with a quantum leap, we're not there yet. The carbon-carbon piston has great potential, but it still needs extensive research and development." He projects that it will take five to eight years to get up to speed. "It won't be used in cars until the year 2000 and that's if everything goes perfectly," Ruth said. "It will be later than that if more research is needed."

## The 1994 CFC Goes Over the Top!!!



# News Briefs

## Around the Agency

### NASA Establishes Program Office for U.S.-Russian Spaceflights

A new program office to direct the upcoming Shuttle flights to the Russian Mir Station has been formed with a long-time Shuttle program official as its manager.

Tommy Holloway will serve as Manager of the Phase One Program Office located at the Johnson Space Center (JSC). Holloway will be responsible for coordinating NASA resources and plans for a series of spaceflights between the United States and Russia. "I am honored and excited to be managing this superb team which has already put so much work into building this joint program," Holloway said. "We have been working with our Russian counterparts for over two years, so it will just be a matter of implementing our new management plan and helping the organization do what NASA and the Russians already know how to do so well — fly manned missions."

"Phase One" represents the activities that will develop the experience and technical expertise necessary for the assembly and operation of the International Space Station, which will occur in Phases Two and Three. In addition, a full program of science experiments and research is planned to be conducted on both the Mir and the Shuttle, as well as extravehicular activities. The Phase One Program Office will be responsible for developing the requirements for Shuttle flights to Mir; directing activities associated with research on astronauts on board Mir for long-duration flights; coordinating the manifest of research hardware and instruments for the Russian Spektr and Priroda science modules; identifying ground support requirements related to Phase One; and integrating the NASA and Russian launch schedules and manifests. "We are totally committed to the success of this Phase One Program, and I am sure that the combination of resources here in NASA and in the Russian space arena will produce a joint program that we will be proud of," Holloway said.

The Phase One activities began in early 1994 with the flight of Cosmonaut Sergei Krikalev on board the STS-60 mission. The Phase One activities will pick up speed in 1995 beginning with a rendezvous and fly-around of the Mir station by the Shuttle Discovery during the STS-63 mission, currently scheduled for launch in February. The mission also features the flight of Cosmonaut Vladimir Titov, who has been training at JSC for the last year.

In March, U.S. Astronaut Norm Thagard is scheduled to be launched in a Russian Soyuz spacecraft with two cosmonauts to begin a three-month tour of duty on Mir. Thagard, along with his backup, Astronaut Bonnie Dunbar, has been training in Russia since February of this year. During his stay on Mir, Thagard will conduct a variety of life sciences experiments that will provide U.S. investigators with the first long-duration medical data on American astronauts since the Skylab missions of the late 1970s. Thagard's mission will end in late May or early June 1995 when the Space Shuttle Atlantis, carrying the newly installed docking mechanism, docks with Mir for the first U.S.-Russian docking operation since Apollo-Soyuz in 1975. The orbiter will remain attached to Mir for five days of joint scientific operations before returning home with Thagard and his Russian crewmates. Two cosmonauts will remain on Mir.

Later in the year, during STS-74, Atlantis will revisit Mir to install a new docking module on the station to improve the ease of future joint operations. In total, Phase One includes a minimum of seven missions to Mir and calls for the flight of five astronauts on the Russian station for a cumulative U.S. crew time of approximately two years.

## How to View Russian Space Station Mir in Orbit

Mir passes over Hampton Roads twice daily. Mir is visible to the unaided eye when the sky is dark while viewing from the ground and yet the sun has not set at the satellite altitude. This special circumstance of events allows the viewer to observe a sun reflection from Mir and the attached Soyuz-TM21 spacecraft against a jet-black sky, even though Mir is orbiting approximately 245 miles above the ground. This combination of events occurs approximately every 24 days, allowing about three to five observing opportunities in a week. Mir appears as a rapidly moving point of steady light, generally brighter than the average star. One interesting phenomenon to look for is sunrise or sunset in space for Mir. This typically occurs when Mir passes over about 45 minutes before sunrise or after sunset on the ground. Illumination or fade-out occurs in about 12 seconds. Mir is currently the largest man-made earth satellite. With three cosmonauts aboard, a record one-and-one-half years in space, is being attempted.

To orient oneself with respect to north, pick a location relatively free of trees and streetlights in the direction specified for the viewing event. Stand so that the right shoulder is pointed in the direction of morning sunrise (east) and the left shoulder is pointed the direction of evening sunset (west).

Looking forward, the viewer is facing north. Behind you is the south. Observing the surroundings for direction, turn in the direction for the event and be sure to scan a wide area of the sky. Allow at least 10 minutes of time in darkness to allow night vision to adapt. Commercial aircraft display blinking strobes whereas satellites generally reflect a constant level of light. Binoculars add a dimension of depth against the fainter background stars, and are helpful, but not necessary. Mir can be seen on Wednesday, November 23, from 5:34 to 5:36 a.m., since there will be a southwest to northeast overpass. Mir will peak nearly overhead in the southeastern sky at 5:35, about 80 degrees above the horizon.

Friday, November 25, from 5:18 to 5:20 a.m., in a west to northeast overpass, Mir will peak in the northwestern sky at 5:19, about 40 degrees above the horizon.

Jim Byrd, a Lockheed support engineer in the Unitary Wind Tunnel, has written a computer program for PCs to compute the overpass data and has regularly observed overpass events of Mir and other orbiting spacecraft such as the U.S. space shuttles. Anyone interested in more information about dates and times for viewing Mir and other spacecraft may call him at 874-3104.

**Thank You for Your Support of the 1994 CFC — We Can Make A Difference!**

CFC
Virginia Peninsula

# Langley Welcomes New Cafeteria Manager

BY GORDON DEGEAR

The breakfast and lunch regulars at Building 1213 Cafeteria have noticed a new face recently in Donis Anders. Anders is the new manager of the Langley Exchange Food Services Branch. She replaces Richard Weeks who resigned to enter the wholesale food business. A Virginia Beach native with eight years of dining service management experience, Anders was selected from among 130 applicants for the job. As food services manager, Anders has oversight of all food operations, including the main cafeteria, the Aerodyner in Building 1202 and catering functions.

So, what's new and exciting at the cafeteria? "We have lots of new 'lighter' menu items," Anders said. "We have different fresh grilled salads available in the snack bar area on Fridays, such as grilled chicken Caesar salad, Chinese chicken salad or taco salad. Also on alternate Fridays, we are serving prime rib dinners and seafood platter."

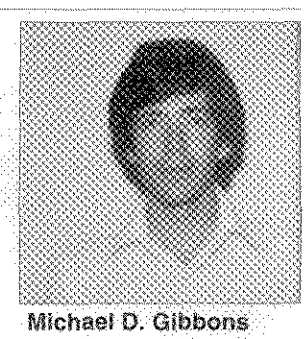
Anders and her staff have instituted a new four-week menu cycle, offering more variety, in addition to the popular items such as fried chicken on Wednesdays. "We have a lot of flexibility with three entrees a day, with one entree being a 'light' offering, containing low sodium, low fat and low cholesterol," she said.

With the addition to the food service staff of a baker who is also a professional cake decorator, new items that will soon be available include fresh-baked decorated sheet cakes and 'pies-to-go' that can be ordered during the holiday season. Anders has also recently developed a new catering menu. "We now offer a full line of catering services for breakfast, lunches, dinners, receptions, banquets, parties or meetings," she said. "We have an expert catering staff, so anything you want, we can do."

Anders has received a very warm reception from her customers and her employees. She said, "I want to thank so many people for personally welcoming me to Langley. There are a lot of nice people who made me feel very welcome and I am happy and excited to be here."

## In Memoriam

### Michael Gibbons



Michael D. Gibbons

Michael David Gibbons, 34, died Thursday, Oct. 20, in Hampton. Gibbons was a native of Albany, Ga., and worked as an aerospace engineer for Lockheed Science and Technology Company at Langley.

### Price P. Powell

Price P. Powell, 81, died Sunday, Nov. 6. Powell was a native of Rocky Mount, Va., and a Peninsula resident for most of his life.

Powell retired from Langley in 1977 after 29 years of service.

### Dr. George D. Sands

Dr. George D. Sands, 75, retired chief of Langley's scientific and technical information programs division, died Wednesday, Nov. 2.

Sands was employed by Langley for 20 years before his retirement in 1979. He was associate project scientist on the Viking Project which landed spacecraft on Mars in 1976.

**News Researcher**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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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 Retirees Discover 'Galaxy'

BY MARNY SKORA

A new community service partnership on the Peninsula — **Galaxy of Gifts** — is ensuring that those serving the area's needy will have a storehouse of resources all year long.

### *The Galaxy of Gifts*

The **Galaxy of Gifts**, a cooperative effort of the NASA Langley Alumni Association, the United Way and the Association of Retarded Citizens (ARC), is bringing products to people. Affiliated with Gifts in Kind America which administers $77 million in product donations annually, the **Galaxy** offers new products, excess inventory, promotional and reconditioned items to nonprofit organizations that pass them on to their clients. These "gifts" can be anything from paint to pantyhose, computers to health care products, wrapping paper to paper plates.

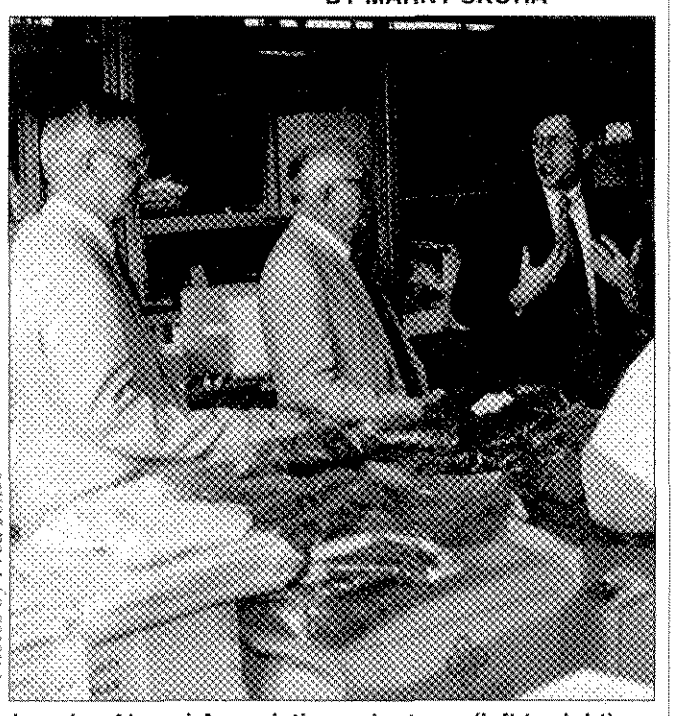
The first shipment includes loads of office products and computer software. Each dollar saved on supplies is one more dollar available to provide much needed services. Also included in the initial $255,000 worth of products are some clothing and small appliances.

### *Langley Alumni Volunteer*

"The Langley Alumni are proud to be a part of this community service initiative," said Charlie King, who headed the steering committee that chose the service project. "Our members are personally involved with so many charitable organizations it was difficult to decide which group to help. The **Galaxy of Gifts** is a perfect choice because this project can serve every local need."

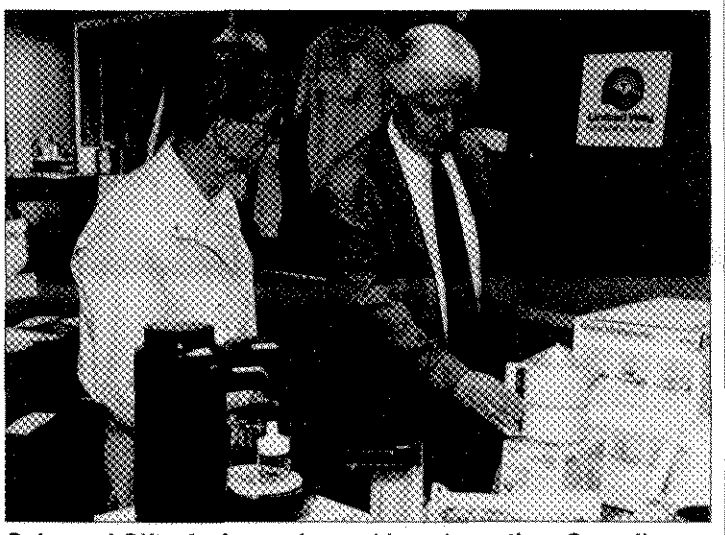
We have about a dozen alumni involved already," said Alumni Association President George Brooks. "So far, Langley retirees have helped draft the business plan, solicit member organizations, select the inventory, and set up and staff the viewing area and warehouse. As the **Galaxy** grows, we'll need even more volunteers."

"We're very pleased to have the NASA Alumni involved in this project," said United Way President Joe Shtulman. "These retirees bring a broad range of capabilities and a new dimension to serving the ever-increasing needs of our Peninsula neighbors."



Photos by Fred Jones

**Langley Alumni Association volunteers (left to right) Bill Williams and George Brooks tour the Galaxy of Gifts warehouse at ARC's Sarah Bonwell Hudgins Center with ARC Associate Director Paul Babcock.**



**Galaxy of Gifts Ambassador and Langley retiree Cornell Burcher answers questions posed by Youth Challenge Executive Director Troy Collier who attended the project's recent Open House.**

### *A Unique Partnership*

More than 60 nonprofit organizations attended the project's Open House in late October at ARC's Sarah Bonwell Hudgins Center. Alumni Association members acted as **Galaxy of Gifts** ambassadors, guiding prospective members through the warehouse operation and answering questions about the accessibility of products.

"I was amazed at the creativity of those who visited the warehouse," said Cornell Burcher, Langley retiree and **Galaxy** ambassador. "The boxes and boxes of health care and cosmetic samples triggered the imaginations of those who run area shelters or serve the community's sick and elderly."

"There's literally something for everyone," said Kay Bradley, **Galaxy of Gifts** managing director, "I see the **Galaxy** as offering nonprofits a rare opportunity to provide their clients with 'extras' or honor volunteers in a way they could never have afforded to do in the past."

This unique partnership offers yet another bonus. ARC has a labor pool of employees with disabilities who are handling many phases of the warehouse operation. The **Galaxy of Gifts** offers these workers — usually the recipients of help — the opportunity to help others.

galaxy of gifts

# *Community Corner*

### Thanksgiving Dinner for the Peninsula Family

The Salvation Army — with help from our local schools — provides food for Thanksgiving dinner for hundreds of families on the Peninsula who might otherwise not enjoy this tradition.

### Here's How You Can Help

The Salvation Army needs volunteers to:

- **pick up food** at area schools and
- **pack food baskets** for the local needy

What a wonderful way to burn "use or lose" leave and perform a valuable community service!

Pick-up and packing will take place Friday, November 18, and Monday, November 21. Volunteers should meet at the Salvation Army facility, 1033 Big Bethel Road, Hampton. Please call Captain Steve Long at 838-1443, to say you can help.

Community Service

JOINING TOGETHER TO LEND A HAND

*Earn your Wings*

## Tradition Puts Spirit in the Season

For the seventh consecutive year, the Acquisition Division is gearing up for a holiday tradition that has proven it is better to give than to receive.

Employees are excited about "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 holiday "wish" may not otherwise be granted.

"We started this tradition in 1988 with hopes of helping two kids," says instigator Stan Ward. "As enthusiasm built throughout the division, we completely outfitted ten children that first year."

Ward approached the project with the idea of selecting a toy for each child, but he soon discovered that their needs were much more basic. "I found out that these kids need warm clothes for the oncoming winter." The holiday plan took on an added dimension and more division employees joined the effort. "We decided to equip each child with jeans, a warm shirt or sweatshirt, underwear, socks, gloves, and a knit hat in addition to a toy," said Ward.

"We found it incredible: the givers — as well as the receivers — experienced the *warmth* of the season," reported Linda Urquhart, another Acquisition employee and Angel Tree kid enthusiast.

From those initial 10 kids, the division's tradition has expanded. Last year, Acquisition completely outfitted 29 kids and adopted a family of five. The hatchback of Urquhart's red Chevette was filled with bags of gifts to be delivered to the Salvation Army for the division's "expanded family."

"I'm very proud of the initiative our employees have taken to ensure that those less fortunate have a happier holiday," remarked Bill Kivett, chief of the Acquisition Division. "This project has been totally employee-driven, and I wholeheartedly support the effort."

Division members shop for their kids after work hours. The Salvation Army requests that clothing and gifts be new and not be wrapped but placed in plastic bags with the Angel Tree label affixed to the bag.

"This year we have identified 6,000 children who need our help," said Captain Steve Long of the Salvation Army. "This will give lots of area volunteers an opportunity to 'earn their wings.'" However, no child is forgotten. Any remaining Angel Tree tags are retrieved by the Salvation Army who ensures that all kids are "adopted."

*The Acquisition Division recommends this activity to every employee or to any group of employees and challenges other divisions on Center to start their own tradition. Adopt one child or a whole family. For more information on the Angel Tree program, call Marny Skora, Langley's Community Service Officer, at ext. 43315.*

# Executive Safety Board Meets to Give Awards, Name Safety Committees

BY CHARLES B. ZEITMAN

The Executive Safety Board (ESB) met at the end of October for its first meeting since the Center's reorganization. Deputy Director Dr. H. Lee Beach emphasized that the activities of the ESB and its subcommittees are some of the most important on Center and employees involved in safety activities are to be supported. He also reemphasized the need for updated procedures for safety-related operations. Beach reiterated the fact that all employees should be proactive in the prevention of accidents, and that no employee shall fear disciplinary action or any other form of retaliation when reporting a hazardous condition that might result in employee injury or equipment damage.

Beach had met with the board and all its subcommittees prior to the meeting to describe the three elements that make up Langley's Safety Program: the ESB and its relationship to the subcommittees; the role of the Office of Safety, Environment and Mission Assurance and the role of the facility safety head and facility coordinator.

The Annual Facility Safety Award was presented to Frederick M. Thompson from Building 1230, and the Annual Facility Coordinator Award was given to Charles A. Poupard of Building 1146. Beach also presented quarterly Facility Safety Head awards to Calvin Chandler, Building 1244; Jeffrey S. Hill, Building 1236; Troy F. Middleton, Building 1221C; and Frederick M. Thompson, Building 1230. He congratulated each winner, thanking all the employees in their facilities who support them in their important safety duties.

***". . . all LaRC employees are charged with the responsibility for ensuring a safe and healthful workplace."***

*— Paul F. Holloway, Director, in a letter to all employees, Nov. 1*

## Safety Committees Named

**Safety committees and their chairpersons are listed below: Pressure Systems, James R. Rooker; Electrical Systems, Carl E. Horne; Systems Operations, James A. Osborn; Ionizing Radiation, Philip H. Gaude; Nonionizing Radiation, Gilda A. Miner; Potentially Hazardous Materials, Carl J. Voglewede; Facility Safety Head Advisory Board, E. Leon Morrissette; Institutional Review Board, Richard E. Snyder; and Airworthiness and Safety Review Board, Harry P. Stough.**

Charles A. Poupard

Frederick M. Thompson

# Source Evaluation Board Receives Special Recognition

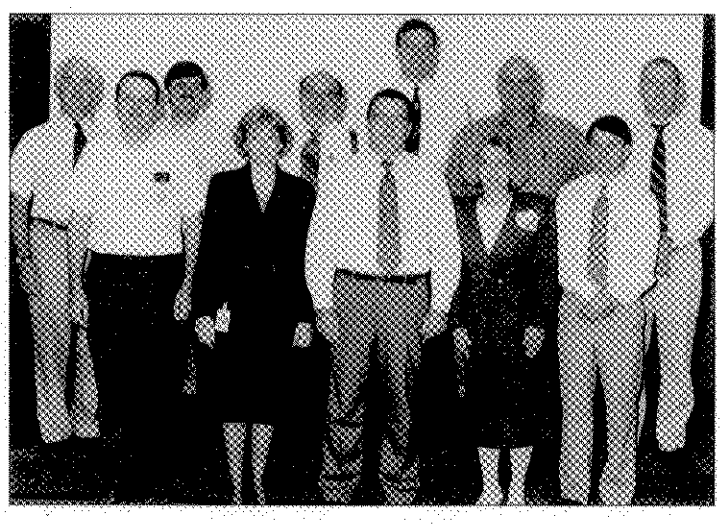
BY VIRGINIA B. MARKS

Langley has been designated by NASA Headquarters as the lead center for the High-Speed research program (HSR) and is specifically responsible for the development of airframe technology. In June 1993, Langley formally appointed the Source Evaluation Board, charging them with the responsibility of developing a Request for Proposal for the HSR Program and, subsequently, to evaluate the responses of those who make offers.

Like the days of Lunar Orbiter and Viking, the Center was asked to assume the responsibility for this vital national program. The SEB began a process that led to recommendations that would be brought to the Source Selection Official. The official then selected companies to help develop the critical HSR technologies that would help get American companies into the forefront of supersonic technology.

The SEB decided to roll three work packages into one procurement package, eliminating the need for a board for each package. Their efforts resulted in negotiations with the Boeing and Honeywell Corporations. This led to contract awards of $440 million and $75 million respectively.

Recognized with an award for their participation on the SEB for HSR were: Howard R. Puckett Jr., Management Support Division; James Burley, High-Performance and High-Speed Aircraft Office; Dr. Paul A. Cooper, Structures Division; Chip Sibbers, Projects Controls Branch; Jerry South, Aerodynamics Division; Stephanie Stockum, Resources Contracts Branch; Brad Gardner, Projects and Focused Programs Contracts Branch; and Bill Sleigher, Pricing Office. Recognized with certificates of appreciation for their work on the procurement process were James L. Thomas, Computational Aerodynamics Branch; Michael S. Lewis, High-Speed Research Program Office; Dr. Raymond G. Kvaternik, Spacecraft Dynamics Branch; R. Todd Lacks, Services Contracts Branch; and Sally O'Neill Mauldin, Office of Chief Counsel.



**Members of the Source Evaluation Board recently given awards were, left to right, Chip Sibbers, Dr. Raymond G. Kvaternik, James L. Thomas, Stephanie Stockum, Dr. Paul A. Cooper, James Burley, Michael S. Lewis, Sally O. Mauldin, Jerry South, Brad Gardner and Howard R. Puckett Jr. Not pictured are R. Todd Lacks and Bill Sleigher.**

## *With the Speaker's Bureau You Make a Difference*

BY CATHARINE G. SCHAUER

Do you take credit for the volunteer talks you give to groups in the community? Or, do you just shrug it off and forget about your contribution?

Langley is proud of its Speaker's Bureau and of the employees who support it. Any employee on Center who gives a talk about NASA's work to a community organization or educational group, either as a result of a request from the Speaker's Bureau coordinator or from a direct request, should send his or her name, mail stop and phone number, the date and place of the talk, the title of the talk and number of attendees during the month of the talk to: Speaker's Bureau, Mail Stop 154.

The information is used to identify the areas and levels of interests the community has in Langley's work, the kinds of organizations making requests, and the number of people that Langley speakers reach. The success of the program cannot be measured without your support and we want to recognize those who participate. For more information, call me at ext. 43314.

# *Speaker's Bureau Report for the Fall*

The following Langley personnel have participated in the Speaker's Bureau Program in the past three months.

**Michael Nelson** spoke to the Society of Professional Engineers about "Changing the Way We Do Business Through Use of the World Wide Web and Mosaic."

**Dr. Gregory S. Jones** spoke at Hampton University Student IEEE Chapter about "Measurements in Aerodynamics."

**Dana Dunham** spoke to finance classes at Christopher Newport University about "Real World Finance — Allocation of Funds in a Research Environment."

**Richard Davis** spoke to sixth grade students at Hines Middle School on the topic of "Weather," and to sixth-graders at Trinity Lutheran School, Newport News, about "Constellations: Birth, Life and Death of Stars."

**Thayer Sheets** and **Dr. Joe Heyman** spoke to the Industrial Development Authority of York County about "Technology Transfer." Sheets spoke to Metro Chamber of Richmond about the "Small Business Innovative Research (SBIR) and STTR Programs – '94 Biz Linc;" and to the Virginia Municipal League of Mayors in Norfolk about "The SBIR and STTR Programs."

**Greg Mekkes** spoke at Old Dominion University on the "National Aero-Space Plane Program."

**Pamela Davis** spoke to the Thomas Woods Ruritan Club, Zuni, Va., about "Space Shuttle Programs."

**Irwin J. Schauer** spoke at USAA Insurance Co. on the "Focus on Quality;" The Virginia Peninsula Total Quality Institute about "Langley's Quality Journey;" to the Hampton Roads Quality Management Council about "Lessons Learned in Implementing a Quality Program;" and to the First Fighter Wing of the U.S. Air Force about "Langley's Strategic Plan Process and How It Relates to Langley's Quality Effort."

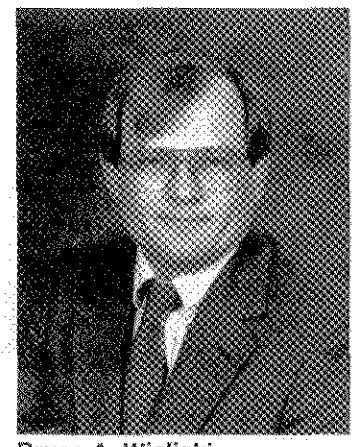
**Jeff Seaton** spoke to students at Bardstown Middle School, Bardstown, Ky., about "Robotics in Future Space Exploration."

**Kathy Powell** and **William Vance** spoke to eight groups of students at Corporate Landing Elementary School, Virginia Beach, about "Employment Opportunities for the Hearing Impaired" and "Educational Opportunities at NASA Langley."

**Larry Cooper** spoke at Coventry Elementary School in York County about the "Shuttle, a NASA Overview and Education."

## Wielicki Honored by AMS

BY SUSAN A. SMIGIELSKI



Bruce A. Wielicki

Senior Research Scientist Dr. Bruce A. Wielicki of the Radiation Science Branch, has earned the American Meteorological Society's Henry G. Houghton Award.

Wielicki received the award "for outstanding contributions to the understanding of clouds and the Earth's radiation budget derived from satellite observations and theoretical radiation transfer models."

The American Meteorological Society gives the Houghton Award annually to recognize research achievements in the field of physical meteorology, including atmospheric chemistry. He will accept the award in January at the group's annual meeting in Dallas, Texas.

Wielicki became a research scientist at Langley in 1980. Since 1989, he has served as principal investigator for the Earth Observing System Interdisciplinary investigation known as Clouds and the Earth's Radiant Energy System (CERES). Wielicki leads the CERES science team and the remote sensing analysis methods. The CERES team consists of 21 investigators from NASA, the National Oceanic and Atmospheric Administration, United States universities, Belgium and France.

Recently, Wielicki led the drafting of an Earth Observing System Science Plan for studies of clouds and radiation. The plan was reviewed at an international meeting on clouds and radiation. It has also been submitted to the American Meteorological Society for publication.

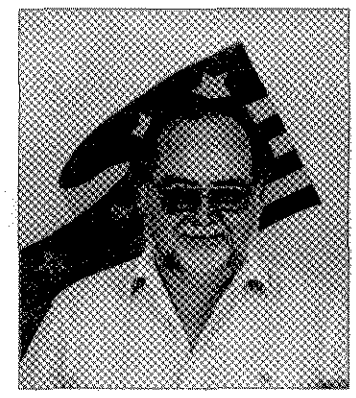
Prior to his role with the CERES program, Wielicki served as co-investigator on Langley's Earth Radiation Budget Experiment. He also was a principal investigator and project scientist on the First International Satellite Cloud Climatology Experiment Regional Experiment.

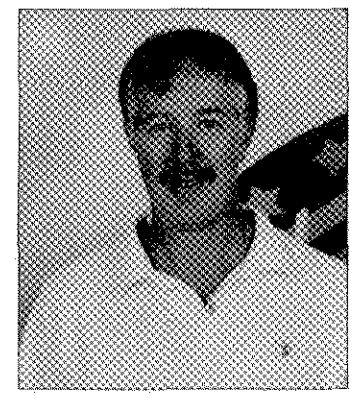
He received his bachelor of science degree from the University of Wisconsin and his doctorate from Scripps Institution of Oceanography. Prior to coming to Langley, Wielicki did research at the National Center for Atmospheric Research as part of a graduate student fellowship.

## Langley League Softball Champions

**The "Ballers" are the 1994 Langley "A" League Softball Champions. They are, front row, left to right, Chip Quinn and Bobby Borchardt; back row, Jamie Goodsey, Rodney Russell, Charlie Poupard, Jimmy Adams, Mark Frye and Bill Tomek. Not pictured are Ray Rhew, Lewis "Bucket" Horsley, Ken Rock, John Costilus, Steve "No Show" Geissinger, Dave Burnett, Kevin Laferriere, Bob "Casper" Redman, Nick Nicosia, Jay Aldrich, Frank Herndon and Donnie "The Glove" Mann.**

## Manned Flight Awareness Awards Given to Three from Langley





**Manned Flight Awareness Awards were given to Tom D. Finley, left, of the Models, Instrumentation and Systems Branch; Robert T. Sherrill, center, of the Space Systems Engineering Branch; and James L. Leiffer, right, of the Office of Systems Assurance, during ceremonies in September, two days before the launch of STS-64. Jeremiah Pearson, Associate Administrator for Space Flight, Bryan O'Connor, Space Shuttle director; and Fred Gregory, Associate Administrator for Safety and Mission Assurance, all of NASA Headquarters, were on hand with Astronauts Marsha Ivins and Andy Thomas to confer the honors on the award recipients.**

## Virginia Air and Space Center News

*Virginia Air and Space Center*
*Hampton Roads History Center*

### AIAA Hampton Roads Section Sponsors Lecture by Dr. Christopher C. Kraft

Dr. Christopher C. "Chris" Kraft will present a lecture entitled "The Future of Aerospace Research," on Friday, Nov. 18 from 12:30 to 1:30 p.m. at the center. The lecture is sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA).

Kraft, the director of the Apollo Program, and from 1972 to 1982, the director of the Johnson Space Center, is well known to many Langley employees and AIAA Hampton Roads Section members.

A native of Phoebus, Kraft began his career at Langley after graduation from Virginia Polytechnic Institute and State University. He left Langley for Texas in 1962 to work with the Space Task group to form Johnson Space Center.

Kraft is an honorary member of the AIAA and counts among his many honors the Arthur Fleming Award, NASA Outstanding Leadership Medal, the Spirit of St. Louis Medal and the Goddard Memorial Trophy.

All Langley personnel are invited to attend. Buses will leave from the H.J.E. Reid Conference Center at noon and return to Langley at 2 p.m. Time may be charged to Job Order A5266.

### Apollo XII Exhibits

Any visitor who says "Apollo XII" during the celebration of the Apollo XII mission at the center, through Nov. 24, will receive free admission to the exhibits.

### Center Facts and Figures

The center's winter hours are 9 a.m. to 5 p.m., Monday through Sunday. Admission to the exhibits is $4 for adults, $3.50 for military and senior citizens and $2 for children four through 12 years of age.

The center is located off Interstate 64, exit 267. Follow Settlers Landing Road to downtown Hampton, and the center is on the left.

For information about activities, call (804) 727-0900 or 1-800-296-0800, ext. 730.

### Children's Gallery

In November and December, children can spend every Saturday studying how simple toys work in space in fascinating demonstrations using jacks, magnets and other toys. Each Saturday, a *Toys in Space* program will be offered in the demonstration gallery at 11:45 a.m., and at 12:45, 1:45, 2:45 and 3:45 p.m.

Sundays in November and December will feature an educational program about living and working in zero gravity. Children will learn how astronauts live and work in zero gravity and micro gravity. They will also have chance to see, touch and wear a real space suit. Each Sunday, a *Living and Working in Zero Gravity* program will take place in the demonstration gallery at 11:45 a.m. and 12:45, 1:45, 2:45 and 3:45 p.m.

### *Destiny in Space*

The IMAX® film, *Destiny in Space*, is still playing at the center, at 10 and 11 a.m., noon, and 1, 2 and 3 p.m.

Narrated by Leonard Nimoy, the film features never-before-seen footage of the space shuttle in flight around Earth. Viewers will also see spectacular scenes of Mars, Venus and Jupiter returned by robotic scouts dispatched across the solar system. Cost is $5.50 for adults, $4.50 for seniors and $4 for children ages four through 12.

## Roundtable: *Economic Future for the Virginia Aerospace Industry*

Joe Casas, President of Spacetec, a Hampton high-tech engineering services firm, will discuss economic strategy planning for the Commonwealth's aerospace business sector at a Virginia Aerospace Roundtable luncheon meeting Tuesday, Nov. 22, at the Hampton Holiday Inn. The aerospace sector is one of eight business sectors being reviewed by Gov. Allen's Opportunity Virginia task force.

Casas' company played a supporting instrumentation role in recent space shuttle flights. Spacetec was the prime integration contractor for LITE (Lidar In-Space Technology Experiment) and MAPS (Measurement of Air Pollution from Satellites), instruments that were conceived and developed at Langley.

Casas will speak at a luncheon that begins at noon and his program will start at 12:45 p.m. For reservations, call Jo Anne Philips at 825-2958. For more information, call Duncan McIver at 827-1100.

# Happenings

**FOR SALE:** 1992 Stealth RT, dealer-protection package, red w/black interior, CD player, anti-lock brakes, air bag, 35,000 miles, excellent condition, fully loaded, 851-1549 after 5 p.m.

**FOR SALE:** Virginia Beach townhouse w/3BR, 2-1/2 baths, attached garage, new carpet and paint, eat-in kitchen w/new floors, great room w/dining area, fireplace, gas heat and water, appliances, fenced yard. Asking $74,000 or assumable 6 percent FHA ARM. Call 474-4610.

**TRAIN SHOW:** The Chesapeake Bay Railroaders will hold their semiannual Open House and Railroad Flea Market Nov. 19 and 20. Model railroad Open House at 110 Dare Road in Grafton, Nov. 19 from 10 a.m. to 5 p.m. and Nov. 20, 1 to 5 p.m. Flea Market at Dare School, 300 Dare Road, Nov. 19 only, 10 a.m. to 5 p.m. Call Joe at 229-8633.

**FOR SALE:** 1989 Plymouth Horizon, excellent condition, less than 44,000 miles. A/C, rear window defroster and wiper, asking $3,000. Call 247-5426.

**ALL NEW AEROBICS – FREE:** New energized instructors Terrance, Andree and DeeDee will bring the latest in aerobic step, low-impact, resistance work and cross aerobics to participants. Classes are held at 6:15 to 7:15 a.m. on Monday (low-impact), Wednesday (cross training) and Friday (super step) and 11 to 11:45 a.m. Monday (cross training) and Wednesday (super step). All are welcome; there is something for everyone. Thanksgiving holiday hours, Friday, Nov. 25 are from 7 a.m. to 1 p.m.; no aerobics. Call the Fitness Center at ext. 46387 for more information.

**FOR RENT:** York Crossing, 2 BR, 1-1/2 baths, end unit townhouse, living room, eat-in kitchen w/ fireplace, washer/dryer, dishwasher, refrigerator, $595/mo. + deposit; available Dec. 16. Call 890-0994.

**FOR SALE:** Hampton, Whealton area townhome, 2 BR w/cathedral ceiling, 1-1/2 baths, family room w/ fireplace, eat-in kitchen, dining room, lots of extras. Asking $65,000. Call 838-9328.

**CNU OPEN HOUSE:** Students interested in undergraduate and graduate careers in science and technology are invited to visit Christopher Newport University's College of Science and Technology Open House, Saturday, Nov. 19, from 11 a.m. to 2 p.m. A tent will be located between Gosnold Hall and the new science building. For more information, call Patricia Hixon at 594-7082.

**SEEKING** the Oct. 17, 1975 issue of the *Researcher News* — to complete the Historical Archive collection for the 1970s. Please contact Dick Layman, Historical Program Manager at ext. 43441, or mail the issue to Mail Stop 446.

**TIDEWATER CLASSIC GUITAR SOCIETY** presents Kevin Gallagher, Saturday, Dec. 3, at the Williamsburg Regional Library Arts Center, and on Sunday, Dec. 4, at the Chrysler Museum, Norfolk. Both concerts are at 8 p.m. For tickets and more information, call 625-2411, Southside, or 566-3304 on the Peninsula.

## 757 Ceremony Slated for December 8

**A ceremony to welcome the 757 aircraft into Langley's research "fleet" is scheduled for Thursday, Dec. 8 from 10 to 11 a.m. in the hangar, Building 1244. Center Director Paul F. Holloway will give the welcome. Representatives from the U.S. Congress, Eastern Airlines and NASA Headquarters. All Langley personnel are welcome to attend. For details, see the Dec. 2 issue of the *Researcher News*.**

## LAA Aerobics Club Celebrates Halloween

*Photo courtesy Michele Macaraeg*

The LAA Aerobics Club has provided low-impact, bench and weight training classes at Langley for four-and-one-half years and to celebrate Halloween (photo above), the club held a special bench—low-impact class, hosted by Morticia and Gomez Adams.

Learn step aerobics at a free Beginner's Workshop for Safe and Effective Exercise, Monday, Dec. 5 from 5 to 6 p.m. at the H.J.E. Reid Conference Center. To register, call ext. 42295 by Dec. 2 or send a note to Mail Stop 128.

The club's classes focus on newcomers to aerobics and exercise. Its instructors are certified in personal training and aerobic exercise science, and can provide diet consultation, body composition and cardiac fitness assessment for members. PowerWalk® classes have recently been added to the fitness agenda. Classes are Tuesday and Thursday, 5 to 6 p.m. and Saturday, 9:30 to 10:30 a.m. in the LAA Gym.

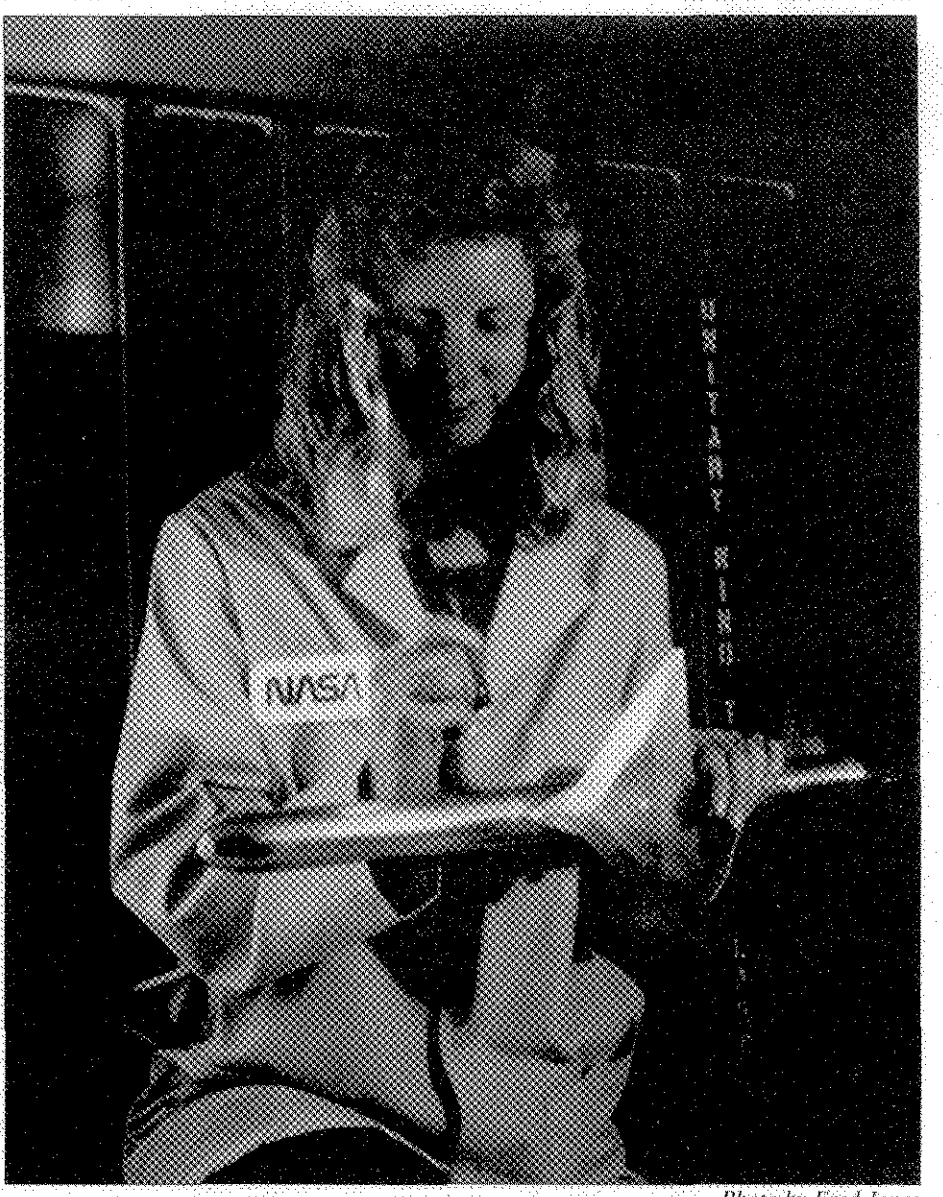



*Photo by Fred Jones*

**Janice Mongesku inspects a three percent scale model of the Orbital Sciences, Corp. Pegasus XL launch vehicle installed in Langley's Unitary Plan Wind Tunnel prior to Mach 1.6 rudder effectiveness testing. These tests are part of Langley's continuing efforts to return to flight the Pegasus launch system.**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National Aeronautics and Space Administration
Langley Research Center

# News Researcher

Bi-weekly Employee and Contractor Publication

Volume 8 ❖ Issue 24 ❖ December 2, 1994

## December Colloquium Features CEBAF Speaker

"CEBAF, the Continuous Electron Beam Accelerator Facility: An Accelerator Laboratory for Nuclear Physics" will be the topic of the next colloquium to be held Tuesday, December 13, at 2:00 p.m. in the H.J.E. Reid Conference Center. The speaker is Dr. Beverly K. Hartline, associate director and project manager of the Newport News facility.

Hartline will describe CEBAF's scientific purpose, accelerator concept, technologies, status and educational outreach programs. CEBAF, under construction since 1987, is an accelerator laboratory for basic nuclear physics research. Its mission is to provide forefront scientific facilities, opportunities and leadership essential for discovering the fundamental nature of nuclear matter; to partner with industry to apply its advanced technology; and to serve the nation and its communities through education and public outreach, all with uncompromising excellence in environment, health and safety issues.

The project scope includes a pair of linked, computer-controlled, superconducting linear accelerators in an underground racetrack-shaped concrete tunnel 7/8 of a mile around, three large experiment buildings equipped with 1,000-ton spectrometers and detectors to observe interactions between accelerated electrons and the nuclei in materials under study, and supporting facilities and equipment.

Construction of the $600 million facility is 99% complete. The first beam was delivered to a target in July and experiments are scheduled to start this month.

Hartline joined CEBAF in June 1985 as scientific assistant to the director and, in March 1989, assumed her current role. In this position, she is responsible for the technical, cost and schedule success of the construction phase of the laboratory. This involves managing the work of building the accelerator, its three nuclear physics experimental halls with their specialized equipment, and all supporting facilities and subsystems. In 1990, she also assumed responsibility for CEBAF's precollege education programs. As both a parent and a scientist, Hartline has been interested in and involved in precollege science and math education. Even as a

Dr. Beverly K. Hartline

teenager she participated as a volunteer in curriculum development and activity testing for hands-on, exploratory elementary school science. CEBAF's education programs now motivate 10,000 students and support 1,500 teachers annually through interaction with the lab's staff and facilities.

Hartline came to CEBAF from Lawrence Berkeley Laboratory, where she served as scientific assistant in the Office for Planning and Development. Previously, she worked as a research scientist for Goddard Space Flight Center, as a research news writer for *Science* magazine, and as a college teacher. She received a doctorate in geophysics from the University of Washington and a bachelor of arts degree in chemistry and physics from Reed College in Portland, Oregon.

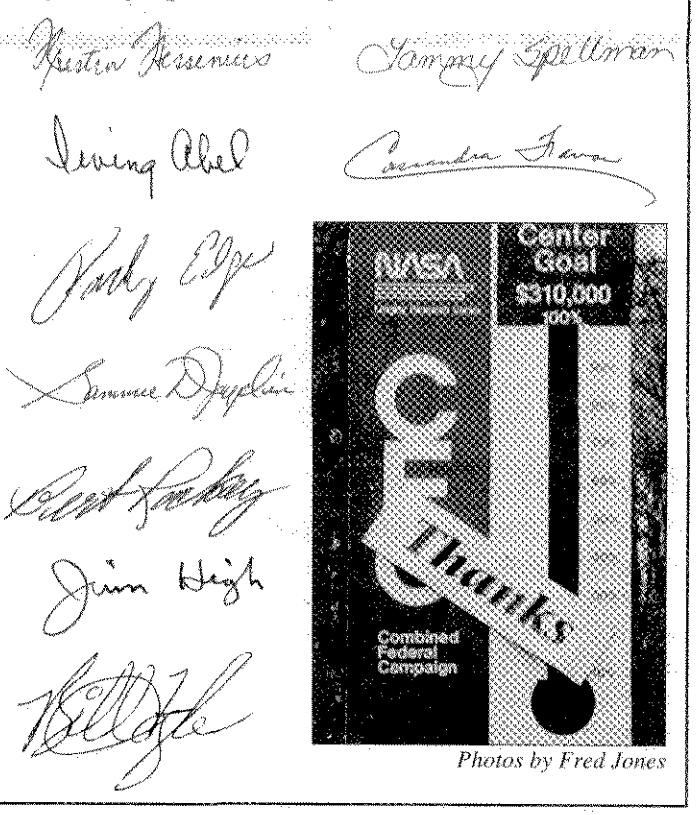
## You Did It!!! Thank You from the 1994 CFC Committee

### Langley Employees Come Through for the CFC

More than $315,000, or 102 percent, was contributed to exceed Langley's goal of $310,000. More than 68 percent of employees contributed to this year's Combined Federal Campaign (CFC).

**The CFC Committee members for 1994 are Chairperson Dr. Kristin Hessenius, Irving Abel, Tammy Spellman, Sammie Joplin, Bert Rockey, Cassandra Favor, Rockey Edge, Bill Fogle, Jim High and Donna Speller.**

*"The Langley CFC Committee would like to thank you for helping the CFC help others who are in need."*




*Photos by Fred Jones*

## *Improved Slip Casting of Ceramic Models Licensed to Local Industry*

An improved technique of slip casting has been developed at Langley by Greg Buck, Aerothermodynamics Branch, and Peter Vasquez, Fabrications Division, for making precise wind-tunnel experiment models. A licensing agreement between Langley and Final Touch of Virginia, Inc., of Richmond has been signed which will allow the company to license the technique for developing research prototypes of consumer goods and their manufacture.

**Peter Vasquez, Fabrications Division, left, and Greg Buck, Aerothermodynamics Branch, right, flank Richard Call, president of Final Touch, Inc., whose company has licensed the slip-casting technique from Langley.**

T.O.P.S.
TECHNOLOGY OPPORTUNITIES SHOWCASE
NASA LANGLEY RESEARCH CENTER

### The Slip-Casting Technique

Precise test models with thermal stability and low values of heat conduction are needed in aerothermodynamic ground testing. Precise fabrication of highly-detailed sub-scale test models are necessary for next generation space transportation systems like the shuttle orbiter and futuristic suborbital high-speed transports such as the Hypersonic Suborbital Research Vehicle. Ceramic materials are known to perform well under these test conditions, but conventional fabrication techniques are too expensive or imprecise.

Slip-casting techniques were developed at Langley in the 1960s using flask or block molds and plaster of Paris. A slip consisting of a ceramic suspension in a liquid is poured into the mold which draws out the liquid and sets the shape of the piece. The piece is then removed from the mold and fired to bonding temperature.

Fabrication of highly detailed slip molds are made possible with the improved method. The new mold material may be formed as a shell over a pattern such as wax, then taken to high temperatures to vaporize the original pattern. It draws liquids, both water-based and non-water-based (like alcohol) so that the shell mold is weakened by the absorbed liquid and thus is easily removed. Plaster of Paris, in contrast, is strengthened by moisture absorption and makes mold release with any detail nearly impossible.

The improved technique enables casting of complete, precise detailed models without the parting lines and surface impurities that are caused by separation of or from molds. The technique was developed by Buck and crafted by Vasquez and Hicks to fabricate models for hypersonic ground testing but it can also be used for precision casting of complex ceramic parts. At Langley, the technique has been used for rapid manufacturing of wind-tunnel test models and with superconducting ceramics for space applications.

*Continued on Page 3*

# News Briefs

## Around the Agency

**PEARSON RESIGNS AS SPACE FLIGHT ASSOCIATE ADMINISTRATOR** – Major General Jeremiah W. Pearson, United States Marine Corps (Ret.), recently announced his resignation as the Associate Administrator for the Office of Space Flight. Dr. Wayne Littles was named as the new Associate Administrator. Littles was the NASA Chief Engineer and former deputy director of the Marshall Space Flight Center, Huntsville, Ala. These past few years at NASA have been tremendously rewarding for me," Pearson said. "We've made great strides in the human space flight program during that time, and we've found new efficiencies in the space shuttle budget while maintaining our strong commitment to safety. We've brought Russia into the redesigned Space Station partnership, and we've set the stage for an exciting future in human space flight. I'm extremely proud of our accomplishments and gratified to have had the opportunity to lead this talented group of people at NASA. Now I'm looking forward to new challenges and opportunities."

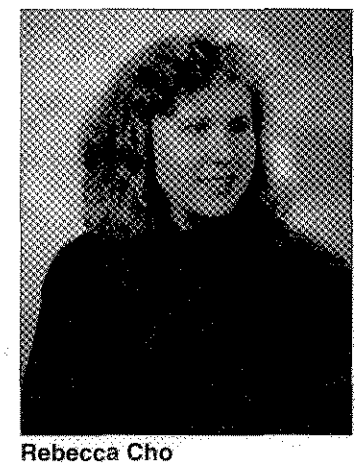
# A New Look for the Exchange Shop

**BY GORDON DEGEAR**

If you've stopped by the Exchange Shop recently, you've noticed a number of changes there. The most noticeable is the new manager, Rebecca Cho, a graduate of Virginia Polytechnic Institute and State University with a bachelor's degree in management science. Since coming to Langley in June, Cho and her assistant Kay Ware have worked to provide the type of shop that will best serve Langley employees. Cho says that her first impression of the shop was that "it had a lot of potential, but it needed some work. I felt that we had to provide more variety."

Cho has worked on getting that variety by purchasing many new types of clothing such as polo shirts, night shirts and boxer shorts. "We also rotate items in and out so that the shop has a new look and new products whenever people stop by," Cho said. Besides clothing, the shop now has a number of products and services available during its operating hours, 7:30 a.m. to 2 p.m.: UPS parcel pickup, sales and delivery of flowers from Freeman's Florist, NASA business card printing, postage stamps, greeting cards, cosmetics and film development. Tickets are available at discount prices for Busch Gardens, King's Dominion, Water Country USA, Colonial Williamsburg, AMC movie theaters, the Virginia Air and Space Center and other local events.

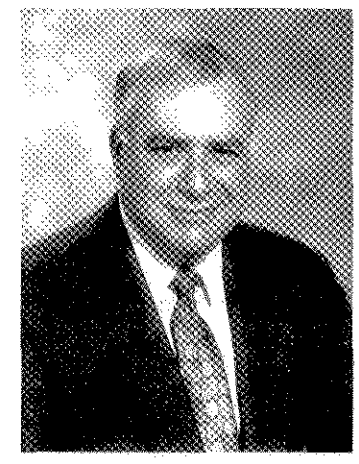
One of the biggest challenges Cho has taken on has been marketing the shop. "We're pretty limited as to how much advertising we can do," she said. "Besides stopping by in person, the main way for customers to find out about sales or new items is in *LaRC This Week*. We also keep a database of interested customers on our mailing list." Another way she promotes employee awareness is by having drawings and contests. A popular drawing was held weekly during the summer for free movie tickets. "We also have a drawing to give away Busch Garden tickets, and we're looking at doing drawings to give away clothing or gift certificates as prizes." In another recent contest, Cho asked employees to suggest their *10 Best Reasons for Working at Langley*.



**Rebecca Cho**

Cho knows that feedback by Langley employees is a key to the shop's success. "Kay and I want to know what the people here want or don't want," she said, "so please stop by and say 'Hi!'"

# A Message from the Director



The holiday season is upon us! For many, the holidays involve traveling on our nation's highways to visit family and friends.

December has been proclaimed National Drunk and Drugged Driving Prevention Month. Langley Research Center fully supports this nationwide effort to reduce motor accidents on our highways.

Last year, there were 10,812 persons injured in alcohol-related accidents in Virginia alone. Nearly 400 of those injuries were fatal. Alcohol-related injuries cost Virginia $328 million in losses — lost productivity, medical costs and property damage. By increasing highway safety awareness, we can help in the effort to save lives, prevent injuries and reduce traffic-related health care and other economic costs.

The most valuable commodity we possess at Langley is our work force. My concern in this instance is not only for our employees, but for your families and friends as well. Let's all join together to make this holiday season safe, healthy and happy.

— **Paul F. Holloway**

## Announcements

### Retirement Reception

An informal reception for Randy Grove will be held Wednesday, Dec. 14, from 1 to 3 p.m. in Building 1268A, Room 2120. Send gift contributions to Jacob Houck, ext. 46412, Mail Stop 125B, or Sonia Herndon, ext. 47494, Mail Stop 125B, by Dec. 9.

## In Memoriam

### Martin J. Menges

Martin J. Menges, 82, former chairman of the Board of Supervisors of Mathews County, died Sunday, Nov. 6.

Menges worked as head of the electrical section at NACA and later, NASA Langley, for more than 40 years and retired in 1972.

## Letters

### ASM Thank You

From Karen Taminger, chairperson, Hampton Roads Chapter, American Society for Metals (ASM): "On behalf of the Hampton Roads Chapter of ASM, I would like thank the LAA staff who helped with our Student Night at the Reid Conference Center on Monday, Nov. 14. They did a fantastic job preparing and serving the dinner, and making the evening an enjoyable one for the 95 students, educators and ASM members in attendance. I particularly wish to commend the staff for being able to accommodate a 25 percent increase in attendance the day of the event."

# *Health Corner*

## *National Drunk and Drugged Driving Prevention Month*

### *Controlling Highway Safety*

• Nearly 40,000 people die each year and more than a million are injured in traffic accidents. Traffic crashes are the leading cause of death in persons under the age of 30 and many of these accidents are alcohol and/or drug- influenced.

• Secretary of Transportation Federico Pena has set tough new goals for increasing seat belt use and decreasing drunk driving, the two actions that hold the most promise of saving lives, preventing injuries, and reducing traffic-related health care and other economic costs. Increased seat belt usage in passenger cars to 75 percent from the current 62 percent would save 1,700 lives and many times that number of injuries. Health care costs would be reduced by $684 million ($180 million of which is publicly funded) and another $328 million would be saved in income taxes and public assistance.

### *The Cost of Prevention*

• Each serious injury prevented saves the country $35,000 in health care costs. By buckling safety belts, drivers save the country $282 million in health care costs. By not driving drunk, and not letting friends do so, taxpayers whittle another $684 million off their bills. Prevention works. This year, resolve to sit back, save money and reduce injuries right from your car. Your resolution can have a profound effect, not just by saving lives but by saving the nation money. By becoming a safe driver, you can help reduce motor vehicle crashes and national health care costs.

### *Keep Your Friends and Family Alive*

Don't drink and drive; don't ride with people who do. Use safety belts and child safety seats. Be a courteous and responsible driver. Never serve alcoholic beverages to anyone under 21. If you drink, always plan ahead to designate a non-drinking driver. Be a responsible party host: serve nonalcoholic beverages; serve high protein food; control the amount of alcohol being served — no open bars; ask alcohol-impaired guests to stay overnight or call a cab to assure them a safe ride home; take away the keys from an impaired guest.

• Report suspected impaired drivers to state or local police.

• Be a positive role model for youth.

• Ask the Governor or state legislators to support tougher laws, such as administrative license revocation and zero-tolerance laws for drivers under 21. Get involved with local groups that support drunk and drugged driving prevention programs.

**Old Duffers 20th (*we think*) Annual Christmas Gathering Saturday, Dec. 17, at 9 a.m. in the Hangar, Building 1244.**

**Coffee and donuts will be served. All those who are or have been involved in a flight project, aircraft or spacecraft, are invited.**

**For more information, call Calvin Chandler at 864-3900 or Lee Person at 864-3915.**


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

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All materials are subject to editing.

# Langley Goes Metric! ...well, OK, we're working on it . . .

BY CATHERINE E. WATSON

At the end of November, the first building at Langley designed using the metric system was completed. A construction project, an addition to Building 1216, is the first building constructed at Langley in response to Executive Order 12770. The order, issued in July 1991 by President George Bush, states that all Federal agencies shall ". . . use, by the extent economically feasible, by September 30, 1992, or by such other date established by the agency. . ., the metric system of measurement in Federal Government procurements, grants, and other business related activities." In February 1992, NASA responded with a Metric Transition Plan that directed NASA centers to adopt the metric system as the preferred system for all activities.

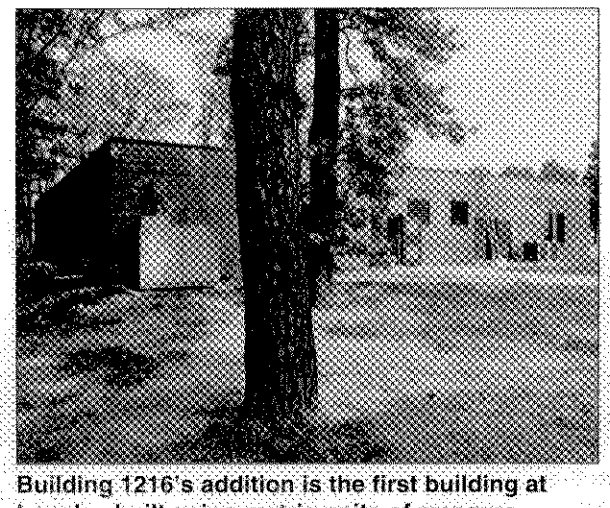
### The Metric Transition in Construction

The Building 1216 addition, a training center for the Office of Education, was constructed using what project engineer Rodney T. Harris, Langley Center Facilities Metric Coordinator, called a 100 percent "soft metric conversion." A "soft" metric conversion involves no change in the actual size of building components but rather a relabeling in metric units. In even the largest metric construction projects, Harris said only five percent of the building products are "hard" metric in size. A "hard" metric component would have rounded millimeter dimensions such as 5 cm x 10 cm instead of 5.08 cm x 10.16 cm, the metric size of the standard 2-in. x 4-in. in building components. Harris said "hard" metric units are typically modular products such as ceiling components, unit masonry and sheet goods.

The 1216 addition, according to Harris, used the soft metric conversion primarily because the "local building industry hasn't sufficiently converted to metric" to allow a project of this size to use many "hard" metric components economically. He said, "Converting to the metric system would force the manufacturers of building materials such as concrete blocks and bricks to make new molds and acquire new equipment. Because, according to him, these manufacturers are often localized small businesses who cannot afford to switch over to metric for the occasional order, the concrete block and brick manufacturers will be the last to switch to the metric system.

Harris said, "The General Services Administration is leading the way in designing and building new facilities using the metric system. This is because it is easier to use the metric system to build large new buildings than to add on to, or refurbish, existing buildings."

To help the contractor employees who worked on Building 1216 adjust to the metric system, the building inspectors were given dual unit tape measures with both English and metric units.



**Building 1216's addition is the first building at Langley built using metric units of measure.**

### The Transition in Aeronautics

According to the NASA Metric Transition Plan, "The introduction of the metric system into new flight programs will determine the pace of the metric transition." Yet an American Institute of Aeronautics and Astronautics (AIAA) position paper titled "Metric Conversion" published in August of this year, states, "The aircraft industry believes that there is an insufficient supply of metric standard parts and materials available in the United States for it to consider metric conversion at this time." Like the Building 1216 engineers, aeronautical engineers are faced with few, if any, available parts to build a metric aircraft at this time.

Dan Vicroy, vice-chairman of the Hampton Roads Section of the AIAA, said, "Government and industry have to work together." According to Vicroy, industry has much to gain from commonality between aircraft manufacturers, such as the standardization of fasteners. Vicroy said standardization would make U.S. aircraft products more compatible with their worldwide counterparts. Operational aspects of aeronautics such as altitude and airspeed, however, do not lend themselves to conversion to metric, he added. By international agreement, altitude and airspeed use the English units of feet and knots, respectively, and both are based on the nautical mile.

### The Transition in Space Research

The NASA Metric Transition Plan states that through joint space projects such as Spacelab with the European Space Agency (ESA), NASA aerospace engineers are exposed to the metric system. The NASA transition plan also states, however, that "Although NASA personnel generally have some knowledge of the metric system, few use it regularly and comfortably." For Spacelab, important interface diagrams contain both English and metric units, though the equipment built by U.S. engineers used English units.

According to Doug Stanley, an aerospace engineer in the Space Systems and Concepts Division, "In our studies of advanced vehicles . . ., in our presentations, we use the English system." Stanley said that variables such as orbit altitude and payload weights still use the English system of nautical miles and pounds respectively. When publishing their results Stanley said, "The journal in our field allows you to use either one [English or metric units]." For international publication, Stanley said English units are converted to the metric system.

### The Transition in Scientific Research

According to the NASA Metric Transition Plan, "NASA science publications have used the metric system since 1970." Dr. Jack Fishman, head of the Chemistry and Dynamics Branch, said atmospheric scientists use the metric system throughout their education and in their research. For many scientists, including those in the Atmospheric Sciences Division, the transition to the metric system is completed before they take their first graduate level course.

### The Transition in Education

The AIAA Metric Transition position paper states, "University-level engineering and technology education is increasingly being taught in SI (Systeme International d'Unites, i.e., metric system) units . . . aeronautical and astronautical education is beginning to catch up in teaching its courses in SI units." Peter Thomas, education specialist in the Office of Education, said "There are some [NASA] education publications which address both systems ... [though] not across the board." During the summer training sessions for teachers at Langley, Thomas noted that the majority of the science teachers use the "English [system], almost exclusively."

### The Future

The NASA Metric Transition Plan states that, "The transition to metric is consistent with NASA's primary responsibilities for preserving U.S. leadership in aeronautics, space science and technology and conducting activities in space that expand human knowledge." In the AIAA Metric Conversion position paper it says, "The use of SI units is the basis of world trade in virtually all commodities and manufactured goods. This use is increasing each year."

The NASA Transition Plan also states, however, that, "Because industry provides hardware and support services for most NASA programs, the success of NASA's metric transition depends on industry acceptance and support of the metric system." As has occurred often in the past, NASA must lead the way down the path industry fears to tread. With NASA leadership in the transition to metric, the United States can be assured of maintaining its lead in aeronautics and space technology.

## Slip Casting . . .

*Continued from Page 1*

Further developments with high-strength/temperature materials may provide production for components such as engine parts and medical implants with ceramic properties.

### What Do We Do with the Technology?

The slip casting technique was exhibited at TOPS '93. Final Touch owner Richard Call came to the Technology Opportunities Showcase hoping to find ideas to help expand his business, which consists of the manufacture and distribution of consumer goods like sporting equipment. "I didn't think there was anything at TOPS '93 for me or my business," Call said. "But follow-up calls from Greg Manuel and other TAG (Technology Applications Group) representatives made me look at Langley technology in a different light." Call began to see that the slip casting technique could be customized for different products in several industries and manufactured in a variety of ways. This led to the signing of a memorandum of agreement with Langley.

Call worked with researchers here under the agreement and realized he wanted to license the technique and begin applying the technique to manufacture products for businesses and their research institutions. "I see," he said, "where this technique can be applied to parts on medical equipment, perhaps even the development of a new artificial hip joint. I am also working with a group that makes laser accessories. They want to develop the technique to mount lasers and other uses." The royalties received from the licensing agreement with Langley allows benefits to be shared with Langley and the researchers themselves.

"Langley has always been a successful environment for making ideas work," Buck said. "While the initial responsibility for recognizing the potential for one's research lies with the researchers, the TAG people helped in promoting our ideas with industry. This let me free to pursue further research." In the current system, a TAG representative works through the organization and with the researcher for the transfer of technology to industry, as would an agent. TAG staff members set up meetings with potential licensing customers and draft memorandums of agreement. "In this relationship, I feel that the TAG group has been very successful," said Buck.

### Working with Langley

Call has been pleased by his relationship with Langley and its people. "I was surprised with the 'gung ho' enthusiasm of the engineers, researchers and the TAG people. I expected to be mired down with red tape but Greg Manuel and his coworkers made the whole process easy. They pushed in all the right directions and got people to make decisions and move the process along." He also feels that Congress and the American public should be made more aware of the work that Langley does and how much the Center's work has positively affected the American economy. He looks forward to doing business with Langley for many years.

"If more companies knew about the technology being developed at Langley, they would jump at the chance to work with the Center," Call said.

# Boosting Airport Capacity Is the Goal of Wake Vortex Research

BY MICHAEL FINNERAN

Langley will collect data on high-energy "tornadoes" that spiral from the wingtips of aircraft, posing a potential disturbance to airplanes that follow too closely, particularly during takeoffs and landings.

The phenomenon, called wake vortex, is under study by NASA and the Federal Aviation Administration (FAA) in an effort to safely increase capacity at major airports. The five-year program kicked off with a deployment to Memphis International Airport in Tennessee in late November.

Langley will work with the Massachusetts Institute of Technology's Lincoln Laboratory to take wake vortex measurements from a lidar (laser) van on the ground. Langley's OV-10A research aircraft also will collect data in flight. Data also will be collected using other instruments, including balloons.

**Langley's OV-10A aircraft, below, will be used to measure weather conditions above runways as part of the NASA/FAA five-year Integrated Wake Program in cooperation with the Massachusetts Institute of Technology's Lincoln Laboratory.**

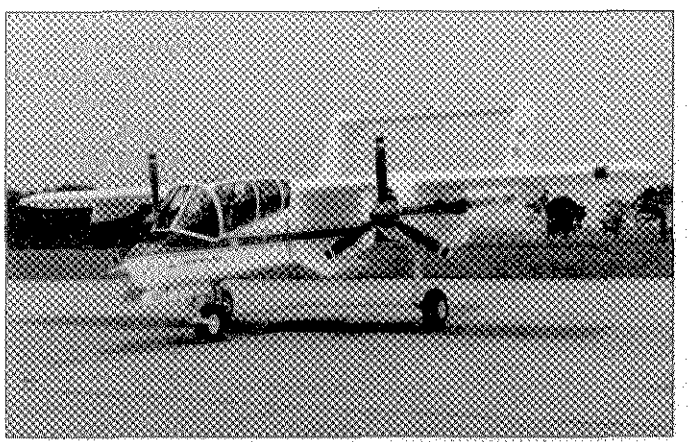


*Photo by Peggy Hopkins*

**Free-flight experiments have demonstrated the feasibility of studying wake vortices in the 30- X 60-Foot Tunnel. This photo, at right, shows a generic business-class airplane model being flown behind a 12-foot span vortex-generating wing. The wake vortex glows in the smoke generated at the wingtip.**

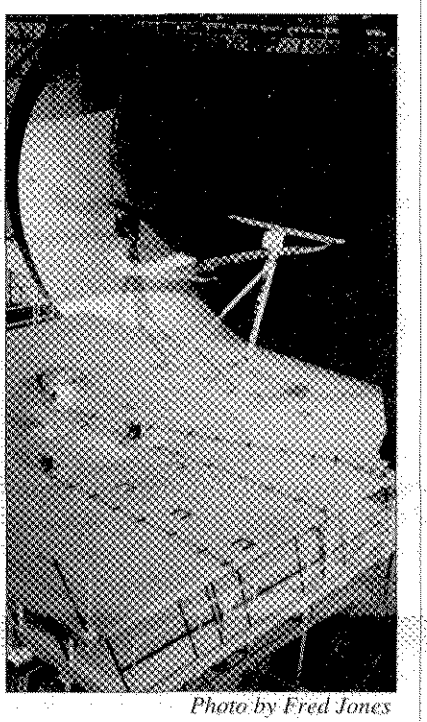


*Photo by Fred Jones*

# Langley FWPC Helps Department of Labor Learn What Women Think About Their Jobs

What do you like about your job? What would you change? If you could tell President Clinton one thing about your job, what would it be? The Federal Women's Program Committee (FWPC) helped the Women's Bureau of the U.S. Department of Labor give working women a chance to answer these questions by distributing *Working Women Count!* questionnaires. Langley was one of 1,600 businesses, labor unions, media, national organizations and government agencies around the country that distributed the questionnaires, which were completed by more than a quarter of a million working women. The FWPC distributed about 200 questionnaires to interested employees, with a return rate of 43 percent.

Better pay and benefits, less stress, more job training, an end to discrimination, and help balancing work and family responsibilities were top priorities for America's working women, according to both the questionnaire and the 1,200 respondents to a scientific phone survey the Labor Department conducted using the same questions. Despite their desire for change, *Working Women Count!* found that most women like their jobs.

The results of *Working Women Count!* were released at a Washington, D.C., news conference featuring First Lady Hillary Rodham Clinton, Vice President Al Gore, Labor Secretary Robert B. Reich and others Oct. 14.

Among the results of *Working Women Count!*: Nearly four in five women either "love" or "like" their jobs but see a need for change. Too much stress is a serious problem for more than half the women in both the popular and scientific samples, cutting across income and occupational groups. Two-thirds of women say improving pay scales is a high priority. Fifty-five percent of women in the sample and half in the scientific sample say they are not getting paid what they are worth. Health and pension benefits are critical concerns. Health insurance is women's number one priority for change. Three-fifths of women in the scientific sample say they have little or no ability to advance and 26 percent of women of color report losing a job or promotion on the basis of their gender or race. Many women consider on-the-job training and insuring equal opportunity high priorities. The number one issue women would like to talk to President Clinton about is their difficulty balancing work and family, including child care. Unequal or unfair pay is second, and lack of equal treatment and equal opportunity is third. More than half of women with children under age five say that finding affordable child care is a serious problem. More than half of this group say that "information about or support for child or dependent care" is a very high priority for change.

In response to *Working Women Count!*, President Clinton has asked the Labor Secretary and Women's Bureau Director for a set of proposals by March 15, 1995, to address the concerns raised by working women. In turn, the Women's Bureau has asked all agencies to submit by Dec. 15 thoughts and ideas about policies and practices that will address these concerns. Please submit your ideas by Dec. 9 to Patsy Campbell, FWP Manager, at Mail Stop 178 or by fax at ext. 48832.

# Cookie Power

BY MARNY SKORA

### *Sweets Add Sparkle to Holiday Season*

You can help wipe out "bah, humbugs!" Langley's Community Services Program will test a theory proposed in millions of households annually — holiday treats can turn a frown upside down.

Acting on that premise, Management Information Systems Branch employee Jeanette George proposes a plan of action. When she does her holiday baking this year, George intends to make an "extra" batch of cookies for those in need.

Her enthusiasm comes as the result of her Day of Caring assignment this fall. George and several other Langley employees spent the day at the Salvation Army facility on Big Bethel Road in Hampton. Instead of the soup and sandwich meal normally provided Monday through Friday to the area's hungry, the Salvation Army planned a turkey dinner complete with fixings. "It was like a Thanksgiving preview," said George who worked along with the other volunteers in the small kitchen.

"What really surprised me was how excited the diners were over the brownies that topped off the meal," said George. "I guess when you are feeding the hungry, dessert is the last thing you budget for."

That's when she decided to expand her holiday baking. "I've talked with some of the people I work with and many have agreed to help," she announced. Volunteers will bake an extra dozen cookies, brownies or specialty items and store them in the freezer.

Donis Anders, Langley cafeteria manager, has offered her support. "The cafeteria will donate clear plastic containers to package the treats. We'll even set aside an area in our walk-in freezer if volunteers don't have room at home."

If you would like to help:

- Pick up a container at the "cookie power" display in the cafeteria
- Fill it when you do your holiday baking
- Freeze or return the filled container to the cafeteria for storage
- Return all containers to the cafeteria by Friday, Dec. 16

George and her crew will deliver treats to the Salvation Army the week of December 19 for distribution with an evening meal. "The goal," explained George, "is a cookie or two for each of the 200 hungry people served during the holiday season. But, wouldn't it be great if we could give each a container of treats to share with others . . . ."

*Community Service*

# Santas Needed; No Experience Necessary

The Salvation Army will distribute holiday items December 19-23 at their facility located at 1033 Big Bethel Road, Hampton. Approximately **40** volunteers **per hour** are needed from 8 a.m. until 4 p.m. daily.

Call Captain Steve Long at **838-1443** if you can help make someone else's holiday a little better.

# Angels Come in All Shapes, Sizes

There's still time for you to join with the Acqusition Division and other Langley employees who are making the holidays special for some very special kids. (See Acquisition Division tradition story in the November 18 *Researcher News*, page 3.)

WVEC-TV-13 and the Salvation Army are sponsoring Angel Trees in area 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 kids whose holiday "wish" may not be otherwise granted this year.

### *Here's how you can earn your wings:*

- Select an "angel" from any Angel Tree
- Purchase a gift of new clothing for the child or young adult noted on the angel tag.
- Attach the angel to your unwrapped gift
  - * Leave tag(s) on item(s) in case of need to exchange
  - * Do not include sales slip
- Place gift under the Angel Tree or, if participating as a group, deliver to Salvation Army, 1033 Big Bethel Road, Hampton, by Dec. 19.

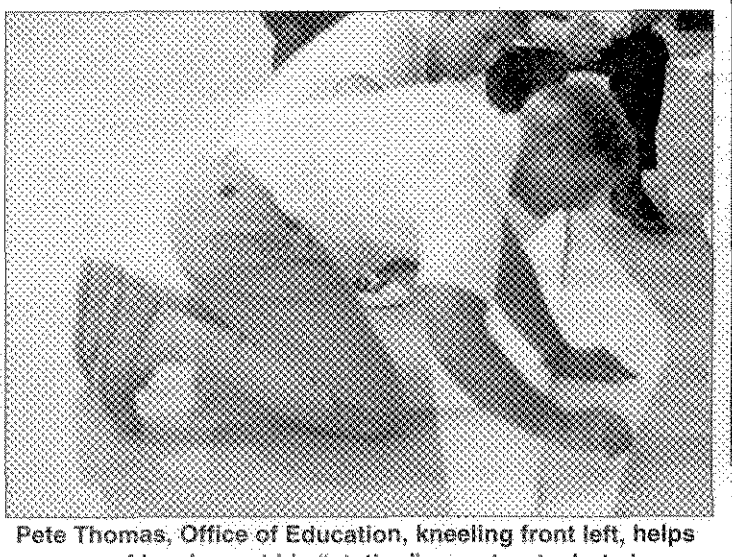
To participate, call Marny Skora, Langley's Community Service Officer, at ext. 43315.

# General Aviation Is a Part of Education Programs

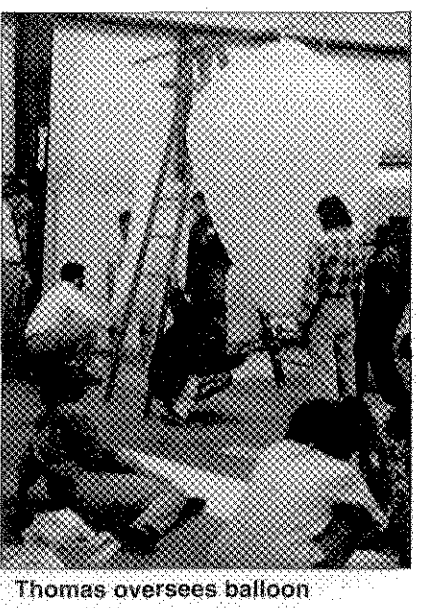
General Aviation (GA) has come into sharper focus as a result of a General Aviation segment to several two-week workshops conducted by Langley: the NASA Education Workshop for Elementary Teachers (NEWEST), the Teacher Enhancement Institute and the Urban Community Education Program. Pete Thomas, precollege aerospace education specialist in the Office of Education, has introduced this newest feature. In addition, Thomas frequently conducts one-day workshops through the Virginia Aviation and Space Education Forum (VASEF) whose aim is "fostering aviation and space education in the Commonwealth of Virginia." Thomas is currently the vice president of VASEF.

One recent VASEF Teacher's Workshop took place at the Virginia Aviation Museum in Richmond. "We tried to touch as many bases as we could with teachers during the six-hour workshop," Thomas said. "We focused on four areas of aviation. The first area was airplane preflight using a general aviation aircraft, and aircraft familiarization/terminology where teachers built model airplanes. Then we moved on to hot air balloon construction, rocketry and, finally, to flying all of the models that had been built." Preflight sessions included learning about how airplanes fly, navigation, careers in aviation, and even, rides for the teachers in small aircraft. Charts, computers and manual navigation devices were also explored to introduce an understanding of how weather affects aircraft flight.

"An evaluation of the General Aviation program follows each session," said Thomas. "These evaluations have shown that teachers were truly amazed at their ability to understand aviation and flight following the session. Teachers thought they had learned enough to be able to relate it to math, science and applications of technology programs and curriculum in their schools. They had learned the 'hook' that they needed to catch the interest of their students and to help assure the learning process. The teachers are also providing feedback about how they have used these aviation concepts in their classrooms."



Pete Thomas, Office of Education, kneeling front left, helps a group of teachers at his "station" construct a hot air balloon during the VASEF workshop this fall.



Thomas oversees balloon construction and launches.

*Photos by Ken Wilson*

Participants in the VASEF General Aviation workshop used a glue gun, cardboard tubes and balsa wood to construct model rockets.

Larry Gilbert, aerospace education specialist, talks to teachers about the principles of flight.

At the end of the workshop, all models were set up for flight. Here, Gilbert helps a teacher get her model rocket ready for takeoff as other watch . . . and wait their turn.

## Virginia Air and Space Center News

Virginia Air and Space Center
Hampton Roads History Center

### Make Plans to See *Titanica*

The final schedule of *Titanica*, which takes audiences on a once-in-a-lifetime adventure of discovery to the site of the world's most famous shipwreck, is playing this holiday season. *Titanica* is being shown every Friday, Saturday and Sunday through January 1 at 4 and 7 p.m.

The Titanic, the largest and most luxurious ocean liner ever built, was described as "unsinkable." April 10, 1912, the Titanic left England and traveled to France to pick up additional passengers and set sail the next day into the Atlantic Ocean. Four days into the voyage, the ship collided with an iceberg and sank, taking 1,502 lives.

During the summer of 1991, a Canadian-American-Russian expedition set out to explore the shipwreck and to conduct scientific research. Filmmaker Stephen Low weaves a dramatic story of the expedition and of the legendary Titanic. Seating is limited. Tickets are available at the center or at TicketMaster locations or by calling 671-8100, Southside, or 872-8100 on the Peninsula.

## AIAA Sponsors Film *The Dream Is Alive* Narrated by Astronaut Jon McBride

The American Institute of Aeronautics and Astronautics invite Langley employees and their families to a special program at the Virginia Air and Space Center featuring Astronaut Jon McBride.

The family-oriented program on Dec. 15 from 5:30 to 6:30 p.m. will be held in the center's IMAX® theater. It will include McBride's comments as cameraman of the 1984 space shuttle flight during which the film *The Dream Is Alive* was shot. McBride will answer questions following the presentation. Light refreshments will be served.

# Mark Young: One of the NSF's Young Scholars

Mark E. Young II, age 13, son of Debbie Young of the Office of Education, has already taken the first steps toward his future in medical research.

Young is one of 24 ninth and tenth graders in Virginia who was chosen to participate in the National Science Foundation's (NSF) Young Scholars Program at Old Dominion University. He is a freshman at Warwick High School in Newport News.

"It was an opportunity to do research projects in a college environment and attend advanced courses in subjects required for college entrance," he said. By the time I'm a senior in high school, I expect to be taking college courses."

One day, I'll have a career as a medical scientist. I'd like to look for ways to cure incurable diseases like AIDS and cancer. And if that doesn't work out, I'd like to be a marine biologist."

The Young Scholars Program is designed for rising ninth- and tenth-graders who want careers in science and engineering. Students explore applied physics, engineering, computer science, oceanography, chemistry and astronomy during the four-week residential program. They are visited by professionals in each of those fields.

# Happenings

**ROOMMATE:** Wanted female roommate to share 2 bedroom, 2 bath condo in Newport News, $300.00 includes all; $100.00 security deposit, available immediately. Call Lisa at 872-0922 for more information.

**PENINSULA KI AIKIDO CLUB:** Shin Shin Toitsu Aikido, the martial art of nondissention, can be learned; no experience required. Call 890-0050 or 229-2219 for information.

**FOR SALE:** 1985 Cadillac DeVille, four door, excellent condition, priced below blue book value at $4,475, negotiable. Call 596-1997.

**FOR RENT:** York Crossing, 2 BR, 1-1/2 baths, end unit townhouse, living room, eat-in kitchen. w/ fireplace, washer/dryer, dishwasher, refrigerator, $595/mo + deposit; available Dec. 16. Call 890-0994.

**FOR RENT:** Townhouse, 2 BR, 1-1/2 baths, living/dining combo, all appliances, central heat and air, storage, many pluses, $525/mo. Call 727-9187 after 5 p.m. or weekends.

**FOR SALE:** 1986 Plymouth Voyager LE, burgundy, new transmission/ clutch, tires and suspension; frame hitch. Moving. Asking $4,500. **1980 Chevy Blazer**, red and white, new battery and clutch, towing pkg./frame hitch, reliable work truck. Asking $2,250. **McCullough 20-inch chainsaw**, 3.7-cu.in. engine, spare chain, excellent condition/low time. Asking $150. Moving. Call 868-6818.

**VA SYMPHONY:** The Virginia Symphony Holiday Pops concerts will be held Dec. 11 and 17. *Mozart & More* will be presented in Williamsburg, Dec. 14, and at Hampton Roads Academy Dec. 18. Tickets are available at the Exchange Shop, ext. 41585, or the Symphony ticket office at 380-0040.

**RIDE NEEDED:** Daily starting Jan. 9 from Locust Avenue in the Wythe area, hours flexible. Call Dave Roberts at ext. 42729 or 247-3060, evenings.

**FOR SALE:** Belgian Malinois puppies, champion and dual-champion bloodlines, family dog; available early December. Call 877-2186.

**CHRISTMAS AT FT. MONROE:** A tree-lighting ceremony will be held Dec. 15 beginning at 6 p.m. At 7:30 in the Chamberlin Hotel there will be a band concert, entertainment by soloist Al Rogers, a sing-along and refreshments, For more information, call the Concert Line at 727-4052.

**FOR RENT:** Magruder Commons, 2 BR, 1-1/2 baths, end unit townhouse, washer/ dryer, $525/mo. + deposit; available mid-December. Call 838-4426.

## "Understanding the New Congress"

Langley's Congressional Affairs Officer Lee Rich will present a briefing entitled "Understanding the New Congress," Friday, Dec. 9, from noon to 1 p.m. in the Langley Room of the H.J.E. Reid Conference Center.

Rich will talk about the shift in Congress following the November elections as well as the effects on NASA and Langley. Her talk is sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA).

## New Sick Leave Usage to Become Effective Soon

Changes are in progress that will effect the way employees may be able to use their sick leave. The first deals with adoptions. Section 629 (b) of Public Law 103-329 amends 5 U.S.C. 6307 which allows an employee to substitute sick leave retroactively for all or any portion of annual leave used for adoption-related purposes between Sept. 30, 1991, and Sept. 30, 1994.

The second change is the "Family Friendly Leave Act," passed by Congress on Oct. 7, 1994. This law allows up to five days of sick leave per year to care for a family member or for bereavement, or up to 13 days, as long as the employee has 80 hours of sick leave in his/her account. This means that sick leave may now be used to care for an ill child or the birth or adoption of a baby. This change will become effective in mid-December (60 days after enactment). This is a pilot program with a three-year run date. As soon as regulatory guidelines are received, they will be published in the *Researcher News*. Employees who wish to change annual leave to sick leave for adoption purposes, need further guidance or have any questions should call Lisa Allen, at ext. 42610.

## December 8 Is 757 Ceremony

**A dedication ceremony for the 757 aircraft is scheduled for Thursday, Dec. 8, from 10 to 11 a.m. in the Hangar, Building 1244. Center Director Paul F. Holloway will welcome representatives from the U.S. Congress, Eastern Airlines and NASA Headquarters. All Langley personnel are invited to attend. See the latest addition to NASA's research aircraft fleet.**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Researcher News

National Aeronautics and
Space Administration
**Langley Research Center**
Hampton, Virginia 23681-0001
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*In celebration of the 25th anniversary*
*of the Apollo Program*
*the Director of the NASA Langley Research Center*
*and Mrs. Paul F. Holloway*
*cordially invite you to attend*
*a Holiday Reception*
*at the H.J.E. Reid Conference Center*
*on Friday afternoon, December 16, 1994*
*from one to three o'clock*

*Sponsored by the Langley Activities Association*
*and the Langley Federal Credit Union*

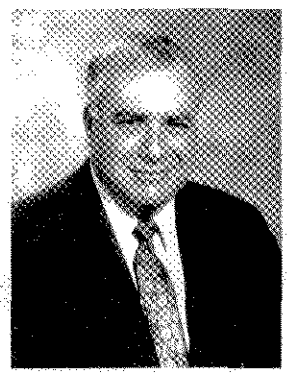
National Aeronautics and
Space Administration
Langley Research Center

# News Researcher

Biweekly Employee and Contractor Publication

Volume 8 ❖ Issue 25 ❖ December 16, 1994

## A Holiday Message to all Langley Employees



On behalf of the senior staff, I would like to wish you and your family a happy holiday season and a very healthy and prosperous new year.

Once again, the Center has seen a year of great change — changes here at Langley, in the Agency, in our nation and throughout the world. Global as well as local economies have forced us to take a deep inward look and to refocus the efforts of our core research and technologies. We have begun what the Danish philosopher Søren Kierkegaard called a "leap of faith," and sought partnerships with industry, both aerospace and non-aerospace. We have broadened our involvement with universities interested in coupling their research efforts with ours. And we have helped redesign, reorganize and streamline the Center to position ourselves to move into the next century.

Our High-Speed Research (HSR) Program, for which Langley is managing the technology development effort, is the lead aeronautics program for the Agency. Contracts have been signed to begin Phase II, so the HSR program is well under way. Despite a period of transition, the National Aero-Space Plane (NASP) has been phased out and a new program in hypersonic technology is being initiated, Hypersonics System Technology (HySTP). And, in subsonics, Langley's initiatives have helped us earn a major role in six of the 10 elements of the Advanced Subsonic Technology Program including a major thrust to revitalize general aviation.

As we celebrated 20 years of highly successful work with the 737 airplane, Langley welcomed the 757 replacement aircraft to its research fleet this year. Finally, we joyfully celebrated the 25th anniversary of the Apollo 11 lunar landing, recounting the many ways in which Langley and its people contributed to that historic event.

Langley saw the success of its Lidar In-Space Technology Experiment (LITE) and recorded the data from LITE for future successful endeavors. The Measurement of Air Pollution from Satellites (MAPS) instrument, another Langley effort, flew two successful missions in 1994. LASE, the Lidar Atmospheric Sensing Experiment, began to prove its value to atmospheric scientists when it flew its first science mission and recorded data in conjunction with LITE. We also saw the flight of our Middeck 0-Gravity Dynamics Experiment (MODE), Langley's Orbiting Meteoroid and Debris Counter on the Clementine satellite, the Small Expendable Deployer System (SEDS), and we led the Pacific Evaluation Mission of the Global Tropospheric Experiment. Each has registered its own research success stories.

We are preparing for 1995 by focusing our energies on a second Technology Opportunities Showcase in April. This will be done jointly with CEBAF and the Peninsula Advanced Technology Center focused on both aerospace and non-aerospace industries. As we make every effort to diversify the Center to embrace and value differences in ideas, people and cultures, we will renew our commitment to ensure that aerospace continues to be the nation's leading net exporter of manufactured goods.

I want to thank the entire Langley work force, every civil servant and contractor, for your exceptional effort and outstanding accomplishments during this very challenging year. We can all look forward to 1995 with the confidence that together we can meet whatever opportunities and challenges are ahead of us. The Langley spirit of dedication and commitment to excellence — our trademark — will help to ensure a positive outcome in 1995.

With my best wishes,

Paul

**— Paul F. Holloway, Center Director**

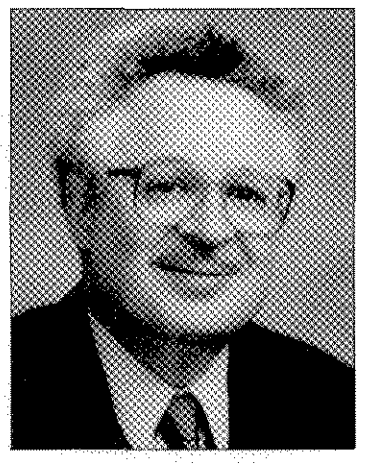
## January Colloquium Reveals 'What the Hubble Space Telescope Is Telling Us'

Following the brilliant success of the First Servicing Mission to the Hubble Space Telescope (HST), the HST has produced exceptional findings throughout the universe. Speaker Dr. Stephen P. Maran, senior staff scientist in the Laboratory for Astronomy and Solar Physics at Goddard Space Flight Center, Greenbelt, Md., will reveal some of the HST discoveries in the next colloquium, Tuesday, Jan. 3, 1995, at 2 p.m. in the H.J.E. Reid Conference Center.

Maran will present some conclusive evidence for the supermassive black hole at the center of Virgo A; indications that the formation of protoplanetary disks may be a frequent accompaniment to star formation in the Orion Nebula; and the most reliable determination of the local value of the expansion rate of the universe. This rate is needed to establish the extragalactic distance scale and to resolve the disagreement between the time since the Big Bang and the ages of the oldest stars. He will discuss the July 1994 impacts of the massive fragments of Comet Shoemaker-Levy 9 that were monitored in visual and ultraviolet light, and also spectroscopically, by the Hubble Space Telescope, with its remarkable results.

Maran has extensive experience in developing and applying groundbased telescopes and orbiting observatories for astronomical research. He was selected as both a principal investigator and co-investigator on the Hubble Space Telescope and as a member of the Ultraviolet Imaging Telescope Team for the Astro-1 and Astro-2 Shuttle Missions.

A prolific writer, Maran authored or co-authored more than 340 publications, including serving as author, co-author, or editor of 12 books on astronomy and space science. He created and edited the widely referenced 1,000-page volume, *The Astronomy and Astrophysics Encyclopedia*, published in 1992. Maran serves as the press officer of the American Astronomical Society and chairman of the Society's Astronomy News Committee. He has written for numerous publications, including *Smithsonian*, *Astronomy*, *Natural History*, *Popular Science*, *Scientific American*, *Science Year*, and *Sky and Telescope*.



**Dr. Stephen P. Maran**

Maran received a bachelor's degree in physics from Brooklyn College of the City University of New York and a master's degree and doctorate in astronomy from the University of Michigan. He received the NASA Medal for Exceptional Achievement.

Maran will present the same topic at a Sigma Series lecture Tuesday, Jan. 3, 1995, at 7:30 p.m. at the Virginia Air and Space Center in Hampton. Admission is free; no reservations are required.

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# News Briefs

## Around the Agency

**KRAFT TO HEAD INDEPENDENT SHUTTLE WORKFORCE REVIEW** – Dr. Christopher C. Kraft, former Director of the Johnson Space Center, will form and lead an external independent team to review data from the Space Shuttle Functional Workforce Review, NASA Administrator Daniel S. Goldin announced. The Space Shuttle Functional Workforce Review was initiated in September 1994 to evaluate the resources and the requirements being expended on human space flight — with program safety the first priority. Kraft's team, which was formed by the first week in December, is charged with evaluating the current process and procedures for conducting Space Shuttle operations at the Johnson, Kennedy, Marshall and Stennis Space Centers and related contractor activities with the intent of recommending a new and more optimum operating structure. Kraft's team also will provide recommendations on a plan to transition to any new organizational structure. Initial efforts will focus on Kennedy Space Center operations. As part of his charter, Kraft will review the management and contractual relationships for the operation of the Space Shuttle program. Kraft's team will review related space station activities, as required, to ensure the necessary Space Shuttle Program support of the International Space Station. The effort will be supported as required by NASA and reviews with the various NASA Centers and involved contractors will be an integral part of the effort. Kraft's team will complete their work and make recommendations by early 1995.

**NASA SELECTS PHASE II SMALL BUSINESS PROJECTS** – Space technology will reach another 166 small, high-technology firms located in 31 states with the selection of Phase II contract awards in NASA's Small Business Innovation Research Program (SBIR). SBIR goals are to stimulate technological innovation, increase the use of small business (including minority and disadvantaged firms) in meeting federal research and development needs, and increase private sector commercialization of results from federally funded research. A total of 338 proposals were submitted by SBIR contractors completing Phase I projects that were initiated in 1993. The 189 selected Phase II projects have a total value of approximately $111 million. Phase II continues development of the most promising Phase I projects. Selection criteria include technical merit and innovation, Phase I results, value to NASA, commercial potential, and company capabilities. Funding for Phase II contracts may be up to $600,000 for a two-year performance period. The SBIR program is managed by NASA's Office of Space Access and Technology, NASA Headquarters, Washington, D.C., with individual SBIR projects managed by nine NASA field centers. As a result of NASA 93-1 PHASE II Award Distributions on Nov. 15, 10 companies in the state of Virginia received 11 Phase II project awards. By NASA field center, 26 awards were distributed to 25 firms through Langley Research Center.

## *Health Corner*

### *November Blood Drive Report*

"Thank you" to all Langley employees, contractors and retirees for a tremendous November blood drive from Karen Ridlon of the Office of Occupational Health Services. Wednesday, Nov. 23, the final bloodmobile visit of 1994 netted 329 pints of blood, according to Ridlon. "We surpassed our goal of 300 pints, established by the Red Cross, and we beat the number of pints donated last year," she said.

A drawing, held during the November drive, awarded tickets to the Virginia Air and Space Center and its IMAX® theater to participants in the blood drive. Winners were: Tracey Miller, Bill Fernald, Cathy Jones, Brad Crawford, Dan DiCarlo, Jim Puffenberger, Kenneth Voss, Richard Moore, Wade Garnett and Noel Talcott.

Langley has a strong bloodmobile program but new donors are always needed. Next year's bloodmobile visits will be on January 25, March 22, May 24, July 26, September 20 and November 22.

"The Office of Occupational Health Services wishes to express our appreciation to all those who participate in our bloodmobiles," Ridlon. "We do make a difference to those in need. We look forward to seeing you during 1995, and we wish you and your families a happy holiday season."

**The Results**

Of the 329 donors, 15 people were first-timers, according to Langley coordinators Ridlon and Peter J. Edgette, head of the Office of Occupational Health Services. First-time donors were Geraleen G. Polhamus, David Ratau, Fred Stillwagen, Myron C. Ware, Craig M. Furlong, Jennifer L. Sedor, John D. Barnes Jr., Jeffrey T. Matney, Crystal D. Chamberlain, Gail L. Temple, Eric D. Estes, Robert W. Caldwell, Bruce R. Rabie, Beth Barnett and William C. Price.

Special thanks are given to multiple blood donors. They are: 13 gallons, Ceylon C. Short Jr. and Howard W. Murray Jr.; 10 gallons, Charles A. Sweet; 7 gallons, Donald L. Lansing and Ernest C. Burt; 6 gallons, Mark W. Wynkoop, Robert D. Turner, Thomas J. Skalski, Mark S. Wampler and Vincent J. Fleck Jr.; 5 gallons, Paul D. Aronsohn; 4 gallons, Thomas A. Toll, Ronald S. Geouge and William P. Chambers; 3 gallons, Thomas W. Hall, Kevin J. Laferriere, Larry C. Dickinson, Gregory Howland, Sandra M. Glenn and Sandra H. Harrison; 2 gallons, Ben M. Copeland Jr., Jocelyn Pritchard, David G. Kessler, Jose A. Vega, Mark A. Simonton and Linda K. Jones; and 1 gallon, Jerry S. Lyle, William S. Luck Jr., Harry E. Kyzer Jr. and Steve J. Hughes.

## AIAA Young Member Paper Competition

The Young Professionals of the Hampton Roads Section of the American Institute of Aeronautics and Astronautics (AIAA) is sponsoring a paper competition designed to recognize outstanding on-the-job technical accomplishments of young professional members. Members under the age of 35 are invited to submit one first-author paper that has either been published or accepted for publication in an archival and refereed publication.

The paper must have been originally submitted while a professional member. Papers received on or before Jan. 31, 1995, 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 AIAA Hampton Roads Section Awards Banquet in the spring.

Please submit three reprints or copies of the manuscript with a copy of the acceptance letter and author information, including age and AIAA membership number to Bill Wood, Mail Stop 408A, ext. 48355.

## *Community Corner*

BY MARNY SKORA

## The Tax Man Cometh

Are you good with numbers? The Volunteer Resource Center needs volunteers to help answer Uncle Sam's annual call!

The United Way's Volunteer Income Tax Assistance Program assists low-income elderly and non-English-speaking persons in completing simple tax returns. The Internal Revenue Service (IRS) will provide training for volunteers on January 14, 17 and 28. Trained volunteers are asked to commit to at least 10 hours of community service at convenient sites in the local area from February 1 through April 15.

Please contact Elyse Brown, Volunteer Resource Center coordinator, at **838-9750 before December 21** to say that you are willing to help.

## Give 1995 a Running Start

Volunteers are needed for the 1995 POMOCO/Hampton Road Race scheduled for Saturday, February 12.

Over 200 individuals are needed on race day to serve as road marshals, water stop volunteers and split timers. Volunteers are also needed before the race to help prepare race packets.

If you can help, call Elyse Brown, at 838-9750.

## Thanks in Advance

Two community service projects for the holidays -- adopting Angel Tree kids and Cookie Power -- are enjoying wide employee participation. Both are employee-initiated suggestions opened to Center-wide participation under the Langley Community Service Program. Thanks for your generosity!

## Notes for Satellite Observers

The month of December will provide three opportunities to observe the Russian Space Station Mir in the evening sky.

• Wednesday, Dec. 21, in a west to northeast transit, Mir will peak in the northern sky at 6:38 p.m., about 40 degrees above the horizon.

• Thursday, Dec. 22, in a southwest to northeast transit, Mir will peak in the southeastern sky at 5:41 p.m., about 65 degrees above the horizon.

• Saturday, Dec. 24, in a west to north transit, Mir will peak in the northwestern sky at 5:26 p.m., about 40 degrees above the horizon.

Shuttle Endeavour's Mission STS-67 will be flying a 28.5 degree inclination orbit in early February and won't be seen in Virginia but can be viewed in more southern states. Discovery Mission STS-63 in late February will be maneuvering near Mir in preparation for the docking of Atlantis on Mission STS-71, scheduled for May 1995. These two spacecraft will appear as two bright and distinct points of reflected light moving across the sky in about three minutes. Further details will be outlined in the future. Questions may be addressed to Jim Byrd at 874-3104.

### Announcement

## Retirement Social

An informal social for Gary P. Beasley of the Aeronautics Program Group will be held Tuesday, Jan. 3, from 2 to 4 p.m. in Building 1219, Rm. 225. Those with gift contributions or photos (or L-numbers) for a gift album should contact Marna Mayo, at ext. 46029, Mail Stop 113.

### In Memoriam

## Buford R. Hunt

Buford R. Hunt, 81, died on Tuesday, Nov. 22. He was a native of East Bend, N.C., and a Poquoson resident for 45 years. Hunt retired from the U.S. Air Force after 21 years and from Langley in 1983 after 28 years of service.


**Researcher News**

The **Researcher News**, an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001, is published every other Friday in the interest of all Langley staff and retirees. Submit contributions to the Editor, Mail Stop 146, telephone 864-6126. Articles are due at noon the Tuesday following the date of this issue.

Managing Editor. . . . . Marny Skora

Editor. . . . . Ann C. Gaudreaux, The Bionetics Corp.

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All materials are subject to editing.

# LITE Success Underpinned by Fabrication Division Performance

BY CRAIG MURDEN

While Langley reflects on the close science and engineering partnership which produced the stunning triumph of its Lidar In-Space Technology Experiment (LITE) mission, there is yet another success story to be told.

It is how more than 135,000 inventive and grueling hours of labor by the men and women of the Center's Fabrication Division ensured the pioneering success of the LITE instrument.

Since 1985, Langley fabricators had translated the scientific and engineering concepts and requirements into an integrated system of flight hardware, electronics, and ground support and test equipment. Then, they coordinated the shipment and installation of all mission operations equipment into the Payload Operations Control Center at the Johnson Space Center.

That long and diverse effort was culminated when the Space Shuttle Discovery, with LITE as its primary payload, launched on its historic mission September 9. And, when success followed success during the nine-day mission that gave the world its first lidar in space, the Fabrication Division's concentrated, nearly 10-year effort was highlighted.

"There is no way to do justice to all the people in the Fabrication Division who made this possible. It was a remarkable performance by hundreds of dedicated and innovative Langley people working toward a common goal," said John Rogers, LITE Project Manager.

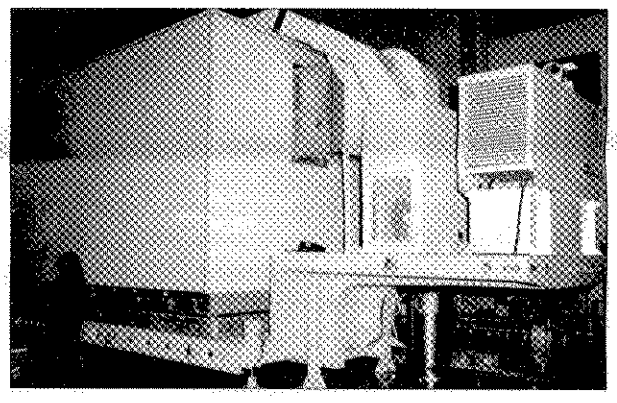
Major "shop" elements of the organization all played pivotal roles. The Advanced Machining Development Laboratory, fabricated 90 percent of the flight hardware under three different lead technicians. It was the Metals Technology Development Laboratory that constructed the LITE transportation container. The Composites and Models Development Laboratory created the thermal blankets and display models. And, the inspection function (Quality Assurance Inspection Branch) ensured the overall excellence of these products.

The LITE mission marks a new era in atmospheric remote sensing using space platforms. This capability heralds a future which will provide new insights into the operations and mechanisms of the Earth's climate systems.

John Bowman, Advanced Machining Development Laboratory, performs a precision drilling operation on LITE's aft optics optical bench.

Tom Burns, Quality Assurance Inspection Branch, conducts dimensional inspection on LITE's Orthogrid Platform as a critical part of Langley's ultra-thorough preparation of the instrument.

At left, Tom Mitchell, Metals Technology Development Laboratory, and co-op engineer Karen Gondoli examine LITE's bore-sight housing which Mitchell fabricated.



The LITE transportation container, right, constructed in the Metals Technology Development Laboratory stands ready. LITE was trucked to the Kennedy Space Center complete with the air conditioning and filter components shown on the right which maintained a clean-room environment during the trip.

## FAB Division Contributions to LITE

**The specific Fabrication Division activities since 1985, portray major technical contributions coupled with integrated testing, evaluation and field delivery of the Langley satellite:**

**Flight Hardware:**
- Orthogrid platform
- Support struts
- Hardpoint fixtures
- Telescope support structure
- Refurbishment/rebuilding of the telescope
- Kinematic mounts to absorb lift-off energy
- All electronic boxes, trays and connector brackets
- Aft optics housing and mechanisms

**Material Processing:**
- Nondestructive evaluation
- Coating of materials
- Bonding/staking of fasteners

**Ground Support and Test Equipment:**
- Support structure for telescope assembly and alignment
- LITE transportation container
- Handling and lifting fixtures
- Mass models for the modal survey testing

**Electronics:**
- Printed circuit boards for flight hardware and Ground Support Equipment (GSE)
- Flight and GSE cables

(NOTE: There were no failures, problems or anomalies associated with the flight cabling subsystem which was delivered on or ahead of schedule and consisted of more than 500 connectors and an estimated 10,000 to 12,000 connections.)

## A Robot by any Other Name

BY TODD HALVORSON, *FLORIDA TODAY*

Calling all kids: a robot destined to explore the desert highlands of Mars needs a name, and you can help.

The Planetary Society, a group devoted to the exploration of the solar system, is offering kids under 18 a chance to suggest a name for NASA's Mars Microrover.

The small, saucer-shaped robot is scheduled for launch from Cape Canaveral in November 1996 on NASA's Mars Pathfinder mission. After an eight-month space voyage, the 35-pound robot will roll out of a Mars lander on its six-wheeled chassis.

Standing one-foot tall, the robot will then cruise the Red Planet, snapping panoramic pictures and collecting scientific data on the chemical composition of Martian soil and rocks.

The pictures and science data will be beamed back to the lander, which in turn, will relay the information to scientists on Earth.

The robot will carry out its mission as fast as possible. It isn't expected to operate longer than seven days in the harsh Martian environment, where extreme cold temperatures range between minus 59 and minus 212 degrees Fahrenheit.

To suggest a name for the rover, pick a hero or heroine from mythology, fiction or history and describe in 300 words or less how he or she would explore Mars. You might write about why the robot should carry that explorer's name or how he/she would get around the Red Planet.

All essays should be written in English, and anyone born after Jan. 1, 1976, is eligible to submit a name.

Entries must include your name, address, phone number and proof of age. Entries must be received by March 1, 1995 at: Name the Microrover Contest, c/o The Planetary Society, 65 N. Catalina Ave., Pasadena, Calif. 91106.

First prize will be an all-expenses paid trip to the launch. Scholarships will be awarded to second- and third-place winners and the top 10 entrants will win an Explorer's Guide to Mars poster; a Mars Pathfinder T-shirt; and a $100 certificate for Planetary Society merchandise. All entrants will receive pictures of the microrover and the surface of Mars.

For more information about the contest, the robot or Mars, write the Name the Microrover Contest at the above address. Don't forget to request a free copy of the poster that includes all the contest rules.

## *NASA-Wide Baldrige Assessment*

**BY CHRIS WILLIAMS, NASA HEADQUARTERS**

The Vice President's National Performance Review has promised the American people a reinvented government that cuts unnecessary spending, better serves its customers, empowers employees, helps communities solve their own problems and fosters excellence throughout. The process of reinvention begins by adopting a model of excellence that works and measuring the organization against that model to establish a baseline for action. The Malcolm Baldrige National Quality Award criteria have traditionally been used by industry as the standard of excellence against which world-class organizations in the United States compete. The Federal government under the rubric of the President's Quality Award program, is now adopting the Baldrige Award criteria as the model of excellence for all Federal departments and agencies.

Between July and October of this year, 12 volunteer Baldrige Award examiners reviewed NASA as a whole against the Baldrige Award criteria to provide a baseline report about where the Agency stands as a quality organization. On Oct. 27, the examiners reported their findings and recommendations to NASA's Quality Steering Team (QST).

### Strengths Identified

The examiners identified a number of strengths that demonstrate "NASA has taken significant actions to define and institute an Agencywide quality improvement initiative to shape the future direction of the Agency." Strengths include: the active involvement of NASA's leadership in guiding the quality transformation; a strong commitment to organizational excellence throughout the Agency; wide recognition of the need for change; and a close working relationship between customers and suppliers at the field center-level projects.

In identifying opportunities for improvement, the examiners focused on NASA's need to integrate a number of planning initiatives in six areas of improvement: communication; information and analysis, customer focus, human resources and development, process management and results.

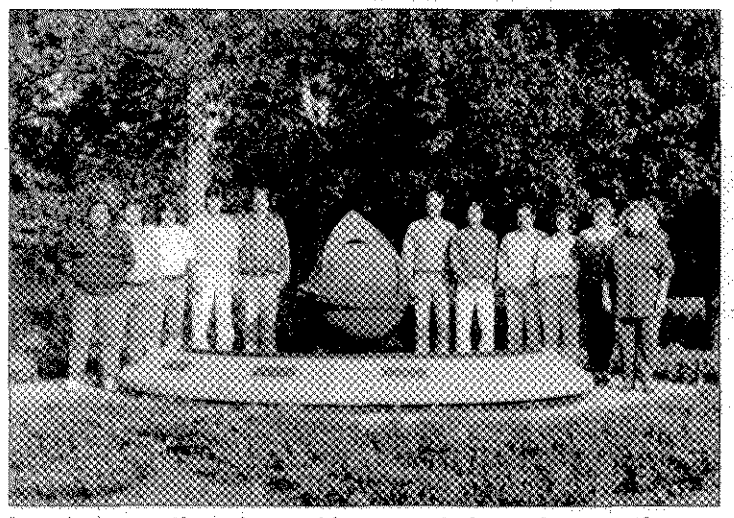
Results of the Agencywide Baldrige examination showed that NASA is an organization which has begun to take positive steps toward implementing quality management practices. The examiners also stressed that they saw a number of areas at NASA where good progress has been made toward quality management, although the Agency must now integrate these efforts toward a common vision.

### What's Next?

NASA must now build on the strengths identified by examiners and take aggressive action in those areas identified as opportunities for improvement, especially in the areas of communication and integration. To this end, NASA's Quality Steering Team recently formed a Quality Management Board focused on working with management and employees across the Agency to improve all aspects of internal relations and communication. Periodically, the efforts of this board will be reported in this column.

For more information about NASA's Continual Improvement External Assessment Results and about how you can play an active role in NASA's reinvention, contact your Center Continual Improvement focal point, Irwin Schauer at ext. 42552.

## Langley Welcomes Newest Apprentice Class



**Langley recently welcomed its newest class of apprentices. Pictured from left to right are: Carlos Castillo, Thomas Overby, S. Joseph Giuliana, Paul Tucker, W. Scott Wallace, Ronald Topping, Christopher McLain, Gregory Shanks, Crystal Chamberlain, Nina Tappan and Margaret Moore.**

## FWP Program: *The Power of Positive Presence*

Debra Benton of Benton Management Resources will present two half-day sessions on January 9 (1 to 3:30 p.m.) and 10 (8:30 to 11 a.m.), in the H.J.E. Reid Conference Center on the *Power of Positive Presence*. The program, sponsored by the Federal Women's Program Committee (FWPC), will provide specific, practical advice on leadership effectiveness and professional presence. Time will be spent on how the individual can think, act, and more effectively deal with anyone, anywhere. She will encourage audience interaction and participation along with a question and answer session.

Benton teaches executives how to present themselves. She has published *Lions Don't Need to Roar; Using the Leadership Power of Professional Presence to Stand Out, Fit In and Move Ahead.* She joined Control Data Corporation out of Colorado State University in 1974, one of about 15 women who were part of an early program to see whether women could do a man's job, she said. After a few years, most of the 15 women including Benton - had been fired. When Benton asked why, she was told it wasn't because she was lazy or ignorant but because she couldn't get along with the men. "Basically, I had poor chemistry — no people skills." She told herself she was never going to be fired again.

After participating in some outplacement consulting, she founded Benton Management Resources in Fort Collins, Colo., as an outplacement consultant. "I started finding a pattern of behavior about how people think and act and relate that sets them apart when the substance is there," she says. She began chronicling those intangible assets in speeches to small groups. When she kept being asked back, she switched from outplacement to teaching people how to present themselves. Benton has people who have run into obstacles in their careers because they worked too hard, were too smart, didn't have an executive laugh or were too narrowly focused.

She has consulted with Bell Laboratories, Pepsi, U.S. Sprint, GTE and other large groups. At the heart of her teaching is a very simple principle: "All the time, with anyone anywhere, I have an attitude of expecting acceptance. I expect acceptance and I grant acceptance, which is consistent with the idea that I think well of myself and well of others." Sound simple? Try it out with Benton on January 9 or 10, 1995.

There is no need to preregister. Charge time to Job Order A5267. For more information, contact Patsy Campbell at ext. 43291, or your FWPC representative.

## Army VSD Office Presents Awards

### Second Annual Awards Ceremony

The U.S. Army Vehicle Structures Directorate (VSD) hosted the second Army Office Annual Awards Ceremony at the Ft. Eustis Officers' Club in November. Awards were presented to employees from all three Army Commands collocated on Center who helped accomplish the Army's mission at Langley during 1994.

### Team Spirit Awards

Team Spirit Awards were presented to Dr. Gary Farley and Howard Hinnant, VSD, Structural mechanics Division, and Carl Elks, Communications and Electronics Command (CECOM)-Langley, for "outstanding and exceptional leadership in promoting and demonstrating the ideas of team building and integrated multidisciplinary research."

### Tech Transfer Awards

Technology Transfer Awards were given to Richard Everett and Dr. Mark Roberts, VSD. Structural Mechanics Division; Dr. Mark Nixon, VSD Loads and Dynamics Division; and Henry Kelley and Kevin Noonan, ATCOM, AFDD-Langley, for "individual achievement in providing timely and meaningful technology support to outside organizations and customers."

### Quality Enhancement Awards

Quality Enhancement Awards were presented to Dr. Karen Jackson, VSD, Loads and Dynamics Division; Hinnant and Russell McHatton, ATCOM, AFDD-Langley, for "taking an active role in facilitating the continuing improvement processes that exemplify the goals of Total Quality Management."

### Customer Service Awards

Customer Service Awards were given to Ken Zastrow, ARL Weapons Technology Directorate; Thomas Jones, ARL Vehicle Propulsion Directorate; Henry Russell, ARL Operations Directorate; Nixon and Rachelle Saunders, VSD, Structural Mechanics Division; and Todd Hodges, ATCOM. AFDD-Langley, for "special and selfless contributions in working with customers to meet their expectations and to enhance the competencies of the Army."

### Director's Awards

Director's Awards were presented to Jeannie Tarran, ARL, Operations Directorate and Lavonne Gardner, Defense Finance and Accounting System at Ft. Eustis for "their loyal and dedicated support to the Army's financial management operations at Langley."

## VSGC Announces Scholarship/Fellowship Competition

Students pursuing studies in fields related to aerospace may qualify for scholarships and fellowships offered by the Virginia Space Grant Consortium for the 1995-96 academic year.

A minimum of $181,000 is awarded annually to qualifying students in aerospace-related disciplines at the five Virginia Space Grant institutions: The College of William and Mary, Hampton University, Old Dominion University, The University of Virginia and Virginia Polytechnic Institute and State University. The scholarships/fellowships require that a student participate in an active, identified research experience with a faculty advisor. Funding has been provided by NASA, the Commonwealth of Virginia and The Bionetics Corp. of Hampton.

Completed scholarship/fellowship forms must be received by Jan. 20, 1995. Application packets which include complete details of the programs may be obtained from the Virginia Space Grant Consortium, 2713-D Magruder Boulevard in Hampton, 865-0726.

# Langley Employees Given Silver Snoopy and MFA Team Awards

### Silver Snoopy Awards

The following Langley employees were recent recipients of the Silver Snoopy Award, presented by NASA astronaut Col. Mark Lee: Danette Allen, Advanced Computer Systems Branch; Joseph F. Delorme, Space Systems Engineering Branch; L. Wayne Hicks, SpaceTec, Inc.; Mulugeta Petros, Science & Technology Corp.; William A. Roettker, Analysis and Test Engineering Branch; David M. Rosenbaum, Electronic Systems Branch; Mark A. Vaughan, Science Applications International Corp.; and Walter L. Wade, Experimental Aero Development Section.

### Silver Snoopy Himself

The Astonauts' Personal Award, designated the "Silver Snoopy" is given to individuals who have performed an outstanding effort contributing to the success of manned space flight missions. These individuals have worked to enhance the probability of mission success, making improvements in design, administrative/technical, production techniques, business systems, flight and/or system safety or identification/correction/prevention action for errors.

The Silver Snoopy award is a silver pin depicting Charles Schultz's famous cartoon character Snoopy garbed in a space helmet and space suit. Recipients also receive a certificate and letter of commendation signed by an astronaut, citing their outstanding performance and the appreciation of the Astronauts' Corps.

### Manned Flight Awareness Team Award

Gerald D. Alexander, Ricky L. Martin of the Landing/Impact Dynamics Operations Section; Robert H. Daugherty, Landing and Impact Dynamics Branch, and William A. Vogler, of Lockheed Engineering and Sciences Co. in the Structural Dynamics Branch, were awarded the Manned Flight Awareness Team Award. All four were cited for their work on the Kennedy Space Center's Shuttle Landing Facility runway.

*Photo by Fred Jones*

**Recipients of the Manned Flight Awareness Team Award, presented by NASA astronaut Col. Mark Lee, were, left to right, William A. Vogler, Gerald D. Alexander, Rickey L. Martin and Robert L. Daugherty. Lee flew on the shuttle during STS-64 which carried Langley's LITE instrument as its primary payload.**

**Danette Allen**

**Joseph F. Delorme**

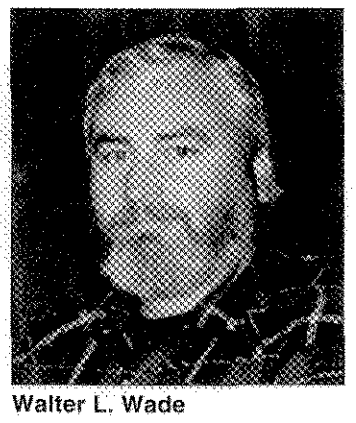
**L. Wayne Hicks**

**Mulugeta Petros**

**William A. Roettker**

**David M. Rosenbaum**

**Mark A. Vaughan**



**Walter L. Wade**

## Voluntary Leave Transfer Program

The Voluntary Leave Transfer Program is designed to permit employees to donate annual leave to other employees who are experiencing personal or family medical emergencies. Please contact Lisa Allen at ext. 42610 for more information. Your annual leave donations are greatly appreciated.

The following Langley Research Center employees are approved leave recipients: Robin L. Cravey, Bette Duncan (Jeanie); Lisa M. Kitchen; Melissa B. Rivers; Julian Roberson; Cassandra Stevens; Marie Storms; Darrell Wood; and from other agencies, Loc T. Nguyen.

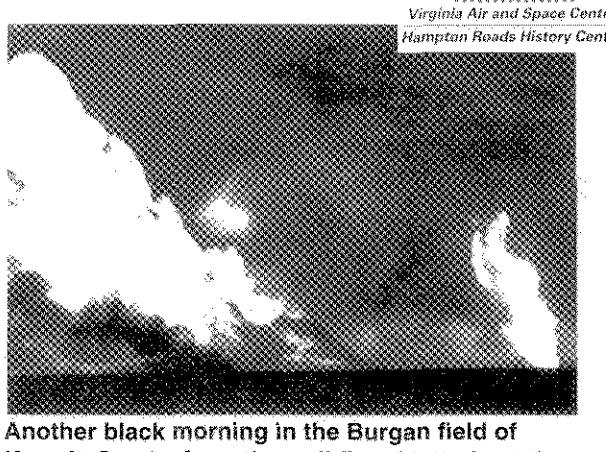
## Virginia Air and Space Center News

Virginia Air and Space Center
Hampton Roads History Center

### Fires of Kuwait — Feel the Heat

February 27, 1991, the Gulf War ended. When retreating Iraqi troops sabotaged more than 600 oil wells, it proved to be the supreme act of vengeance, in many ways as terrible as the war that preceded it. The battle against the blazing oil wells began. The IMAX® film, *Fires of Kuwait*, puts viewers in the heat of the action as heroic firefighters battle the blazing inferno. *Fires of Kuwait* opens Dec. 16, in the center's IMAX® theater.

A one of the first professional firefighters to assess the damage, Texas firefighter Joe Bowden Sr. said, ". . . there are no words around to describe what we saw when we came here." If left alone, the wells could burn for generations and could cause inestimable damage to the Earth's ecosystem. As word of the devastation spread, help came from around the globe. What experts feared might have taken years was accomplished in just nine months through team work, courage and dedication.



*Courtesy of MCMXCII Imax Corporation*

**Another black morning in the Burgan field of Kuwait. Smoke from the well fires blotted out the sky and the sun.**

Witness the victory of the largest international non-military effort in history as 10 countries join forces to attack Earth's worst man-made fire. People from around the world responded to this environmental assault with determination and unity. The international effort grew steadily over the initial months. Firefighting teams from the United States, Canada, Great Britain, France, China, India, Romania, Hungary, the Soviet Union and Kuwait were supported by thousands of people from 40 countries and more than 100,000 tons of equipment, the largest mobilization in peacetime history.

Feel the heat in the IMAX® theater. *Fires of Kuwait* will be shown Dec. 16 through March 1995 at 1 and 3 p.m., Monday through Thursday, and 1, 3 and 6 p.m., Friday through Sunday. A double feature of *Fires of Kuwait* and *Blue Planet* will be show at 7 p.m. on Friday and Saturday and 4 p.m. on Sunday.

Admission to *Fires of Kuwait* is $5.50 for adults, $4.50 for seniors/military and $4 for children ages 4 to 12. Admission to the double feature is $7 for adults, children, seniors and military. For more information, call 727-0900 or 1-800-296-0800.

# Happenings

**LAA ACTIVITIES:** The next **Country/Western Dance** will be on Saturday, Dec. 17, at the H.J.E. Reid Conference Center. Doors open at 6:15 p.m. and the cost is $3 per person. **Bingo** games are held every Thursday evening at the center: fun begins at 7 p.m. The **LAA Social Hour** will be Friday, Dec. 16, beginning at 4 p.m. There will be food, entertainment and door prizes. The LAA will sponsor a **New Year's Eve Dance** this year. Entertainment will be provided by *Ramblin' Country*. Tickets are on sale now for $12.50 at the LAA Office. For more information, call Andrea Whitesides at ext. 46369. Orders for **1995 Federal Employees' Almanacs** will be accepted until Dec. 23. The cost is $7.20 per book. To purchase, call Whitesides at ext. 46369.

**RETIREMENT RECEPTION:** A reception for Bob Myers will be held on Friday, January 6, from 1 to 3 p.m. in Building 1195C, Room 154. Please send gift contributions to Yvonne Beyer, ext. 41205, or Simone S. Foretich, ext. 42565, both at Mail Stop 174, by Dec. 30.

**GEORGE WASHINGTON UNIVERSITY** School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences at Langley offers the following degrees: Master of science, professional and doctor of science degrees in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, structural engineering and structural dynamics, and master of engineering management. Registration period for the Spring semester is January 9-13, 1995. For a complete listing of courses and telephone registration procedures, call ext. 41982.

**FOR SALE:** Couch, $250. Call 596-2144 after 6 p.m.

**FOR SALE:** One twin-size boxspring, $5; two twin-size bed frames, $5 each; two toddler car seats, $10 each. Call Sherry Barnes, 865-1725.

**PENINSULA KI AIKIDO CLUB** teaches Shin Shin Toitsu Aikido. No experience required. Call 890-0050 or 229-2219 for information.

***Engineers Week 1995***

**Volunteers are needed to teach classes stressing the importance of math and science during Engineers Week February 20-24, 1995. Registration forms to participate have been sent to all NASA employees and contractors. Please complete the form and return to Cathy Schauer at Mail Stop 154 by January 13, 1995.**

**RETIREMENT PARTY:** A retirement party for Alton T. Moore will be held January 27, 1995, from 5 to 10 p.m. in the H.J.E. Conference Center. The cost is $8 per person and a cash bar is available. Gift contributions of $2 are being accepted. Send gift contributions and party fee to William Salyer or Louise H. Sykes, ext 43524, Mail Stop, by January 20.

**FOR SALE:** 3 BR, 2 baths, large kitchen, attached garage, solar heat, near NASA and Langley. Asking $88,500. Call 766-3464.

## PDP Seeks Nominations

Nominations are being sought for the NASA Professional Development Program (PDP). The program gives participants an opportunity for a 12-month work assignment at NASA Headquarters or other NASA installation.

Work assignments provide experimental learning in new tasks and functions from an Agencywide perspective, supplemented by briefings and formal training. Participants begin a one-year assignment in August 1995.

The PDP has two levels in the Headquarters-sponsored program. Level I is for employees at GS-15 and Senior Executive Service levels. Level II is for those at GS-13 and -14, and some from GS-12. Individuals may nominate themselves to their directorate offices if they are in the specified grades and have demonstrated the potential to take on broader responsibilities in future positions. The Langley Executive Resources Panel will select Langley's nominees in February. PDP III level program is also being offered to provide on-Center developmental opportunities. Persons selected to participate in this program will be identified by the Langley Executive Resources Panel and, like those persons participating in PDP I and II, will begin their one year assignment in August 1995. Additionally, under the provisions for PDP III, employees may, in conjunction with their respective organizations, identify short-term developmental assignments which may be approved at the division level.

If interested in PDP Level I, II or III programs, call Dr. Janet McKenzie of the Employee Development Branch at ext. 42598 for a nomination form. Nominees are encouraged to inform their perspective Group office early so appropriate consideration may be given to each application. Deadline for all nominations is January 31, 1995.

**FITNESS CENTER** Holiday Hours: The Fitness Center will close one hour early (6 p.m.) on Friday, Dec. 23 and reduce its hours between Christmas and New Year to the following times: Dec. 26, holiday; Dec. 27, 7 a.m. to 3 p.m.; Dec. 28, 10 a.m. to 6 p.m.; Dec. 29, 10 a.m. to 6 p.m.; Dec. 29, 7 a.m. to 3 p.m.

**FOR RENT:** 3 BR brick ranch in Riverdale, wall to wall carpet, fireplace in living room, appliances, newly decorated, finished garage w/ auto door; central air, gas hot water heat, large yard, $800/mo. + deposit. Call 827-7485.

*Photo by Fred Jones*

**Langley's OV-10A flies over a laser van operated by the Massachusetts Institute of Technology's Lincoln Labs at Memphis International Airport earlier this month. The plane was collecting meteorological data while the van took data for research on a type of turbulence caused by jet aircraft. This turbulence, or "wake vortex," spirals from the wingtips of aircraft and requires following planes to maintain a safe separation, or distance. Federal Aviation Administration rules set separation standards that aircraft must maintain when landing. A joint NASA-FAA program aimed at boosting airport capacity is expected to determine under what conditions planes may fly closer together.**

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National Aeronautics and
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**Langley Research Center**
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