National Aeronautics and
Space Administration
Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 1 ❖ January 17, 1997

High-Speed Civil Transport Program Gaining Momentum

Supported by a team of major United States aerospace companies, NASA began a multiyear research program in 1990 to develop technologies for a next-generation supersonic passenger jet – a jet that would fly 300 passengers at more than twice the speed of sound. As envisioned, this high-speed civil transport (HSCT) would cross the Pacific or Atlantic in less than half the time of modern subsonic jets – at a ticket price less than 20 percent above comparable subsonic flights.

The projected HSCT market is substantial; long-range international travel is the fastest-growing sector of the projected market – the sector in which the benefits of high-speed travel are most obvious.

The economic stakes of the HSR program also are high. The successful development and production of an HSCT by foreign competitors would significantly reduce the U.S. aerospace industry's market share of civil transport aircraft. The projected market for up to 500 high-speed civil transports between the years 2000 and 2015 translates to more than $200 billion in sales, and about 140,000 new jobs in the U.S.

"I think someone's going to build this airplane," said Wally Sawyer, head of the NASA HSR program. "Whether the United States or somebody else is going to build it, I think the airplane will be built. How big a player [the U.S. airframe and powerplant manufacturers] could be would depend on the technology that they could bring to the table."

The development of these HSCT technologies is being accomplished in two phases. Phase I, which was recently completed, focused on the areas of atmospheric effects, community noise and sonic booms, and smoothing the flow over wings at supersonic speeds.

Phase II of the HSR program focuses on further developing and verifying the essential technologies to produce an economically and environmentally compatibile HSCT, building on knowledge gained from Phase I.

"We're well into Phase II," said Sawyer. "We've been successful in using that information [gained from Phase I]. Phase I was very important."

Selecting the right structures and materials for an airframe designed to fly 60,000 hours in its lifetime – in temperatures approaching 350 degrees Fahrenheit – is critical to making a future supersonic transport economically feasible. Weight and manufacturing costs must be minimized, while strength and durability are maintained.

Laboratory tests of proposed HSCT engines have confirmed that undesirable nitrogen oxide emissions and airport noise produced by supersonic engines can be reduced significantly.

The High-Speed Research program is a key element of NASA's Office of Aeronautics and is managed by the High-Speed Research Program Office at NASA Langley. The HSR program is also supported by NASA Lewis, Ames and Dryden. Industry team members include airframe manufacturers Boeing and McDonnell Douglas, powerplant manufacturers General Electric and Pratt & Whitney, flight deck partner Honeywell, and more than 50 major subcontractors.

"Since the current administrator and [the Associate Administrator for Aeronautics] want the agency to do things differently...this program has given us an opportunity to do that," said Sawyer, who has led the HSR program for more than two and a half years. "We now have industry as a true partner, and we're working on technology that is product-focused."

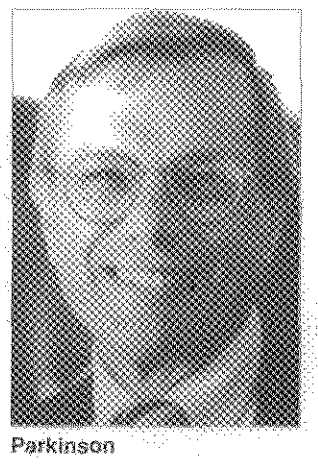
Colloquium Communiqué

Parkinson To Trace Satellite Navigation

Stanford University's Bradford Parkinson, the original program director for the Department of Defense's Global Positioning System (GPS), will deliver Langley's February colloquium lecture, Feb. 11, 2 p.m., at the H.J.E. Reid Conference Center.

He will repeat the lecture – titled "The Origins, Evolution and Future of Satellite Navigation" – the same evening, at 7:30 p.m., as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

Parkinson will discuss the history, applications and issues associated with GPS and will present some of Stanford's advanced satellite-based navigation research projects, which address how GPS availability may change the future of ground, marine and aerospace navigation worldwide.


Parkinson

Also known as NAVSTAR, GPS has been called "the most significant civil spinoff of the Cold War." Evolved from early technology development efforts in the United States Navy and Air Force, GPS is still fairly new, and applications taking advantage of it are still being conceived. The GPS constellation of 24 satellites gained fully operational status less than two years ago, in April 1995.

While some of its implementations can offer phenomenal accuracy, GPS still requires some expansions to satisfy signal integrity, continuity and availability requirements. Most of all, for GPS to be formally accepted and certified internationally, the world community will need greater participation and greater confidence in commitments by the U.S., which owns and operates the system.

FYI	
What:	Sigma Series Lecture
When:	Feb. 11, 7:30 p.m.
Where:	Virginia Air & Space Center, 600 Settlers Landing Rd., Downtown Hampton
Info:	727-0900

Parkinson has a broad background in management, modem control, astrodynamics, simulation, avionics and navigation. He manages the NASA/Stanford Relativity Mission and Gravity Probe B, directs Stanford research on innovative uses of GPS and chairs the NASA Advisory Council.

Future Planetary Exploration To Follow Mars Pathfinder, Global Surveyor Projects

BY DR. ROBERT D. BRAUN

The design and development of planetary exploration missions is proceeding rapidly at NASA and industry centers across the country. These projects should continue to expand our knowledge of the solar system long after the Mars Pathfinder and Mars Global Surveyor missions are complete.

NASA Langley personnel are contributing to many of these missions by performing planetary entry analyses.

Several of these flight projects are being developed through the Mars Surveyor Program at NASA's Jet Propulsion Laboratory in Pasadena, Calif. Under the decade-long program, an aggressive series of orbiters and landers are to be launched every 26 months, as Mars and Earth move into alignment.

This program is operating under the "better, faster, cheaper" philosophy, while providing scientists and the public with new data, insight and images of Mars.

The Mars Surveyor landers to be launched in 1998, 2001, 2003 and 2005 will capitalize on the entry experience of Mars Pathfinder. Orbiters launched in the 1998 and 2003 opportunities will draw on the aero-braking experience of Mars Global Surveyor, while carrying other scientific instruments into orbit.

▲ **Mars 98 Lander** will perform a controlled landing near the south pole, search for signs of water ice and conduct soil analysis and atmospheric dust measurements. The aeroshell geometry and heatshield are derived from Pathfinder.

▲ **Mars 98 Orbiter** will perform remote sensing of Mars' atmosphere and serve as a data link for the Mars 98 Lander and Mars Microprobes. The aerobraking maneuver required for orbital insertion is similar to that of Mars Global Surveyor.

▲ **Mars 2001 Orbiter** is currently in the early design stage. It will determine global chemical surface composition. Due to mass and cost constraints, this will be the first aerocapture mission – a single-pass atmospheric maneuver which provides orbital insertion directly from interplanetary flight. The vehicle's aeroshell geometry is likely to be derived from Pathfinder; however, a more complex guidance and control system than either Pathfinder or 98 Lander is required. Additional heatshield thickness or modification is also required.

▲ **Mars sample return** (2003 or 2005) is currently in the early design stage. This challenging mission of two entries and launches will obtain and return intriguing soil and rock samples to Earth for detailed analysis. Precision landing requirements at Mars may necessitate the choice of an aeroshell shape different than that of Pathfinder.

Other opportunities for planetary exploration are being provided by NASA Headquarters' Discovery missions and JPL's New Millennium program:

▲ **Mars Microprobes** – As the second mission in the New Millennium program, these two basketball-size aeroshells are being carried to Mars aboard the 98 Lander cruise-stage. This proof-of-concept mission is intended to provide scientific return while demonstrating key elements of future network science missions.

Housed within each aeroshell are instrumented surface penetration devices designed to analyse the subsurface layers by performing soil sampling and water detection. The aeroshells have little Pathfinder heritage; alternate configurations and heatshield materials have been selected based on the unique nature of this planetary entry. The planned impact site is near the Mars south pole.

▲ **Stardust** – The fourth Discovery mission is being designed to fly through the tail of the Wild 2 comet, returning interstellar and cometary dust particles to Earth for detailed analysis. Launch is planned for February 1999. This will be the first non-lunar sample return mission and the highest speed Earth entry ever performed. The aeroshell has little Pathfinder heritage; an alternate configuration and heatshield material have been selected.

(See related photos, page 4.)

News Briefs

Martin Luther King Jr. Honored

BY VIVIAN B. MERRITT

Dr. Martin Luther King Jr. dreamed of peace and equality for all mankind. He believed that everyone should have the freedom to reach for higher goals, as well as the opportunity to climb to greater heights.

On the anniversary of his birth, observed this Jan. 20 and celebrated in more than 100 nations, we honor his effort and encourage others to take up the torch. In his memory, let all of us at Langley work for a better today and a brighter tomorrow.

> *"I have a dream that one day ... my four little children will live in a nation where they will not be judged by the color of their skin but by the content of their character."*
>
> *Dr. Martin Luther King Jr., Civil Rights Leader*

Langley Cited for Civic Improvement

NASA Langley received the Mayor's Civic Improvement Award for the City of Hampton, dated Dec. 19, for its "significant aesthetic improvement to our community."

The certificate states, "Through your efforts, you have provided an invaluable service to the citizens of the City of Hampton, our environment and our future."

Disabilities Awareness

SCPD Makes Great Strides

BY GERRY PARDUE

Langley's disability program, which began as a study group in 1982 and was officially recognized as a Langley committee in 1983, has become NASA's lead center for hiring and accommodating employees with disabilities. In 1985, a satellite committee was formed to promote the development of positive attitudes toward people with disabilities by increasing employee awareness. Ten years later, the Satellite Committee for People with Disabilities (SCPD) produced the existing strategic plan that NASA Headquarters uses as a guideline for other centers.

However, it has taken more than the written word to accomplish this plan.

During the past several years, each directorate has had direct input in providing necessary accommodations/accessibilities.

Langley is conscientious of all disabilities, and the SCPD continues to promote the development of positive attitudes and employee awareness. Meetings are open to all and are held the second Wednesday of the month, 9:30 a.m., in the cafeteria.

Researcher News 1997 Publication Schedule

Deadline	Distribution	Deadline	Distribution	Deadline	Distribution
Jan. 21	Jan. 31	May 12	May 23	Sept. 2	Sept. 12
Feb. 3	Feb. 14	May 27	June 6	Sept. 15	Sept. 26
Feb. 18	Feb. 28	June 9	June 20	Sept. 30	Oct. 10
March 3	March 14	June 23	July 3	Oct. 14	Oct. 24
March 17	March 28	July 7	July 18	Oct. 27	Nov. 7
March 31	April 11	July 21	Aug. 1	Nov. 10	Nov. 21
April 14	April 25	Aug. 4	Aug. 15	Nov. 24	Dec. 5
April 28	May 9	Aug. 18	Aug. 29	Dec. 8	Dec. 19

Announcements

Project Management for Windows 95 Offered

"Project Management for Windows 95: Version 4.1," a two-day course, is being offered Jan. 23-24, 8:30 a.m.-4 p.m., in Building 1194A, Room 206. The course prerequisite is "Microsoft Project Management." Space is limited to 12 participants.

The course presents the basic concepts and theory of project management. Students will study project management theory, explore a case study, create and print projects, enter tasks; organize schedules, assign task relationships, add resources, and assign costs to tasks and resources.

To register, send an Application for On-Site Training, (Form 24), to DeAnna Wooster at Mail Stop 137. For more information, call George Allison at ext. 42594.

Sexual Harassment Prevention Training

The Office of Equal Opportunity Programs is sponsoring "Sexual Harassment Prevention Training" for all NASA and Army Research Laboratory employees at the H.J.E. Reid Conference Center, Jan. 27-29.

John DiDio, director of Professional Personnel Services, Inc., will conduct the training.

Below is a suggested attendance schedule. All employees are encouraged to attend one of the sessions. A sign language interpreter will be available at the Jan. 27, 1-3 p.m. session.

Jan. 27 – 9-11 a.m. (A-D)
1-3 p.m. (E-H)
Jan. 28 – 9-11 a.m. (I-L)
1-3 p.m. (M-P)
Jan. 29 – 9-11 a.m. (Q-U)
1-3 p.m. (V-Z)

Registration is not required.

For more information, call Dollie McCown at ext. 43561.

ASRB Meeting Dates Set

The Airworthiness and Safety Review Board (ASRB) will hold monthly open meetings on Wednesdays, 1 p.m., in Building 1209, Room 180, on the following dates: Feb. 5, March 5, April 2, May 7, June 4, July 2, Aug. 6, Sept. 3, Oct. 1, Nov. 5 and Dec. 3.

Meeting agenda will be published in the *Researcher News*. To schedule an agenda topic, call Paul Stough at ext. 43860 or Melvin Lucy at ext. 47069.

The ASRB conducts reviews and provides guidance for aircraft flight operations; recommends airworthiness and safety requirements, standards, procedures, specialized personnel qualifications and training for these operations; and provides airworthiness and safety information for these operations for the Langley Safety Manual.

The board also ensures all Langley flight experiments involving center employees, aircraft, hardware, facilities and/or funding.

Blood Drive Donors, Totals

Langley's Red Cross Blood Drive reports 261 total donors for November, including four first-time donors, according to Karen Ridlon and Joann Schiffer.

Following is a list of donors and total amounts donated:
15 gallons – Robert F. Berry Jr.;
10 gallons – Michael M. Bryan;
8 gallons – Robert L. Myers;
7 gallons – Thomas J. Skalski, Jan A. Benson;
6 gallons – Franklin O. Mayhew, Patricia P. Davis, Robert A. Baals;
5 gallons – Roger K. Johnson, Robin L. Freeman;
4 gallons – Catherine S. Jones, Mike C. Fox, Steven K. Bene;
3 gallons – Jose A. Vega, Gary A. Wainwright;
2 gallons – J. Ray Dagenhart, William L. Kleb, Michael T. Oliver, Didier F. Rault.

First-time donors included Charles S. Lehtio, Audrey Coppedge, William G. Rodgers and Barmac Taleghan.

The winners of the turkey raffle were Paul Daspit, Jennifer Hubble, Steve Yaros, Joseph Price, Tom Levin and Bradley Leighty. The American Red Cross provided the turkeys.

The next blood drive is Jan. 22, 9 a.m.-3 p.m., in the H.J.E. Reid Conference Center.

CFC Totals for 1996

Totals for Langley's 1996 CFC Campaign are listed below:

$ 306,859.82 – total contributions

$188.14 – average contribution

107.67 percent of total goal

63.61 percent of contributors (participation).

Traffic Crackdown Issued

The Office of Security and Public Safety (OSPS) has increased enforcement of parking and traffic regulations to ensure that speed is maintained at safe levels and that parking is limited to authorized areas. Violators will be issued citations; severe and/or numerous violations may lead to the revocation of driving privileges at Langley.

Speakers Bureau November Activities

John J. Korte spoke to John B. Dey kindergarten students in Virginia Beach about aerospace engineering as a career.

Scott C. Asbury addressed the same subject when he visited Belle Heth Elementary School in Radford, Va.

In one of several speaking engagements during November, William B. Grant visited the Sierra Club, United States Department of Agriculture Forest Service Southern Research Station, in Boone, N.C., to discuss "an epidemiological approach for determining the contributions of acid deposition and ozone exposure to hickories and oaks in the eastern U.S."

He addressed the same subject when he visited the Ozone Workshop, sponsored by the Sputhern Appalachian Mountains Initiative in Asheville, N.C.; the University of Virginia; Duke University; and the U.S. Environmental Protection Agency in Research Triangle Park, N.C.

Irwin Schauer spoke to the Continual Improvement Symposium at Goddard Space Flight Center, Greenbelt, Md., on "Evaluating Continual Improvement."

James Byrd talked to the Smithfield Ruritan Club about information resources, satellite spotting and the Internet.

Dr. Jag Singh spoke to the Old Dominion University's Departments of Electrical and Computer Engineering about "Microstructural Characterization of Polymers with Positrons, Bragg Gating and Their Aerodynamic Applications."

Larry Bement visited the New Horizon Regional Education Center in Hampton to discuss pyrotechnics.

Paul Holloway was a guest of Yorktown Middle School for their Career Day.

Gary Price gave an overview of NASA to the Warwick Rotary Club.

Bruce Fisher spoke to the Poquoson Lions Club about NASA storm hazards and lightning research.

Sharon Smith visited second-graders at Hampton's Cooper Elementary School to discuss "The Role of an Attorney."

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, phone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

Photographer ..... Fred Jones

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley Leads NASA's New Program Assessment Efforts

BY MARY GRAVES

Langley has assumed another agency lead as the home of the new Independent Program Assessment Office (IPAO), with the current center chief engineer, William M. Piland, as director.

The new charge for Langley is the result of recommendations of the NASA Advisory Council and the Presidential Advisory Committee on the Future of the U.S. Space Program, and the resulting directive from the NASA deputy administrator to implement the IPAO at Langley.

Two Functions

Beginning this month, with assumption of full responsibility to follow this spring, Langley's IPAO will perform two NASA-wide functions: to conduct independent assessments of proposed new systems concepts, prior to agency approval for development, and to organize and conduct evaluations of ongoing programs in support of the NASA Headquarters' Program Management Council (PMC).

"NASA has determined a need for review of planned and ongoing programs, and Langley was chosen to take the agency lead because of our core capability in conducting space and aeronautical systems analyses," said Piland. "The IPAO's role is to provide independent assessments of advanced systems designs and program evaluations, using Langley's resources and those of other centers, where appropriate."

NASA-wide Teamwork

The IPAO will be comprised of about eight full-time Langley employees and five "detailees" from Langley and other centers.

The independent assessment teams will spend from a few weeks to several months conducting analyses to validate conceptual designs evolving from within and outside the agency. The teams will confirm design integrity, system/subsystem trades, life-cycle costs, realism of schedule, risks and risk mitigation approaches and technology issues.

Langley's Role

"We've been doing a lot of this [analysis] at Langley for a long time, but the official recognition that we have a place in the agency's cycle for developing projects and doing independent assessments is new, and the office is new," said Piland.

The program evaluation function is a check to make sure that ongoing programs are on track, are staying within cost and schedule and are being managed properly.

"The function of organizing these reviews for the PMC has been ongoing and administered by NASA Headquarters," said Piland. "The responsibility for administering the review process for the PMC is migrating to Langley and will be a part of this new office. The value Langley brings to the process is the application of our analysis tools and expertise to add technical depth to the reviews."

Assuring Success

NASA's advisory groups and agency leadership recognized the need to independently assess proposed programs as a means "to improve the quality of our program planning and to help assure the likelihood of program success," said Piland.

"A NASA center has an idea for a new system to meet a particular mission objective, works on it a while, then asks NASA Headquarters for the money to build and operate it," he explains. "Headquarters asks, 'how much will it cost to build, how long will it take, how much will it cost to operate?'

"Then, we find – after we've gotten into building or operating the program – that it costs a lot more than we thought it was going to cost, and so we're over cost and schedule budgets. The problem is that we didn't do a sufficiently thorough job up-front in understanding what we're about to design or build."

> **"Our job in the IPAO is to take an independent look at ... projects, to do an ... assessment, then to advise the Office of the Administrator whether this program will actually do what it's designed to do."**
>
> *Bill Piland, Independent Program Assessment Office*

The IPAO will help remedy this problem through its organization of thorough independent assessments.

"Our job in the IPAO is to take an independent look at proposed or ongoing projects, to do an independent analysis or assessment, then to advise the Office of the Administrator whether this program will actually do what it's designed to do," said Piland.

"By having an independent, third-party assessment of proposals, we offer the administrator greater confidence when he approves a program for development – confidence that he's proceeding with something that has a clear definition, that is a quality design at the conceptual level, that is low-risk, that has a likelihood of being built and operated within cost and on schedule," he said.

The IPAO reports administratively to the Langley center director and functionally to the Office of the Administrator through Headquarters' chief engineer.

Langley Family, Salvation Army Help Others To Enjoy '96 Yuletide

Angels Trees, Cookies Brighten Holidays for the Needy

BY NANCY M. FINN

Langley employees made the 1996 Christmas season a little brighter for 53 local children and several hundred homeless persons.

'Angel Tree'

A tradition started eight years ago by members of the Acquisition Division has blossomed into a center-wide project. A Salvation Army Angel Tree set up in the cafeteria gave employees the opportunity to spread holiday cheer beyond the Langley gates. Organizations across the center, as well as individuals, responded to the call.

For several years, the Financial Management Division (FMD) has sponsored at least one needy family. This year, however, they opted to support the center-wide initiative.

"FMD members realize how fortunate they are," said the division's Marilyn Aldrich. "They have food, shelter and clothing, so they give to local families in need."

FMD and others chose "angels" – the names of needy children – from the tree and bought them warm clothes, toys and books.

Photo by Sandie Gibbs

Langley cafeteria workers Barbara Mann, left, and Marie White stack dozens of cookies for the Salvation Army's mobile kitchen.

'Cookie Power'

Langley's Community Service Program and the cafeteria also sponsored "Cookie Power," a project which encouraged employees to spread holiday cheer by making an extra batch when doing holiday baking. "Cookie Power" netted more than 100 dozen goodies for the Salvation Army's mobile kitchen.

"The Langley family is incredibly generous," said Community Services Officer Marny Skora. "Our holiday projects are just some of the initiatives Langley employees participate in throughout the year."

The Salvation Army provides assistance to all in need, all year 'round.

"We have a constant need for nonperishable food and warm clothes for children and adults," said Capt. Steve Long of the charitable organization.

Technical Officers Fulfill Role as Liaison, Program Monitor

BY JOSEPH S. MURRAY

Since technical officers (TOs) for grants and cooperative agreements are not formally appointed, they do not receive a listing of official duties, and so may not be fully aware of their duties and responsibilities. These individuals serve a vital role as the technical liaison between the grantee and the grants/contracting officer.

In part, TOs monitor the research, training, or education program and ensure receipt of the summary of research or final report.

Further, technical officers perform all the following duties:

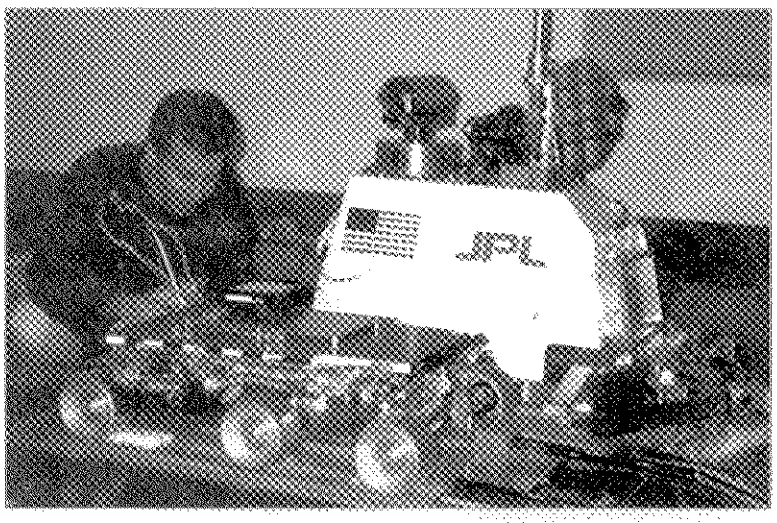
- Review and evaluate unsolicited proposals for the initial award actions; ensure that grants and cooperative agreements are not used to procure goods and/or services that should be procured by a contractual action; process the evaluation package through the division and group levels for concurrences as necessary
- Ensure that a purchase request (PR) is initiated for funding support and identify the PR number in the proposal evaluation package
- Maintain a file of the proposal, initial award and each supplemental award action
- Communicate with the grantee and grants/contracting officer on all technical matters
- Communicate with the principal investigator to ensure timely receipt of technical reports
- Ensure timely submission of PRs to support incremental funding requirements as specified in award documents
- Monitor the grantee's use of funds to ensure that NASA costing objectives are achieved
- Communicate with the grants/contracting officer or administrative contracting officer, industrial property officer, and patent council office as necessary to ensure timely closeout of physically complete awards
- Perform other technical duties as requested by the grants/contracting officer.

Alternate TOs are not usually assigned. And since TOs are not formally appointed, duties may be redelegated; however, the person performing the duties should be assigned as the TO. The TO is identified initially on the CASE Report (NASA Form 1356). TO changes require a letter from the division office.

For more information, contact Joseph Murray at ext. 42415, or at j.s.murray@larc.nasa.gov.

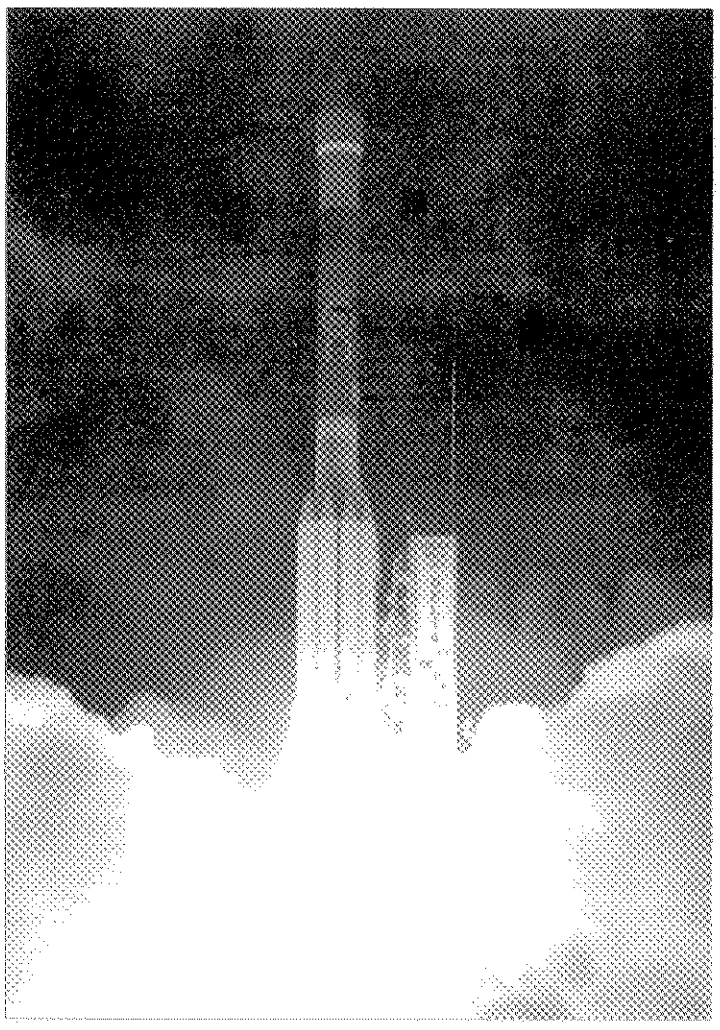
Mars Pathfinder Takes NASA to the Red Planet and Beyond

Photos Courtesy of NASA's Jet Propulsion Laboratory

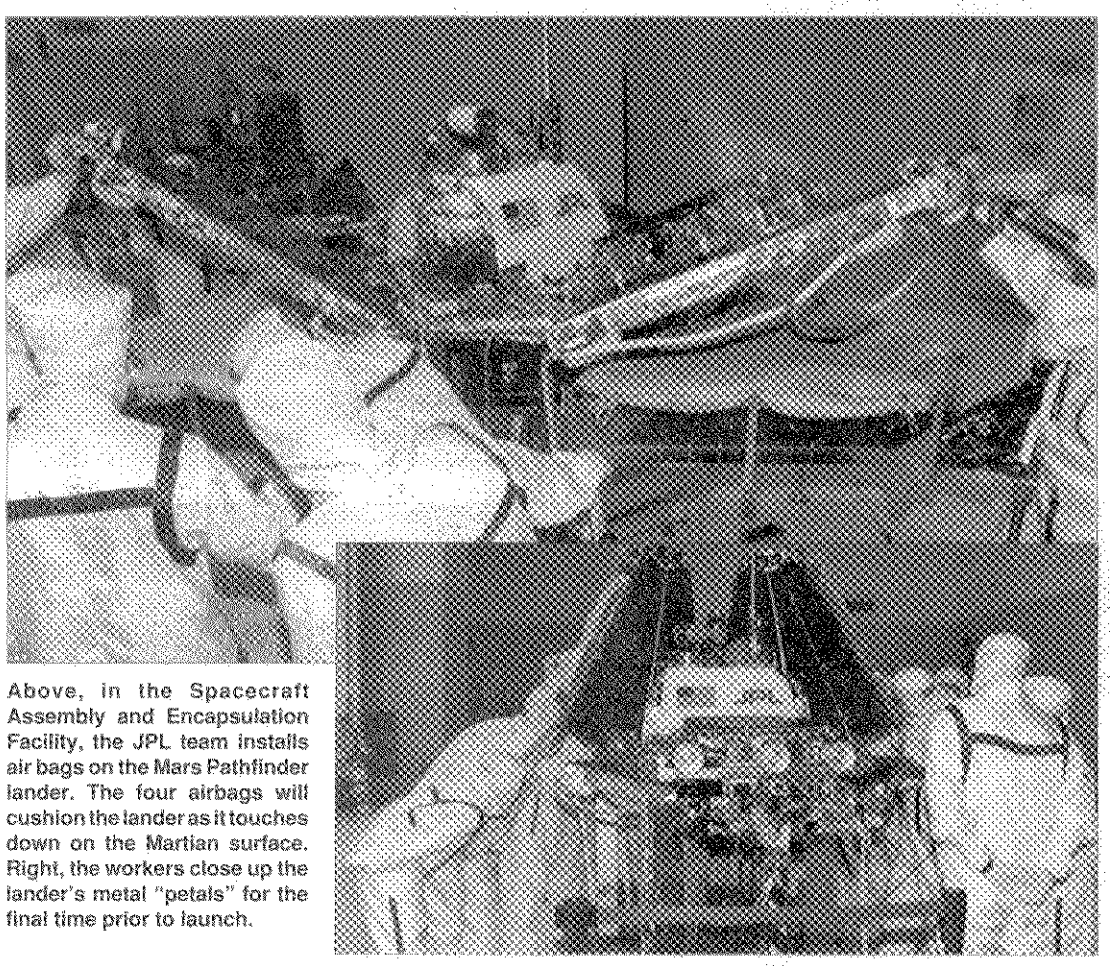


NASA Langley's Robert Braun, of the Vehicle Analysis Branch, checks out the Mars Pathfinder Test Rover at the Jet Propulsion Laboratory in Pasadena, Calif. As a member of the Pathfinder operations-navigations team, Braun will be in the JPL control room in July when Pathfinder is scheduled to land on Mars.

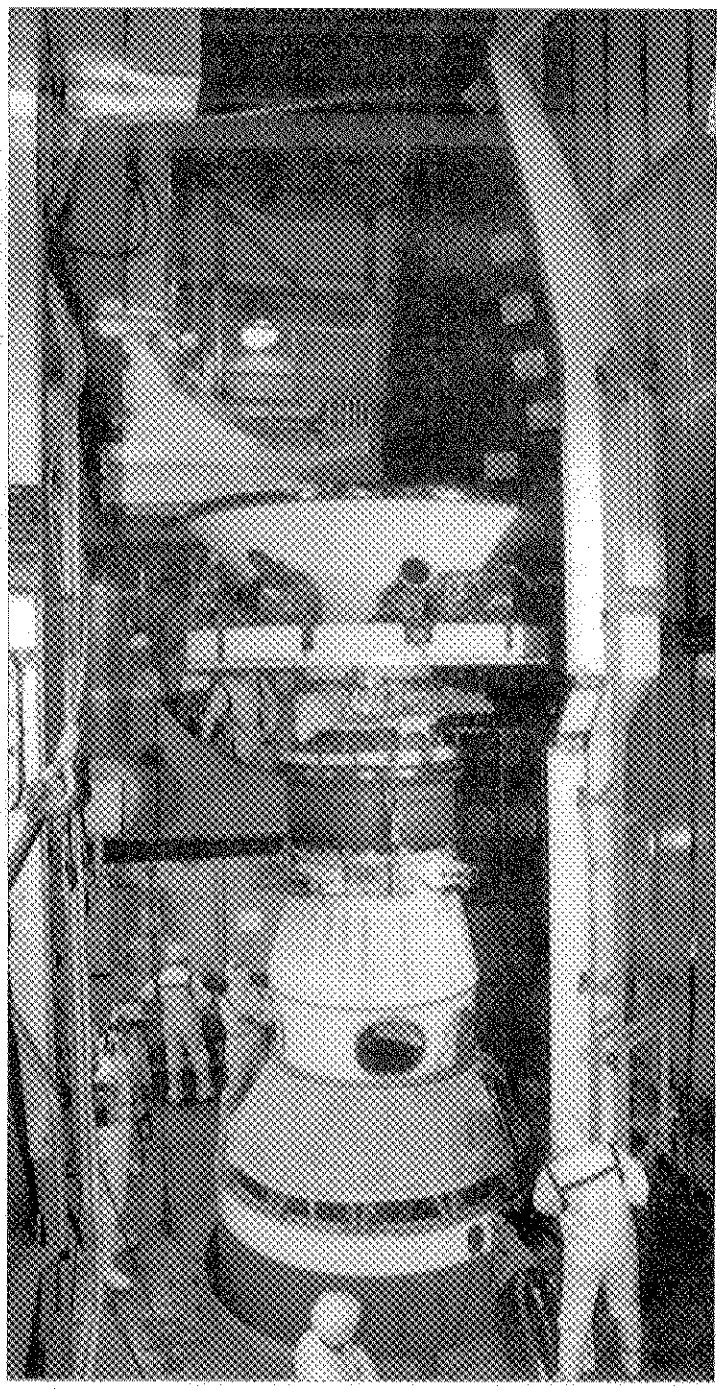
See related story, page 1.



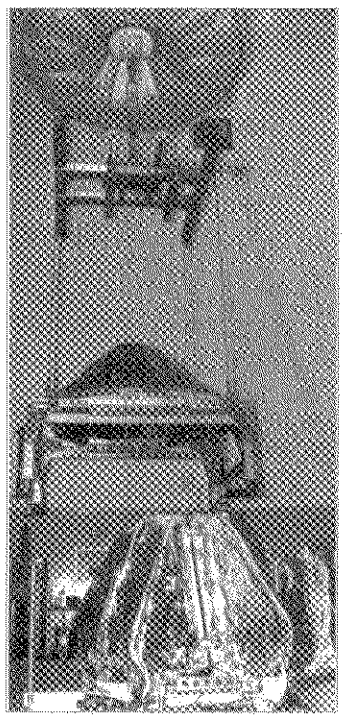
Delta II liftoff began Pathfinder's journey to Mars, early the morning of Dec. 4. Mars entry, descent and landing are scheduled for July 4.



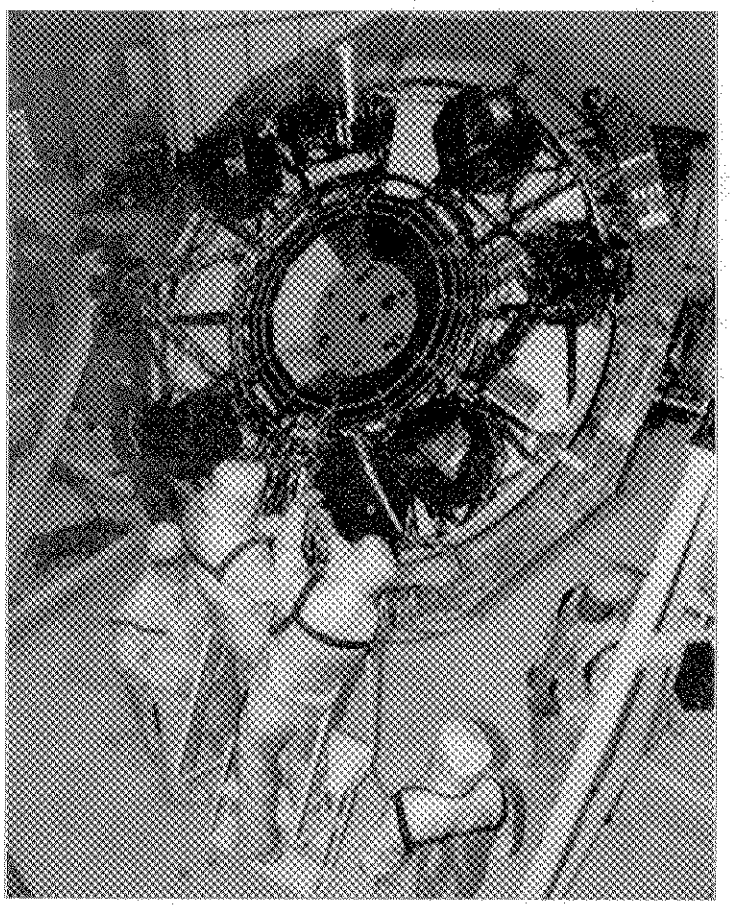
Above, in the Spacecraft Assembly and Encapsulation Facility, the JPL team installs air bags on the Mars Pathfinder lander. The four airbags will cushion the lander as it touches down on the Martian surface. Right, the workers close up the lander's metal "petals" for the final time prior to launch.



Workers at Cape Canaveral Air Station, Kennedy Space Center, Fla., get one final look at the Mars Pathfinder spacecraft before it is sealed inside a protective payload fairing for flight. The Pathfinder and its upper stage booster are perched atop the Delta II expendable launch vehicle that propelled the spacecraft into orbit.



Above, the Pathfinder backshell is lifted above the lander during final assembly at the Kennedy Space Center. Right, the cruise stage of the Pathfinder, mounted inside a support assembly, is prepared for attachment to the lander.



Langley Members of NASA Team Receive Agency Kudos

Four Langley employees, members of the NASA Acquisition Internet Service (NAIS) Team, received Space Flight Awareness Team Awards on Dec. 12: **Mary Deuell**, **John Kusterer** and **Sandra Ray**, Acquisition Division; and **Kennie Jones**, Information Systems and Services Division.

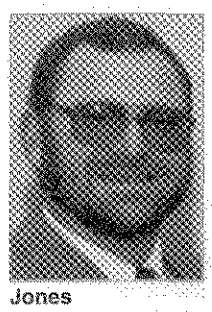
Deuell

The award recognizes the team's "extraordinary efforts and remarkable dedication to NASA's missions in establishing a standard, agencywide process for procuring equipment and services over the Internet."

Acquisition Notices Go Online

Through this service, NASA now provides immediate industry access to advance notices and solicitations for all competitive contract acquisitions of more than $25,000, plus acquisition forecasts, regulations and other procurement-related information. The service reduces paperwork and saves time and money.

Companies not only can get the electronic version of the solicitation, but they can also download it immediately upon release, avoiding several days of document reproduction and mail time. The NAIS team of representatives from each center implemented this innovative service without a budget, applying ingenuity and pressing well beyond their normal day-to-day responsibilities, often working after hours.


Jones

Time Is Money

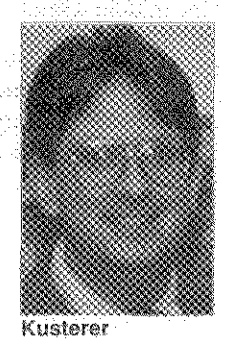
The service substantially reduces the leadtime and costs associated with the procurement of supplies, equipment and services supporting the shuttle, space station and other NASA programs.

In the recent Global Positioning System/Inertial Navigation Sensor procurement for the shuttle and space station, prospective contractors obtained immediate access to the solicitation and amendments via the Internet, and the closing date for proposals was moved up several days.

This service is also helping the ongoing Consolidated Space Operations Contract competition. Posting status information and solicitation drafts significantly reduced the number of phone inquiries and triggered industry feedback which helped in the final drafting of the solicitation.

While some competitive solicitations are available in both electronic form over the Internet and in paper form, the Internet is now the only source for NASA's midrange acquisitions up to $500,000 in value. Curtailing the normal paper process in favor of immediate electronic access can shrink lead times for soliciting offers by as much as two weeks.

More savings result from reduced paper and mailing costs. NASA issues more than 1,500 solicitations annually, and prior to the NAIS implementation, some 500 copies of those were mailed, at about $10 per copy. Reducing the number of solicitation mailouts saves thousands of dollars, with estimated savings of more than $1 million per year in the future.


Kusterer

Starting from Scratch

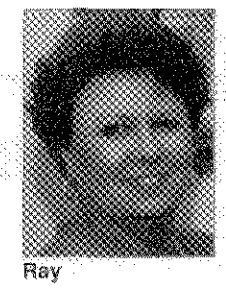
The NAIS team started out as mostly individual procurement professionals at different sites with little or no Internet experience. Within one year, these people became a cohesive team, familiar with the emerging World Wide Web methodology and its supporting programming language, and they implemented the Internet service.

The team used existing hardware and software, established internal processes and trained each center's procurement staff.

This intercenter initiative has continually progressed from its original concept through a unique collaborative process, including weekly telecons, monthly video teleconferences and maintenance of an up-to-date virtual library of all team information.

Improved Procurement

The team's performance has led to enhancements which further improve the effectiveness of NASA's procurement operations. A search feature allows companies to search for business opportunities across the agency at one time, implementing user-selected criteria.


Ray

In addition, the team is piloting an e-mail notification feature which allows a company to register online and to receive e-mail announcements on acquisitions matching the company's specified criteria.

With these enhancements, the NAIS is tearing down geographical barriers for prospective suppliers and contractors who were previously unaware of many of NASA's business opportunities.

Model Effort

The NAIS is the first agencywide implementation of an acquisition service on the Internet which serves as a working model for other federal agencies. Because of this team's efforts, NASA leads the way for the federal government in pursuit of the president's electronic commerce initiative.

Blankenship Recognized for Exceptional Service

Langley's Charles P. Blankenship, NASA program director for Advanced Subsonic Technology (AST), received a Distinguished Executive Service Award from the Senior Executives Association (SEA) and its Professional Development League at their Executive Excellence Awards Breakfast on Dec. 13 in Washington, D.C.

Blankenship, a 35-year veteran of federal service and a Langley employee since 1980, was cited for his "outstanding dedication and technical innovation" and "exemplary abilities in advocacy, planning and implementation."

In his work in aeronautics, Blankenship led the planning and integration of four key multiyear programs with the aeronautics industry, universities and other government agencies. The successful programs led to the development of cost-effective composite aircraft structures, structural test methods and computational model predictors for ensuring structural integrity of an aging commercial fleet.

Blankenship

Blankenship also led the planning and implementation of the Advanced Composites Technology program for subsonic transport aircraft wing and fuselage components, resulting in industry use of composites to reduce aircraft weight and maintenance costs.

His leadership has resulted in the development of airframe materials, structures and acoustics technology for the High-Speed Research and AST programs, as well as other major technology programs.

A graduate of Virginia Polytechnic Institute and State University, the Bluefield, W.Va. native has served as Langley's Materials Division chief, Structures Program director and Technology Applications Group director. He was named AST program director last year.

The SEA is a professional organization that represents the interests of career federal executives. It aims to improve the efficiency, effectiveness and productivity of the federal government, to advance the professionalism and advocate the interests of career federal executives and to enhance public recognition of their contributions.

Center Historian Launches New Langley History Project

Finding Practical Solutions is the working title of the newest three-year history project dealing with the history of Langley Research Center, written by Deborah G. Douglas, the center's current contract historian.

Douglas, who was a researcher for the Smithsonian's National Air and Space Museum in the mid-1980s, is an experienced historian of technology and science. She recently completed a doctorate degree at the University of Pennsylvania with a written history of airports in the United States before World War II.

The two existing volumes about Langley written by James Hansen, *Engineer in Charge* and *Spaceflight Revolution*, are "internal" histories, noted Douglas.

"Their fundamental point of reference is the center – how Langley views itself, how it organized its research and what it thought its priorities should be," she said. "This new book will be about how others – the military, universities and industry – see Langley."

She likened her project to looking through the "wrong" end of a telescope.

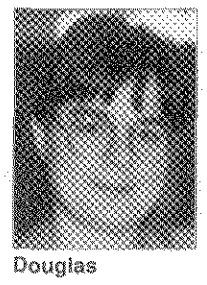
"When you look through a telescope the 'right' way, you can see an incredible amount of detail," she said.

Conversely, Douglas' objective is a broad, external survey of the ways Langley has contributed to the development of aeronautical engineering – as opposed to the Hansen books' internal focus on the center. Douglas' work will also include coverage of some of the most important aviation research conducted since 1958.

"It's not written in stone that the United States government should undertake research in aviation," said Douglas. "Every year since the establishment of the National Advisory Committee for Aeronautics in 1915, the case (for aviation research) has had to be made before Congress.

"Every year, the engineers, technicians and support staff have to show that they have fulfilled that first mandate – to find 'practical solutions' to the problems of flight."

Douglas will complete research and preparation of the draft manuscript in early 1999. She will draw on the rich resources of Langley's own archives and technical library. She will also study Langley materials which are now held by the National Archives in Washington, D.C., and in Philadelphia.


Douglas

But one of the things that make this book different from its predecessors will be Douglas' use of materials from outside sources. She has already spent time in the archives of Boeing, Stanford University, California Institute of Technology and McDonnell Douglas. She has obtained materials from companies as diverse as Alcoa and the J.A. Jones Construction Company.

"It is fascinating to see what others think of us," Douglas said. "I hope that this work, like other volumes in the NASA History Series, will provide a long-range perspective on issues facing Langley today."

AdVentures

FOR SALE: Oriental wool rug, 11 x 17 feet, cream with blue-and-pink floral pattern, $400. Call 247-5144 before 9 p.m.

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

INCOME TAX PREPARATION: Member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227 for an appointment.

GEORGE WASHINGTON UNIVERSITY: Late registration is Jan. 21-24 for the spring semester with George Washington University's School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences (JIAFS) at NASA Langley. JIAFS offers master of science, doctor of science and professional engineer degrees in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, structural engineering and structural dynamics, as well as a master of engineering management degree. For more information, call the GW Office at ext. 41982.

CAREER SEMINARS:

▲ "Networking for Career Development," Jan. 23, 9-10:30 a.m.

▲ "Conflict Management," Jan. 30, 9 a.m.-noon

▲ Open House (designed for buyout personnel, but all are welcome), Jan. 31, 9 a.m.-3 p.m.

▲ "Life After NASA" (designed for buyout personnel, but all are welcome), Feb. 11, 9 a.m.-noon

▲ "Negotiating Salary & Benefits," Feb. 20, 9 a.m.-noon

▲ "The Net & Career Development," Feb. 27, 9 a.m.-noon.

For more information or to register, call Susan Costello at ext. 45000; or e-mail her at s.b.costello@larc.nasa.gov.

NATIONAL ENGINEERS WEEK WORKSHOP: Jan. 24, 1 p.m., H.J.E. Reid Conference Center. A general session will offer tips and advice on what to do after you receive an assignment and will inform you about materials available to support the lessons. Former volunteers will share ideas about getting students involved in the presentation early and maintaining their interest. Open to anyone interested in school visitation opportunities throughout the year. Charge time to K-12 Math-Science Outreach Job Order A-5423.

MENTORS NEEDED: Christopher Newport University and the Peninsula Engineers Council host the second annual Engineering Design Contest on March 22. Mentors are needed by Jan. 24 to act as project managers for the middle school and high school teams. A kick-off meeting is Feb. 15; mentors and teams will meet at least four more times before the contest, which is held in the CNU gym. For more information, contact Beth Fogarty at 594-7065 or Randall Caton at 594-7188 or e-mail at rcaton@pcs.cnu.edu.

RETIREMENT PARTY: Friends and colleagues are invited to join in celebrating the retirement of Bob Davis and Roy Tate of the Facility Systems Engineering Division. The cake-and-ice cream party will be held Jan. 28, 1 p.m., Building 1209, Room 180. Send donations for food and gifts to Jim Mayhew at Building 1209, Room 112, Mail Stop 447.

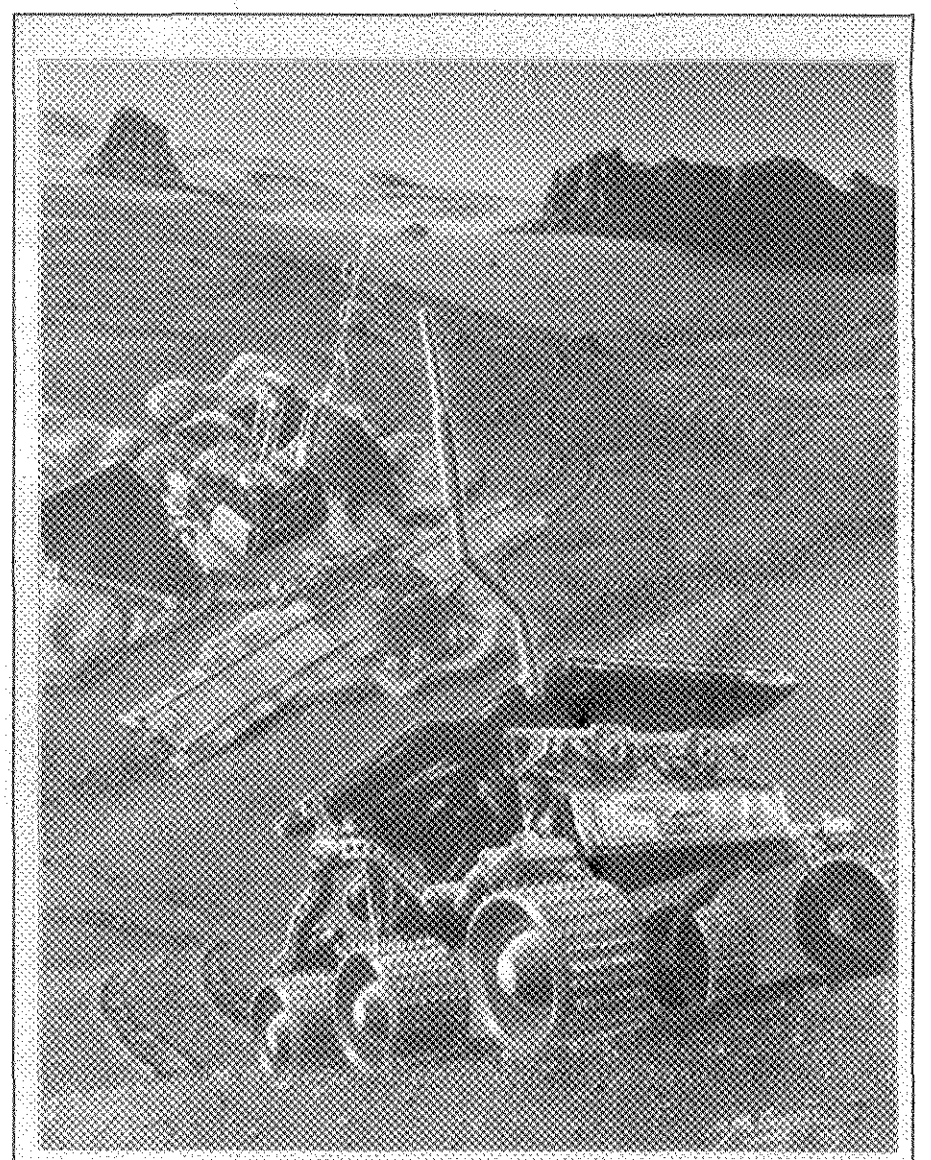
YOUNG PROFESSIONALS PAPER COMPETITION: The Young Professionals Committee of the American Institute for Aeronautics and Astronautics (AIAA), Hampton Roads Section, sponsors a paper competition to recognize outstanding on-the-job technical accomplishments of its young professional members. Members under age 35 may submit one first-authored paper that has been published or accepted for publication in an archival and refereed publication. Low-number NASA Technical Memoranda are eligible. Papers received on or before Jan. 31 will be judged for both technical content and style by an independent review committee. The winner will be selected in March and presented an award at the spring section awards banquet. Submit three copies or reprints of the manuscript, along with a copy of the acceptance letter and author information. Include age and AIAA membership number with your submission to: Robin C. Hardy, NASA Langley Research Center, Mail Stop 432, Hampton, Va., 23681-0001.

GIRLS PROGRAM: "Growing Smart: What's Working for Girls in School," a free public program for parents and their daughters, will be held Feb. 1, 10 a.m.-noon, in the Main Street Meeting Room of the Newport News Public Library, on Main Street near Warwick Blvd. in Newport News. Sponsored by the American Association of University Women, Newport News Branch. Features two short films – "Failing in Fairness" and "Girls in the Middle." Designed for parents and all elementary and middle school girls, but all educators and girls are welcome. For more information, call 898-5691 or 851-2639.

FORE! The NASA Golf Association's trip to Myrtle Beach, S.C., is May 29-June 1. Deadline for $100 entry deposit is Feb. 15. For more information, call Tom Yager at ext. 41304.

LANGLEY TECHNICAL FORUM AGENDA: The Feb. 19 Technical Forum will offer the following presentations:

- Tetrahedral Unstructured Software System (TetrUSS) – Dr. N.T. Frink
- Jet Noise Test Capabilities for Critical Propulsion Component Research at Langley – Dr. J.M. Seiner
- A New Methodology for System Uncertainty Identification for Robust Control Application – Dr. K.B. Lim
- Effect of Cloud Horizontal Inhomogeneity on Remote Sensing Retrieval of Optical Depth – Dr. L.H. Chambers
- Canopy Fracture Technology for In-Flight Crew Egress from Fighter Aircraft – L.J. Bement



NASA illustration

ROVING THE RED PLANET – Sojourner, the Mars Pathfinder's Rover, shown in the foreground, will traverse the planet's surface after it is deployed from the Pathfinder surface station, shown in the background. Sojourner will travel across and examine the Mars surface for seven days, at an average speed of one centimeter per second. Pathfinder is scheduled to land on Mars on July 4.

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National Aeronautics and Space Administration
Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 2 ❖ January 31, 1997

Robotics helicopter may offer new option for public safety

Free Flight Rotorcraft Research Vehicle possesses multitude of capabilities

BY NICOLE FOREST

NASA and the U.S. Army have developed a remote-controlled helicopter that could be used for a wide range of tasks, including precision crop spraying, border patrol, hazardous-spill inspection, fire surveillance, crowd security and emergency medical delivery.

Photos by Fred Jones

The remote-controlled helicopter may be used for crop spraying, border patrol, crowd security and emergency medical delivery.

Called the Free Flight Rotorcraft Research Vehicle (FFRRV), the robotic helicopter can carry a movie camera, a still camera, video downlinks, night vision or infrared cameras. Artificial intelligence techniques keep the chopper stable in flight and allow it to be remotely controlled from the ground.

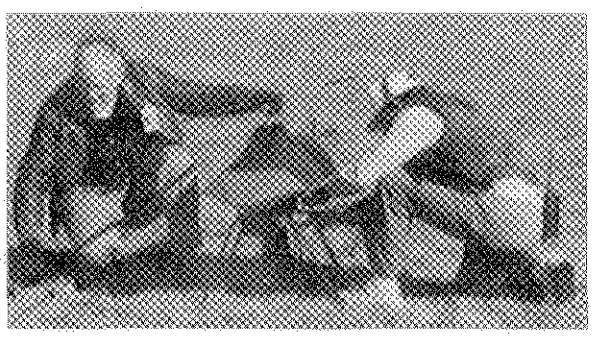
"An autonomous helicopter could help perform all of these jobs better, quicker and at a lower cost, while not exposing any humans to potentially dangerous situations," said Todd Hodges, an Army employee at NASA Langley and manager of the helicopter project.

The helicopter contains adaptive electronic flight control systems that incorporate artificial intelligence techniques, small lightweight sophisticated sensors, and advanced telepresence-telerobotics systems.

The robotic helicopters also could be used for pollution monitoring, law enforcement, bridge and building construction inspection, crop and forest monitoring, mine clearing and other public security tasks, said Hodges.

"It could even be used as a 'carrier pigeon,' shuttling supplies and so forth between military locations," he said. "The potential applications are fairly wide-ranging."

The project initially set out to develop a tool for testing flight dynamics. Hodges and his team were tasked to develop a suitcase-portable version, including a small helicopter and a ground control station comprised of a moving map and video monitor that could be set up in 20 minutes.



Pilot Orren Haynes, left, and George Makowiec, adjust the helicopter prior to flight. Haynes is responsible for controlling the helicopter remotely from the ground during flight testing.

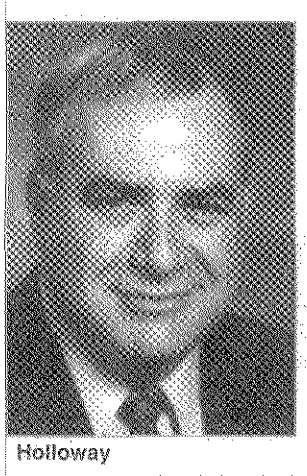
The prototype helicopters are powered by a modified gasoline engine and are about six feet long, including the rotor diameter. They can fly at speeds up to 60 mph for approximately two hours.

Inquiries about the technology have come in from various government agencies and the film industry, as well as from power and pipeline companies and local fire departments, said Hodges.

Holloway cited as Engineer of the Year

Former Langley center director Paul F. Holloway was selected as the Virginia Peninsula's 1997 Engineer of the Year by the Peninsula Engineers Council.

Holloway was nominated by the American Institute of Aeronautics and Astronautics (AIAA), Hampton Roads Section. He is a fellow of the AIAA. He is also a member of the American Astronautical Society and the International Academy of Astronautics.



Holloway

Holloway served as Langley's sixth director and led the aeronautical and space research programs of the nation's oldest civil aeronautics research laboratory. His leadership was instrumental in enabling NASA to develop cutting-edge technology crucial to maintaining U.S. leadership and competitiveness in aerospace.

His contributions to NASA – and to engineering – span a career of more than 35 years. He came to Langley in 1960 as an aerospace engineer and was appointed his first supervisory position in 1969. He was named chief of the Space Systems Division in 1972 and Director for Space in 1975. He served as deputy director from 1985 until 1991, when he became center director. He resigned that position this past summer.

Author of more than 40 technical publications, Holloway is an internationally recognized authority on hypersonic aerodynamics, boundary layer transition and flow separation, analysis of entry flight mechanics and Earth orbital and planetary space missions.

NASA announces 1996 SBIR Phase I selections

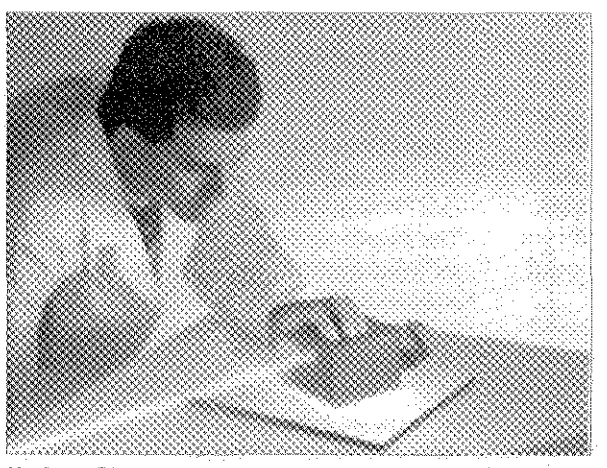
NASA NEWS RELEASE

NASA has selected 349 research proposals for immediate negotiation of Phase I contracts in the agency's 1996 Small Business Innovation Research (SBIR) Program. Langley received 50 competitive awards, totaling $3.5 million, more than any other NASA center.

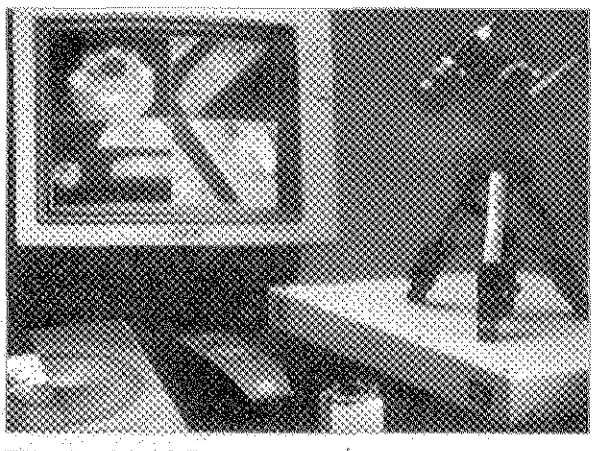
The current solicitation, which closed in August 1996, prompted 2,367 proposals submitted by small, U.S.-owned, high-technology businesses from across the United States. The combined award total for the 349 Phase I contracts is expected to be about $24 million.

The SBIR program seeks proposals directed at specific NASA needs. SBIR proposals are focused on meeting NASA mission requirements and on further developing the proposed technology into "the creation of new jobs within existing industries, new industries and the generation of new revenues for the economic benefit of the United States," according to Thayer Sheets, SBIR program manager at Langley.

The program aims to stimulate technological innovation in the United States by using small businesses, including minority and disadvantaged firms, to meet federal research and development needs and to encourage commercial applications of federally supported research innovations.



Under a Phase II contract awarded in 1992, LIGHTWAVE Electronics developed the LIGHTWAVE Series 140 laser head and power supply, which is an all-solid-state laser with highly stable visible output.



TRI's Omniview® The Virtual EyeÂ can look in four directions at once from a single video source. This technology resulted from a Phase II SBIR contract awarded in 1991.

Nine NASA field centers, the Jet Propulsion Laboratory and NASA Headquarters reviewed proposals for technical merit, feasibility and relevance to NASA research or technology requirements and commercial potential. The selected firms will be awarded fixed-price contracts valued at up to $70,000 each to perform a six-month Phase I feasibility study.

Companies which successfully complete the Phase I activities may be invited by NASA for Phase II compet-ition the following year. The Phase II award allows for a fixed-price contract of up to two years and up to $600,000.

In October 1992, President Clinton signed legislation reauthorizing the SBIR program. As part of this new legislation, award authority for 1997 was increased to 2.5 percent of the total research and development budgets of the 10 largest agencies within the federal government. Greater emphasis was placed on the development of commercial products and services.

News Briefs

Around the Agency

KIDSAT BRINGS SPACE SHUTTLE EXPERIENCE TO CLASSROOMS – The space shuttle Atlantis, which launched Jan. 12, supports the second flight of KidSat, NASA's pilot education program that uses an electronic still camera aboard the shuttle to bring the frontiers of space exploration to 15 U.S. middle school classrooms via the Internet. The three-year pilot program is a partnership between NASA's Jet Propulsion Laboratory (JPL), the University of California at San Diego (UCSD), and the Johns Hopkins University Institute for the Academic Advancement of Youth. During the shuttle mission, the KidSat mission operations center at UCSD is staffed by undergraduate and high school students. The students receive telemetry from the shuttle on their computer monitors and can listen to and receive instructions from NASA's flight controllers over direct channels to JSC. The KidSat mission operations team monitors the shuttle's progress around the clock and continually provides up-to-date information to the middle schools, who are using the Internet to send instructions to photograph specific regions of the Earth. After the photographs are taken, they are sent back down to the KidSat data system at JPL, staffed by high school students during the mission and posted on the World Wide Web. During the first KidSat mission, students explored weather, biomes, the relationship between history and geography and the patterns of rivers on the landscape. Additional interests for this mission include searching for impact craters and studying the relationships of center pivot irrigation fields to available water supply. Images and student results will be posted on the KidSat home page at http://www.jpl.nasa.gov/kidsat.

SPACE SHUTTLE MISSION WEB PAGE GETS NEW LOOK FOR 1997 – The STS-81 NASA shuttle Web page has gone on-line with a new look and feel designed to improve speed and to ease navigation. The Internet address remains the same for all shuttle missions at http://shuttle.nasa.gov/. Visitors to the remodeled site will find daily updated information on the STS-81 mission, and a new menu bar that takes them quickly and easily to targeted features, including a new daily dispatch called "The Grunsfeld Report," as well as several surround videos of the Mission Control Center and shuttle simulators. A new set of frequently asked questions and a new structure for the reference section have been added. Due to directory changes, repeat visitors may find that some old bookmarks or links from other web sites no longer function. Visitors should go directly to the NASA shuttle Web main page to update their bookmarks and cached links, or to use its new navigation capabilities to view the site.

Center's new inclement weather policy emphasizes emergency phone system

Two changes have been made from last year's Langley inclement weather policy: (1) center closings will be announced using the Langley toll-free emergency phone system *only* (**864-2111** or **1-888-664-2111**); media will carry an announcement *only if* the phone system is inoperable; (2) a specific opening time will be announced, as opposed to a delayed opening time frame, i.e., "a two-hour delay." The time of the next announcement update will also be indicated. Decisions regarding the second and third shifts, if applicable, will also be announced on the emergency phone system.

Barring unforeseen circumstances, any decision to delay work hours or to close the center will be made prior to 5 a.m. on the day in question.

If weather or road conditions change, a second decision concerning delayed work hours may be made, but no more than one change will be made on any day. For administrative leave purposes and to ensure equity for all employees, the center uses a standard opening time of 8 a.m. when operations are interrupted by severe weather.

Employees must monitor the Langley emergency telephone system, or the local media, for changes to the center's operational status. Employees who do not comply with announced changes to the center's operational status will be charged appropriate leave to cover their absence.

When hazardous driving conditions occur, the center and all supervisors will recognize a liberal annual leave policy and will announce center opening schedules as quickly as possible.

Announcements

Parkinson to deliver February colloquium

Stanford University's Bradford Parkinson, the original program director for the Department of Defense's Global Positioning System, will deliver Langley's February colloquium lecture, Feb. 11, 2 p.m., at the H.J.E. Reid Conference Center.

He will repeat the lecture – titled "The Origins, Evolution and Future of Satellite Navigation" – the same evening, at 7:30 p.m., as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

Microsoft forms course offered

A course in Microsoft Access for Windows 95, Version 7.0 – Forms and Reports will be held Feb. 6, 8:30 a.m.-4 p.m., in Building 1194A, Room 206. Space is limited to 12 participants.

Students learn how to create and manage forms, subforms, and reports; use forms to manage data; and customize forms and reports.

To register, send an Application for On-Site Training, (NASA Langley form 24), to DeAnna Wooster at Mail Stop 137. For more information, call George Allison at ext. 42594.

Analysis course offered

A Basic MSC/NASTRAN Linear Static and Normal Modes Analysis course will be offered Feb. 19-21, 8:30 a.m.-4 p.m., Building 1229, Room 120.

The seminar will introduce the new MSC/NASTRAN user to the basic ASCII input requirements for linear static and normal modes analysis of structures. MSC/NASTRAN data structure and element library, modeling practices, model debugging and guidelines for efficient solutions are discussed. A basic knowledge of statics and strength of materials is recommended; no previous finite element experience is required.

This seminar provides the foundation required for intermediate and advanced MSC/NASTRAN applications.

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information, call George Allison at ext. 42594.

Science abstracts sought

The Aerospace Sciences Section of the Virginia Academy of Science is now soliciting abstracts for the meeting at Virginia Polytechnic Institute and State University on May 21-23. The author will make a 15-minute presentation at the meeting and deliver a one-paragraph abstract to be included in the proceedings.

Submit titles of proposed presentations by Feb. 20 to Jeanette Elliott (ext. 45990) at Mail Stop 248, e-mail at j.m.elliott@larc.nasa.gov, or fax them to ext. 43553. Abstracts will be due at the meeting at Virginia Tech.

CPR class offered

Cardio-pulmonary resusitation (CPR) certification for all levels, as well as recertification, will be held Feb. 26-27, 8:30 a.m.-4 p.m., in Building 1194A, Room 106.

Lifesaving techniques are presented for emergency situations where closed-chest massage is used to restore heartbeat and to provide circulation to carry oxygen to the brain.

In addition to the lecture, films and slides, hands-on practice sessions are included. Successful completion of the course results in a recertification card from the American Heart Association at one of three levels.

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information, call Millie Boone at ext. 42589.

Langley receives NTA awards

The National Technical Association (NTA) presented awards to NASA Langley and several of its employees at its 68th National Conference, held Oct.17-19 in Cleveland, Ohio. The awards are part of NTA's technical excellence recognition program held each year at its national conference and technical career opportunity fair.

Dr. Woodrow Whitlow, group deputy director of the Airframe Systems Program Office, received the 1996 NTA Technical Achiever of the Year Award in Engineering.

The NTA Hampton Roads Chapter received the 1996 NTA Fred C. Downs Special Event Award for its mathematics contest for Hampton Roads area high school students.

In addition, Langley received the Silver NTA Corporate Support Award for its participation at the conference in a collaborative educational and outreach activity conducted by NASA Langley, NASA Lewis, and the Cleveland Public School System.

The NTA will hold its 1997 national conference Nov. 6-9 in Philadelphia, Pa.

Stover receives Silver Snoopy Award

Astronaut Wendy Lawrence presented a Silver Snoopy Award to Gregory Stover of the Space Projects Office, who was recognized for contributions to the Middeck Active Control Experiment and advanced shuttle operational capabilities.

Vehicle passes available for shuttle launches

A limited number of vehicle passes for the causeway at the Kennedy Space Center are available for each shuttle launch. The passes allow one vehicle and all its occupants to view a launch from the causeway, about four miles south of the launch pad.

For vehicle passes, call Olin Jarrett at ext. 46320 about three weeks before a scheduled launch. For launch schedules, see "Shuttle Mission Information" on the Kennedy Space Center home page.

Speakers Bureau activities

W.B. Grant visited Old Dominion University to discuss "an epidemiological approach for determining the effects of ozone on oaks and hickories."

Dick Davis visited Palmer Elementary School in Newport News to talk about the solar system and space travel.

Michael D. Uenking spoke to students at Great Neck Middle School in Virginia Beach about careers in engineering and about NASA's mission.

In memory of Timothy W. Towell

Timothy Winfield Towell, 36, died Dec. 21 in Hampton. The New Jersey native had been a Hampton resident since 1989. He was a research engineer in NASA Langley's Composites and Polymers Branch of the Materials Division.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley to participate in 'Take Our Daughters to Work Day'

BY PATSY CAMPBELL

The Federal Women's Program Committee (FWPC), the Hampton Roads Section of Women in Aerospace (HRS of WIA) and the Newport News Branch of the American Association of University Women (AAUW), are co-sponsoring Langley's fourth annual "Take Our Daughters to Work Day" program, April 24, in the Pearl Young Theater. The program will introduce young daughters, ages 9 to 15, of Langley employees to the technical community where their parents work.

Program background

The concept was developed by the Ms. Foundation for Women, an education-oriented, nonprofit organization that provides a forum to learn about women's issues, networking, and professional growth.

The program "Take Our Daughters to Work Day," held across the United States for the first time in April 1993, encourages parents to take their daughters to the workplace to introduce them to the working world. The focus is to broaden young girls' minds to the possibilities available to them.

This program was developed to address the issue of gender bias in education, where girls sometimes are not actively encouraged to develop math and science skills. Many organizations throughout the country observed this day last year, including NASA Headquarters and most of the NASA centers.

Daughters' day at Langley

Langley's program will consist of a half-day structured event (8 a.m.-12:30 p.m.), with the afternoon spent at the parent's workplace.

The half-day structured event will include registration, introductory remarks by a Langley official, followed by two hands-on activities for the students and concurrently a two-hour briefing for the parents.

The hands-on activities will involve the students in understanding math and science concepts used at the center. The two-hour briefing for the parents will feature an educational specialist on gender bias in education and tips on how to help children overcome difficulties in math and science skills.

The students' program will conclude with a guided tour of the Flight Simulator in Building 1268 for ages 9 to 12, or of the Acoustics Lab, Building 1208 for ages 13 to 15. The program will break for lunch at 12:30 p.m. Lunch is on your own, but the Aero Diner and main cafeteria will be prepared with sufficient food to accommodate this late lunch. The afternoon is left open for the employee to share with his daughter at the workplace.

Terms of agreement

Available on a first-come-first-served basis, the program is open to all NASA employees and contractors. The first 100 registrants will be accepted, and a waiting list will be kept for cancellations and returning daughters from last year's program.

Registration deadline is Feb. 28. The registration form requires the parent's supervisor's approval, and the parent must inform the student's school principal and teachers of the absence. Schools are well aware of this program and have granted excused absences in the past.

The employee must escort his child at all times, including structured event and tour.

Return the completed registration form to Patsy Campbell, FWP Manager, Mail Stop 178. For more information, call ext. 43291 or 45083. NASA civil servant employees can charge their time to J.O. B1011. Contractors must negotiate leave with their employer.

Registration Form for:
"Take Our Daughters to Work Day"
April 24, 1997, 8 a.m.-12:30 p.m.
Pearl Young Theater, Building 1202A

Parent's Name _____
Organization (Group/Division or Company) _____
Mail Stop _____
Work Phone _____
Supervisor's Approval _____
Student's Name _____
Age _____
School Name/City _____

Do you wish to purchase a "Take Our Daughters to Work Day" T-Shirt @ $12 each from Ms. Foundation? If so, indicate quantity, size and enclose with this form your check, payable to Ms. Foundation:

Medium _____ Large _____ Extra Large _____
(Adult sizes)

Terms of Registration:

- *This program is offered to daughters of NASA Langley employees and contractors.*
- *Each student must be accompanied by a parent or legal guardian at all times.*
- *Interested employees must receive approval from their supervisors to participate in this program.*
- *A limited number of children can be accommodated; therefore, only the first 100 registration forms will be accepted. Must be received by Feb. 28.*
- *Call Patsy Campbell, ext. 43291, if special accommodations or accessibility to buildings are required.*
- *Return completed registration form to Patsy Campbell, Mail Stop 178, or fax to ext. 48832.*

Mail or hand-carry checks to Building 1153, Room 106, at 1 West Reid Street, Mail Stop 178.

Langley steps into classroom of future with 'virtual laboratory' textbooks

BY MOLLY RITZ

The typical classroom setting is taking a promising leap into the future.

Two college professors from Clarkson University are creating two interactive "virtual laboratory" textbooks, using software developed at NASA Langley. This will be the first time that NASA engineering and science technologies have been transferred to the educational arena in the form of a textbook.

The textbooks will create a spontaneous learning environment for undergraduate engineering and science students. These multimedia books will also provide an interactive tutor for minorities and individuals with disabilities.

A new way to learn

Equipped with self-paced software, the textbooks will allow students to review background materials and apply classroom-related concepts at their own discretion.

"The textbooks were originally developed to replace repetitive class lectures which would allow for more interactive labs," said Jeff Layton, a mechanical engineering professor from Clarkson University in New York.

Structural simulation

Layton, creator of one of the interactive textbooks, spent last summer working with Langley's Bob Smith, a researcher who developed an algorithm for unstructured grid generation. This algorithm is the basis for the strength-of-materials simulator – part of an instruction package used at Clarkson last spring, to be marketed in about a year.

The simulator will allow students to visualize and calculate the external and internal stresses of a structure. This new development can be used to examine aircraft landing gear during a landing.

Structure analysis

In a separate project, Gina Lee-Glauser, assistant research professor from Clarkson University, has been working for four years with NASA Langley Principal Scientist, Jer-Nan Juang. Juang developed a structure analysis code for determining the behavior of a structure.

"The program will act essentially the same way that a doctor's stethoscope diagnoses human sickness," said Glauser.

A code will allow students to construct a mathematical model from input and output data, which will be an instrumental part of the second textbook. The model will be able to characterize the system's uncertainties and measurement noises.

CD-ROM technology

Both multimedia textbooks will be CD-ROM based. This will allow a wide range of media to be accessed, such as sound, 3-D visualization and animation, which will enhance the students' learning environment. Courseware of this magnitude will equip the United States with competitive scientists and engineers able to survive in the global market, while decreasing training time and cost.

"The transfer of NASA technologies to the educational community will significantly enhance students' educational experiences," said Glauser. "These textbooks will change the application of engineering lab courses in the classroom. In turn, students' skills and enthusiasm for learning will grow."

Black History Month event to feature Hampton judge

The Office of Equal Opportunity Programs is sponsoring a program in observance of Black History Month on Feb. 12, 2 p.m., at the H.J.E. Reid Conference Center. The Honorable Bonnie L. Jones, General District Court, Hampton, is the guest speaker and will address the theme, "A Celebration of Achievement."

Jones began her position in April 1996. Prior to her appointment, she was a member of the Hampton law firm of McDermott, Roe and Jones. She is a graduate of Lincoln University and of North Carolina Central University School of Law.

Additionally, she has served as commissioner in chancery for the Hampton circuit courts and has taught law-related courses at Thomas Nelson Community College, Hampton Roads Regional Academy of Criminal Justice and Hampton University.

Jones

She is an adjunct professor at the College of William and Mary, Marshall-Wythe School of Law, in Williamsburg.

All employees are invited to attend this observance and should charge their time to J.O. A5006.

For more information, call Dollie McCown at ext. 43561.

Clipper Graham incident report released

NASA NEWS RELEASE

An unconnected hose led to the destruction of the Clipper Graham technology demonstrator last summer. The Clipper Graham (DC-XA) Incident Investigation Board – which included Langley's Charles E. Harris – released its final report concerning the July 31 post-landing tip-over and fire which destroyed the 43-foot vertical takeoff and landing vehicle at White Sands Missile Range, N.M.

Chaired by former astronaut Vance Brand, the board concluded, "The primary cause of the vehicle mishap was that the brake line on the helium pneumatic system for landing gear #2 was not connected. This unconnected brake line prevented the brake mechanism from being pressurized to release the brake and resulted in landing gear #2 not extending. The vehicle became unstable upon landing, toppled onto its side, exploded and burned."

The July 31 flight demonstration was the fourth in last summer's series of tests with Clipper Graham by NASA and its industry partner, McDonnell Douglas. The vehicle flew the planned flight profile successfully and uneventfully until landing. With landing gear #2 failing to deploy – Clipper Graham had four landing gears – the vehicle tipped over and, according to the report, "The Clipper Graham DC-XA vehicle was totally destroyed by ground impact and ensuing explosions and fires."

Identified contributing causes of the mishap included:

▲ Design of the system for gear stowage required McDonnell Douglas technicians to break the integrity of the helium brake line after integrity already had been verified. No other check was conducted to reverify the integrity of the system after disconnection and reconnection of the line were completed.

▲ Landing gear stowage was never identified as a critical process. No special steps were taken to ensure the readiness of this system for flight.

▲ During the gear stowage process, there was no record of checking off steps or evidence of cross-checking.

▲ Distraction or interruption of the mechanical technician during gear stowage operations may have contributed to nonconnection of the brake line.

"Even though the Clipper Graham program itself is now behind us, the technology demonstrations from last summer's four flights were outstanding," said Gary E. Payton, NASA's director of space transportation. "'Lessons learned' from the board's report and the observations and recommendations made will play an important role in the agency's continuing Reusable Launch Vehicle activities," he said.

The five-member board consisted of Harris; Brand, Dryden Flight Research Center, Calif.; George Hopson, Marshall Space Flight Center, Ala.; Lt. Col. David Sharp, United States Air Force Safety Center, N.M; Warren Wiley, Kennedy Space Center, Fla.

'Science of Sports' exhibit opens at Virginia Air & Space Center

The new interactive, 4,000-square-foot exhibit, *Science of Sports*, is open at the Virginia Air & Space Center through Sept. 7.

Developed by Ohio's Industry of Science & Industry, this exhibit uses the familiar topic of sports to teach basic scientific principles of chemistry, physics, anatomy, physiology, psychology, sociology, mathematics and economics.

The science and technology of sports appear throughout five themed areas: the *Locker Room* – a display of trophies and uniforms; the *Gymnasium* – a basketball court; the *Arena* – an "angular momentum machine" which simulates an ice skater's spins; the *Dugout* – a sports trivia challenge; and the *Training Room* – a measure of reaction time, peripheral vision and muscle tension, as well as a "training table computer whiz."

Along with more than 180 hands-on activities, demonstrations include *Major League Physics*, *Impacts and Collisions*, *Balance and Stability*, *Center of Mass*, *Bounce-Ability* and the *Science Ball Game*.

A one-on-one game of rat basketball is also featured, using trained rats to illustrate Skinnerian and Pavlovian theories.

IMAX film 'To the Limit' featured with exhibit

In conjunction with the *Science of Sports* exhibit, a new IMAX film, *To the Limit*, is featured at the Virginia Air & Space Center. The film conducts a tour of the internal workings of the human body and follows three world-class athletes as they illustrate how the body adapts to meet the physical demands placed on it.

Admission to the *Sports* exhibit is $6 for adults and $4 for NASA, military, seniors and children under age 12; admission to the IMAX film is $5.50 for adults and $4.50 for NASA, military, seniors and children under age 12. The museum is open from 10 a.m. to 5 p.m. daily.

For more information, call 727-0900.

NASA's FY '98 budget request heads to Capital Hill; follows FY '97 Operating Plan for Aeronautics, MTPE

BY LEE RICH

President Clinton's State of the Union address, to be delivered on Feb. 4 to a joint session of Congress, will set the stage for the federal budget, which arrives on Capitol Hill Feb. 6. Work then begins that leads to a budget for fiscal year 1998, which begins Oct. 1. NASA's budget request for FY 1998 will be released at the agency administrator's press briefing in Washington, D.C., Feb. 6.

In late December, NASA's FY 1997 Operating Plan, which takes into account the actual FY '97 appropriations passed by Congress, was sent to Capitol Hill. The portion of the plan which deals with Aeronautics and Mission to Planet Earth – from the appropriations category "Science, Aeronautics and Technology" – follows:

NASA's Aeronautics Program and elements of the Space Access and Technology Program have been redesignated as the Aeronautics and Space Transportation Technology Program and are funded in this Operating Plan at a total of $1,343.5 million.

This total represents a net increase of $485.7 million, as the result of the reallocation of $487.3 million from the Space Access and Technology Program, offset by a reduction in the Advanced Subsonic Technology and other adjustments.

The previously designated Aeronautics Research and Technology Enterprise has been expanded to encompass the Commercial Development of Space and Advanced Space Transportation Technology activities, formerly managed and funded by the Space Access and Technology Enterprise.

The obvious synergy between these programs lies in their common focus on developing technologies that enable breakthroughs to enhance the global position of the U.S. industry, whether in aeronautics or space launch. The Enterprise has incorporated the Advanced Space Transportation Technology program into its strategic planning by establishing advances in access to space as one of the three "pillars" supporting its strategic vision.

Within funding included for the Advanced Space Transportation Technology program, $12 million is identified to augment funding for the Low-Cost Booster Technology program, as directed in House Report 104-812. This additional funding will be used for additional technology development solicited through a NASA Research Announcement. In addition, $2 million has been realigned within the High-Speed Research program, as directed in that same house report.

The increase of $49.8 million in the Research and Technology (R&T) Base reflects the reallocation of funding for the Environmental Research Aircraft and Sensor Technology project, from High-Speed Research to the Flight Research element, and the reallocation of funding for the Numerical Aerodynamic Simulator to the Information Technology element, both within the R&T Base.

Funding for the Advanced Subsonic Technology program is reduced $13.6 million, reflecting termination of the Fly-by-Light/Power-by-Wire element of the program.

Mission to Planet Earth funding totals $1,370.6 million, a net reduction of $31.5 million from the request, which is made up of a reduction of $75 million as part of the $95 million general appropriations reduction directed by Congress and reallocation of $8 million to Academic Programs, offset by a reallocation of $51.5 million from the Space Access and Technology Program. The reductions have been achieved by applying funds available from a close review of uncosted carryovers and new obligational authority against projected cost requirements in FY '97.

Black holes may dwell in most galaxies

NASA NEWS RELEASE

Announcing the discovery of three black holes in three normal galaxies, an international team of astronomers suggests that nearly all galaxies may harbor supermassive black holes which once powered quasars – extremely luminous nuclei of galaxies – but now are inactive.

This conclusion is based on a census of 27 nearby galaxies carried out by NASA's Hubble Space Telescope and ground-based telescopes in Hawaii, which are used to conduct a spectroscopic and photometric survey of galaxies to find black holes which have consumed the mass of millions of sun-like stars.

The findings, which should provide insights into the origin and evolution of galaxies, include:

▲ Supermassive black holes are so common that nearly every large galaxy has one.

▲ A black hole's mass is proportional to the mass of the host galaxy, so that a galaxy twice as massive as another would have a black hole that is also twice as massive. This discovery suggests that the growth of the black hole is linked to the formation of the galaxy in which it is located.

▲ The number and masses of these black holes are consistent with what would have been required to power the quasars.

Though several groups have previously found massive black holes dwelling in galaxies the size of our Milky Way or larger, these new results suggest smaller galaxies have lower-mass black holes, below Hubble's detection limit.

It remains a challenging puzzle as to why black holes are so abundant, or why they should be proportional to a galaxy's mass. One idea, supported by previous Hubble observations, is that galaxies formed out of smaller "building blocks" consisting of star clusters. A massive "seed" black hole may have been present in each of these protogalaxies. The larger number of building blocks needed to merge and form very luminous galaxies naturally would have provided more seed black holes to coalesce into a single, massive black hole residing in a galaxy's nucleus.

New Langley phone directory under way; updated info needed

Communications and Computer Systems Branch seeks employees' help to verify listings

Langley's Communications and Computer Systems Branch is planning to publish a new *NASA Langley Telephone Directory* this spring. All updates to the personnel listing (current directory page 39), the services listing (page 130), the "On/Near-Site Support Service and R&D Contractors" listing (page 123) must be received by Feb. 19 for guaranteed inclusion in the spring 1997 directory.

The center's locator database, which is also used as one of the inputs for the electronic directory, provides the data for the phone book's personnel listings. Using the electronic directory to look up his record, each employee needs to verify that the locator database contains his correct personnel information.

The electronic directory can be accessed on the World Wide Web at URL = http://post.larc.nasa.gov/cgi-bin/whois.pl, or by using the finger command from various computer platforms as detailed in the Langley E-Mail Post Office User's Guide. The Post Office User's Guide is at URL = http://cnb-www.larc.nasa.gov/email/doc/edoc_main.html.

If your name, telephone number, mail stop, building, or room number are incorrect, submit a Langley Directory Change Notice, LF 41, to the Facilities Program Development Office (FPDO), Mail Stop 446, so that the electronic directory and the next phone book will be correct. This form can be found on page 142 of the current telephone directory or on the Informed Manager System.

If your organization is listed incorrectly in the electronic directory, call the Office of Human Resources at extension 42570.

The electronic directory can also display your nickname, fax number and/or homepage address. This information does not come from the locator database, so it cannot be updated by an LF 41 Directory Change Notice. This data must be entered and maintained by individual employees via their Langley Post Office account.

Instructions for adding or changing nicknames, fax numbers or homepage addresses are in the Langley E-Mail Post Office User's Guide, section 3.4, which can be found at URL = http://cnb-www.larc.nasa.gov/email/doc/edoc_main.html.

Nicknames, fax numbers, or homepage addresses will not be printed in the personnel listing of the *Langley Telephone Directory*, but the information will continue to be available via the electronic directory.

Any changes, additions or deletions to the services listing or to the "On/Near Site Support Service and R&D Contractor" listings should be submitted to Patti Deyerle at Mail Stop 124 or fax number 47605, or by email to p.k.deyerle@larc.nasa.gov.

For more information, contact Sue Lemon at ext. 46965 or at s.j.lemon@larc.nasa.gov.

Making Directory Changes

If changes are needed to:	*Do this:*
Name, telephone number, mail stop, building number, room number	Submit LF 41 to Mail Stop 446
Organization	Call Human Resources at ext. 42570
Nickname, fax number, homepage address	Change data yourself on the Langley Post Office
Services listing	Send updates to Patti Deyerle
On/near-site support service, research and development contractor	Send updates to Patti Deyerle

NASA UniLibrary strengthens library services at four centers

Employees at NASA's four Office of Aeronautics (Code R) centers will soon notice expanded library services as the result of a unified library project known as the UniLibrary.

Nearly 70 NASA employees from Langley, Lewis, Ames and Dryden research centers gathered at Ames Research Center in Moffett Field, Calif., more than two years ago for a DesignShop, establishing a six-month effort called Project Reliance.

This Code R initiative studied and recommended ways to improve the operations of these centers. The group formed teams to explore seven functional areas: acquisitions, fabrication/manufacturing, plant management, experimental facilities operations, engineering automatic data processing, library and technical information production.

These seven teams met at Ames in April 1995 to present their final recommendations. The library team called for the establishment of a "geographically distributed alliance of the four Code R center libraries..." – resulting in the UniLibrary.

The UniLibrary is designed to effectively and efficiently serve the information needs of its customers. It coordinates planning, resource allocation and various library functions and operations through an intercenter governing council. These functions include acquisitions, cataloging, the online patron catalog, subject searching, collection development and access to commercial and NASA-wide databases.

Library staff from all four centers are contributing ideas, flowcharting their functions, and identifying current and future possibilities for relying on each other. Strengthened by these collaborative efforts, the UniLibrary will continue to provide support for NASA's missions and goals.

As the UniLibrary evolves, library patrons at Langley will notice changes in the information-gathering process. UniLibrary patrons will have increased access to professional reference service, regardless of the time zone in which they reside. Patrons on the East Coast may call Ames; those on the West Coast may call Langley or Lewis Research Center in Cleveland, Ohio. An Internet address for e-mail inquiries at any of these libraries will be established. As this particular service becomes official, the relevant telephone and fax numbers will be publicized.

For more information, visit the Web site at http://unilibrary.larc.nasa.gov/

X-33 wind tunnel testing continues at NASA Langley

BY ANN C. GAUDREAUX

The country's next generation of space transportation, a reusable launch vehicle (RLV), has taken on a more tangible form during wind tunnel testing at Langley.

"Langley provides both model design and fabrication followed by wind tunnel testing and computational analysis for the X-33 RLV," said John Paulson, an engineer in the Aerothermodynamics Branch. During Phase II, Langley is continuing to support configuration development through testing of a composite X-33 model in the 22-Inch Mach 20 Helium Tunnel.

"As Lockheed Martin Skunk Works has conducted wind tunnel tests to address low-speed aerodynamic concerns, Langley has provided hypersonic aerodynamic and control effectiveness information to ensure that 'good' low-speed concepts are also 'good' high-speed concepts," he said.

The helium tunnel was chosen because the X-33 models can be fabricated of wood or plastic. The X-33 models currently being tested in the helium tunnel are formed from resins using a process called stereolithography, and are about six inches long.

"These tests represent the high Mach number entry aerodynamics that are necessary to design an aerospace vehicle for flight in this speed regime," said Bill Scallion, aerospace engineer in the Aerothermodynamics Branch. Scallion heads up the aerodynamic testing for the X-33.

Photos by Fred Jones

Technician Christal Kellam of the Operational Support Division makes an adjustment to the X-33 composite model prior to wind tunnel testing in the 22-Inch Mach 20 Helium Tunnel. The tests were conducted to replicate high Mach number entry aerodynamics.

Langley's Bill Scallion holds a six-inch composite model of the X-33 reusable launch vehicle.

High-temperature hypersonic tunnels are also being used to determine the aerodynamics and heat transfer characteristics of the X-33, but the materials used to make the models will be metal or ceramic. The X-33 has been tested in the Langley 31-Inch Mach 10 Tunnel, the 20-Inch Mach 6 Air Tunnel and the 20-Inch Mach 6 CF4 Tunnel.

During Phase I, an aluminum model was tested in the Low Turbulence Subsonic High-Reynolds Number Tunnel, the 16-Foot Transonic Tunnel and the Unitary Supersonic Tunnel. During Phase II, models ranging in size from 6 inches to 5 feet will be tested at speeds from Mach 10 down to Mach 0.1 for landing.

AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

TAX TIMES 2: Income tax preparation by member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227.

FOR SALE: Three-drawer metal office desk. $25. Call 245-1736.

FOR SALE: Lifetime membership to Indian Cove Campground. Located on the Virginia Beach oceanfront, offers fishing, swimming, canoeing, volleyball, more. Full hookup for RVs, storage area for boats and campers. $495. Call 865-0586.

FOR SALE: King-size waterbed, six-drawer pedestal, 90 percent waveless mattress, heater, liner, padded headboard, side rails. Walnut color. $225 or best offer. Call 874-6697.

WANTED: Roommate to share waterfront home at 355 Chesapeake Ave., four-room suite, deck, jacuzzi. $450/month, includes all utilities and cleaning service. Call Michael Nelson at 245-8319.

STEALTH HISTORY: John F. Cashen, Systems Research Leader in the Microwave Radar Division of the Defense Science and Technology Organization in Australia, will be guest speaker for the Joint Institute for Advancement of Flight Sciences' Distinguished Lecture Series, Feb. 3, 1 p.m., in the H.J.E. Reid Conference Center. He will trace the history of stealth design at Northrop Grumman, from the early prototype development of *Tacit Blue* to the full-scale development and production of the B-2 stealth bomber. Cashen is an authority on all-spectrum signatures of air, land and sea targets, stealth vehicle design and radar and infrared surveillance. For more information, call ext. 41982.

TIME TO RELAX: A retirement social for John J. Cox, associate chief of Human Resources, will be held Feb. 3, 1-3 p.m., in Building 1195, Room 154. Send gift donations to Sheri Bias. For more information, call ext. 42554.

FOND FAREWELL: A farewell luncheon for Patricia Redwood will be held Feb. 6, 11:30 a.m., at the Red Lobster on West Mercury Blvd. Gift contributions are welcomed. Send checks payable to Nannette D. Atkins, Mail Stop 377, or call ext. 43431. To confirm a reservation, contact Jean Eley at ext. 47490 or at r.j.eley@nasa.gov.

RETIREMENT SOCIAL: Friends and colleagues of Vernon Batson are invited to attend a send-off retirement social for him, Feb. 7, 4:30- 6:30 p.m. in the Langley/Hampton rooms of the H.J.E. Reid Conference Center. Light hors d'oeurvres and punch will be served. Cash bar is available. Send $4 per person for social plus any contribution for gift, if desired, to James Robertson, Mail Stop 152, ext. 46654, by Feb. 3.

OPERATION SMILE: Dr. Ronald E. Godby, a local dentist, will present a program on Operation Smile, Feb. 6, 1:30 p.m., at the Pearl Young Theatre. This event is sponsored by the Outreach Subcommittee, Satellite Committee for People with Disabilities.

A TOAST TO CONFIDENCE: Do butterflies attack your stomach when you speak before a group? Join the NASA Langley Toastmasters Club, serving Hampton since 1985, to improve your communication and leadership skills. Meetings are the second and fourth Wednesdays of each month, 11:30 a.m.-1 p.m., at the H.J.E. Reid Conference Center. Meetings are open to all NASA civil service and contractor employees and Langley Air Force Base military and civilian employees. NASA employees may charge one hour to training. For more information, call Myra Walton at ext. 49254 or e-mail to m.l.walton@larc.nasa.gov.

SAY GOODBYE: Retirement Party/Luncheon for Bill Tennis on Feb. 19, at the Langley NCO Club ballroom. Buffet lunch starting at 11 a.m. for $6.85 (includes tax). Gag gifts are welcome. Call Vicki Boyer at ext. 46294 or Becky Sample at ext. 43673 by Feb. 14.

FORE! The NASA Golf Association's trip to Myrtle Beach, S.C., is May 29-June 1. Deadline for $100 entry deposit is Feb. 15. For more information, call Tom Yager at ext. 41304.

LANGLEY TECHNICAL FORUM AGENDA: The Feb. 19 Technical Forum will offer the following presentations:

- Tetrahedral Unstructured Software System (TetrUSS) – Dr. N.T. Frink
- Jet Noise Test Capabilities for Critical Propulsion Component Research – Dr. J.M. Seiner
- A New Methodology for System Uncertainty Identification for Robust Control Application – Dr. K.B. Lim
- Effect of Cloud Horizontal Inhomogeneity on Remote Sensing Retrieval of Optical Depth – Dr. L.H. Chambers
- Canopy Fracture Technology for In-Flight Crew Egress from Fighter Aircraft – L.J. Bement

SKI MASSANUTTEN: The Peninsula Ski Club plans a one-day trip to Massanutten on Feb. 19, open to anyone. Call Margarette Pitts at 868-8101.

FOCUS ON RETIREMENT: Come say farewell to Fred Jones, Feb. 21, 4:30 p.m., H.J.E. Reid Conference Center. $6 per person, cash bar, heavy hors d'oeuvres. Contributions for gift welcomed. RSVP by Feb. 14 to Bill Salyer or Louise Sykes at ext. 43524.

SO LONG TO PAUL: Preliminary plans are being made for a retirement dinner honoring Paul Holloway at the H.J.E. Reid Conference Center, March 1, 6 p.m. For more information, contact W.C. Woods at ext. 45238, Mail Stop 408A.

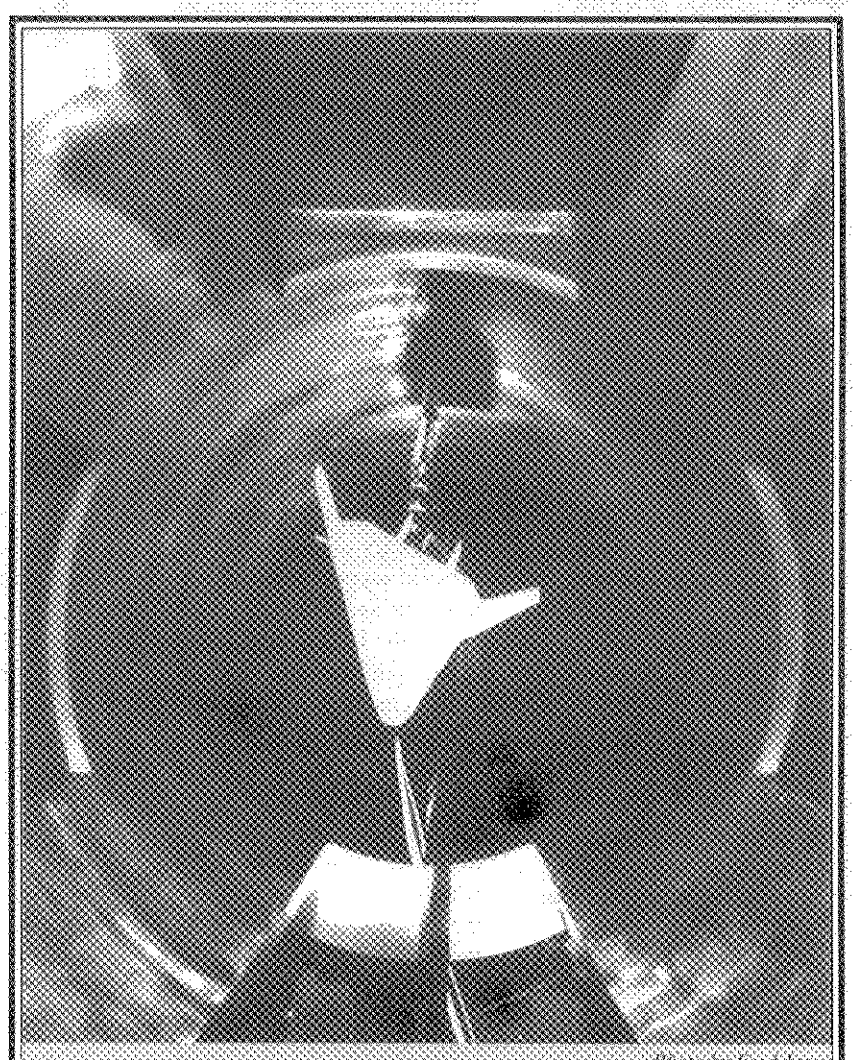


Photo by Fred Jones

X-33 TUNNEL TESTING – A composite model of the X-33 reusable launch vehicle (RLV) is tested in the 22-inch Mach 20 Helium Tunnel as part of Phase II of the RLV program. The helium tunnel allows for use of wood or plastic models. This 6-inch X-33 model is formed from resins, using a process called stereolithography. Langley is conducting the hypersonic tests to supplement those which Lockheed Martin Skunk Works has performed on low-speed aerodynamics. The wind tunnel testing adds another link in Langley's chain of the X-33 development, complementing the center's involvement in model design and fabrication and computational analysis.

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NASA budget request for FY 1998 remains stable

Editor's Note: *Following are excerpts from NASA Administrator Daniel Goldin's remarks at the NASA budget briefing held Feb. 6 at the NASA Headquarters auditorium in Washington, D.C.*

Last March, I stood on this stage and told you about the amazing year we had been through in 1995. I told you we had asked the administration for a stable budget for 1997 and we had gotten it.

We told the administration we needed the stability to fulfill our promises to the American people – to give them relevant, astonishing science and aeronautics missions that would provide history-making discoveries. NASA has kept that promise.

The president has seen that and has delivered on his commitment to the space program. He and his administration have recognized that NASA is doing more with less.

Last year, the budget for 1997 was stable, but the outyears were much lower than we expected. I told you then that I hoped we could do better. I am happy to report that we have.

The president put in place stable funding for the next five years. He had his own challenge of balancing a smaller budget with relevant programs. NASA was one of the places he had to look at carefully. He saw that NASA has taken its cuts and still has produced world-class science. He saw that NASA had performed. But it is more than NASA performing.

This stable funding shows the commitment this administration has to science and technology.

As NASA looks to the future, we will focus our science and technology on programs that will enhance the lives of all Americans:

In the area of astronautics, we will implement the new strategic technology goals that we developed with the Federal Aviation Administration, the Department of Defense and our industry partners. Through these goals, we are aiming for a major improvement in aircraft safety of flight, a 50 percent reduction in the cost of air travel and equally aggressive reductions in aircraft noise and emissions.

NASA is going to aggressively pursue its very critical research into weather and climate prediction. We will make the tools developed in this research

(see BUDGET, page 4)

Flight experiment smoothes flow over supersonic wings

BY CATHERINE E. WATSON

In a series of flight tests performed at Dryden Flight Research Center, Edwards, Calif., NASA engineers have successfully smoothed the flow over the surface of an F-16XL wing flying at supersonic speeds, completing an historic achievement in high-speed aerodynamics.

"Supersonic laminar flow control has been called the 'holy grail' of aerodynamics, because it's the last frontier that can offer significant drag reductions and save airlines – and eventually the flying public – a great amount of money," said Jeffrey Lavell, project manager of the F-16XL Supersonic Laminar Flow Control (SLFC) experiment at NASA Langley.

As an aircraft flies, the friction between the air and the wing creates drag, or resistance, called skin friction drag. Skin friction drag accounts for about half of the total drag on an aircraft. When airflow over the wing becomes turbulent and separates from the wing, skin friction drag increases.

Laminar flow, a condition where the airflow over the wings remains smooth and close to the wing, greatly reduces skin friction drag. Smooth, or laminar, flow over a wing can reduce drag and contribute to reduced operating costs by improving fuel consumption and lowering aircraft weight.

The F-16XL flight tests, part of NASA's High-Speed Research (HSR) program, aimed to demonstrate that laminar flow could be achieved over a significant portion of a wing at supersonic speeds.

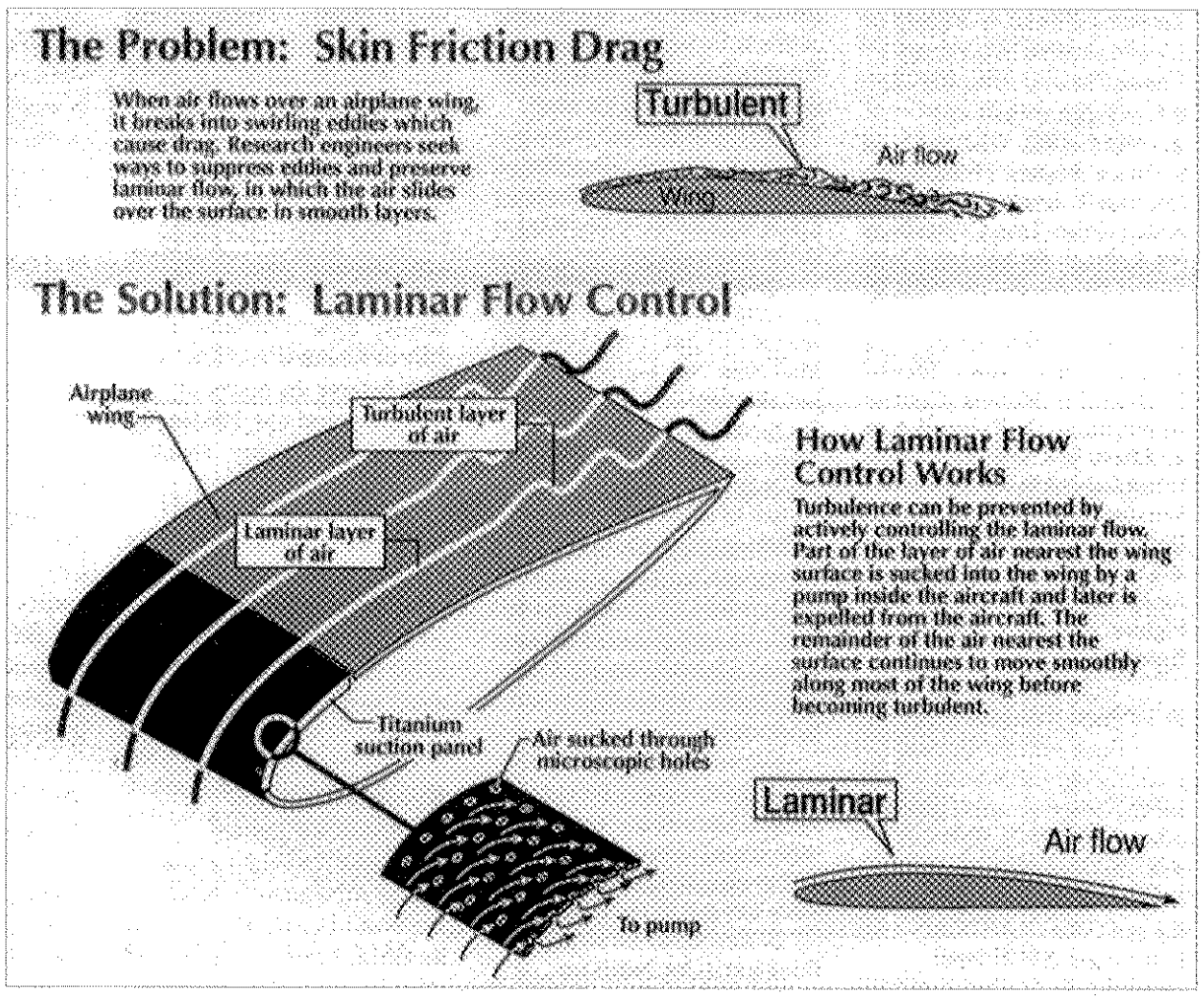
"We've had terrific results," Lavell said. "We've obtained a large amount of data that can be used to refine our design codes and provide the U.S. aircraft industry with the means to design SLFC wings."

The project's objectives were met, he said, although exact details of the amount of laminar flow achieved and with what amount of suction is restricted information. The U.S. aircraft manufacturers may compete with aircraft manufacturers from other countries someday, and laminar flow control technology could create a considerable competitive advantage.

Although this method of maintaining laminar flow was shown to be promising and could be incorporated into the design of a future High-Speed Civil Transport (HSCT), aircraft manufacturers have put the technology "on the shelf," according to Lavell.

"Boeing and McDonnell Douglas [soon to become one company] have decided that the first-generation HSCT probably will not include laminar flow control technology," he said. "At this point, they feel that, should they need higher-risk technology to produce fuel savings in the future, laminar flow control might be brought back into the plan."

(see LAMINAR FLOW, page 3)



Colloquium Communiqué

Hubble's images bring new understanding of solar system

Dr. Heidi B. Hammel, principal research scientist at Massachusetts Institute of Technology, department of earth, atmospheric and planetary sciences, will deliver Langley's March colloquium lecture, March 4, 2 p.m., at the H.J.E. Reid Conference Center. The lecture is titled "Exploring the Giant Planets with Hubble Space Telescope."

She will present a related lecture geared to the general public – "Exploring the Solar System with Hubble Space Telescope" – the same evening, at 7:30 p.m., as part of the Sigma Lecture Series, at the Virginia Air & Space Center in Hampton.

FYI

What:	Related "Sigma Series" Lecture: "Exploring the Solar System with Hubble Space Telescope"
When:	March 4, 7:30 p.m.
Where:	Virginia Air & Space Center 600 Settlers Landing Rd. Downtown Hampton
Info:	727-0900

During the 1980s, our understanding of the giant planets – Jupiter, Saturn, Uranus and Neptune – was revolutionized by detailed images taken by the Voyager spacecraft of these planets' atmospheres. Virtually all astronomy textbooks today still use Voyager images of the planets.

(see HUBBLE, page 3)

Hammel

News Briefs

Around the Agency

NASA CALLS FOR SUBMISSIONS FOR 1997 SOFTWARE OF THE YEAR AWARD – NASA's Office of Safety and Mission Assurance (OSMA), Washington, D.C., as co-sponsor with NASA's Inventions and Contributions Board (ICB), is calling for submissions for the 1997 NASA Software of the Year Award. The winning teams in 1996, Tetrahedral Unstructured Software System from NASA Langley and The Linked Winds Interactive Data System from the Jet Propulsion Laboratory (JPL), Pasadena, Calif., each received a prize of $40,000. The award will be presented to the author(s) of software in which NASA has an intellectual property interest; which has been supported, adopted, sponsored or used by NASA; and which is significant to the NASA mission. For more information, contact the NASA Space Act Awards liaison officer at any NASA center or through the ICB. Entries and supporting material must be submitted not later than April 18.

ROY BRIDGES SELECTED AS KSC'S NEW CENTER DIRECTOR – Former shuttle astronaut and retired U.S. Air Force Maj. Gen. Roy D. Bridges Jr. is the new director of the Kennedy Space Center (KSC), Fla. Bridges, who will become the seventh KSC center director effective March 2, will succeed Jay F. Honeycutt, who announced his retirement last October. As director, Bridges will manage NASA's only site for processing and launch of the space shuttle vehicle at a rate of seven to eight flights per year; will process the payloads flown on both the shuttle and expendable launch vehicles; and will oversee expendable launches carrying NASA payloads. As a NASA astronaut, Bridges served as pilot for the space shuttle Challenger on STS 51-F in July and August 1985.

Disabilities Awareness

SCPD seeks volunteers

BY GERRY PARDUE

Langley's disability program has many volunteer programs that invite participants to become actively involved with helping co-workers with disabilities.

We are now looking for drivers of the handicap vans. If you are interested in becoming a volunteer driver, call our disability program manager, Diane Forrest, at ext. 47318.

We are also looking for volunteers for the "buddy system" – a program designed to assist employees with disabilities in emergency situations.

Announcements

Technical Forum agenda set

The Feb. 19 Langley Technical Forum, to be held 10 a.m. to noon in the Pearl Young Theatre, will offer the following presentations:

▲ Tetrahedral Unstructured Software System (TetrUSS) – Dr. Neal T. Frink

▲ Jet Noise Test Capabilities for Critical Propulsion Component Research – Dr. John M. Seiner

▲ A New Methodology for System Uncertainty Identification for Robust Control Application – Dr. Kyong B. Lim

▲ Effect of Cloud Horizontal Inhomogeneity on Remote Sensing Retrieval of Optical Depth – Dr. Lin H. Chambers

▲ Canopy Fracture Technology for In-Flight Crew Egress from Fighter Aircraft – Laurence J. Bement

Analysis course offered

A Basic MSC/NASTRAN Linear Static and Normal Modes Analysis course will be offered Feb. 19-21, 8:30 a.m.-4 p.m., Building 1229, Room 120.

The seminar will introduce the new MSC/NASTRAN user to the basic ASCII input requirements for linear static and normal modes analysis of structures. MSC/NASTRAN data structure and element library, modeling practices, model debugging and guidelines for efficient solutions are discussed. A basic knowledge of statics and strength of materials is recommended; no previous finite element experience is required.

This seminar provides the foundation required for intermediate and advanced MSC/NASTRAN applications.

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information, call George Allison at ext. 42594.

Science abstracts sought

The Aerospace Sciences Section of the Virginia Academy of Science is now soliciting abstracts for the meeting at Virginia Polytechnic Institute and State University on May 21-23. The author will make a 15-minute presentation at the meeting and deliver a one-paragraph abstract to be included in the proceedings.

Submit titles of proposed presentations by Feb. 20 to Jeanette Elliott (ext. 45990) at Mail Stop 248, e-mail at j.m.elliott@larc.nasa.gov, or fax them to ext. 43553. Abstracts will be due at the meeting at Virginia Tech.

CPR class offered

Cardio-pulmonary resusitation (CPR) certification for all levels, as well as recertification, will be held Feb. 26-27, 8:30 a.m.-4 p.m., in Building 1194A, Room 106.

Lifesaving techniques are presented for emergency situations where closed-chest massage is used to restore heartbeat and to provide circulation to carry oxygen to the brain.

In addition to the lecture, films and slides, hands-on practice sessions are included. Successful completion of the course results in a recertification card from the American Heart Association at one of three levels.

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information, call Millie Boone at ext. 42589.

New officers named for Alumni Association

New officers of the NASA Langley Alumni Association are as follows: president – Ray Hook; vice president – Jerry Elliott; secretary – Barbara Fryer; treasurer – Bert Rockey.

Aldrich sends thanks

"It has been one year since I completed my treatment for breast cancer and three months since I came back to work full time. I would like to extend my appreciation to everyone who helped me through my treatment and recovery.

"So many of you sent cards and gifts, made phone calls, donated blood in my name, brought meals to my family; these were amazing gifts of kindness and love. I truly believe the power of prayer worked miracles on my disease and recovery. Thank you so much.

"I also send a heartfelt thank-you to those who donated their annual leave to me through the donated leave program. It played a big part in my recovery and meant so much to my family."

– Marilyn Aldrich

Bushnell named to advisory panel

Sandia National Laboratory of Albuquerque, N.M., appointed Dennis M. Bushnell, Langley's senior scientist, to its 1997 External Advisory Panel for the Engineering Sciences Research Foundation Programs.

Sandia Laboratory is a large, multiprogram Department of Energy national laboratory which manages four research foundations – Engineered Materials and Processes, Microelectronics and Photonics, Computational and Informational Sciences and Engineering Sciences. Sandia also works with university partners.

The scope of the Engineering Sciences Research Foundation (ESRF) Council program encompasses core engineering disciplines in fluid and thermal sciences, solid mechanics and structural dynamics, material mechanics, reactive processes and aerosciences.

The advisory panel will provide an independent assessment of the research and development activities supported by the ESRF. Upon assessment, they will determine the quality of the technical work, the effectiveness of the ESRF in supporting the current and future mission needs of Sandia and in the management of the ESRF.

The panel will evaluate the ESRF's effectiveness in making use of university/industry/government partnerships to satisfy mission needs, the appropriateness of the defined program metrics and the adequacy of the resources to satisfy program responsibilities.

Bushnell is one of nine current external advisory members who will participate in the review process.

Downsizing report hits the Web

Government Executive, the independent business magazine of government, has published the most extensive report on government downsizing released to date.

"The Downsizing Report" is only available electronically, on *Government Executive*'s World Wide Web site, http://www.govexec.com.

Using the hyperlinking power of the Web, the magazine compiled more than 50 of its articles from the past four years into a guide to government downsizing which includes management issues and the impact of downsizing on civil servants and in the public sector.

Government Executive is a monthly business magazine serving senior executives and managers in the federal government.

For editorial information, contact Tom Shoop at tshoop@govexec.com or (202) 739-8510. For information regarding *Government Executive* on-line, contact Michael Reeder at mreeder@govexec.com or (202) 739-8507.

In memory of Abraham D. Spinak

Abraham Davis Spinak, 71, of Pocomoke City, Md., died Jan. 7. He retired in 1981 as the acting director of NASA's Wallops Island, Va., facility.

In memory of Charles S. Laird Sr.

Charles S. Laird Sr., 76, of Cobbs Creek, died Jan. 31. A NASA aerospace engineer, he retired from Langley's Scout Project Office in 1980.

In memory of Harold R. Long

Harold Raymond Long, 71, died Jan. 31. He worked for NACA and NASA before and after he served in the Navy, retiring in 1981 after 38 years of service.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor ..... Keith Henry

Editor ..... Mary Graves
Science and Technology Corp.

Assistant Editor ..... Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

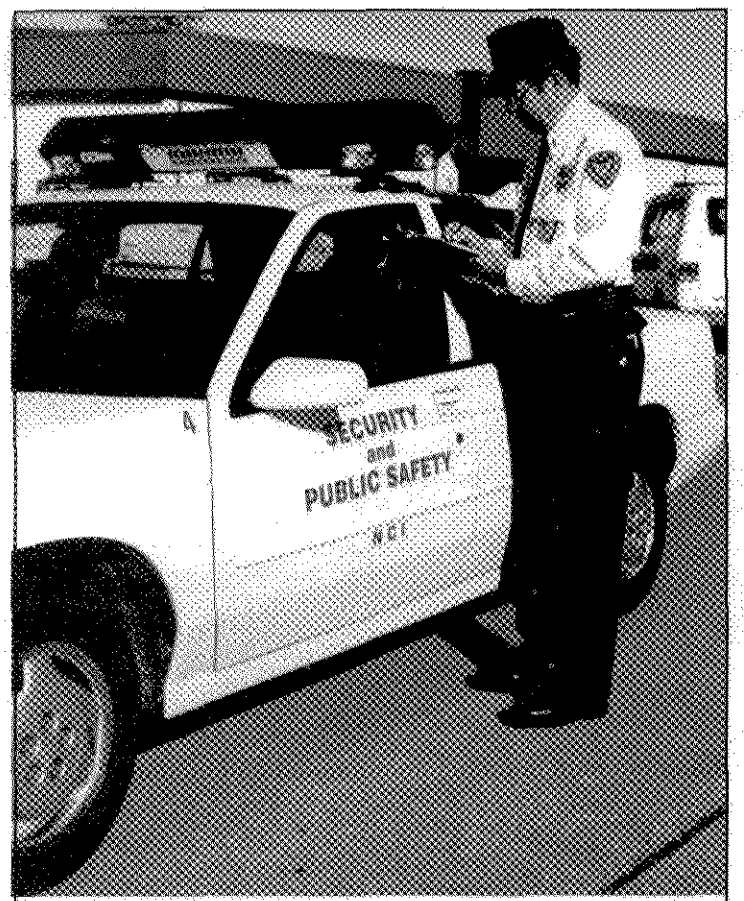


Photo by William Salyer

Lt. Don Shuler, security supervisor with NCI/DynCorp, prepares to cruise Langley in one of the new white security vehicles provided by the contractor.

New security contractor brings changes to center

BY WALTER BAILEY

Who are the guys patrolling NASA Langley in white cars with emergency lights on top?

Contract security, previously provided by Mason & Hanger Security, is now the domain of a company called DynCorp.

Teamed with contractor NCI, DynCorp took over the Langley security contract officially Dec. 1. Bill Barnes is the new security manager, and his goal is to offer high-quality service to all NASA personnel.

The two new shift sergeants are officers Walter Bailey and Ron Strahle. Bailey also serves as the crime awareness monitor.

In addition to the change in security cars and uniforms, the officers' titles have changed from "security officer" to "public safety officer."

'Restricted' signs clarify visitor access

BY O.J. COLE

New signs at numerous NASA Langley locations that read "Restricted Area, Authorized Personnel Only" are part of an initiative of the Office of Security and Public Safety/ Office of Safety, Environment and Mission Assurance to replace obsolete center signs with meaningful and informative signs.

Signs identifying Langley as a government facility have been placed on the perimeter fence. New signs were also placed at center building entrances declaring that only persons who have access authorization may enter the building.

The wording of both types of signs implies that only authorized personnel may enter the center and center buildings.

The "Restricted Area, Authorized Personnel Only" signs serve to inform visitors to the center's "open areas " – i.e., the H.J.E. Reid Conference Center, the cafeteria, the credit union, the athletic fields – that they are about to enter an area into which they were not granted access.

Visitors to "open areas" are issued a yellow, restricted, one-day pass that must be prominently displayed on their vehicle. If a visitor who is approved only for access to an "open area" proceeds to any other center area, a security and public safety officer can readily identify the vehicle and direct the visitor to an approved location.

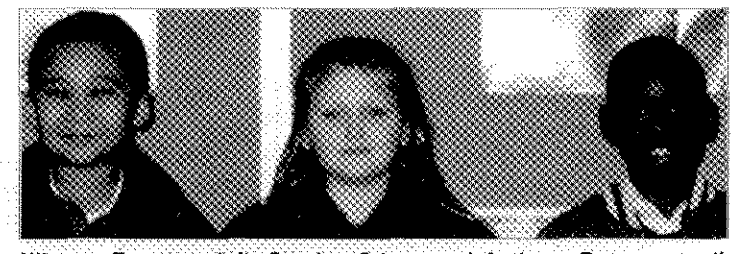
Langley's Engineers Week workshop prepares volunteers to enter classroom

Langley's Office of Education and the Hampton Roads Section of American Institute of Aeronautics and Astronautics co-sponsored the 1997 National Engineers Week Workshop here Jan. 24 at the H.J.E. Reid Conference Center.

The workshop provided an overview of the National Engineers Week program, available resources for volunteers to use in their presentations and "train-the-trainer" sessions on how to construct an effective lesson to take into an elementary school classroom.

Dr. Shelley Canright, Langley's precollege officer, provided background on and overview of the center's participation in National Engineers Week. Jackie Colander, teacher specialist from the science office of Norfolk Public Schools, provided information on the national and state science and mathematics standards.

During the workshop's general session, three third-grade students Colander brought with her – Anthony Davenport, Carolyn Griggs, and Ujimasa Freeman, students at the Chesterfield Academy of Math, Science and Technology in Norfolk – addressed the question: "What would I want to know from a NASA person visiting my classroom?"



Ujimasa Freeman, left, Carolyn Griggs and Anthony Davenport, all students from Chesterfield Academy of Math, Science and Technology in Norfolk, helped Langley's Engineers Week volunteers learn just what kids want to know about NASA.

The children's answers – which questioned matters ranging from comets to weather to objects floating in space – would help the volunteers to gear their presentations to the interests of elementary school students.

NASA Aerospace Education Services Program Specialists Patterson Biggs (Aeronautics), Lawrence Gilbert (Mission to Planet Earth), and Stanley Jones (Human Exploration and Development of Space and Space Science) conducted three "train-the-trainer" sessions to show volunteers lesson activities using existing NASA educational products. They also outlined how to implement an effective 30-minute lesson related to NASA enterprise topics and national/state science and mathematics standards.

Langley employees Geoff Tennille, Alan Stockwell, Carl Gerhold, Pete Thomas, Marilou Phillips, Donna Roper, Audrey Coppedge, Jeane Shanks and Kathy Powell provided exhibits and other activities as part of the workshop training.

More than 100 volunteers contribute to Langley's National Engineers Week and the workshop. Volunteers will visit third-, fourth- and fifth-grade classrooms in 12 local school districts throughout February.

HUBBLE

(continued from page 1)

However, those images were static – brief snapshots in time of four complex and dynamic atmospheric systems. They are no longer representative of the appearance of these planets.

Our knowledge of the atmospheres of the gas giant planets has undergone striking new advances, due in part to the excellent imaging capability of the Hubble Space Telescope (HST).

Two recent HST programs have also contributed to this new understanding: the study of the collision of Comet Shoemaker-Levy 9 with Jupiter, and imaging of intriguing variability in Neptune's clouds.

In addition, HST observations of Uranus and Saturn place all four giant planets in comparative planetological context, offering a new view of the largest planets in the solar system.

Hammel, who works primarily in the field of outer planets, is an acknowledged expert about the planet Neptune and was a member of the Imaging Science Team for the Voyager 2 encounter with that planet in 1989.

She led the Hubble Space Telescope Team in 1994 that investigated Jupiter's atmospheric response to collisions with comets. Her most recent research has focused on imaging of Neptune and Uranus with Hubble Space Telescope.

LAMINAR FLOW

(continued from page 1)

The HSCT, the subject of the HSR program, is a conceptual supersonic airliner of the future that would carry 300 passengers at 2.4 times the speed of sound.

Flights with the SLFC experiment at NASA Dryden used the F-16XL, which has a large delta wing. The wing's shape is similar to the design that likely will be used on the HSCT, making the F-16XL an excellent testbed for the laminar flow research project.

A large, titanium panel, perforated with more than 10 million laser-cut holes, was attached to the upper surface of the F-16XL's left wing. Natural aerodynamic drag on an aircraft wing is caused by the friction of a thin turbulent layer of air moving across the wing's surface. During research flights, a suction system pulled a portion of that thin layer of air through the glove's porous surface to keep the airflow over the wing from becoming turbulent.

Without any means of control, the flow over a highly swept supersonic wing is laminar for only a few inches. By perforating the skin of the glove and providing suction through the perforations, the airflow can remain stable and laminar flow can be extended over most of the wing.

NASA flew approximately 40 flights during a 12-month time span and achieved "a significant amount of laminar flow," according to Lavell. Most of the research flights were at speeds of Mach 2 (approximately 1,400 mph) and altitudes of 35,000 to 55,000 feet, which is close to the proposed range for the future HSCT.

The HSR laminar flow experiment represents a collaborative effort between NASA and the U.S. aerospace industry. A team composed of Boeing, Rockwell and McDonnell Douglas designed the wing panel and suction system. The panel was assembled at a Boeing facility in Seattle, Wash., and the suction system was fabricated by McDonnell Douglas in Long Beach, Calif.

NASA Budget Request

BUDGET

(continued from page 1)

available to other U.S. agencies and private corporations, so they can use them to make life better for all Americans and people around the world in a very critical area.

From the Earth, we look to the stars.

By giving us a stable budget, the president has given us the green light to accelerate a program that is relevant to all of us – the Origins Program. The Origins Program was designed to answer questions about the universe.

Origins will look at many facets of the universe, its creation, the formation of chemical elements and of galaxies, stars and planets. We will unravel the mystery of what it took to get from the creation of the universe to life on Earth.

Some of the highlights of the Origins Program are:

▲ An accelerated pace for the Mars Surveyor Program, assuring a sample return mission to Earth by 2005

▲ A program to develop a new generation of high-tech, low-cost, intelligent spacecraft and science instruments to explore Europa – a moon of Jupiter, fly close by Pluto and the Sun, and return samples from a comet

▲ A Space Infrared Tele-scope Facility launch in 2001 to examine galaxy, star and planetary system formation, and to make measurements that will tell us how to observe planets around other stars with future space-based and ground-based telescopes

▲ A program to develop the technologies required to build the next-generation space telescope to observe the universe to its very beginnings, and to build a space interferometer to search for planets around other stars

▲ A major program in astrobiology for research into the chain of processes leading to the formation and early evolution of the simplest forms of life in the universe; through this program, NASA will bring together the best minds in the field of life sciences – and will bring balance into our programs seeking answers about the universe.

We at NASA are very excited about the Origins Program. But it isn't really our program. It belongs to the American people. They want to know where it all started and how it led to a blue planet, the third from the sun.

Another way we learn about space is through the Space Shuttle Program. This program is continuing to live up to its commitments and give the taxpayers more for their money.

Since 1993, in-flight hardware problems have decreased by 50 percent, and reliability has tripled.

The shuttle is spending more time on orbit to conduct science. Our new prime contractor for shuttle operations, United Space Alliance, is four months into its contract, and the transition is going extremely well. All of this has been accomplished while the shuttle budget has been reduced by 24 percent over the past four years.

The bottom line is – the Shuttle Program is not only much safer, but significantly more capable. It gives the American people more for their dollar. And with this budget, we will continue to improve shuttle safety and efficiency.

This year, the International Space Station will reach an historic milestone when the first piece of station hardware is ready for launch in November. For the past three years, we have gained an unparalleled level of experience and have learned much in working with other nations toward this common purpose in space. From this first step, we will move forward to blaze trails to other planets and explore the vast expanse of space.

The Reusable Launch Vehicle Program will develop and demonstrate new technologies for the next generation of reusable space transportation systems. One day, we expect these technologies to be in vehicles that reduce the cost per pound of getting to Low Earth Orbit by an order of magnitude – from $10,000 per pound to $1,000 per pound – and that increase reliability by at least 10 times.

These are all very exciting missions. And we are doing them with less money than we thought we would have four years ago.

In the fiscal year 1994 budget, we projected that the NASA budget in FY 1998 would be $16.8 billion. The actual budget request for 1998 from the president is $13.5 billion. That's a world of difference. But we are making it work.

Let's look at those figures:

We see stable funding for 1998 – $13.5 billion, plus

▲ $13.4 billion for 1999

▲ 13.2 billion for 2000 and beyond.

Some people will say that's not enough. But we believe it is. The president had to balance the needs of many agencies and of the American people.We understand that. We're part of Team America.

The outyears for this budget are much better than those projected for last year. With this budget, NASA can bring programs like Origins to the American people and to fly astronauts safely and to fill the space station.

FY1998 NASA Budget Request Summary (millions of dollars)

	FY 1997	FY 1998
Human Space Flight	**5,674.8**	**5,326.5**
Space Station	*2,148.6*	*2,121.3*
U.S./Russian Cooperative Program	*100.0*	*0*
Space Shuttle	*3,150.9*	*2,977.8*
Payload and Utilization Operations	*275.3*	*227.4*
Science, Aeronautics & Technology	**5,453.1**	**5,642.0**
Space Science	*1,969.3*	*2,043.8*
Life & Microgravity Sciences & Applications	*243.7*	*214.2*
Mission to Planet Earth	*1,361.6*	*1,417.3*
Earth Observing System (EOS)	586.7	679.7
EOS Data Information System	254.6	244.7
Earth Probes Development	57.2	40.7
Science	295.4	271.1
Operations, Data Retrieval & Storage	78.0	54.2
Global Observations to Benefit the Environment (GLOBE)	5.0	5.0
Launch Services	84.7	121.9
Aeronautics & Space Transportation Technology	*1,339.5*	*1,469.5*
Aeronautical Research & Technology	844.2	920.1
Research & Technology Base	404.2	418.3
Focused Programs	440.0	501.8
High-Performance Computing & Communications	23.3	45.7
High-Speed Research	243.1	245.0
Advanced Subsonic Technology	173.6	211.1
Advanced Space Transportation	336.7	396.6
Reusable Launch Vehicle	283.5	353.5
Advanced Space Transportation Technology	53.2	43.1
Commercial Technology Program	158.6	152.8
Commercial Technology Programs	25.8	20.0
Technology Transfer Agents	7.8	7.8
Small Business Innovative Research Programs	125.0	125.0
Mission Communication Services	*418.6*	*400.8*
Academic Programs	*120.4*	*96.4*
Mission Support	**2,564.3**	**2,513.2**
Safety, Reliability & Quality Assurance	*38.8*	*37.8*
Space Communication Services	*277.7*	*245.7*
Research & Program Management	*2,092.5*	*2,070.3*
Construction of Facilities	*155.3*	*159.4*
Inspector General	**17.0**	**18.3**
Total Budget Authority	**13,709.2**	**13,500.0**

NASA Distribution of Workyears by Installation FY 1998 Budget Request Summary

	FY 1997	FY 1998
Johnson Space Center	3,294	3,065
Kennedy Space Center	2,036	1,824
Marshall Space Flight Center	2,964	2,779
Stennis Space Center	237	238
Ames Research Center	1,466	1,436
Dryden Flight Research Center	575	616
Langley Research Center	**2,475**	**2,450**
Lewis Research Center	2,170	2,022
Goddard Space Flight Center	3,495	3,472
Headquarters	1,224	1,143
Full-time Permanent Workyears	**19,936**	**19,045**
Other Than Full-time Permanent Workyears	565	514
Total	**20,501**	**19,559**
Inspector General	198	198

Code R budget statement outlines Aero, Access to Space programs

Editor's Note: *Following are excerpts from the Aeronautics and Space Transportation Technology Enterprise (Code R) statement accompanying the NASA FY 1998 budget request.*

The goal of the Aeronautics and Space Transportation Technology Enterprise is to conduct enabling, risk-reducing research with focused technology demonstrations, through industry-led cooperative partnerships, that will result in the near-term application of high-payoff and critical technologies that support the efficient accomplishment of NASA mission requirements, while also leading to improvement of U.S. economic competitiveness.

The combined Code R organization was created as a strategic alliance between NASA's aeronautics and space programs for developing ... advanced technologies in aeronautics and space transportation.

These technologies have the potential to dramatically reduce the cost of access to space and to provide for safer, more environmentally responsible and economically superior U.S. civil and military aircraft and space launch systems, as well as to improve operation of the national airspace system.

The cooperative nature of these research efforts and technology demonstrations not only allows for the research funding burden to be shared with private industry, but also increases the effective transfer of research and technology products and results to private industry and other federal agencies in order to further support increased U.S. economic competitiveness.

The Aeronautics and Space Transportation Enterprise now includes two programs – Advanced Space Transportation and Commercial Technology – which resided in the former Office of Space Access and Technology.

This combined organization was created as a strategic alliance between NASA's aeronautics and space programs for developing, with industry, advanced technologies in aeronautics and space transportation and for facilitating the transfer and commercialization of these technologies.

The total Fiscal Year 1998 Budget Request for the Aeronautics and Space Transportation Technology Enterprise is $1,469.5 million. Highlights of the budget request include:

1. Aeronautical Research and Technology – $920.1 million

High-Speed Research – $245 million

NASA's High-Speed Research Program is working on advanced technologies to address the high-risk, make-or-break environmental and economic "barrier issues" that currently prevent any manufacturer from making a financial commitment to this potential market.

The FY 1998 budget request of $245 million will enable the program to build upon successful completion of 1997 milestones, including the completion of *in situ* atmospheric observations to aid in determining the potential impact of a fleet of HSCT aircraft on atmospheric chemistry, and selection of a flight controller mechanism.

Major milestones for FY 1998 will include detailed design of selected nozzle concept, down-selection of preliminary flight deck configuration, including selection of basic External Visibility System concept, and selection of materials and structural concepts for wing and fuselage component test articles, including a preliminary design review. Other efforts will include completion of an assessment of environmental compatibility of HSCT, incorporating HSR emissions reduction technology, reassessment of engine concept technical readiness, and structural testing of wing and fuselage subcomponent test articles.

Following the successful completion of the High-Speed Research Program, U.S. industry should be in a position to determine whether or not to invest in the development of an HSCT.

Advanced Subsonic Technology – $211.1 million

The FY 1998 request includes funds for continued increased emphasis on research vital to the future health of the U.S. aviation air transportation infrastructure. In air traffic management, NASA plays a pivotal role by leveraging its expertise in aircraft guidance and air traffic controls technology to develop and validate high-risk elements of the future air traffic architecture that will enable "free flight."

The FY 1998 budget also contains funding to continue research in aircraft and engine noise reduction, terminal area productivity, aging aircraft, integrated wing design, propulsion systems, environmental assessment, short-haul aircraft (general aviation and civil tiltrotor), system performance methods (formerly technical integration) and composites.

For FY 1998, the AST program will emphasize those technologies that will lower both the manufacturing and operating cost of new aircraft designs, thus increasing the competitive position of U.S. industry in today's world aircraft marketplace. These investments provide broad national benefits by developing technologies that will ultimately manifest in lower airfares to the traveling public.

High-Performance Computing and Communications – $45.7 million

NASA's High-Performance Computing and Communications program is part of the multi-agency effort to boost supercomputer speeds one thousand-fold to at least one trillion arithmetic operations per second (one teraflop) and communications capabilities one hundred-fold. In addition to this amount, HPCC effort is funded in Space Science, Mission to Planet Earth and Education programs. The total agency funding for HPCC in FY 1998 is $73.8 million.

Research and Technology Base – $418.3 million

The goal for NASA's Aeronautics Research and Technology (R&T) Base program is to serve as the vital foundation of expertise and facilities that consistently meets a wide range of aeronautical-technology challenges for the nation.

The same technological resources must serve frequently as an essential contributor to the overall U.S.-product design and development process that no one company could afford to maintain for its own occasional use.

The program continues to respond to critical national needs as in the past – in areas such as fuel-efficient propulsion concepts, composite secondary structures, winglets, supercritical wings and advanced high-lift systems.

The R&T Base program meets national needs presented by challenges like aging aircraft; aircraft-accident investigations; lightning effects on avionics; and flight safety and security.

The R&T Base program is designed to accelerate technology development, validation, and transfer. It also provides the capability for NASA to respond quickly and effectively to critical problems identified by other agencies, industry or the public. Examples of these challenges are found in aging aircraft; aircraft-accident investigations; lightning effects on avionics; flight safety and security; wind shear; crew fatigue; structural fatigue; and aircraft stall/spin.

The same R&T Base project teams that conduct broadly applicable disciplinary research can provide the infrastructure to support future, large-scale, focused programs.

In FY 1996 and 1997, the R&T Base Program was reorganized into six systems-oriented, customer-driven programs that serve the needs of the full range of aeronautical-vehicle classes. The ongoing research within the disciplinary areas was evaluated for its potential system level benefits and then programmatically reorganized into appropriate, new programs.

Airframe and Propulsion Systems programs derive from vehicle research; Aviation Operations Systems addresses important interactions between vehicles and their operational environment; and the Information Technology program advances and enables the infusion of computer-science into information-age aeronautics.

The Flight Research and Rotorcraft Systems programs provide the special treatment needed for unique aspects of research operations and powered-lift vehicle technologies, respectively. The base is now organized to be more flexible and responsive to its customers, as agency downsizing implements measures intended to achieve enhanced efficiency and effectiveness with available research resources.

2. Advanced Space Transportation – $396.6 million

The second major program area of the Aeronautics and Space Transportation Technology Enterprise is the Advanced Space Transportation program, recently transferred from the former Office of Space Access and Technology. The goal of the Advanced Transportation program is to develop new technologies aimed at revitalizing access to space. These new technologies are targeted to reduce launch costs dramatically over the next decade, to increase the safety and reliability of current and next generation launch vehicles, and to establish new plateaus of performance for in-space propulsion while reducing cost and weight.

The FY 1998 program will include DC-XA, X-34 and X-33 flight demonstrators.

In accordance with National Space Policy, NASA is taking the lead in developing the technology for the next generation reusable space transportation system. The FY 1998 program will include concept analysis, ground-based technology development, and a series of flight demonstrators (the DC-XA, the X-34 Small Reusable Demonstrator, and the X-33 large-scale Advanced Technology Demonstrator). Each portion of this program contributes to the process of validating key component technologies, proving that the technologies can be integrated into a functional vehicle, and demonstrating the required operability to make low-cost access to space a reality.

3. Commercial Technology Programs – $152.8 million

The third major program area of the Aeronautics and Space Transportation Technology Enterprise is the commercial technology program, also recently transferred from the former Office of Space Access and Technology. Since its inception in 1958, NASA has been charged with ensuring that NASA-developed technology is transferred to the U.S. industrial community to improve the competitive position of the U.S. in the world community.

The technology commercialization program consists of conducting a continuous inventory of newly developed NASA technologies, maintaining a searchable database of this inventory, assessing the commercial value of each technology, disseminating knowledge of these NASA technology opportunities to the private sector, and supporting an efficient system for licensing NASA technologies to private companies. The amount requested for NASA commercialization efforts includes $125 million to carry out the provisions of the Small Business Innovation Research (SBIR) Act, which requires a set-aside of 2.5%, for small business research grants, of NASA's total extramural R&D spending. The NASA SBIR program has contributed to the U.S. economy by fostering the establishment and growth of over 1,100 small, high technology businesses.

AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

TAX TIMES 2: Income tax preparation by member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227.

LOST: Dark aqua blue ski jacket, Feb. 1, noon, center cafeteria. Call ext. 42146 or 42962.

WANTED: Pet/house sitter. When on travel, would like someone to stay in my home with my two dogs. Salary negotiable. Call Glenn in the evening at 850-8720.

FOR SALE: White Westinghouse heater/air conditioner window unit, requires 220 line. $150. Call 898-4230 after 5:30 p.m.; leave message.

FOR SALE: Sanyo 4-head VCR with remote, 2 years old, model VHR-5420. Trilingual display; on-screen programming; 1-year, 8-event program timer with daily and weekly settings; automatic tracking; index search; still, frame advance, cue, review, and variable-speed slow motion functions. $155. Call Scott at 566-8346.

FOR SALE: Pentium-120 dual-scan color laptop computer, 16MB RAM, 1.3GB HDD, PCMCIA 28.8 FAX/Modem, 4X CD-ROM, software. Orig. $3,500; will sell for $1,700. Call Greg at 627-5839.

FOR SALE: Diamond engagement ring, 2 carats, 14K gold. $8,000. Call 868-7395 for appointment.

FOR SALE "M" Hull Nordkapp sea kayak with paddle, vest and skirt, $1,200; large poly canoe with paddles, $175. Page Bill at 820-8066.

FOR SALE: Queensize waterbed, maple finish, headboard with mirror and shelves, all sheets and cover, $75. Call 886-0532 to leave message.

BOOKS FOR SALE: The Langley cafeteria will host a book fair March 11-13, 9 a.m.-2 p.m. For more information, call ext. 41585.

VIRGINIA SYMPHONY presents "Coppelia" ballet with the Richmond Ballet, Feb. 15, at Chrysler Hall in Norfolk. Student tickets, $8. Masterworks concerts, Feb. 21-23 include works of Vivaldi and Mozart. Schubert, Mozart and Strauss featured Feb. 28 in Williamsburg. Student tickets to either event, $6. Brochures available at Langley Exchange Shop. For tickets, call 623-2310.

NATIONAL PRAYER BREAKFAST: Fort Monroe will hold a National Prayer Breakfast on Feb. 18, 6:30 a.m., at the Fort Monroe Club. Guest speaker will be Lee Corder, chaplain of the Washington Redskins. For more information, call 727-2611.

SKI MASSANUTTEN: The Peninsula Ski Club plans a one-day trip to Massanutten on Feb. 19, open to anyone. Call Margarette Pitts at 868-8101. Club meetings are held the second Thursday of the month, 7 p.m., at the Days Inn in Oyster Point, Newport News. For more information, call 596-4742.

AFRICAN-AMERICAN HERITAGE CELEBRATION: Fort Monroe welcomes Don Roberts, WAVY TV-10 news anchor, as the narrator for the U.S. Continental Army Concert Band's African-American Heritage Celebration performance, Feb. 20, 9:30 a.m., at the post theater. Roberts will narrate the same program with the band on Feb. 21, 9:30 a.m., at Fort Eustis' Jacobs Theater. Both performances are free and open to the public. For more information, call 727-4052.

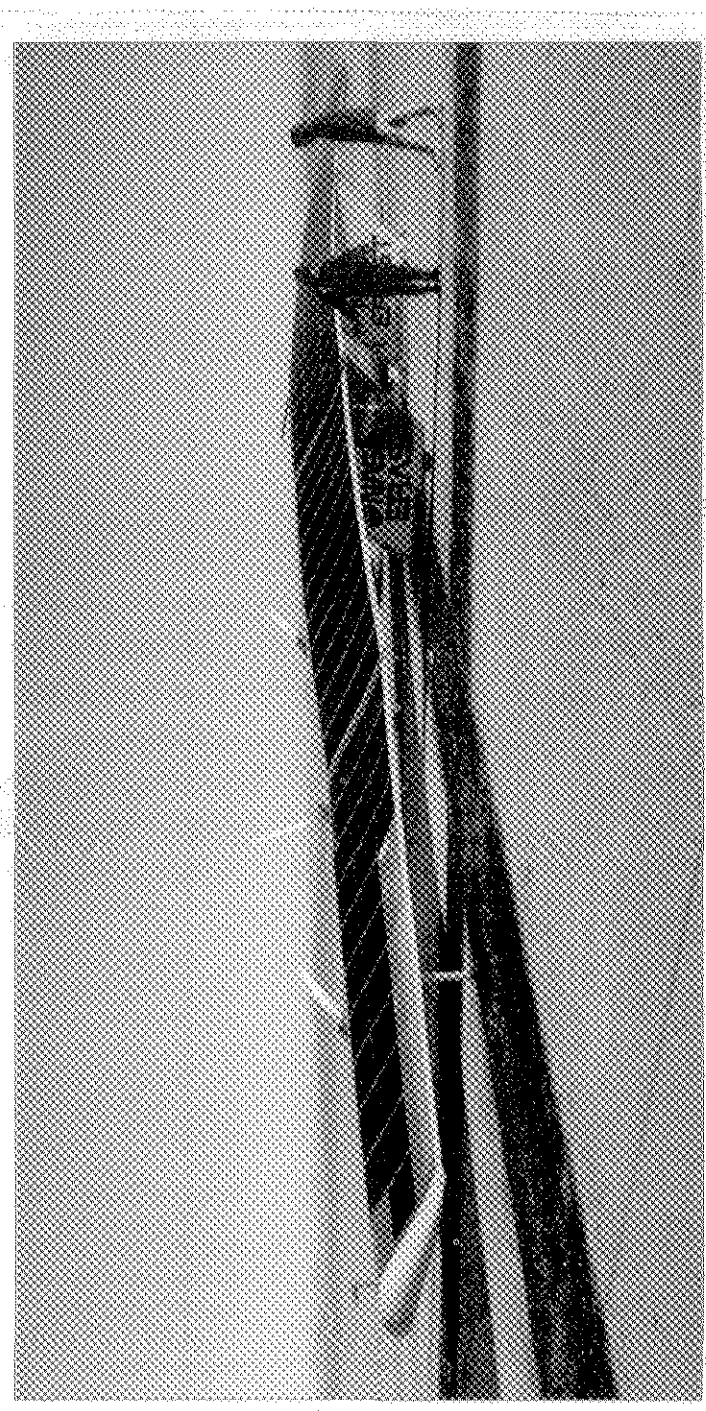
FOCUS ON RETIREMENT: Come say farewell to Fred Jones, Feb. 21, 4:30 p.m., H.J.E. Reid Conference Center. $6 per person, cash bar, heavy hors d'oeuvres. Contributions for gift welcomed. RSVP by Feb. 14 to Bill Salyer or Louise Sykes at ext. 43524.

ENGINEERS BANQUET: To celebrate National Engineers Week and to honor the Peninsula Engineer of the Year, former Langley director Paul Holloway, the Peninsula Engineers Council will hold a banquet, Feb. 22, 6 p.m., at the Holiday Inn Patriot Conference Center in Williamsburg. Guest speaker is Larry Giles, vice president of design and construction for Busch Gardens and Water Country U.S.A., Williamsburg. Cost is $16 per person; $8 for students. For more information, call Andy Schuster at 886-9564, or Dan West at 898-4511.

FITNESS 101: With its special beginning-of-the-year focus on exercise beginners, the LAA Aerobics Club offers exercise classes, nutrition counseling, personal training, low-impact and step aerobics classes, strength training equipment, body composition analysis and cardio-fitness assessment -- all included in a club membership. Classes are in the LAA gym, Tuesdays and Thursdays, 5-6 p.m., and Saturdays, 9:30-10:30 a.m. For more information, call ext. 42295.

SO LONG TO PAUL: Preliminary plans are being made for a retirement dinner honoring Paul Holloway at the H.J.E. Reid Conference Center, March 1, 6 p.m. For more information, contact W.C. Woods at ext. 45238, Mail Stop 408A.

THE VIRGINIA CHORAL SOCIETY will present "Songs of the Land and Sea," March 7, 8 p.m., at St. Mark's Lutheran Church in Yorktown, and March 8, 8 p.m., at First Presbyterian Church in Hampton. Tickets are $7; $5 for seniors and students. For more information, call 851-9114.



NASA Dryden photo by Carla Thomas

SOAKING UP THE SUN – The solar cell arrays which cover about 75 percent of its upper-wing surface are evident in this view of the Pathfinder solar-electric aircraft. In addition to absorbing direct sunlight, the solar arrays can absorb light reflected from the ground through the transparent lower surface of the 98-foot-long wing. Pathfinder flew successfully for two hours late last year at NASA Dryden Flight Research Center, Edwards, Calif. The craft is now at the Simi Valley, Calif., facility of its developer, AeroVironment, and is undergoing preparations for a new series of flight tests in Hawaii later this year.

National Aeronautics and
Space Administration
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Researcher News

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News Researcher

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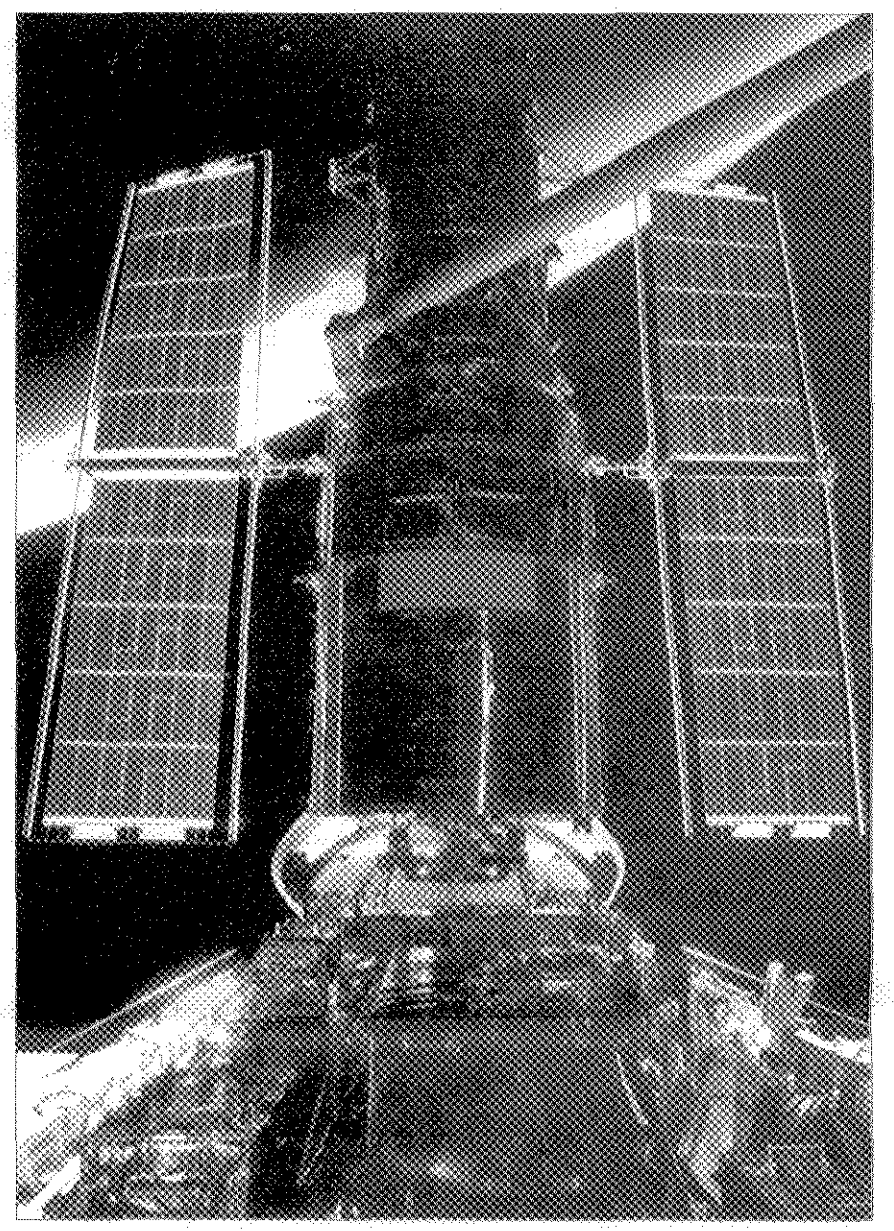
STS-82 performs second Hubble Space Telescope servicing mission



NASA photo

The Hubble Space Telescope is in the grasp of the remote manipulation system (RMS) following the Feb. 13 morning capture. The curved outline of Earth forms part of the background.

NASA NEWS RELEASES

Astronauts on the space shuttle Discovery STS-82 bid farewell to the Hubble Space Telescope (HST) early Feb. 19 as they placed the orbiting observatory back into its own orbit to continue its investigation of the far reaches of the universe.

The shuttle's robot arm released the telescope and, within minutes, Discovery separated from it. Shortly after deployment, Hubble resumed standard operations and began processing commands from the ground through the Tracking Data Relay Satellite system.

Discovery's seven astronauts significantly upgraded Hubble's scientific capabilities during the ten-day servicing mission by installing two state-of-the-art instruments. They also performed maintenance to keep HST functioning smoothly until the next scheduled servicing mission in 1999.

STS-82 is the 22nd flight of Discovery and the 82nd mission flown since the start of the space shuttle program in April 1981. Launched Feb. 11, it is the second servicing mission to HST since its deployment in April 1990. Discovery landed back at Florida's Kennedy Space Center on Feb. 21.

Mission tasks

The crew conducted a record-tying five spacewalks – also called Extravehicular Activities or EVAs – to remove two older instruments and install two new astronomy instruments, as well as other servicing tasks.

The Space Telescope Imaging Spectrograph (STIS) and the Near Infrared Camera and Multi-Object Spectrometer will replace the older Goddard High Resolution Spectrometer and the Faint Object Spectrograph. HST's current complement of science instruments includes fine guidance sensors, as well as two cameras and two spectrographs. Astronauts also replaced other existing hardware with upgrades and spares.

The STS-82 crew included commander Ken Bowersox, pilot Scott Horowitz and mission specialists Joe Tanner, Steve Hawley, Greg Harbaugh, Mark Lee and Steve Smith. Lee, Harbaugh, Smith and Tanner conducted the EVAs.

Hubble's new gear

Hubble got a refurbished Fine Guidance Sensor, an optical device that is used on HST to provide pointing information for the spacecraft and is used as a scientific instrument for astrometric science. The Solid State Recorder (SSR) replaces one of HST's reel-to-reel tape recorders. The SSR provides much more flexibility than a reel-to-reel recorder and can store ten times more data.

One of Hubble's four Reaction Wheel Assemblies (RWA) was replaced with a refurbished spare. The RWA is part of Hubble's Pointing Control Subsystem. The RWAs use spin momentum to move the telescope into position. The wheels also maintain the spacecraft in a stable position. The wheel axes are oriented so that the telescope can provide science with only three wheels operating, if required.

Replacing old instruments

The HST was designed to allow new instruments to be easily installed as old ones become obsolete, as was demonstrated during the first servicing mission – STS 61 – in December 1993.

During that 11-day mission, which also included five EVAs, astronauts installed a new camera with built-in corrective optics, as well as the Corrective Optics Space Telescope Axial Replacement, which properly refocused light from the flawed main mirror to the other instruments.

The new instruments installed during this mission will again dramatically expand Hubble's scientific capabilities.

Space Telescope Imaging Spectrograph

The Space Telescope Imaging Spectrograph (STIS) provides unique and powerful spectroscopic capabilities for the HST. A spectrograph separates the light gathered by the telescope into its spectral components so that the composition, temperature, motion and other chemical and physical properties of astronomical objects can be analyzed.

STIS's two-dimensional detectors allow the instrument to gather 30 times more spectral data and 500 times more spatial data than previous spectrographs on Hubble which looked at one place at a time. One of the greatest advantages to using STIS is in the study of supermassive black holes.

STIS will search for massive black holes by studying the star and gas dynamics around galactic centers. It also will measure the distribution of matter in the universe by studying quasar absorption lines, use its high sensitivity and spatial resolution to study star formation in distant galaxies and perform spectroscopic mapping of solar system objects.

Near-Infrared Camera and Multi-Object Spectrometer

The Near-Infrared Camera and Multi-Object Spectrometer (NICMOS) promises to gain valuable new information on the dusty centers of galaxies and the formation of stars and planets. NICMOS consists of three cameras and will provide the capability for infrared imaging and spectroscopic observations of astronomical targets.

NICMOS will give astronomers their first clear view of the universe at near-infrared wavelengths between 0.8 and 2.5 micrometers – longer wavelengths than the human eye can see. The expansion of the universe shifts the light from very distant objects toward longer red and infrared wavelengths.

NICMOS's near-infrared capabilities will provide views of objects too distant for research by previous Hubble optical and ultraviolet instruments. NICMOS's detectors perform more efficiently than previous infrared detectors.

Looking to the future

The Hubble Space Telescope was designed to operate in space for 15 years. Since its deployment in 1990, HST has revolutionized astronomers' vision of the universe more than any prior telescopes. Many new details about planets, stars and galaxies have been revealed in the short span of six years.

Hubble provided dramatic and detailed views of comet fragments smashing into Jupiter and clues about the existence of black holes in the core of galaxies. In addition, Hubble has made significant progress in determining the age and size of the universe.

During the next several weeks, calibrations of the newly installed instruments will be made as Hubble resumes its scientific efforts. The first images and data from these new scientific components are expected from Hubble in about eight weeks.

Turn-of-the-century service calls

Two more Hubble servicing missions are planned for 1999 and 2002 to keep the telescope functioning efficiently and to improve its scientific capability.

The 1999 mission will reboost the telescope into a higher orbit. In 2002, plans call for installation of an as-yet-undefined advanced scientific instrument, as well as maintenance to keep HST functioning until at least 2005. The HST is a joint project between NASA and the European Space Agency.

News Briefs

Around the Agency

REUSABLE LAUNCH VEHICLE PROGRAM SHOWCASES CUTTING-EDGE TECHNOLOGIES – Researchers and design engineers from NASA Langley participated in a two-day Technology Expo, Feb. 25-26, held by NASA's Reusable Launch Vehicle (RLV) program, which is developing technologies for the next generation of space launch vehicles. At the event, which was held for invited industry, government agency and military representatives at NASA's Marshall Space Flight Center, Huntsville, Ala., five NASA centers showcased their capabilities and roles in developing some of the cutting-edge systems and components to be used in future advanced space transportation systems, as well as some of those being used in the ongoing X-33 and X-34 programs. Other NASA centers scheduled to participate in the Tech Expo included: Ames Research Center, Mountain View, Calif.; Jet Propulsion Laboratory, Pasadena, Calif.; Lewis Research Center, Cleveland, Ohio; and Marshall Space Flight Center.

NASA, FAA, DOD CHALLENGED TO REDUCE AIRCRAFT ACCIDENTS – In response to a report from the White House Commission on Aviation Safety and Security and in partnership with the FAA, the Department of Defense (DoD) and the aviation industry, NASA has been challenged to reduce aircraft accident rates five-fold within ten years. The initiative includes research to reduce human-error-caused accidents and incidents, to predict and prevent mechanical and software malfunctions and to eliminate accidents involving hazardous weather and controlled flight into terrain. The Department of Defense will assist in defining requirements and actions to implement many of the safety standards. NASA is proposing to invest up to one-half billion dollars over the next five years. Funding will originate from reprogramming existing aeronautics funds, in addition to reassigning people and NASA facilities' work. For more information, see upcoming story in the March 14 issue of the *Researcher News*.

IMAGERY SHOWS SUN'S PLACE IN THE GALAXY – An action-packed movie assembled from images taken by an instrument aboard the NASA-European Space Agency Solar Heliospheric Observatory (SOHO) provides a galactic perspective on the sun and its place in the Milky Way. Taken this past Dec. 22-27, the images show the sun drifting in front of the stars of the constellation Sagittarius, as the constant solar wind blows outward in all directions. A comet passes into view from the south and disappears behind the sun; a giant puff of solar gas is emitted, representing a large mass ejection in a direction away from the Earth. The images come from SOHO's visible-light coronagraph, LASCO, which masks the intense rays from the sun's surface to reveal the fainter glow of the solar atmosphere, or corona. Operated with its widest field of view, LASCO's unprecedented sensitivity enabled it to see the thin ionized gas of the solar wind out to the edges of the picture, 13 million miles from the sun's surface. The images are available on the Internet at the Naval Research Laboratory's SOHO/LASCO home page at http://lasco-www.nrl.navy.mil/lasco.html. Launched on Dec. 2, 1995, SOHO and its instruments are operated from the Goddard Space Flight Center, Greenbelt, Md., for NASA's Office of Space Science, Washington, D.C.

President sends message to federal employees

As I begin my second term as president, I want all of you to know how proud I am of your hard work and accomplishments during the past four years. I came to Washington with a high regard for civil servants, and you have only confirmed that opinion.

And I'm not the only one who has been impressed. Four years ago, public confidence in the federal government was at an all-time low.

But you have begun to change that attitude. Even in a time of leaner budgets and smaller staffs, you have improved service to the public, forged effective partnerships with communities and private businesses, and discarded old-fashioned management systems. Now, for the first time in decades, public opinion of federal agencies is markedly on the rise. Congratulations – the credit for this stunning turnaround goes to you.

Vice President Gore and I are excited and optimistic about the prospects for America in the next four years. We are on the right track to the 21st century and are picking up speed as we continue to work with you to reinvent government. I believe that our nation will enter that new century stronger, more confident and more capable than ever before. And I believe that a large part of that success will be achieved because of the energy and talent of each of you – the men and women of the federal government.

Thank you for all you do on behalf of your fellow Americans.

Bill Clinton

William J. Clinton

Announcements

Juang participates in lecture series

Jer-Nan Juang, principal scientist, Structural Dynamics Branch, participated in the prestigious Southwest Mechanics Lecture Series (SWMLS) early this month.

The SWMLS is a cooperative effort of several institutions to invite speakers to address their faculty and students. Researchers in mechanics and control have participated in the series.

Juang presented lectures Feb. 3-7 on autonomous system identification and control at Bell Helicopter, Fort Worth, Texas, and at the University of Texas, Arlington; Southern Methodist University at Dallas; the University of Oklahoma at Norman; the University of Houston; and Texas A&M University at College Station.

Juang presented several real-time system identification and deadbeat predictive control techniques, with possible applications to include acoustic noise reduction, helicopter and unmanned aircraft auto-pilot system and highway bridge vibration suppression. Attendance ranged from 30 to 100.

Goddard employee sends thanks

Many thanks to everyone who donated leave on my behalf. I'm so grateful, and it is appreciated more than you can imagine. If I was provided names, I would thank each of you personally.

– Nancy Hornung, Goddard Space Flight Center, Greenbelt, Md.

Building keys available at new location

New building keys, approved for issuance by the Office of Security & Public Safety (OSPS), may be picked up now from the main gate Badge & Pass Office (B&PO), Building 1228. Building and room keys that are no longer needed should be returned to the OSPS/Locksmith; keys can be returned to either the B&PO or the OSPS. The OSPS is now in Building 1163, 7 Hunsaker Loop, ext. 43420.

Scholarships available to dependents of NASA employees

The NASA College Scholarship Fund, a nonprofit organization established to award scholarships to qualified dependents of NASA and former NASA employees, is accepting scholarship applications through March 31. The scholarship fund was established in 1982 through a gift from author James Michener.

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. Applicants must also have a combined high school and college grade-point average of 2.5 on a 4.0 scale or the equivalent.

Five scholarships will be awarded in the amount of $2,000 each for the 1997-98 academic year. The renewable scholarship is for a maximum of $8,000 over six calendar years.

Applications should be submitted directly to the Johnson Space Center in Houston, Texas, and must be received 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, call Sheri Bias of the Office of Human Resources at ext. 42571.

TAG offers forum on technology commercialization

The Technology Applications Group will present a technology transfer forum on March 7, 9-10 a.m., at the H.J.E. Reid Conference Center. Discussion will center on how technologies have been or can be successfully transferred to private industry.

Topics will include:

1. What is happening in technology transfer?

2. What are the benefits for Langley and for you?

– Contributions to Langley and the Nation

– Accomplishment Metrics for Performance

– Peer Recognition

– Publications

– Patents and Licenses

– Monetary benefits

3. How does the center commercialize research?

4. How can the Technology Applications Group improve?

5. What thoughts and concerns exist about technology commercialization?

E-mail any comments and/or suggestions ahead of time to d.a.hurst@larc.nasa.gov.

Speakers Bureau January activities

Dr. Allen Pope spoke to the Williamsburg Medical Society on "Hazards and Error Management."

John Mouring addressed the Fort Monroe Historical Society on "Archaeology to Aerospace: NASA's Management of Historic Cultural Resources."

Luther N. Jenkins visited the Bethel High School CHROME Club to talk about careers in engineering.

Christine Darden spoke at a Martin Luther King breakfast sponsored by the National Association for the Advancement of Colored People, the Afro-Academic Cultural Technological and Scientific Olympics and Colonial Williamsburg on "The Formula That Changed America."

Ledora Akanni spoke to first- through sixth-graders at Summit Christian Academy about living in space.

Bill Grant addressed the Peninsula Kiwanis Club about "Epidemiological Studies of Chronic Disease in Forests and Human Populations."

In memory of Erna E. McPherson

Erna Elfrieda McPherson, 76, died Feb. 9. The Poquoson resident and German native retired from a contractor position in the Langley cafeteria in 1989 after 22 years of service.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

FAA, NASA sign agreement to facilitate joint R&D efforts

BY TERRY KRAUS
OFFICE OF AVIATION RESEARCH

Dr. Andres Zellweger, the Federal Aviation Administration's director of aviation research, and NASA Langley Director Jeremiah Creedon signed a memorandum of agreement (MOA) Feb. 11, providing for the continued operation and support of the FAA's field offices established at NASA's Ames and Langley Research Centers. The charter for these field offices is set forth in a 1990 FAA/NASA Memorandum of Understanding for Program Support.

The FAA established its first field office in 1971 at NASA's Ames Research Center located at Moffett Field, Calif., to provide the means for conducting needed FAA research requiring the use of specialized facilities. The shared use of resources and facilities would achieve substantial economies and promote efficiency with respect to the continuing research and development activities of each agency, without resorting to the duplication of costly facilities.

FAA opened its second field office here at Langley in 1978. Both offices report directly to FAA headquarters in Washington, D.C.

Since their inception, the scope of the field offices has been expanded to provide technical coordination for numerous joint and cooperative research projects being conducted at the NASA centers; the means for participation in and conducting both joint and individual research activities; and the means to identify and facilitate the transfer of significant NASA research and technology to meet the operational needs of the National Airspace System.

Major research efforts conducted at the NASA centers on behalf of the FAA are typically carried out under the auspices of various MOUs and MOAs established between the two agencies.

Over the years, a number of research activities have been accomplished to the mutual benefit of the FAA and NASA through the coordination efforts of, and the experimental research conducted by, personnel stationed at the FAA Field Offices.

Those offices work closely with NASA personnel on cooperative technical projects by contributing resources directly to established NASA research projects; by performing research projects jointly with NASA researchers; and, in cases where there are no established NASA research programs pertaining to the effort needed, by acting as principal investigator on mutually agreed-upon FAA research using NASA's unique facilities.

Participation by the FAA and personnel at the field offices varies from general monitoring of research being conducted at the NASA Research Centers to active involvement in jointly conducted or individual research experiments, depending upon the nature of the research and the expertise of the office staff. The office staff consists of permanently assigned FAA civil servants, detailees, co-ops and contractors.

This cooperative program provides for a synergistic and cost-effective research, engineering and development effort between the FAA and NASA in areas of mutual interest. The field offices support joint FAA/NASA programs and provide continuous coordination on aviation-related NASA work.

They also represent a unique resource for the FAA because of their proximity and access to NASA facilities, their knowledge of NASA personnel and ongoing NASA research and their understanding of FAA needs. Benefits realized when the agencies work together include an enhanced perspective on joint research activities, reduced duplication of similar efforts and conservation of scarce funds and resources.

For more information, contact FAA's R&D field offices at the following addresses:

FAA R&D Field Office (Langley)
Mail Stop 250
NASA Langley Research Center
Hampton, Va. 23681-0001
Phone: (757) 864-1905
Fax: (757) 864-1908
Manager: Hugh Bergeron
h.p.bergeron@larc.nasa.gov

FAA Eng. Field Office (Langley)
Mail Stop 250
Administrative Officer
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NASA Langley Research Center
Hampton, Va. 23681-0001
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FAA R&D Field Office (Ames)
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NASA Ames Research Center
Moffett Field, Calif. 94035
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Fax: (415) 604-0173
Manager: Barry C. Scott
bscott@mail.arc.nasa.gov

Photo by Bill Salyer

Dr. Andres Zellweger, right, director of the Office of Aviation Research, Federal Aviation Administration, Washington, D.C., and Langley Center Director Dr. Jeremiah F. Creedon, sign a Memorandum of Agreement concerning support of the FAA/Research and Development Offices at NASA centers. The signing is part of the approval process, which continues in Washington, D.C.

New book highlights findings from global biomass burning

BY CATHERINE E. WATSON

Two years ago, more than 250 scientists from 21 countries came together in Williamsburg to discuss the global impacts of biomass burning. This month, the results of that meeting will appear in a two-volume series entitled *Biomass Burning and Global Change*, published by MIT Press and edited by Dr. Joel S. Levine, a senior research scientist at NASA Langley.

Researchers here, many of whom were pioneers in the study of biomass burning, wrote 17 of the books' 84 chapters.

Biomass burning, the burning of live and dead vegetation, is one of the most significant sources of carbon dioxide and particles in our atmosphere. Carbon dioxide is an important greenhouse gas that may lead to the warming of our planet, while the large quantities of particles in fire plumes can impact our climate, cause low visibility conditions and health problems. The release of gases from fires also contributes to the production of ground level ozone, which is both a pollutant and a greenhouse gas.

Though some of the biomass burning is started by lightning, the overwhelming majority of burning is deliberately set to clear land. This is particularly prevalent in Africa, South America and Southeast Asia, where as much as 30 percent of the agricultural land is burned each year.

The two volumes discuss biomass burning studies conducted in Africa, South America and Southeast Asia. The books also contain discussions of various techniques for measuring the effects and extent of biomass burning, such as the use of satellites and other space-based measurements.

The 1995 conference in Williamsburg was sponsored by the American Geophysical Union, NASA Langley, the NASA Mission to Planet Earth Program Office, the Environmental Protection Agency and the U.S. Forest Service.

Stories sought from participants in Take Our Daughters to Work Day

The Ms. Foundation announces their "Take Our Daughters to Work National Search for Girls' Stories" contest.

To celebrate the upcoming fifth anniversary of Take Our Daughters to Work Day, the Ms. Foundation is documenting how girls have benefitted from participating in the day.

For the past five years, girls have shared incredible stories about how, as a result of Take Our Daughters to Work Day, they found mentors, deepened their relationship with a parent, chose a different course of study, worked harder in school or overcame hardship.

Now, the Ms. Foundation wants to hear from girls and young women who think the Day has positively affected their lives. The stories of six girls will be selected and featured in a national press release. The girls whose stories are used will be flown to New York City or Los Angeles to follow a surprise celebrity mentor on April 24 – this year's Take Our Daughters to Work Day.

For more information on how to enter this contest, contact Patsy Campbell at ext. 43291 or e-mail at p.l.campbell@larc.nasa.gov.

The Ms. Foundation must receive all entries by April 7.

Langley to conduct anniversary tours to mark 80th year

Beginning March 7, tours of NASA Langley will be conducted on the first and third Friday of each month starting at 2 p.m.

Langley celebrates the 80th anniversary of its founding as the National Advisory Committee for Aeronautics (NACA) in 1917. NACA became the National Aeronautics and Space Administration in 1958.

Tours will begin at the main gate parking lot on Commander Shepard Blvd. at 2 p.m. They will run from March 7 though Dec. 5, excluding the month of July.

The tours will include a drive-through of the west area of the center, with stops at the lunar landing facility historical site, now the crash dynamics facility, and two wind tunnels.

There is no cost for the tour, and a bus will be provided in the parking lot.

For more information or to make reservations, contact Julie Fowler, Office of Public Services, at (757) 864-3309, fax 757-864-7732, or e-mail at j.b.fowler@larc.nasa.gov.

FY 1998 Research & Development budget overview presented

***Editor's note:** Following are excerpts from a statement delivered in a press conference Feb. 6 by Office of Management and Budget Associate Director T.J. Glauthier. For full text, contact Rebecca Dittmar at r.dittmar@ostp.eop.gov or at 202-456-6020.*

President Clinton's Fiscal Year 1998 budget request increases total federal research and development (R&D) funding by more than $1.6 billion over 1997, to roughly $75 billion, as traditionally reported.

The president's FY 98 budget boosts funding for basic research. The budget proposes $15.3 billion for basic research, an increase of $418 million (3 percent) over 1997. This includes a 4 percent increase for R&D at the National Science Foundation on the civilian side, and a 5 percent increase in defense basic research. Basic research funded by the Department of Energy is slated to increase by more than 4 percent. In the outyears, basic research is projected to increase steadily by nearly 5 percent to 2002.

We are proposing to increase university-based research by $289 million, to a total of $13.3 billion in FY 98.

Information technology

Investments in computing and communications R&D are increased by 10 percent, to $1.1 billion. This includes a three-year, $300 million Next Generation Internet initiative. This initiative will create the foundation for the networks of the 21st century by connecting more than 100 U.S. universities and national labs at speeds that are 100-1,000 times faster than today's Internet – with an ability to transmit voice, video and virtual reality in a secure and reliable fashion.

The FY 98 budget also provides $205 million for the Department of Energy's Accelerated Strategic Computing Initiative (ASCI), a critical part of our science-based Stockpile Stewardship program. This program is producing new generations of the world's fastest supercomputers, which will be available for both civilian and defense applications.

Education

The budget includes $524 million for research and development in education technology. This includes $75 million for the Technology Innovation Challenge Grants program that funds competitive grants for consortia of schools, businesses, universities and other organizations to develop innovative applications of innovative technology.

In addition to these R&D programs, the budget more than doubles, to $425 million, the funding for the president's $2 billion, five-year Technology Literacy Challenge Fund, designed to stimulate public-private partnerships focused on fully integrating education technology into teaching and learning.

Civilian applied research

A 6 percent increase in civilian applied research ensures that the U.S. will benefit from a continuing flow of technological advances.

The budget boosts investments in critical technology initiatives like the Advanced Technology Program at the Department of Commerce, which gets a 22 percent increase over FY 97 (to $275 million), and which provides a 36 percent increase for the Manufacturing Extension Partnership program that operates in close cooperation with state governments to ensure that our nation's small and mid-sized companies are able to compete worldwide with state-of-the-art technology.

The president's FY 98 budget includes tax incentives to encourage private sector investment in research and technology. The budget proposes a one-year extension in the Research and Experimentation tax credit.

Environment

The FY 98 budget allocates $5.3 billion for environmental research, a 4 percent increase over FY 97. The largest component is $1.9 billion for understanding and predicting global climate change and its regional impacts.

Civil space program

The president's FY 98 budget continues his strong support for the nation's civil space program. The budget maintains funding for the International Space Station program at $2.1 billion; strengthened commitment to Mission to Planet Earth at $1.42 billion (a 4 percent increase over FY 97); and solid support for the X-33 Reusable Launch Vehicle program ($330 million) and aeronautics initiatives ($456 million). In addition, NASA's space science budget has been augmented by $1 billion over the next five years.

The overall outyear projections for NASA in the president's FY 98 budget represent a significant improvement over the FY 97 estimates, which had the agency dropping to $11.6 billion by FY 00. Under the FY 98 runout, the NASA budget will go from $13.5 billion in FY 98 to $13.2 billion in FY 00, then remain at that level through FY 02. In total, NASA's five-year budget has been increased by $2.7 billion compared to last year, to provide a stable planning environment.

Defense research

We are requesting a 5 percent increase in defense-related fundamental research, which includes an 8 percent increase in the basic research budget of the Department of Defense to $1.16 billion.

We are also continuing our support of defense R&D, which also leverages innovation in the commercial sector through the Dual-Use Applications Program (DUAP). The request for DUAP is $225 million.

We are maintaining our priority for investments that will help to control the spread of nuclear weapons and the materials used to make them. The FY 98 budget requests a 16 percent increase in the Cooperative Threat Reduction Program to $382 million.

This U.S.-Russia cooperative program has proven to be a critical investment in helping the states of the former Soviet Union sequester, dismantle and destroy Cold War era nuclear and chemical weapons.

Budget cut fears

There have been many well-publicized predictions – "fears" may be a better description – within the science community that balancing the budget would require deep cuts in civilian research programs – cuts on the order of one-quarter to one-third over the next five years.

In fact, in the years between 1998 and 2002, the president's plan will preserve civilian research funding while completing the job of balancing the budget. The president's baseline outyear budget plan proposes civilian R&D to grow by 2 percent (nominal) between 1998 and 2002.

Much of FY 98 federal budget seen as mandatory

BY LEE RICH

As defined in the pie chart at right, the main budgetary problem of the United States is that most of the $1.7 trillion budget is non-negotiable, that is, off-limits, except for relatively small adjustments.

"Most" is usually described as "nearly 70 percent," but really is nearly 85 percent. Traditionally, defense spending is included in the negotiable, or discretionary, part of the budget (Table 1).

However, although the defense portion has declined in the post-Cold War era, defense spending is unlikely to fall below 16 percent of budget authority in the foreseeable future.

The remaining 15.5 percent of the total translates into a discretionary spending amount of $268 billion. The appropriations for NASA come from this funding category. The Administration's budget, sent to Capitol Hill on Feb. 6, will be debated as Congress produces 13 appropriations bills over the next seven months.

Table 2 shows NASA's 0.8 percent of the total submitted budget, or $13.6 billion, in relation to other spending categories.

Table 1

Budget Totals Compared
(in billions of dollars)

	FY '97 Estimated	FY '98 Proposed
Spending		
Discretionary		
Domestic	$262.5	$268.0
Defense/Int'l	287.6	279.4
Subtotal	**550.0**	**547.5**
Mandatory		
Medicare	191.6	204.3
Medicaid	98.5	105.9
Social Security	364.2	380.9
Other	179.3	199.1
Subtotal	**833.6**	**890.2**
Net Interest	**247.4**	**249.9**
Spending	**1,631.0**	**1,687.5**
Revenues	**1,504.4**	**1,566.8**
Deficit	**$125.6**	**$120.6**
Deficit % of Gross Domestic Products	**1.6**	**1.5**

Pie Chart

Budget in Perspective
(Fiscal Year 1998, percentage of total spending)

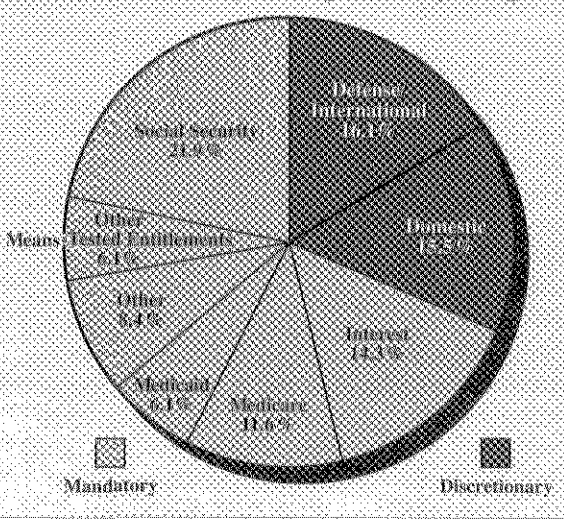

Table 2

Allocation of Federal Spending
(percentage of total budget authority)

Department or Unit	FY '80	FY '90	FY '97	FY '98
Legislative Branch	0.2%	0.2%	0.2%	0.2%
Agriculture	5.9	4.3	3.6	3.5
Defense	23.3	24.7	18.8	16.7
Education	2.3	1.9	1.8	2.3
Foreign Aid	2.4	1.1	0.8	1.0
Health and Human Services*	10.4	14.4	21.7	21.6
Housing and Urban Development	5.4	1.3	1.3	1.3
Justice	0.4	0.7	1.1	1.0
Transportation	3.0	2.3	2.5	2.5
Treasury#	13.5	20.1	22.7	23.0
Veterans Affairs	3.2	2.4	2.4	2.4
Environmental Protection Agency	0.7	0.4	0.4	0.4
NASA	0.8	1.0	0.8	0.8
Social Security Administration	19.0	20.6	24.3	24.1

*Includes Medicare, Medicaid and Aid to Families with Dependent Children
#Includes interest on the federal debt

Graph and tables from the Budget of the United States Government, Fiscal Year 1998.

Thinking 'BIGG,' Langley 'connects' to educational community

BY JANE A. GEORGE
OFFICE OF EDUCATION

In conjunction with 1997 National Engineers Week activities, Feb. 17-21, Langley's Office of Education is continuing its Distance Learning Initiative project with a new series of educational broadcasts called "Connect."

These programs, aimed at students from kindergarten through grade 12, were broadcast throughout February on the WHRO ITFS wireless cable system to school cable networks.

"Connect" not only teaches lessons which relate to the science and mathematics education standards of learning, but it also communicates and disseminates to the educational community instructional programs and materials from NASA's mission to promote excellence in mathematics, science and technology.

In each of these programs, students took a "field trip" to a researcher's lab to see the variety of research being conducted at Langley. As part of the lesson, students completed an Enterprise Challenge activity which relates to the program topic. Dr. Stanley Jones, aerospace education specialist, hosted each program.

The elementary program, "The Shape Is the Answer," features test engineer Frank Quinto and uses shapes to introduce students to geometric concepts and to NASA's aeronautics research enterprise. The lesson helps students to identify and describe a cube, rectangular solid and cylinder.

The middle school program, "The Heat Is On," featuring atmospheric scientist Dr. Mary Ann Smith, explores the greenhouse effect and provides an opportunity for students to conduct an investigation related to the Mission to Planet Earth research enterprise. The program helps students to discover how greenhouse gases in the Earth's atmosphere trap heat in the same manner as the glass in a greenhouse.

The high school program, "Leap Before You Fly," features aerospace engineer Melvin Ferebee and challenges students to use the rocket equation to calculate how much fuel is required to launch a rocket carrying a payload into space. The program provides a mathematics lesson which relates to NASA's Human Exploration and Development of Space and Space Science research enterprises.

The "Connect" series reaches students and educators in 19 school districts in southeastern Virginia and northeastern North Carolina and will augment the activities of the 126 Langley volunteers who visit more than 200 schools in 12 districts as part of National Engineers Week.

Thinking 'BIGG'

The "Think BIGG" video series, also an Office of Education Learning Initiative, further reaches out to students during National Engineers Week.

Each episode includes a live, interactive teacher program and a two-part, prerecorded, problem-based student program. The current episode, "Getting the Right Angle on Tall," targets students in grades 5-8.

Part One of "Getting the Right Angle on Tall" focuses on the mathematics concept, the Pythagorean Theorem. Characters Mission Man, Professor Bigg, and the Mission Accomplish Crew face the challenge of using the Pythagorean Theorem to determine the height of the Washington Monument, so that its elevator can be repaired within 24 hours, in time for the monument to be used as a judging site for an international kite festival.

NASA engineer and master kite builder and flyer Charles Dunton gets caught in the "updraft" of the Mission Crew's plan and provides information to the crew about kites and aeronautics. He also introduces the notion of using the Pythagorean Theorem.

Part Two finds the Mission Accomplish Crew and the viewers faced with more information and questions as they determine a plan of action. Should they use the Pythagorean Theorem? Can the crew and the viewers determine the most effective plan and complete the necessary steps in time to repair the monument's elevator? Will the crew's math anxiety prevent them from accomplishing the mission?

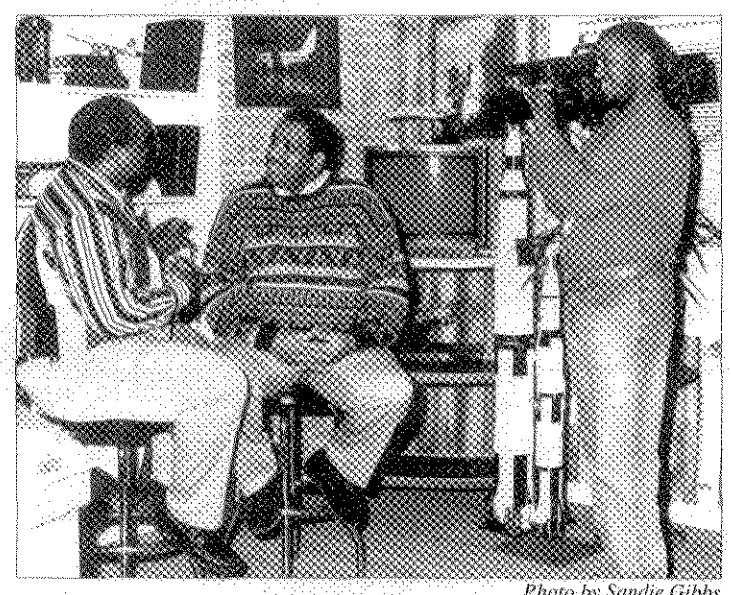

Photo by Sandie Gibbs

Aerospace engineer Melvin Ferebee, left, and aerospace education specialist Dr. Stanley Jones are videotaped by Langley videographer Franklin Fitzgerald as they discuss the rocket equation for the "Connect" series program "Leap Before You Fly," a distance learning initiative for high school students.

Local broadcasts

Both "Connect" and "Think BIGG" will be broadcast on WHRO-TV, Channel 15, every Friday during March (7, 14, 21, 28), from 2 to 3 p.m. The broadcast is expected to reach nearly 540,000 households.

(See related photo, page 6.)

Langley researcher, co-author wins AMS award with cousin

BY CATHERINE E. WATSON

Dr. Jack Fishman, a senior research scientist at NASA Langley, is the 1996 co-recipient of the American Meteorological Society's (AMS) Louis J. Battan Author's Award. Fishman and Robert Kalish, an environmental journalist from Bath, Maine, were honored for their book, *The Weather Revolution*, on Feb. 5 at the society's annual banquet in Long Beach, Calif.

Fishman, of Langley's Chemistry and Dynamics Branch, has conducted research on global pollution since 1979. A satellite technique Fishman developed in the late 1980s first identified large pollution plumes coming from southern Africa that pollute the entire Southern Hemisphere. In 1992, he led a NASA-sponsored expedition to the South Atlantic region to study this pollution.

Fishman and Kalish also co-authored *Global Alert, The Ozone Pollution Crisis* in 1990. Fishman and Kalish are cousins who grew up together in St. Louis, Mo.

Fishman

"Spending most of my life writing research results for technical presentations, I found it particularly challenging bringing this information down to a level that could be understood by a general audience," Fishman said. "After spending nearly three years writing this book in collaboration with my cousin, whose background is journalism, the end result was very rewarding, and it's particularly exciting to receive the recognition from the AMS."

The Louis J. Battan Author's Award is presented to the author(s) of an outstanding, newly published book of a technical or nontechnical nature, with consideration to those books that foster public understanding of atmospheric science.

The Weather Revolution describes how advances in technology and our understanding of meteorology will provide better weather forecasts before the turn of the century. Louis J. Battan, the award's namesake, contributed outstanding research efforts in radar meteorology and wrote several books aimed at nonscientists.

Researcher to present program on Mars Microprobes design

As part of an evening event sponsored by the American Association of Aeronautics and Astronautics (AIAA), Dr. Robert A. Mitcheltree, of Langley's Aerothermodynamics Branch, will deliver a lecture entitled "Aerothermodynamic Design of the Mars Microprobes," March 26, 6 p.m., at the H.J.E. Reid Conference Center.

When the Mars Surveyor mission is launched in February 1999, it will transport not only its own lander and orbiter to Mars, but also two small soil penetrators. These two Mars Microprobes are the second of the Deep Space missions from the New Millennium Program Office.

Langley assisted the Jet Propulsion Laboratory, Pasadena, Calif., in selection of the aeroshell, described the expected aerodynamics and aeroheating environments, and performed trajectory simulations for the Mars Microprobes.

The instrumented penetrators will look for the presence of water at depths to 2 meters. The presence of water within the soil has important implications relative to the planet's geology, climate and ability to support past or present life.

In order for the two penetrators to be delivered to the surface, they must each be packaged within an aeroshell capable of surviving the 7.5 km/s entry and decelerating the vehicle to a prescribed velocity and attitude at impact.

In his presentation, Mitcheltree will outline the choices made to design these unique aeroshells to meet those requirements.

Admission to the dinner and program is $11 for AIAA members and guests; $8 for student members; $13 for nonmembers.

To make reservations by the noon, March 19, deadline, contact Odilyn Santa Maria at ext. 45104, or e-mail at o.l.santamaria@larc.nasa.gov; or Lynda Foernsler, ext. 48146, e-mail at l.j.foernsler@larc.nasa.gov

FYI

What:	AIAA Dinner/Lecture "Aerothermodynamic Design of the Mars Microprobes." Dr. Robert A. Mitcheltree
When:	March 26, 6 p.m.
Where:	H.J.E. Reid Conference Center
Cost:	$11 – AIAA members, guests $8 – student members $13 – nonmembers (Reservations required by March 19)
Info:	864-5104/8146

AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

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FOR SALE: White Westinghouse heater/air conditioner window unit, requires 220 line, $150. Call 898-4239 after 5:30 p.m.; leave message.

FOR SALE: King-size waterbed with 6-drawer pedestal, 90 percent waveless mattress, heater, liner, padded headboard and side rails, walnut color, $225 or best offer. Call 874-6697.

FOR SALE: 2-BR Hampton house on large, fenced corner lot; convenient to Langley and shopping; newly renovated inside and out – new vinyl siding, windows, doors, interior paint, carpet, vinyl in kitchen/bath, water heater, large eat-in kitchen with stove, refrigerator, $52,900. For more information, call 851-9002; leave message.

SO LONG TO PAUL: A retirement dinner honoring former center director Paul Holloway will be held March 1, 6 p.m., at the H.J.E. Reid Conference Center. $18 per person. For more information, contact William C. Woods at ext. 45238, Mail Stop 408A.

RETIREMENT LUNCHEON: A pay-as-you-go buffet luncheon for Jim Smith, Operations Support Division, will be held March 5, 11:30 a.m., at the Langley Officers Club. For reservations and gift contributions, contact Gloria S. Evans, ext. 44570, Mail Stop 481 by Feb. 28.

LET THE SUN SHINE: Langley's Satellite Committee for People with Disabilities presents the professional touring theatre group, "Sunshine Too," March 6, for three presentations at the H.J.E. Reid Conference Center: children's show – 10-10:45 a.m.; family show – 2-2:45 p.m.; workshop – 2:45-3:30 p.m. The group is sponsored by the National Technical Institute for the Deaf, a college of the Rochester Institute of Technology, Rochester, N.Y. For more information, call ext. 47164 or ext. 46986.

THE VIRGINIA CHORAL SOCIETY will present "Songs of the Land and Sea," March 7, 8 p.m., at St. Mark's Lutheran Church in Yorktown; March 8, 8 p.m., at First Presbyterian Church in Hampton. Tickets are $7; $5 for seniors and students. For more information, call 851-9114.

LET'S GO SWOOSHING: Join in on a 2-day ski trip to Canaan Valley, W.Va., March 7-9, leaving from the Langley cafeteria parking lot at 5 p.m., March 7, leaving the slopes at 5 p.m., March 9, arriving home before midnight. $189 per person includes double-occupancy lodging, 3 meals. For more information, call Richard Bennett at ext. 44112 or at 599-5585.

I HEAR A SYMPHONY: The Virginia Symphony presents an evening with composer Marvin Hamlish, March 8; Peanut Butter and Jam Family Concert, "Sail Along with the Symphony," March 22. Season brochures available at the Langley Exchange Shop. For tickets, call 623-2310.

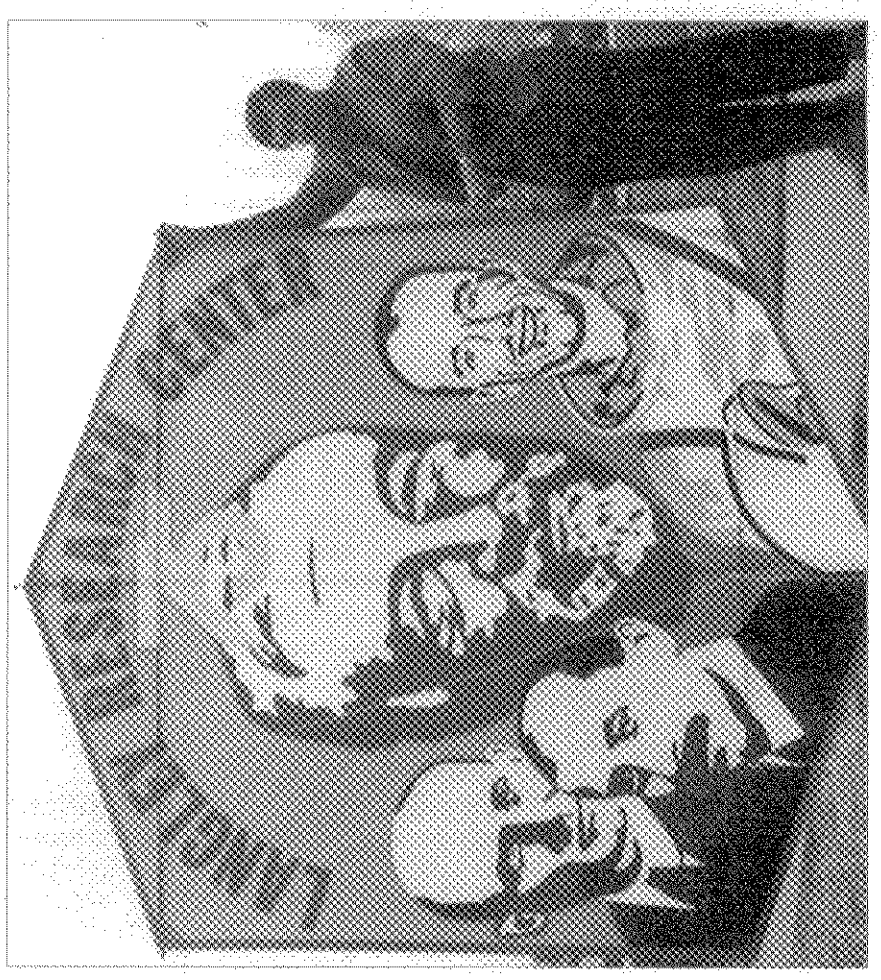
WILLIAMSBURG SYMPHONIA will present "Music in the Air," March 10, 8:15 p.m., at Phi Beta Kappa Memorial Hall, Williamsburg. Preconcert discussion at 7:15 p.m. Tickets $15-$28; $8 for children and students. For more information, call 229-9857.

FAREWELL LUNCHEON for Ronald D. Brown, March 19, 11:30 a.m., at the Langley Officers' Club, Daedalian Room. Cost is $12, or contribution for gift only $3, to Althea Brown, Mail Stop 395, ext. 41359, by March 14.

LANGLEY ALUMNI ASSOCIATION meets the second Tuesday of each month at noon in the Langley cafeteria's private dining room. For more information, call 874-1004.

SIDE OUT: Registration is open for the spring volleyball season, March 3-May 30, with five coed leagues – D (beginner/novice), C (beginner/intermediate), B (intermediate/advanced), BB (advanced) and an open league (no restrictions). Team registration fee is $100. Rosters are available from the volleyball website and the gym. Send completed forms to : D league, Melvin Ferebee, Mail Stop 328; C league, Tom Britton, Mail Stop 161; B league, Wes O'Neal, Mail Stop 355; BB league, Lou Glaab, Mail Stop 343; open league, Dave Rosenbaum, Mail Stop 488. Also, nominations are still open for the offices of president, vice president and D-league representative. For more information, call ext. 44421.

A TOAST TO TALK: The NASA Langley Toastmasters Club can help you improve your communication and leadership skills. Meetings are every second and fourth Wednesday of the month, 11:30 a.m.-1 p.m., and are open to all Langley employees and Langley Air Force Base military and civilian employees. NASA employees can charge one hour to training. Club home page is at http://erb-www.larc.nasa.gov/toast. For more information, contact Myra Walton at ext. 49254, or e-mail at m.l.walton@larc.nasa.gov.



HIGH-FLYING TRADITION -- NASA engineer and master kite builder and flyer Charles Dunton holds the Langley 75th Anniversary Kite featured in the "Think BIGG: Getting the Right Angle on Tail" middle school program, a Langley Office of Education Learning Initiative conducted in conjunction with National Engineers Week, Feb. 17-21. The NASA connection to the "Think BIGG" program includes flex-wing research done at Langley, as well as the kite, built in 1992 by Dunton. Pictured on the kite are NASA Langley's namesake, Dr. Samuel P. Langley (center); Wilbur and Orville Wright (left), who represent the aeronautical research done at Langley; and Alan Shepard (right), the first American to travel into space, and the only member of the original Mercury 7 astronauts crew to walk on the moon. Langley was the lead center for Project Mercury and home to the Mercury astronauts.

Photo by Sandie Gibbs

Researcher News

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

Official Business. Penalty for Private Use $300.

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Permit No. G-27

National Aeronautics and Space Administration
Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 5 ❖ March 14, 1997

NASA, FAA, DOD unite to reduce aircraft accidents

Government, industry form partnership to improve aviation safety

NASA NEWS RELEASE

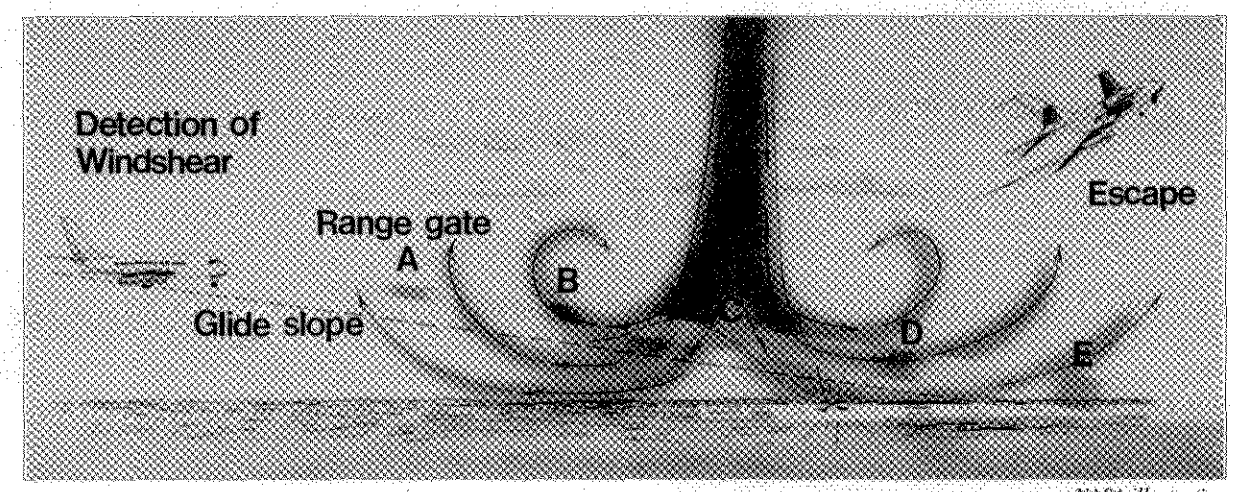
In response to a report from the White House Commission on Aviation Safety and Security, chaired by Vice President Al Gore, and in partnership with the Federal Aviation Administration (FAA), the Department of Defense (DoD) and the aviation industry, NASA has been challenged to reduce aircraft accident rates five-fold within ten years.

"We're looking for solutions that will save lives...This partnership will lead to breakthroughs that will achieve a safer tomorrow in aviation."

Daniel S. Goldin, NASA Administrator

The initiative includes research to reduce human-error-caused accidents and incidents, to predict and prevent mechanical and software malfunctions, and to eliminate accidents involving hazardous weather and controlled flight into terrain. It also uses information technology to build a safer integrated aviation system to support pilots and air traffic controllers.

The Department of Defense will assist in defining requirements and actions to implement many of the safety standards.



NASA illustration

NASA Langley has teamed often with the FAA on safety-related projects, including a recently completed five-year study of windshear. The study resulted in technology for the airborne detection of windshear. This artist's sketch shows how windshear affects an aircraft. As a downdraft spreads down and outward from a cloud, it creates an increasing headwind over the wings of an oncoming aircraft. This headwind causes a sudden leap in airspeed, and the plane lifts. As the plane passes through the shear in a matter of seconds, the wind quickly becomes a downdraft and then a tailwind. This reduces the speed of air over the wings, and the extra lift and speed vanish. If the shear is strong enough, pilots may be forced to crash the plane, especially at low-speeds during takeoff and landing.

"We're looking for solutions that will save lives," said Daniel S. Goldin, NASA Administrator. "NASA is prepared to step up to the national goal set by the vice president's commission without requesting additional funds. This partnership will lead to breakthroughs that will achieve a safer tomorrow in aviation."

To accomplish the goal, NASA proposes to invest up to one-half billion dollars over the next five years. Funding will originate from reprogramming existing aeronautics funds, in addition to reassigning people and NASA facilities' work.

"The FAA and NASA have a proud history of working together to make the U.S. aviation system the safest and most efficient in the world," said Acting FAA Administrator Barry Valentine. "Our two agencies, along with our industry partners, are going to take this research investment and turn it into improvements that will benefit all aviation users."

The FAA brings to the new initiative a diverse aviation safety research effort that ranges from basic studies on the airworthiness of materials to development of new products for safety inspectors, security inspectors and air traffic controllers. The agency has vigorous programs in areas such as aviation human factors, aircraft fire safety, advanced air traffic management technology and safety information technology.

"The FAA and NASA have a proud history of working together to make the U.S. aviation system the safest and most efficient in the world."

Barry Valentine, Acting FAA Administrator

Last year, the FAA also unveiled an unprecedented concept to help reduce accident rates. The Global Analysis and Aviation Network (GAIN) would collect and analyze worldwide aviation safety data to spot safety-related trends, then would share the analysis with the global aviation community. By learning more about potential problems, the participants in GAIN would be in a better position to take action to address the problems proactively.

NASA's aeronautics research and development efforts, ranging from general aviation to jumbo jets, are key to U.S. competitiveness and safety in the aviation industry.

"NASA has always worked to improve safety by developing the technology industry needs to improve the performance and reliability of aviation products," said Robert Whitehead, NASA Associate Administrator for Aeronautics. "We have also worked closely with the FAA to conduct basic research in support of their mission. This initiative is the first time we have started

(see SAFETY, page 4)

Colloquium Communiqué

Global burning adds fuel to environmental fire

Senior Research Scientist Joel S. Levine, of the NASA Langley Atmospheric Sciences Division, will present the center's April colloquium lecture, April 8, 2 p.m., at the H.J.E. Reid Conference Center. The lecture is titled "Fire and Global Change: A Hot New Environmental Issue."

At 7:30 p.m. the same evening, he will repeat the lecture as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

Levine

A recent report of the National Research Council concludes, *"Our planet and global environment are witnessing the most profound changes in the brief history of the human species. Human activity is the major agent of those changes – depletion of stratospheric ozone, the threat of global warming, deforestation, acid precipitation, the extinction of species and others that have not become apparent."*

The burning of the world's vegetation – forests, grasslands and agricultural land for land clearing and land-use change – is responsible for all of those global changes.

Global burning, believed to be overwhelmingly human-initiated, has increased significantly over the last few decades, with most of the burning taking place in developing countries. Recent studies using satellite measurements performed at Langley and elsewhere, indicate that global burning is much more widespread and extensive than previously believed. On the average, as much as one percent of our planet's land cover may burn each year. The burning of our planet's vegetation is a significant global source of gases and solid particles to the atmosphere. These substances disturb the chemistry of the atmosphere and impact the transfer of incoming solar and outgoing thermal infrared radiation, which in turn impacts the climate of our planet.

As Levine will discuss, Langley scientists have been in the forefront of research in global burning, including the use of satellite measurements to assess the geographical extent of burning and the chemical sampling and analysis of gases and particles produced by burning in diverse ecosystems.

Levine's areas of research include the origin and evolution of the atmosphere, atmospheric chemistry, global change and global burning. He serves as the principal investigator on global burning investigations supported by both NASA and the Global Change Program of the U. S. Environmental Protection Agency.

Levine is codirector of an international scientific team to develop a global inventory of the gaseous and particle emissions produced by global burning for the International Global Atmospheric Chemistry Project, part of the International Geosphere-Biosphere Program.

Levine has authored or co-authored more than

FYI

What: Sigma Series Lecture "Fire and Global Change: A Hot New Environmental Issue"
When: April 8, 7:30 p.m.
Where: Virginia Air & Space Center 600 Settlers Landing Rd. Downtown Hampton
Info: 727-0900

(see BURNING, page 4)

News Briefs

Around the Agency

NEXT GENERATION INTERNET A MILLION TIMES FASTER THAN HOME COMPUTER MODEMS – Research and development by NASA and five other federal agencies on the Next Generation Internet (NGI) initiative could, by 2002, result in information flowing one million times faster than today's modern home computer modems and one thousand times faster than a current standard T1 business computer line, according to NASA engineers. NASA's Ames Research Center, Mountain View, Calif., is the lead institution for the agency's $30 million portion of a three-year $300 million federal project to develop the NGI. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-029.txt.***

WILCUTT TO LEAD CREW ON EIGHTH SHUTTLE/MIR DOCKING MISSION – U.S. Marine Corps Lt. Col. and astronaut Terrence W. Wilcutt will command the eighth of nine planned missions to dock the space shuttle with Russia's Mir space station. STS-89 is targeted for a January 1998 launch on Discovery. Joining Wilcutt on the flight deck will be U.S. Navy Cmdr. and pilot Joe Frank Edwards Jr., and mission specialists Bonnie J. Dunbar, Ph.D., U.S. Air Force Maj. Michael P. Anderson and James F. Reilly II, Ph.D. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-033.txt.***

NEW WIND DATA IMPROVING ACCURACY OF WEATHER FORECASTS – NASA scientists using weather forecast models with newly incorporated data from the wind-measuring NASA Scatterometer (NSCAT) instrument onboard Japan's Advanced Earth Observing Satellite (ADEOS) are seeing significant improvements in their ability to analyze weather patterns and generate more accurate forecasts, especially in the Southern Hemisphere. NSCAT appears to more accurately locate both cyclones and fronts, and to improve the forecasts of their location. Such information should assist meteorologists at the National Oceanic and Atmospheric Administration's Marine Prediction Center, Camp Springs, Md., to issue more accurate storm warnings. The wind images are available via the Internet at http://www.jpl.nasa.gov/winds. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-032.txt.***

Disabilities Awareness

Heart problems show no signs

BY DIANE FORREST

February was American Heart Month. Having had open heart surgery, I find a special and personal meaning in the occasion.

I was first diagnosed with a mitral valve problem in 1977. Two different doctors gave me two different prognosis. The first said I would die in 20 years, which, by the way, happens to be this year.

The other said I would live to a ripe old age, since nothing usually comes from my type of heart problem.

Then I saw a cardiologist. His diagnosis was to wait and see and monitor what was happening.

I lived fairly normally with only slight changes in my lifestyle until I began to notice I was always out of breath.

Sometimes after exercise or mowing the lawn, my heart felt as if it would beat out of my chest.

The cardiologist confirmed with the help of a catheter test that I needed to have my valve fixed. The operation took place Dec. 1, 1980. I was lucky in that the valve itself was not damaged and did not have to be replaced.

Since that time, I am

See HEART, page 4

Announcements

March blood drive set

The next Langley blood drive will be held March 26, 9 a.m.-3 p.m., in the H.J.E. Reid Conference Center. For more information, call the Office of Occupational Health Services at ext. 43191.

Program management and control courses offered during April

The Langley Employee Development Branch offers the following program management and control courses in April:

▲ **Program Management and Control Fundamentals** (formerly an overview course), April 1-4, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103. Calculators are recommended.

This course provides a synopsis of implementing a NASA project through the life cycle from conceptual designs to operations, including management control systems and processes.

Topics covered include:

- NASA Project Life Cycle Phases
- Program Control Processes
- Planning and Requirements
- Configuration Management
- Project Planning, Schedule and Risk Management
- Cost Estimating
- Budgeting
- Full Cost Accounting
- Procurement Processes
- Management Information and Data
- Earned Value Management
- Internet References and Guidance.

▲ **Work Breakdown Structure (WBS)**, April 30-May 1, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103. Prerequisite course is Program Management and Control Fundamentals or the equivalent.

NASA requirements will be covered as they apply to both contract statements of work and NASA in-house project work activities.

Topics covered include:

- Fundamentals of a WBS
- Requirements and guidelines and preparation of a program/project WBS
- Requirements and guidelines for the contract WBS
- Preparation of preliminary and extended-contract WBS
- WBS relationship to agency-wide coding structure contractor's reporting of correlated cost and performance data performing organizations, project management organizations, and program control process.

To enroll for these classes, send one Application for On-Site Training (NASA Langley Form 24) for each class to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information about the courses, call Tony Maturo Jr., ext. 42590.

Technical library offers workshops

The Technical Library offers these workshops in March and April, 10-11 a.m. in the library training room. To register, send e-mail to workshops@tech-library.larc.nasa.gov, or call ext. 42368.

▲ **Library Orientation**, March 19

Orientation of library services and electronic resources. Learn basic searching of STILAS, the online catalog. Become familiar with the Library's CDNET, a collection of networked CD-ROM titles. Learn the layout of the library with a walking tour.

▲ **Searching COREAREO**, March 26

COREAREO is a database of aerospace reports, journal articles and conference papers intended to be a core source of information for researchers. Initially, the database will consist of 2 million records from the NASA RECON database.

▲ **Searching NASA GALAXIE** (formerly known as STILAS), April 9

This class will show how to access NASA GALAXIE, NASA's Gateway to Libraries for Aerospace Information Exchange. NASA GALAXIE has the look and feel of STILAS; however, the database has been expanded to include the library collections of all NASA centers.

▲ **Accessing Electronic Journals**, April 16

The Technical Library has subscribed to a series of electronic journals, including *Environmental Science and Technology* and *Journal of Physical Chemistry*. The workshop explains how to access the journals and demonstrates searching techniques.

▲ **Searching UNCOVER on the WWW**, April 23

Learn how to access tables of contents of approximately 17,000 journals and how to set up your own current awareness profile through this electronic service.

Credeurs send thanks

"We would like to thank the many of you who cheered us by sending cards, flowers, fruit, balloons and candy; by calling, visiting, running errands, bringing food, caring for our yard and offering to help in many other ways following our car accident in New York on Nov. 9. Your generosity, thoughtfulness and prayers meant more to us than we could possibly say."

– Leonard and Karen Credeur

Retirees send thanks

"To all my friends and comrades at NASA Langley: Words cannot express the joy and love that I felt upon my retirement. I am grateful for the opportunity to say farewell in grand style. I will always have fond memories of NASA. Thank you for a memorable retirement luncheon, social and gifts."

– Patricia Redwood

"Louisa and I sincerely thank everyone who participated in my retirement reception on Feb. 3, particularly the personnel staff, retirees, many others who came by and the representatives of the Office of Personnel Management.

"I will cherish the good wishes, gifts and mementoes, especially the NASA plaque presented by Dr. Creedon.

"I have many pleasant memories of my 34-plus years at Langley."

– John J. Cox

In memory of Gus Morris

Melvin "Gus" Morris Jr., 72, died Feb. 22. The native and lifelong resident of Newport News retired from NASA Langley in 1988 with 40 years' service as an aerospace engineer.

In memory of Viola O. Phillips

Viola Ohler Phillips, 83, died Feb. 23. Beginning in 1939, she worked as a human computer with the Langley Memorial Aeronautical Laboratory of the NACA. She later became chief of the facility's editorial office, and she retired from the NACA in 1949.

Phillips was the wife of W. Hewitt Phillips of Hampton, who worked at Langley from 1940-1979, when he retired as chief of the Flight Dynamics and Control Division.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

NASA supports Hampton school in national robotics competition

Phoebus High students work with NASA volunteers to create remote-controlled robot

BY NICOLE FOREST

Students at Hampton's Center for High Technology at Phoebus High School have built a robot for a national competition with some help from NASA Langley.

NASA gave $30,000 to the group of 32 students from Phil May's robotics class to participate in the sixth annual "For Inspiration and Recognition of Science and Technology" (FIRST) high school robotics competition. The competition, founded in 1989, is designed to kindle student interest in science and technology.

"The students and volunteers really pulled together and came up with a robot that is performing better than any of us ever anticipated," said Jeff Seaton, a research scientist in the Research and Technology Group. "Without the assistance we received from several companies outside of NASA and the all day – and in some cases all night – work of many volunteers who helped the students, this never would have been possible."

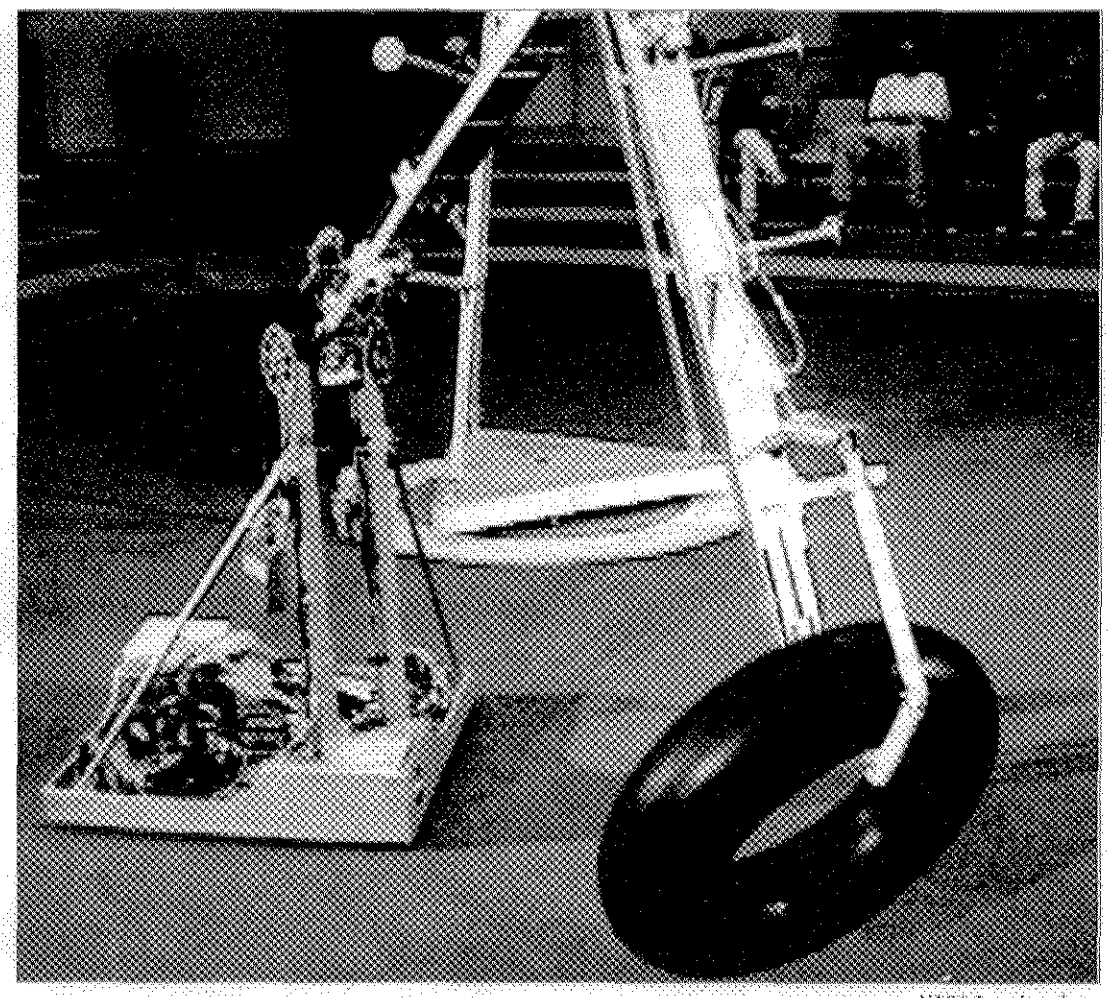
"Taking two boxes of spare automotive parts, a few small pieces and items from [a local home supply store], and turning them into a re-motely controlled robot that can lift two automotive inner tubes 11 feet into the air is impressive for a high school project," Seaton said. "Now all that's left is to see how we do against the other teams."

NASA engineers and retirees mentored the students for seven weeks to build a robot tasked to place inner tubes on an 8-foot-high goal while keeping rival robots from doing the same. The Phoebus robot will compete against robots built by teams from across the U.S.

More than 150 teams are expected to compete this year, including 10 teams fielded by NASA centers. The agency first participated in the competition last year. The teams will compete regionally March 20-22 at Rutgers University in New Jersey. The national competition will be held April 10-12 at Epcot Center, Orlando, Fla.

Previously, Phil May and his program have been competitively awarded grants related to robotics for people with disabilities and have received materials from the Langley Robotics Lab. They have also competed in local robotics competitions.

Mentors included Ansel Butterfield, Bill Reed, Israel Tabek, George Brooks, all NASA retirees; Rick Mangum, husband of Langley employee Cathy Mangum; and Leonard Weinstein, of the Measurement Science and Technology Branch.



NASA Langley photo

A robot built by students at Phoebus High School is put through precompetition paces. The goal is to pick up inner tubes and put them on the rack behind the robot.

Senior scientist honored twice

BY ELIZABETH JOHNSON

Langley Senior Scientist Dennis Bushnell has received the American Institute of Aeronautics and Astronautics (AIAA) Dryden Lectureship.

This is the first time a currently employed NASA Langley employee has won the award since Herb Hardrath took the honor in 1974. Hardrath was the assistant chief of the Materials Division here and won the award for fracture mechanics.

Bushnell

"This is a tremendous honor for the center," Bushnell said."It indicates the high quality of Langley Research Center and its scientific contribution."

Bushnell received this award for "outstanding leadership and exceptional innovation in pioneering advanced prediction methodologies and flow control concepts in fluid mechanics, aerodynamics and aerothermodynamics."

The award consists of an engraved medal, a certificate of citation and a rosette pin, symbolizing technical excellence. Bushnell will receive the Dryden award after he presents a lecture at the 1998 AIAA 36th Aerospace Sciences and Exhibit in Reno, Nev., in January.

In addition to the Dryden Lectureship, Bushnell received the University of Connecticut's alumni award, given to distinguished engineering graduates. Bushnell will receive the award at the school's annual banquet in April.

The AIAA Dryden Lectureship is a salute to research scientists and engineers. The award emphasizes the importance of basic research to the advancement of aeronautics and astronautics.

Virginia Air & Space Center honors volunteers

BY MEGHAN WOODCOCK

The staff at the Virginia Air & Space Center (VASC) know the value of their volunteers. More than 300 people put in 16,984 volunteer hours at the VASC in 1996 alone.

The "top ten" volunteers for 1996 – those with the most hours accumulated during that year – were among the 71 people honored Feb. 12 at the VASC's annual Volunteer Recognition Ceremony. Kim Maher, executive director for the VASC, presented awards.

The "top ten" volunteers named were Wally Carter, 653.75 hours; Scott Wood, 591 hours; Dottie Elwell, 422.25 hours; John "Jay" Shatzer, 397 hours; Kevin McNamara, 364.25 hours; Meghan Knowlton, 307.75 hours; John Whistler, 289.25 hours; Richard Stetson, 268.5 hours; Ira Davis, 255.5 hours and Langley retiree Kenneth Pierpont, 236.25 hours.

Other volunteers received pins for their cumulative volunteer hours. Nineteen people received pins for 500 hours of volunteer time, 19 received pins for volunteering 250 hours and 18 were awarded for 100 hours of volunteer time.

Five volunteers received special name tags for reaching 1,000 hours of service. William A. Conner, Ira L. Davis, Dottie Elwell, Herbert S. Johnston and Scott B. Wood will also see their names added to a plaque located in the VASC for those volunteers accumulating 1,000 hours.

Forty-nine volunteers on the VASC rolls are NASA Langley employees or retirees. Bert Smith, volunteer coordinator for the VASC, recognizes the importance of Langley's helping hand.

"The Langley employees and retirees are invaluable to our program," Smith said. "They always have a specific technical or scientific knowledge which helps to pull things together.

"We are always looking for people," Smith added.

Volunteers for the VASC participate as tour guides, or docents, and as summer van tour guides, greeters, amateur radio operators, Teacher Resource Center assistants, librarians, administrative assistants and exhibit consultants. Some volunteers also help with the multitude of special events held at the VASC. Others aid in the restoration of display aircraft. Anyone older than 14 years old can volunteer. For more information, call Smith at 727-0900, ext. 735.

VASC volunteers from Langley

The following are Langley employees and retirees who volunteer their time to the Virginia Air & Space Center:

John Allen
Wesley Berryman
Freddie Bloch
Robert Bower
Ed Brummer
Gordon Bullock
Hubert Clark
George Curran
Edward Dickes
Doris J. Forrest
John Franke
Barbara A. Fryer
Robert Girouard
John Goslee
Fred Healey
Jane Hess
Harvey Hubbard
Robert Huston
Bill (W.B.) Jones
Jim J. Jones
Betty Joyner
James Joyner
William King
Richard Kurtz
Glenna Martin
Robert McKinley
Dwight McSmith
George Meidinger
Robert Miserentino
Homer Morgan
Merle Ott
Ralph Parks
Charlotte Phillips
Hewin Phillips
Kenneth Pierpont
James Puffenberger
Frank Quinto
Wilmer "Bill" Reed
Bert Rockey
Marianne Russell
Sue Seward
Jim Sivitar
Milton Skolaut
Robert Stewart
Virginia Taylor
Bill Terrill
J.J. Tsou
Charlotte Tyeryar
John Witherspoon

NASA Langley participates in

Volunteers bring NASA, engineering into grade school classrooms

Thanks to scores of volunteers, local children learn about aerospace, aeronautics during National Engineers Week, Feb. 16-22

BY DR. SHELLEY CANRIGHT AND JANE A. GEORGE OFFICE OF EDUCATION

For the seventh consecutive year, Langley National Engineers Week volunteers reached out to make a world of difference in the lives and education of elementary students, grades 3 through 5, in the Hampton Roads area.

The school volunteers' willingness and enthusaism made this year's effort one of the most successful .....

The 139 civil service, contractor, grantee and retiree volunteers visited more than 10,500 elementary school students in 102 schools from 12 school divisions during the month of February. The school volunteers' willingness and enthusiasm made this year's effort one of the most successful and gave volunteers an opportunity to share the importance of mathematics, science, technology and communications skills in school and throughout life.

TV as teacher

Besides all the volunteers who visited classrooms, Langley's Office of Education helped bring science, mathematics and technology to local classrooms through two television program series and a special broadcast.

This Feb. 21 broadcast, which aired on WHRO-TV, Channel 15, featured Center Director Dr. Jeremiah F. Creedon and Precollege Officer Dr. Shelley Canright. The program aimed to inform the viewer about NASA's mission, enterprises and outcomes; to expose viewers to NASA's educational strategy and sample programs; and to highlight Langley's National Engineers Week distance learning initiatives.

'Connecting' to kids

Through the distance learning initiative called "Connect," three Langley volunteers reached out to grades kindergarten through 12. Frank Quinto, Dr. Mary Ann Smith and Melvin Ferebee were featured in three special researcher-led lessons broadcast to 19 school districts in southeastern Virginia and northeastern North Carolina.

Each program highlighted different areas of research being conducted at Langley. The three lessons – "The Shape Is the Answer," "The Heat Is On," and "Leap Before You Fly" – allowed students to "virtually" tour the center and to see researchers and engineers in action; to see the connection between school lessons and workplace application; and to engage in a real-time challenge as part of the program's design.

'BIGG' and tall

"Think BIGG: Getting the Right Angle on Tall," a second video series produced and broadcast during the month, was a mathematics-oriented program targeting grades 5 through 8. The program featured the characters Mission Man, Professor Bigg and the Mission Accomplish Crew attempting to use the Pythagorean Theorem to determine the height of the Washington Monument, so that it can be repaired for a kite festival set to take place within 24 hours.

Kite-flying and aeronautics

NASA engineer and master kite builder and flyer Charles Dunton provided the information about kites and aeronautics to the Mission Accomplish Crew. Dunton also used the Langley 75th anniversary kite to help the crew meet their challenge.

Some volunteers made their own contacts and gave presentations....

Cooperation and teamwork

The successes of the 1997 National Engineers Week activities are the result of a team of contributors. In addition to the efforts of our school and distance learning volunteers, supporting managers and supervisors, the Office of External Affairs, the Public Inquiry Center, the Graphics and Video Sections and Reproduction all contributed.

In addition, some volunteers made their own contacts and gave presentations for National Engineers Week.

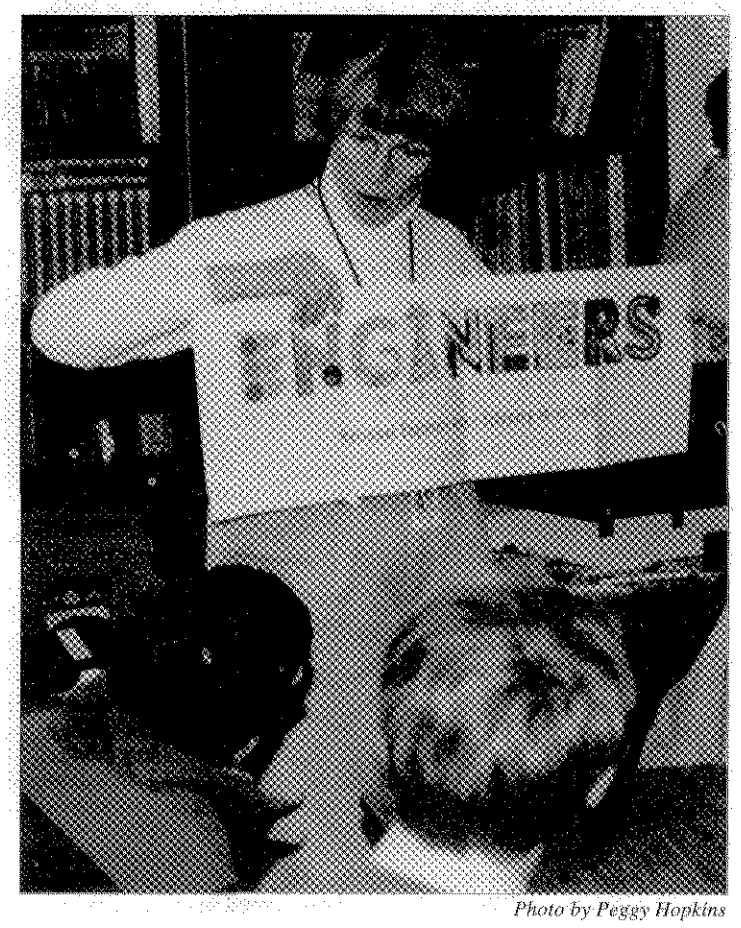


Photo by Peggy Hopkins

As fourth-graders at Hampton's Gloria Dei Private School listen, volunteer Katherine Young, of the Multidisciplinary Design Optimization Branch, explains what each letter in the word "engineers" means as depicted on the Engineers Week banner.

National Engineers Week Volunteers

Elvin Ahl	Greg Fletcher	Kathy Powell
Ledora Akanni	Julie Fowler	Anne Racel
Marilyn Aldridge	Larry Gilbert	Susan J. Rickard
Mike Alexander	Susan Givens	Nancy Ritchey
George Allison	David Glass	Phil Robinson
Tahani Amer	John Gleason	Jim Rogers
Rich Antcliff	John Greco	Donna Roper
Melvin Bailey	Donne Grigsby	Christopher Rumsey
Larry Barisciano	Shashi Gupta	Anita Rinkel
James Barnes	Robin Hardy	James W. Russell
Danny Barrows	Steve Harvin	Ken Rutledge
Scott Bartram	Jennifer Heeg	Jeff Seaton
Walt Baskin	Richard Hellbaum	Matt Sexstone
Brian Beaton	Greg Herman	Dave Schuster
Keith Belvin	Yolanda Hinton	Rafaela Schwan
Laurence Bement	Edward F. Hogge	Walter Silva
Patterson Biggs	John Hoppe	Mia Siochi
William Bolden	Michael C. Hudson	Sandra Smalley
Jay Brandon	Linda Hunt	Sharon Smith
Darrell Branscome	David Hutchinson	Leroy M. Spearman
Greg Buck	John Iacobucci	Daniel Stead
Kathy Bush	Peter Jacobs	Debbie Steigerwald
Mark H. Carpenter	Henry Jones	Brian Stewart
Lin Chambers	Stanley Jones	Alan Stockwell
David Christoff	Guy Kemmerly	Olaf O. Storaasli
Dan Cler	Bill Kluge	Nina Tappan
William Compton	Dr. John J. Korte	Geoff Tenille
Bruce Conway	Dr. John Lamar	James Thomas
Vincent Cowling	Allen Larar	Peter Thomas
Jared Cox	Andrew LaRoy	Debbie Tomek
Tim Curry	Susan J. Lemon	James Townsend
Tom Daniels	James Mack	Clayton Turner
Richard Davis	Angela Mason	Dan C. Victoy
Pamela Davis	Tony Maturo	Susan Voigt
Prasun Desai	Naomi McMillin	Richard Wahls
Stephen Devan	Clyde Medley	Robert Wallis
Russell DeYoung	James Miller	Myra Walton
Glenn Diskin	Walter Miller	Martin Waszak
Christopher Domack	Albert Motley	Catherine Watson
Dana Durham	Tom Moul	Sharon Welch
Marco Eguavit	Anna Noe	Tom Yager
Jeanette Elliott	Clifford L. Obara	Edgar Yarrington
Patricia Erickson	Lewis Owens Jr.	Katherine C. Young
Anna Estes	Sharon Padula	W. R. Young
Lloyd Evans	Vickie Parsons	Otto Youngbluth
Marta Fenn	Joe Posey	James Yu

SAFETY

(continued from page 1)

with a clean slate to identify the most significant ways we can improve safety for today and the future."

In partnerships with the FAA and private industry, NASA has made significant accomplishments in aviation safety over the years.

NASA has provided technology for advanced warning of wind shear; has developed non-destructive evaluation methods and analyses to help ensure older aircraft are as structurally sound as new ones; has improved the control of general aviation aircraft stall and spin; has developed advanced ice-protection concepts to improve aircraft operations; has improved engine reliability, systems and displays; and has designed advanced air-traffic-management equipment and procedures.

Great strides have been made over the last 40 years to make flying the safest of all major modes of transportation. More technological advances are required today, however, to prevent any future rise in aviation accidents if air traffic triples as predicted over the next 20 years.

This release is available electronically at ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1997/97-026.txt.

HEART

(continued from page 2)

keenly aware of how lucky I was and, although my limitations are few, I am aware that many who have open-heart surgery must be very careful with their health.

When you walk around Langley, you don't recognize the person with heart problems, and therefore, you don't think of him as being disabled. He might be the person you see in a handicap parking spot that you feel shouldn't be parking there because he looks so 'normal."

We all have in common an awareness of our heart and our mortality, and that's why American Heart Month means a little more to us.

BURNING

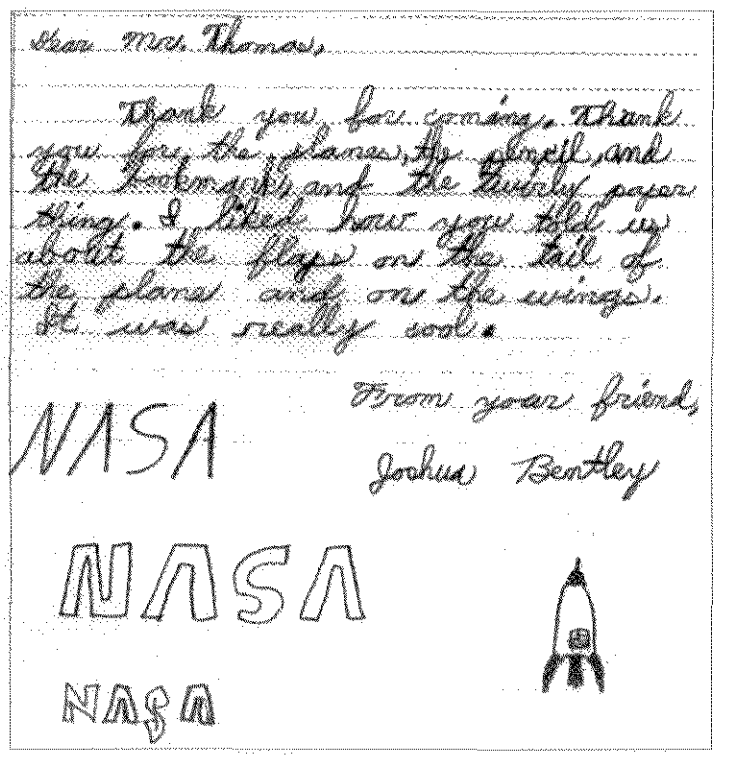
(continued from page 1)

125 scientific papers and has edited four books on global change, atmospheric chemistry and global burning: *Photochemistry of Atmospheres: The Earth, the Other Planets, and Comets* (Academic Press, Inc., 1985), *Global Biomass Burning: Atmospheric, Climatic, and Biospheric Implications* (The MIT Press, Inc., 1991), and the recently published two-volume set, *Biomass Burning and Global Change* (The MIT Press, Inc., 1996).

National Engineers Week 1997

Photo by Peggy Hopkins

Volunteer Mia Siochi, right, a contractor with Lockheed-Martin, demonstrates changes in the states of matter for third-graders at Hilton Elementary School, Newport News. She showed the kids how liquid nitrogen can be used to make "instant ice cream," changing liquids to solids by freezing. Siochi is assisted by teacher Michelle Miller.



Dear Mr. Thomas,

Thank you for coming. Thank you for the planes, the pencil, and the bookmark, and the funky paper thing. I liked how you told us about the flips on the tail of the plane and on the wings. It was really cool.

From your friend,
Joshua Bentley

NASA

NASA

NASA

Photo by Peggy Hopkins

Volunteers Phil Robinson, of the Landing/Impact Operations Section, and Pamela Davis, of the Structural Dynamics Branch, explained and demonstrated Bernoulli's Principle to Ira Gallagher and Mandy Nixon, fourth-graders at Poquoson Elementary School.

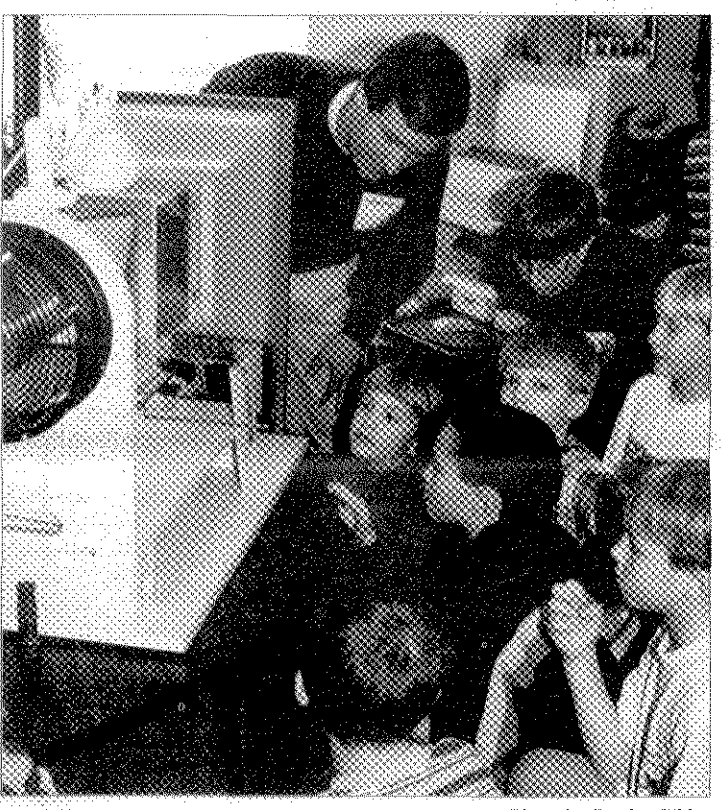
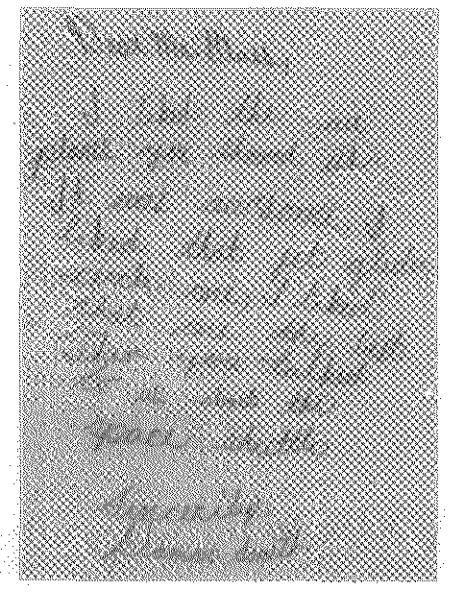


Photo by Sandie Gibbs

Volunteer Peter Jacobs, of the Research Facilities Branch, conducts a demonstration of a small-scale wind tunnel for fourth-graders at Coventry Elementary School in York County.

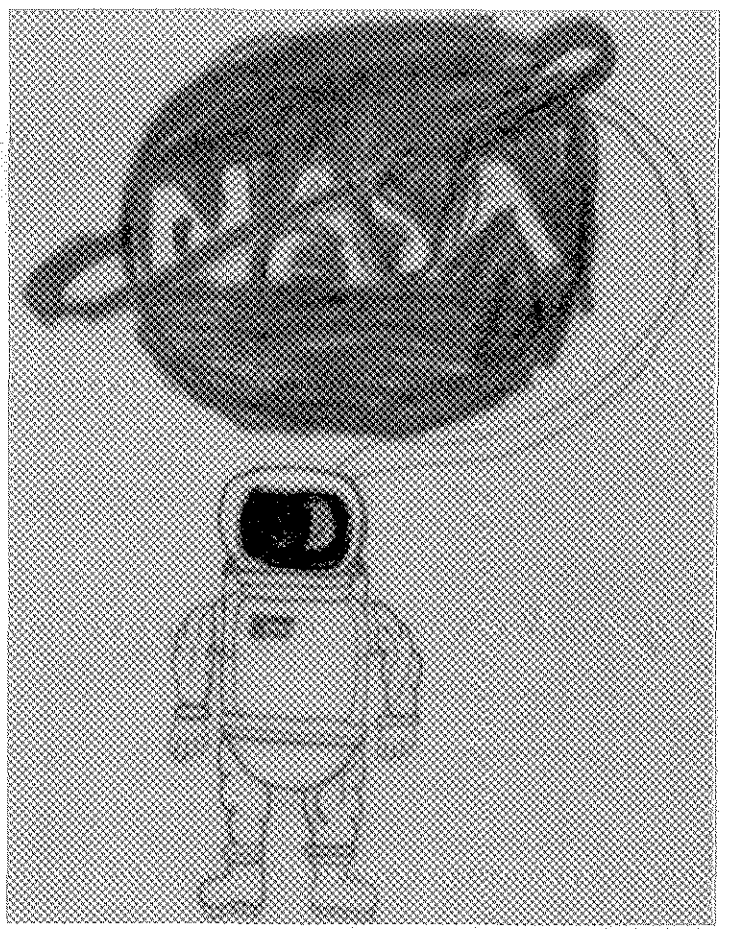


Dear Mr. Thomas,

I enjoyed having you come to our class today. I thought it was interesting that you are from NASA. I learned alot. I remember what you told us about aero nautics. Aero is French and means air and nautics is Greek word that means to sail. I liked the experiments we did. I especially liked the gyroglider and the ring wing. I hope to see you soon. Got to go!

Chill,

Laura Jurgaus



AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

TAX TIMES 2: Income tax preparation by member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227.

TAX TIMES 3: Specializing in personal and small business income tax returns; offering accurate computerized tax preparation, reasonable rates with referral discounts and valuable information to reduce your 1997 tax liability. Bachelor's degree in accounting, annual VITA certification through the IRS. Call Wanda at 838-6546 for quote and appointment.

FOR RENT: 2-BR condo on Oceanview Ave. overlooking Chesapeake Bay; washer/dryer included; available April 1. $800/month. For more information, call 800-484-6800 (pin 6262).

FOR RENT: 3-5-bath vacation house in the Outer Banks in Ocean Sands, N.C., close to beach, with den and pool. Rates vary with the season. Call 415-961-9629.

FOR RENT: Oceanfront house in Nags Head, April 4-11; 4 BR, 3 baths on 2 floors, hot tub, 3 decks, full kitchen, LR, DR, garage, laundry. $650 firm. Call Mike at 596-7936.

FOR SALE: Black futon bunk bed, upper twin/lower-full size mattresses included. $300. Call Gresha at 766-9553.

FOR SALE: Henry Link Cherie bedroom set. Includes double dresser, night stand, corner desk, chair, draw back chest, lingerie chest, two large hutches. $900. Call 890-9474.

FOR SALE: Entertainment center, all oak and hardwood construction, drawers and glass doors, pickled white finish, 67 1/2" x 36" x 20." $365; handcrafted, glass-top coffee table, 17" x 36" x 66." $325. Call 728-0379.

WANTED: Roommate to share 3-BR, 2-bath home in Gloucester Pt.; 1,500 sq. ft. with attached garage on 1/2-acre wooded lot; in secluded neighborhood, next to Coleman Bridge. Property has waterway access to York River. For more information, call 499-3079.

WANTED: Roommate for spacious, third-floor apartment in Norfolk's Ghent. $241 plus utilities. For more information, call Chris Jones at 627-9262 or send an e-mail to c.r.jones@larc.nasa.gov.

WANTED: Loving home with fenced yard for abandoned, mixed-breed hound, female, medium size, 55 pounds, about 8 years old, spayed, with all shots, excellent disposition. Call Tim Collins at 874-0408 or Judith Watson at 874-4072.

BUZZZZZZ: The NASA Langley Apiculture Club (Honeybunch) will meet March 17, 7-9 p.m., at Regency Health Care Center, 112 North Constitution Drive, Yorktown. Spring management will be discussed and an open forum conducted. Everyone is welcome. For more information, call Wilson at 868-9284.

HRTA BREAKFAST: The Hampton Roads Technology Alliance will host a breakfast meeting March 18, 7:30-9 a.m., at the Hampton Radisson Hotel. Guest speaker is NASA Langley Center Director Dr. Jeremiah Creedon. For reservations, call 594-7092 by March 14. For more information, call 595-1306.

WOMEN'S HISTORY MONTH: Retired Army Brig. Gen. Sherian Grace Cadoria will speak at the Fort Monroe Women's History Month luncheon, March 19, 11:30 a.m.-1 p.m., at the Fort Monroe Club. Tickets are $5.75 through March 17; $6.50 thereafter. For tickets or more information, call 727-3363.

RETIREMENT SOCIAL: For Dr. G. Louis Smith, March 21, 4:30 p.m., in Building 1250, Room 118; $5 per person (includes gift); gift donations are $3. Send to Jennifer Hubble, Mail Stop 420. For more information, call ext. 45665.

A TOAST TO TALK: The NASA Langley Toastmasters Club can help you improve your communication and leadership skills. Meetings are every second and fourth Wednesday of the month, 11:30 a.m.-1 p.m., and are open to all Langley employees and Langley Air Force Base military and civilian employees. NASA employees can charge one hour to training. Club home page is at http://erb-www.larc.nasa.gov/toast. For more information, contact Myra Walton at ext. 49254, or e-mail at m.l.walton@larc.nasa.gov.

HAI KARATE: The Langley Karate Club offers classes in Cuong-Nhu oriental martial arts, Mondays and Wednesdays, 5-7 p.m., at the Langley Gym, for NASA employees, co-ops, contractors and their families (ages 12 and older). For more information, call Roy Albang at ext. 46160, Glenn Bobskill at ext. 46257, or send e-mail to l.f.albang@larc.nasa.gov or to g.j.bobskill@larc.nasa.gov, or access our web site at http://members.aol.com/cuongnhu/index.html

GET IMAXED: IMAX films now showing at the Virginia Air & Space Center in Hampton in-clude ***To the Limit*** and ***Cosmic Voyage***, showing through March 27; ***Ring of Fire*** and ***Beavers***, double feature, showing through June 12. Admission is $5.50 for adults; $4.50 for NASA, military, seniors and children under age 12. Double-feature tickets are $8 for adults; $7.50 for NASA, military, seniors and children under age 12. For more information, call 727-0900.

Photos by Paul Bagby

'WE ARE THE CHAMPIONS' – The NASA Basketball Association champions for the 1996-97 season include "A" league champions, the "Slo Bricks," and "B" league champions, the "Raptors." Above, the Slo Bricks include, from left, Roger Cundiff, Mike Koch, Neal Cheatwood, John Costulis, Brian Killough and Dana Gould. Not pictured are Steve Sandford, Keith Paschal, Chuck Brooks, Chris Mouring, Ralph Buehrle and Mike Blythe. Below, the Raptors include, from left, Mike Jones, James Allen, Roger Lepsch, Craig Neal, Dan Mazanek and Vernon Dyke. Not pictured are Raptors Kirk Ayers, Marty Kaszubowski, Keith McKoy, Will Nuckolls and Joe Vega. The championship tournament concluded Feb. 23.

Researcher News

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Langley Research Center
Hampton, Virginia 23681-0001

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Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 6 ❖ March 28, 1997

Cessna Citation X wins NAA Collier Trophy

NASA NEWS RELEASE

The National Aeronautic Association (NAA) has awarded the prestigious Robert J. Collier Trophy to Cessna and the Citation X design team. The award recognizes the top aeronautical achievement in the United States for 1996.

Cessna and the Citation X team were recognized specifically for "designing, testing, certifying and placing into service the Citation X, the first commercial aircraft in U.S. aviation history to achieve a cruising speed of Mach .92."

(Langley's contributions to the aircraft are described in a related story on page 4, "Langley Contributed to Collier Winner.")

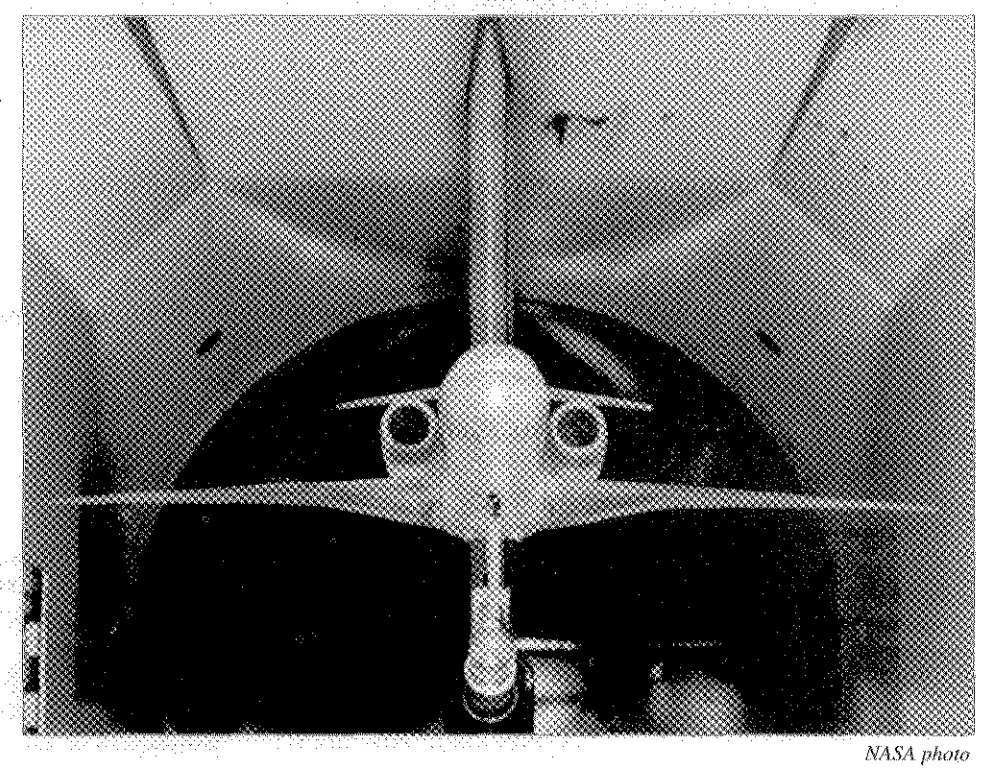
"The Citation X has dramatically advanced the speed and altitude performance envelope of general aviation," said NAA President Steve Brown. "This aircraft represents a significant breakthrough in aerodynamic efficiency at high, subsonic Mach numbers. The Citation X's advanced aerodynamic design permits the highest cruise speeds ever for a civilian aircraft other than the Concorde."

The trophy, established in 1911, is awarded each year by the NAA for "the greatest achievement in aeronautics or astronautics in America, the value of which has been demonstrated by actual use in the preceding year."

The first delivery of a Citation X was to professional golfer Arnold Palmer.

"I have been flying the Citation X for almost six months, and I continue to be awed by its great performance compared with any other business jet," said Palmer. "With cruising speeds to Mach .92, excellent high-altitude performance and extremely low fuel flows, the Citation X has significantly raised the bar in commercial aviation."

The selection of the Cessna Citation X acknowledges this aircraft as the first to forge new ground by bringing to civilian aviation an airspeed and performance level previously attained only by high-performance, military aircraft.



NASA photo

Cessna provided this one-seventh scale model for testing in Langley's Transonic Dynamics Tunnel in the fall of 1993.

The revolutionary Citation X was certified and placed into service in 1996. Cessna's design team has broken many barriers to make cruising at .92 Mach routine and affordable. Prior to certification, the

(see COLLIER, page 3, and related story, page 4)

A dream come true

Former Langley researcher ready to fulfill ambition of space flight

BY CATHERINE E. WATSON

Dr. Roger Crouch will fulfill his lifelong dream on April 3. He, along with six crewmates, will be launched into space aboard the space shuttle Columbia.

"When I was around 9 or 10 years old, I saw a movie about going to the moon and have pretty much wanted to go ever since then," said Crouch, who worked at Langley from 1962 to 1982, in an interview from the Johnson Space Center, Houston, Texas. "Although this is nothing near that neat, it is certainly as close as I will ever get, and it is way beyond what I thought I would ever be able to attain."

Crouch

Crouch will be flying as a payload specialist aboard STS-83 during the 16-day Microgravity Science Laboratory (MSL) mission. The MSL is a collection of 19 materials science investigations housed inside a Spacelab module.

"I am not a career astronaut," Crouch said, "but Greg Linteris (the other MSL payload specialist) and I have been chosen by the scientists who have experiments on this mission to represent them on orbit. As such, we are primarily responsible for carrying out the research while we are on orbit."

Crouch and Linteris will conduct investigations in fluid physics, combustion science and materials science.

"When I was at Langley, I worked with a wonderful group of people, and my career evolved into the microgravity field of semiconductor crystal growth in a low gravity environment," said Crouch. "During that project, I worked with Bill Debnam and Arch Fripp quite closely, and to a lesser extent, with Ivan Clark. The work we did was funded by the microgravity program and is directly responsible for my opportunity on this mission."

Crouch has done research in various types of semiconductor crystal growth, electrical and optical properties of materials, electronic devices for remote sensing and flat panel displays, and heat shield protection for reentry space vehicles. He has published more than 40 technical papers and given as many presentations in various areas of research, concentrating since 1978 on semiconductor crystal growth and the influence of gravitational forces on materials properties.

"When I first came to Langley," he said, "I worked with Gerry Walberg on some research related to charring ablators or heat shield materials for reentering spacecraft. One of the specialties for STS-83 is combustion science, and that previous work was extremely valuable in establishing credibility in the breadth of my background.

"Understanding the basic process of combustion [from this mission] could lead to enhancements in combustion efficiency which would save billions of dollars in fuel costs each year, not to mention the savings in pollution control due to cleaner combustion processes.

"This mission is extremely important to NASA in that it is the bridge which will carry the microgravity

(see DREAM, page 4)

Researcher News Electronic Extra

Goldin outlines NASA's future aeronautics plans

In the debut issue of NASA Langley's new electronic news page, the *Researcher News Electronic Extra*, readers can find the full text of NASA Administrator Daniel S. Goldin's address to a group of aeronautics and aviation professionals last week in Washington, D.C.

Goldin outlined the agency's plans to achieve the national priorities for Aeronautics and Space Transportation Technology at a luncheon cohosted by the Aero Club of Washington, the American Institute of Aeronautics and Astronautics, and the National Aviation Club.

Entitled "The Three Pillars of Success for Aviation and Space Transportation in the 21st Century," the speech described dramatic technology goals that guide NASA's research and development. One of the goals concerns aviation safety and responds to the report of the White House Commission on Aviation Safety and Security, which calls for reducing the fatal aircraft accident rate five-fold within 10 years.

For the complete text of the speech, see the new *Researcher News Electronic Extra* on the Internet at http://oea.larc.nasa.gov/RN_Extra.

Extra! Extra!

The *Researcher News* introduces a new feature – the *Researcher News Electronic Extra* – a periodic, on-line extension of Langley's printed news and information source. When an important news story falls between *Researcher News* deadlines and publication dates, the *Electronic Extra* will serve to fill the gap and keep readers informed.

To access the page, go to our Internet address at http://www.larc.nasa.gov/RN_Extra.

News Briefs

Around the Agency

ROMINGER REPLACES ASHBY AS STS-85 PILOT – U.S. Navy Cmdr. and astronaut Kent Rominger has replaced U.S. Navy Cmdr. and astronaut Jeffrey S. Ashby as pilot for the July STS-85 mission aboard Discovery. Ashby has been named as an assistant to the director of flight crew operations. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-042.txt.***

NASA SELECTS 1996 GOVERNMENT INVENTION OF THE YEAR – A patented high-temperature seal developed for the National Aerospace Plane project by Dr. Bruce M. Steinetz and Paul J. Sirocky (retired) of NASA's Lewis Research Center, Cleveland, Ohio, has won NASA's 1996 Government Invention of the Year award. The High-Temperature, Flexible, Fiber Preform Seal has been used for numerous NASA aeronautical applications since 1992. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-047.txt.***

ADVANCED X-RAY TELESCOPE MIRRORS PROVIDE SHARPEST FOCUS – Performing beyond expectations, the high-resolution mirrors for NASA's most powerful orbiting X-ray telescope have successfully completed initial testing at Marshall Space Flight Center's X-ray Calibration Facility, Huntsville, Ala. The mirror assembly will form the heart of NASA's third great observatory. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-048.txt.***

CTAPC offers career seminars

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars during April for those who wish to develop their careers here at Langley, as well as for those who are in transition to other careers:

▲ "Interview Basics," April 3, 11:30 a.m.-1:30 p.m.(brown bag lunch)

▲ "Making Yourself Indispensable at Work," April 9, 9 a.m.-noon

▲ "First 30 Days on the New Job," April 15, 1-4 p.m.

▲ "Integrating Covey's *7 Habits of Highly Effective People* into Your Career Strategy," April 22, 9 a.m.-3 p.m.

▲ "Money Matters – Benefits, Options & Plans," April 30, 9 a.m.-noon

These seminars are authorized NASA and Langley training events. Particpation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Announcements

Levine to deliver April colloquium

Senior research scientist Joel S. Levine, of the Atmospheric Sciences Division, will present the center's April colloquium lecture, April 8, 2 p.m., at the H.J.E. Reid Conference Center. The lecture is titled "Fire and Global Change: A Hot New Environmental Issue."

At 7:30 p.m. the same evening, he will repeat the lecture as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

Seminar on elder care looks at 'Today's Reality'

Office of Occupational Health Services (OOHS) will sponsor "Today's Reality," a seminar on elder care, on April 9, 9 a.m. to noon, in the H.J.E. Reid Conference Center. The seminar will provide information on the needs and rights of the elderly, as well as care options.

"Today's reality" is that retirement-age people often find themselves caring for increasingly dependent parents who need their help to maintain quality of life.

Ginny Becker, founder of Eldercare Connection Inc., and Joseph T. Buxton III, president and founding partner of Buxton, Lasrts & Vannon P.C., will lead the discussion and will take questions after the presentation.

The seminar is open to NASA employees, retirees and contractors. For more information, call OOHS at ext. 43191.

Deadline approaches for upgrading AIAA memberships

American Institute for Aeronautics and Astronautics National is inviting applications for membership upgrade to associate fellows. A completed four-page application form must reach AIAA HQ by April 15.

Nominees must be AIAA senior members, must have 12 years of professional experience (including higher education) and must furnish three references from members who are associate fellows or higher grades. Only one associate fellow for every 150 voting members may be upgraded annually.

For application blanks and reference forms to nominate candidates, contact Paresh Parikh, local honors and awards chair, at ext. 42244, e-mail at p.c.parikh@larc.nasa.gov.

Superelement analysis seminar offered

MSC/NASTRAN Superelement Analysis will be offered April 16-18, 8:30 a.m.-4 p.m., Building 1229, Room 120.

This seminar describes how to perform static and dynamic analysis using superelement techniques. The methodology used in superelement partitioning and its implementation are covered in detail. Special attention is paid to restarts in superelement analysis and applying superelements to dynamic analysis, including component modal synthesis.

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Wooster at Mail Stop 309, or fax to ext. 48543. For more information, call George Allison at ext. 42594.

Technical Forum topics announced for April

The next Langley Technical Forum, April 16, 10 a.m.-noon, in the Pearl Young Theatre, will cover these topics:

▲ STS-74/MIR Photogrammetric Appendage Structural Dynamics Experiment – *Michael G. Gilbert, Sharon S. Welch, Richard Pappa*

▲ CCD-Based Mosaic Digital Mammography: An Innovative Solution Based on Langley-Developed Remote Sensing Technology – *James A. McAdoo*

▲ The Guidance and Control Software Project: A Software Engineering Case Study – *Kelly J. Hayhurst*

▲ Open Architecture Dynamic Data System for the TDT – *Charles S. Bryant, Sherri T. Hoadley*

▲ Graphite-Composite Primary Structure for Reusable Launch Vehicles – *James Wayne Sawyer*

Career transition workshop set for engineers, managers

"Managing Career Transitions: Managing Yourself Through Job or Career Turbulence," a one-day workshop, is set for April 19 at the Old Dominion University Peninsula Center in Hampton. It is designed for engineers or managers who work in changing organizations or who are considering a career change.

Registration fees, including lunch, are $30 for members and $45 for nonmembers. Attendance is limited to 30.

The workshop is presented by the local sections of the Institute of Electrical and Electronic Engineers, the American Institute of Aeronautics and Astronautics and Women in Aerospace.

For more information, contact Michael Stark at 396-8290 (m.stark@ieee.org) or Marilyn Ogburn at ext. 41175 (m.e.ogburn@larc.nasa.gov).

Speakers Bureau February activities

Greg Jones visited the Boy Scouts at their annual Patrick Henry Mall show to discuss the space exploration merit badge; he also spoke to the Yorktown Kiwanas Club about NASA's future.

Sam James visited Lindsay Middle School in Hampton to talk about careers in aerospace.

Jane Hogge spoke to students at Round Hill Primary School in Roanoke about living and working in space.

Dr. Mary Ann H. Smith addressed the Brotherhood of Temple Sinai in Newport News about women in aerospace careers.

Bruce Fisher talked to 4th-graders at Poplar Halls Elementary School in Norfolk about lightning.

John Korte spoke to the Wilkes University Engineering Club on "The Role of the Engineer in Society."

Bill Grant talked to students at Christopher Newport University about diet, oxidative stress and Alzheimer's disease.

John Mouring talked about national historic landmarks to the men of Denbigh Presbyterian Church.

Bob Witcofski spoke to the Poquoson Exchange Club about the high-speed research program.

VTC research scientist receives ASTM award

Dr. T. Kevin O'Brien, senior research scientist with the Army Research Laboratory's Vehicle Technology Center (VTC), co-located at NASA Langley, received the Wayne W. Stinchcomb Memorial Award for Excellence in Research and Mentorship from the American Society for Testing and Materials (ASTM).

The award honors outstanding contributions to the research, engineering and teaching of the technology of composite materials and service to ASTM's Committee D30 on composites.

As part of the award, O'Brien will also deliver a lecture at the ASTM Symposium on Composite Materials: Fatigue and Fracture, May 7, in St. Louis, Mo.

O'Brien joined the Army's co-located research laboratory at Langley in 1978. He has conducted research here in characterizing, analyzing and predicting delamination behavior in composite materials. His research results have been used widely in the aerospace industry and have contributed to the improvement of advanced composite materials.

O'Brien serves as an adjunct professor with the George Washington University Joint Institute for Aeronautical and Flight Sciences here at Langley.

He also directs the research of other Army engineers and post-doctoral fellows and serves as a technical mentor for visiting university professors, graduate students, military academy cadets and high school students.

Notice to grad students

Employees anticipating attending graduate school full time in the fall should contact George Allison at ext. 42594.

(see ANNOUNCEMENTS, page 3)

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

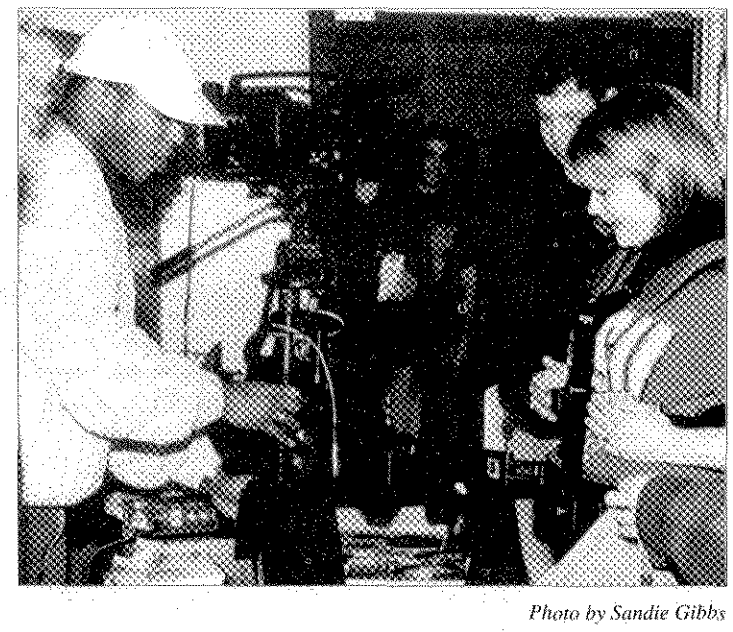
Career Days offer interactions between students, researchers

BY PETE THOMAS
AEROSPACE EDUCATION PROGRAMS SPECIALIST

NASA Langley Research Center and the Peninsula Engineers Council (PEC) co-hosted the 1997 Career Days program Feb. 19-20 in the H.J.E. Reid Conference Center. More than 450 sophomore, junior and senior high school students and teachers participated in this program designed to use NASA's and the PEC's expertise to inspire a student's ability to discern optimum career fields.

Fifteen high schools and three home school groups from a total of eight Virginia and one North Carolina counties were represented. This included Camden County, N.C., which participated because of its partnership with the Langley Office of Education.

Twenty-seven exhibitor booths were positioned around the perimeter of the Reid Center to permit easy access of the students to the technicians, researchers and engineers, facilitating the one-to-one exchange of career planning information.



Franklin Fitzgerald, left, of Computer Sciences Corp., demonstrates the use of the video camera called "Steadicam" to students at Langley's '97 Career Days.

Photo by Sandie Gibbs

Stanford professor to receive lectureship award

Antony Jameson, the Thomas V. Jones Professor of Engineering at Stanford University, Stanford, Calif., will deliver the Theodorsen Lectureship Award lecture April 10 at the Pearl Young Theatre, following a 10 a.m. reception. His talk is entitled "Essential Elements of Computational Algorithms for Aerodynamic Analysis and Design."

The lecture traces the development of computational fluid dynamics as a tool for aircraft design. Jameson will address the requirements for effective industrial use and tradeoffs between modeling accuracy and computational costs. He will also discuss essential elements of algorithm design, a unified approach to the design of shock-capturing schemes, and the use of techniques drawn from control theory to determine optimal aerodynamic shapes.

Jameson

From the early 1970s to the mid-'80s, NASA Langley supported Jameson's research, in collaboration with NASA scientists, on the development of computational tools for the analysis of aircraft flow fields.

During the past decade, Jameson has devised a variety of schemes for solving the Euler and Navier-Stokes equations for inviscid and viscous compressible flows. He has also written a series of computer programs which have been widely used in the aircraft industry.

The award, sponsored by the Institute for Computer Applications in Science and Engineering and NASA Langley, recognizes those who have made theoretical contributions in the field of aeronautical sciences and engineering.

Theodorsen was a researcher at Langley in the 1930s and '40s.

Langley's laser research lands at local airport

BY MIKE FINNERAN

NASA Langley Research Center has deployed a laser-radar system near Norfolk International Airport to study planes landing as part of a national effort to improve airport productivity.

The laser-radar system, or lidar, is collecting the signatures of wake vortices, which are invisible "tornadoes" that spin off the wingtips of aircraft. The wakes from small planes are not strong enough to affect most passenger aircraft. But those from large planes can cause problems ranging from passenger discomfort to serious accidents in smaller planes that fly into wake vortices.

The wake vortex data will be used to help determine if airplanes may, in some cases, safely follow more closely together when landing during inclement weather.

Currently, air traffic controllers rigidly apply fixed spacings between different classes of aircraft during adverse weather conditions. These spacings often cause air traffic delays that disrupt flight schedules and increase costs. But if more is understood about the behavior of wake vortices, it may be possible to change those separation standards.

The wake vortex work is part of a larger NASA effort called the Terminal Area Productivity program. The program goal is to reduce costs and delays in a variety of areas at airports.

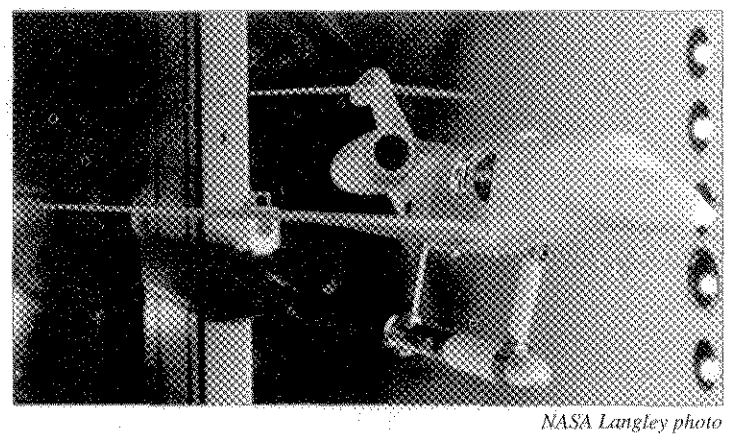
COLLIER

(continued from page 1)

aircraft became one of the most thoroughly tested aircraft in history, accumulating more than 3,000 hours of flight-test time and undergoing nearly 2,000 separate tests.

The Citation X received certification from the Federal Aviation Administration on May 31, just 67 months from concept to design completion – record time for such a sophisticated aircraft. At the end of 1996, the growing fleet of Citation X aircraft had already accumulated more than 1,000 flying hours.

Cessna Aircraft and Cessna's line of Citation Business Jet Aircraft received the Collier Trophy in 1985 for an unparalleled passenger safety record during the 14-year period since the Citation's introduction.



NASA Langley photo

This quarter-scale model of the Citation X was tested in Langley's Transonic Dynamics Tunnel (TDT).The smooth-skinned model, constructed of fiberglass and wood, correctly represented the stiffness and mass of the actual airplane.

Cessna Aircraft Company is a subsidiary of Textron, Inc., a global multi-industry company with market-leading operations in five business segments – Aircraft, Automotive, Industrial, Finance, and Systems and Components.

Formal presentation of the trophy will be at the annual Robert J. Collier Presentation Banquet, May 7, at the Crystal Gateway Marriott Hotel in Arlington, Va. For reservations, contact the National Aviation Club at (703) 379-1506.

NAA consists of more than 100 member organizations. Collectively through its member affiliates, NAA serves more than 400,000 individuals, of whom 250,000 are active aviators.

The National Aeronautic Association is the National Aero Club of the United States and the nation's oldest aviation organization. Its primary mission is the advancement of the art, sport, and science of aviation and space flight.

NAA is also the United States representative to the Fédération Aéronautique Internationale, the 93-country organization that oversees all aviation and space records established worldwide.

ANNOUNCEMENTS

(continued from page 1)

Langley welcomes Navy liaison officer

As part of a new overall Department of Defense/NASA exchange program, Cdr. Bob Struth now serves as Langley's Navy liaison officer, responsible for fixed-wing aeronautics programs. He works under the Naval Air Systems Command Engineering Competency through the Naval Aviation Science and Technology Office.

Struth was integrated into the NASA Langley organization as a member of the High Performance Aircraft Office.

Contact Struth at ext. 41758 or at r.g.struth@larc.nasa.gov with questions or comments.

Retirement thanks

"Dear Friends: Barbara and I appreciated and enjoyed the great retirement party. The warmth and friendship of the night will stay with us for many years to come. And thank you for the really thoughtful, special gifts. Once again, you have shown why Langley is not only first but best in NASA. Thanks again."

– Paul and Barbara Holloway

Employee offers thanks

"My family and I would like to express our heartfelt gratitude and appreciation for the many cards, flowers, calls and prayers during my recent hospitalization. I have always known Langley Research Center coworkers were special, but you have just made me truly aware of how kind and wonderful you are."

– Sharon Fairheart

In memory of James H. Schrader

James H. Schrader, 68, of Newport News died March 6, after a battle with cancer. He retired from NASA as an electronics engineer in 1978.

Langley contributed to '96 Collier winner

Directly and indirectly, Langley researchers played a part in this successful aircraft

BY KEITH HENRY

Not many people realize it, but NASA Langley contributed in a variety of ways to the Cessna Citation X aircraft, 1996 winner of the coveted Collier Trophy.

(See page 1 for related story about the Citation X and why the judges were impressed with Cessna's newest and most technologically advanced business jet.)

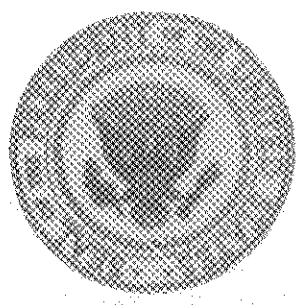
Langley contributed directly in the aero-structural and acoustics areas, and indirectly in the materials area

In the summer of 1993, a quarter-scale semi-span wing model of the aircraft was tested in Langley's Transonic Dynamics Tunnel (TDT) to verify that the aircraft was free of the aero-structural phenomenon called "flutter" – an unstable, self-excited oscillation of a lifting surface and its associated structure. Cessna felt that, because of the high-speed cruise capability of the aircraft, detailed testing of model aircraft prior to prototype first flight was crucial.

Shortly thereafter, an article in the company's newsmagazine said, "The NASA tunnel's transonic capability allowed Cessna engineers to calculate flutter safety near Mach 1 with much greater accuracy....These tests gave us an added measure of assurance and confidence in the safety of this aircraft." A one-seventh scale model of the entire aircraft was tested in the TDT later that same year.

In the acoustics area, research conducted at Langley – and at Virginia Polytechnic Institute and State University under grant to Langley – contributed to the design and implementation of the active noise control system on the Citation X. Langley has led research demonstrating that noise can be reduced or eliminated by the introduction of a countering soundwave at the same level and frequency but shifted out of phase.

Much less directly, Langley contributed to the aircraft's lightweight structure. Advanced composite materials used on the Citation X, as on other aircraft, can be traced to Langley's comprehensive basic research program to develop promising fiber-resin material systems. This 25-year-effort has focused on developing a dependable database while proving that composite materials, versus aluminum, can be safely used on aircraft.



Women's History Month, 1997

By the President of the United States of America

A Proclamation

Throughout the history of our Nation, women have played a pivotal role in bringing about positive change to every aspect of American life, and their achievements continue to touch the lives of every single citizen. Women's History Month honors the women who made these accomplishments possible, securing their rightful place in history among those who have made our country great. This month, we celebrate these women's lives-and renew our commitment to breaking down the gender barriers that still exist.

Through their courage, foresight, and community spirit over the years, American women have created a world of opportunity for today's heroines and role models-women such as Secretary of State Madeleine Albright, the highest ranking woman to serve in any presidential administration; Dr. Shannon W. Lucid, who has performed five historic and complex Space Shuttle missions during 18 years with NASA and recently broke the American and women's world record for continuous time in space; Oseola McCarty, who in 1995 donated the life savings she had earned as a maid to fund scholarships at the University of Mississippi; and Julie Su, the young attorney who first came to prominence through her efforts to expose illegal exploitation of Thai immigrants in a California sweatshop and who continues to help immigrants to secure proper medical care, employment, and the dignity they deserve. The pioneers in women's history would be proud of today's women pioneers.

As we approach the 21st century, we have reached another significant milestone in our Nation's history:

Women have approached an almost equal share in the labor force. Thus, it is more important than ever that we enable women and men to meet their responsibilities at work and at home.

Women continue to break the glass ceiling, changing their status from employee to employer. Today, women-owned businesses are creating one out of every four jobs in the United States. From the classroom to the board room, women now occupy every part of the work force, building the kinds of lives for themselves and their families that are the heart of the American Dream.

Women's History Month provides Americans with an opportunity to celebrate the contributions of all the women who have enriched our Nation, to honor their legacy, and to reflect upon what we can all do to end discrimination against women. I encourage all Americans to learn from, and share information about, women's history in their workplaces, classrooms, and family rooms. As every family has its own heroes, so does our country. Only by studying the history of America's women can we fully understand the history of America.

NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by virtue of the authority vested in me by the Constitution and laws of the United States of America, do hereby proclaim March 1997, as Women's History Month. I ask educators, Government officials, and all citizens to observe this month with appropriate programs, ceremonies, and activities, remembering not only this month but also every month the many different contributions that women make every day.

IN WITNESS WHEREOF, I have hereunto set my hand this third day of March, in the year of our Lord nineteen hundred and ninety-seven, and of the Independence of the United States of America the two hundred and twenty-first.

William J. Clinton

DREAM

(continued from page 1)

program into NASA's next generation of research on the space station," he continued. "It is the last spacelab flight currently scheduled prior to the [space] station and will have to serve as the standard for spacelab research results for the next several years."

Dr. Archie Fripp of the Sensors Research Branch will be at the Kennedy Space Center (KSC) to watch his friend be launched into orbit.

"Roger is going to climb on top of that great big firecracker," Fripp joked, "and someone is going to light the fuse. What a way to earn a living!"

More seriously, Fripp added, "[Crouch] has planned well and worked hard for this opportunity. He will do good work and be an asset to our agency. I'll be at KSC watching from terra firma, but my thoughts will be with him as he lifts into the sky."

From the Marshall Space Flight Center in Alabama, Bill Debnam is preparing for an October shuttle experiment that is an extension of the early work that was started with Crouch.

"I am happy and excited for Roger," said Debnam. "He had the perseverance to keep on trying to get his flight. At liftoff, I will saying a big prayer for this mission and my friend ... I will be nervous, happy, excited and a few other emotions that I'll be able to tell you later."

Before being selected as a payload specialist in January 1996, Crouch served as the chief scientist of the NASA Headquarters Microgravity Space and Applications Division for 11 years. He has served as program scientist for several microgravity lab missions, and trained as the alternate payload specialist on STS-42, the first International Microgravity Laboratory.

NASA plans comet Hale-Bopp observations, activities

NASA NEWS RELEASE

As the orbit of comet Hale-Bopp brings it closer to the sun in late March, NASA and agency-supported scientists are studying the large and bright comet using sounding rockets, spacecraft and ground-based observations.

Using NASA's Hubble Space Telescope, Hale-Bopp's nucleus was measured at roughly three to four times larger than that of comet Halley (6 miles in diameter), making it one of the largest comets ever observed.

Researchers are studying Hale-Bopp to better understand comets, primitive bodies of loosely packed ice and dust that many scientists consider the best-preserved remnants of the early solar system.

Sounding Rocket Campaign

The Wallops Flight Facility, Wallops Island, Va., is conducting four sounding rocket launches from March 24 through April 5. The U.S. Navy will launch the missions for NASA at the White Sands Missile Range (WSMR), N.M.

The payloads, launched on two-stage Black-Brant IX rockets, will observe the comet in the ultraviolet wavelengths of light for about five minutes before returning to Earth. The payloads will be recovered following a parachute descent at White Sands.

Images of the sounding rocket activity at WSMR will be posted on the Internet at **http://www.wff.nasa.gov/~web/comet.html**

Ulysses spacecraft

The joint NASA/European Space Agency Ulysses spacecraft, now in solar orbit, will study what happens to comets as they are exposed to different solar wind conditions at various solar latitudes.

Hale-Bopp is about to enter the sun's lower latitude zone, where solar wind – a continuous outflow of charged particles streaming from the sun in all directions at a million miles per hour – is more disturbed than in the equatorial regions. Dramatic changes in the comet's plasma tail are expected to occur at these lower celestial latitudes.

A related observing program, called "Ulysses Comet Watch," a collaboration between the Jet Propulsion Laboratory (JPL), Pasadena, Calif., and the University of Colorado, will provide images from more than 200 amateur observers around the world.

These images will be posted on the Ulysses Comet Watch home page on the Internet at **http://lasp.colorado.edu/ucw/index.html.**

Observations will continue to be posted after the comet makes its closest approach to the sun on April 1.

Hubble Space Telescope

NASA's Hubble Space Telescope has made a series of observations of the comet, particularly the nucleus, since September 1995. Hubble cannot observe Hale-Bopp during the next few months because the comet is too close to the sun. Hubble's sensitive detectors could be damaged if pointed in that direction.

The last observation was made Oct. 18, and the next possible opportunity will be this autumn.

Images already obtained by Hubble are available from the Internet at **http://oposite.stsci.edu/pubinfo/PR/95/41.html**

Other NASA comet investigations

NASA's Polar spacecraft will observe Hale-Bopp using ultraviolet and visible imaging instruments. Images obtained by Polar will be posted to the Internet site at **http://pao.gsfc.nasa.gov/gsfc/spacesci/pictures/spacepic.htm.**

Scientists have been using NASA's Infrared Telescope Facility, Mauna Kea, Hawaii, to observe Hale-Bopp in the infrared region of the spectrum. Their observations will continue until summer.

NASA also will fly a mid-deck experiment on the space shuttle Discovery's STS-85 mission in July. The Southwest Ultraviolet Imaging System is designed to complement the capabilities of the 5-to-10-minute sounding rocket flights by observing the comet more extensively during the shuttle's 11-day mission.

In addition, NASA and the National Science Foundation are collaborating on ground-based observations and analyses of Hale-Bopp.

JPL "Comet Chasers: On the Trail of a Comet"

Jet Propulsion Laboratory will host a public event called "Comet Chasers: On the Trail of a Comet" on April 11. The event is co-sponsored by the Galileo and Stardust projects.

Galileo observed the 1994 comet Shoemaker-Levy 9 impact on Jupiter. Stardust will launch in 1999, capture samples of comet dust from the comet Wild-2 and return them to Earth for study.

"Comet Chasers" activities will include a comet viewing session (weather permitting), and a round-table discussion of the study of comets and NASA's role in comet studies, featuring Dr. Alan Hale and Thomas Bopp, co-discoverers of comet Hale-Bopp, et al.

Web sites, images information, experts

In addition to the Internet sites already listed, the JPL Hale-Bopp Home Page is a comprehensive information and image resource, including many images taken by amateur observers. The address is **http://newproducts.jpl.nasa.gov/comet/**

A mirror site is **http://galileo.ivv.nasa.gov/comet**

Other images and information and links will be posted at the Today@NASA home page at **http://www.hq.nasa.gov/office/pao/NewsRoom/today.html**

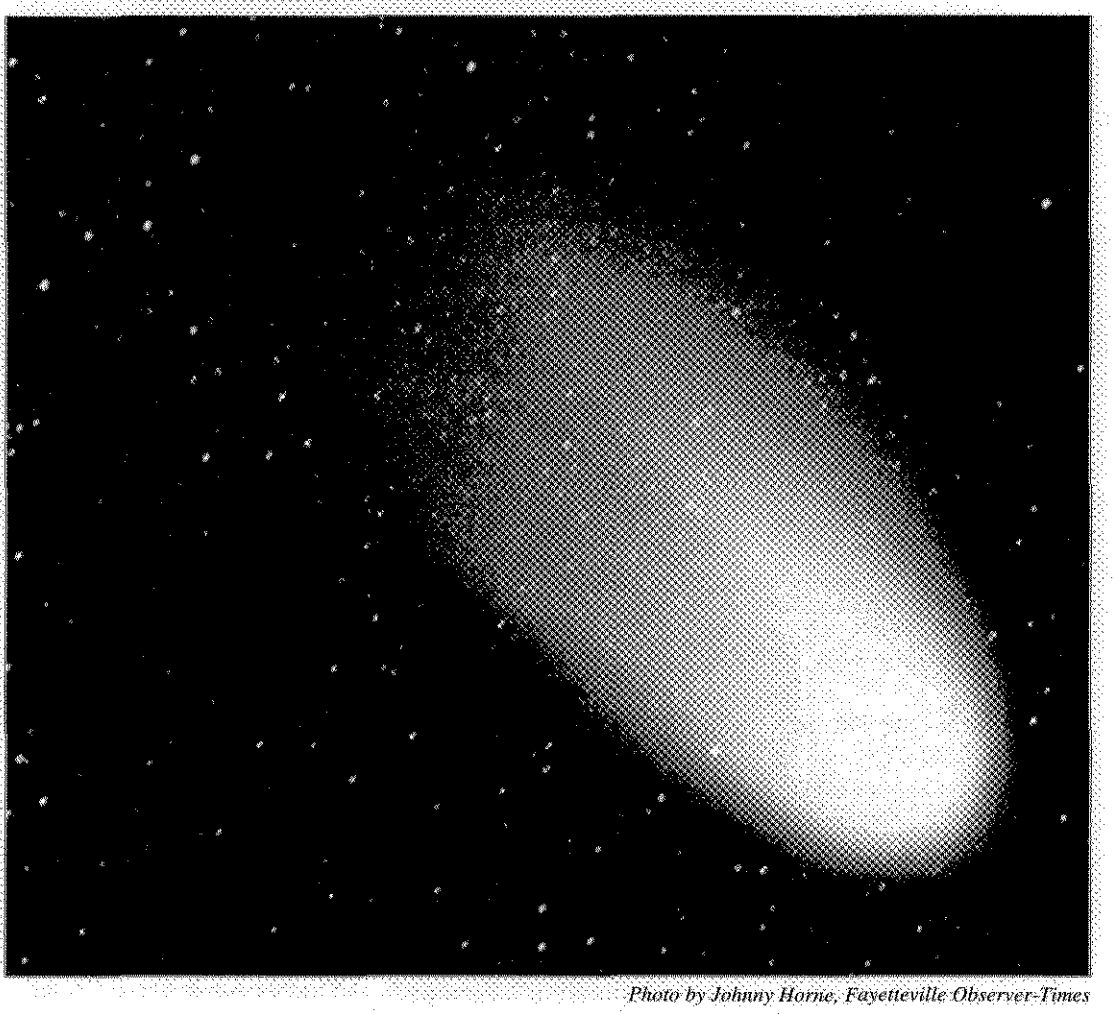


Photo by Johnny Horne, Fayetteville Observer-Times

Astrophotographer Johnny Horne shot comet Hale-Bopp from his home in Stedman, N.C., Feb. 17.

Comet shines now, fades out by spring's end

BY EDWIN L. AGUIRRE
ASSOCIATE EDITOR,
SKY & TELESCOPE

After a 4,200-year odyssey through the deep freeze of the outer solar system, comet Hale-Bopp is finally making its closest approach to the sun and Earth. It is delivering an impressive naked-eye show, especially from dark, unpolluted observing sites.

The comet will be brightest from late March through mid-April and is easily visible to the unaided eye, even from cities.

However, Hale-Bopp will remain quite far from Earth – coming no closer than 196 million kilometers. So its visual appearance may contrast with that of comet Hyakutake one year ago, which put on a spectacular naked-eye display for observers with dark skies because it passed by at only a tenth of the Earth's distance from the sun.

But Hale-Bopp is spewing more dust than Hyakutake did, and so should display a brighter – but shorter – dust tail.

The climax of comet Hale-Bopp's performance should extend through the moonless period from March 26 to about April 14. The comet should then be highest and brightest in the northwest after dusk.

Hale-Bopp comes closest to the sun on March 31, 10:14 p.m., Eastern Standard Time, some 137 million kilometers from the sun. The comet will then be traveling at a speed of about 44 kilometers, or 27 miles, per second relative to the sun.

By the end of April, the comet will be fading and getting lower in the west-northwest, but another moon-free viewing window opens from April 24 to about May 11.

By late May, Hale-Bopp becomes too close to our line of sight to the sun for good viewing, and the great comet show will be over for the Northern Hemisphere.

As spring gives way to summer, the comet will become a Southern Hemisphere object, fading and shrinking as it rapidly recedes from the sun and Earth. Telescope users in far-southern latitudes should still be able to follow the comet throughout 1998.

For more information, see these Web sites:

▲ Comet Observation Home Page, Jet Propulsion Laboratory, at **http://encke.jpl.nasa.gov/**

▲ SKY Online, at **http://www.skypub.com/.**

Editor's note: This text was adapted from Sky & Telescope magazine.

AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

TAX TIMES 2: Income tax preparation by member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227.

TAX TIMES 3: Specializing in personal and small business income tax returns; accurate computerized tax preparation, reasonable rates with referral discounts and valuable information to reduce 1997 tax liability. Bachelor's degree in accounting, annual certification through the IRS. Call Wanda at 838-6546 for quote and appointment.

FOR RENT: 2-BR condo on Oceanview Ave. overlooking Chesapeake Bay; washer/dryer included; available April 1. $800/month. For more information, call 800-484-6800 (pin 6262).

FOR RENT: 3.5-bath vacation house in the Outer Banks in Ocean Sands, N.C., close to beach, with den and pool. Rates vary with the season. Call 415-961-9629.

FOR RENT: Oceanfront house in Nags Head. April 4-11; 4 BR, 3 baths on 2 floors, hot tub, 3 decks, full kitchen, LR, DR, garage, laundry. $650 firm. Call Mike at 596-7936.

FOR SALE: Oriental wool rug, 11x17 feet, cream with blue- and pink floral pattern. $250. Call 247-5144 before 9 p.m.

FOR SALE: Two 12-speed racer bicycles: one blue Firenze GL 1000, one teal Schwinn Sprint. $175 each. Call 456-2775.

WANTED: Roommate to share 3-BR, 2-bath rancher in Gloucester Pt.; 1,500 sq. ft. with attached garage on wooded lot; in secluded neighborhood, next to Coleman Bridge with access to York River. $400/month plus half phone and electric, water included. For more information, call 499-3079 or 684-3620.

WANTED: Volunteers to drive the van for the Virginia Air & Space Center summer motor tours of NASA Langley. First driver meeting, April 4, 9 a.m., at the VASC. For more information or to volunteer, call Steve Devan at 898-9290.

EASTER SUNRISE: Chaplain Matthew A. Zimmerman, a retired Army major general who heads the Veterans Administration's National Chaplain Center from the VA Medical Center in Hampton, will be guest speaker for Fort Monroe's interfaith Easter Sunrise Service, March 30, 6:30 a.m., at Continental Park. Gospel singers from the U.S. Military Academy and the U.S. Continental Army Band also will participate in the event. The public is invited. In case of inclement weather, the service will be held in the post theater, Building 42. For more information, call 727-2611.

CRAFTY SPEECH: The next session of NASA Langley Toastmasters Club's Speechcraft program is April 1, 11:30 a.m.-1 p.m., in the Wythe Room of the H.J.E. Conference Center. Experienced speakers will present fundamentals of verbal communication in a relaxed atmosphere. Cost is $25. For more information or to register, contact Myra Walton, Mail Stop 397, ext. 49254.

SPACE CAMP: The Virginia Air & Space Center's *Sports in Space* spring camp, April 1-3, 9 a.m.-3 p.m., features team activities, projects and an IMAX film. Campers ages 7-12 will learn about physical training and diet endured by NASA astronauts. Cost is $60. For more information, call 757-0900.

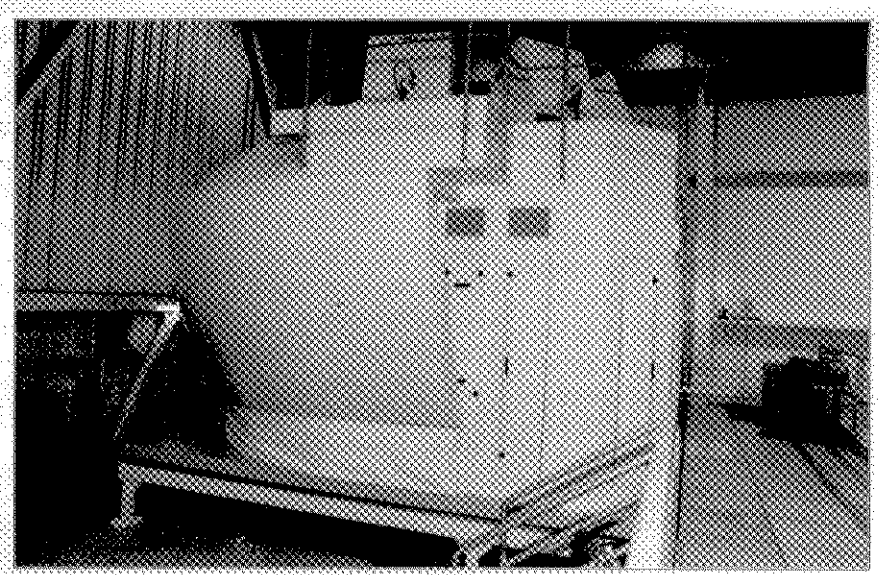
CLASSICAL GUITAR: The Tidewater Classical Guitar Society presents Antigoni Goni, winner of last year's Guitar Foundation of America International Solo Guitar Competition, in concert on April 4, at the Virginia Beach Center for the Arts, 2200 Parks Ave., Virginia Beach, and on April 5, at the Williamsburg Regional Library Arts Center, 515 Scotland St., Williamsburg. A "Meet the Artist" reception will follow the concert. Tickets are $12 regular, $8 student/senior, and will be available at the door. For more information or reservations, call 627-6229 (Norfolk), 566-3304 (Williamsburg), or visit our Web site at www.widomaker.com/tcgs.

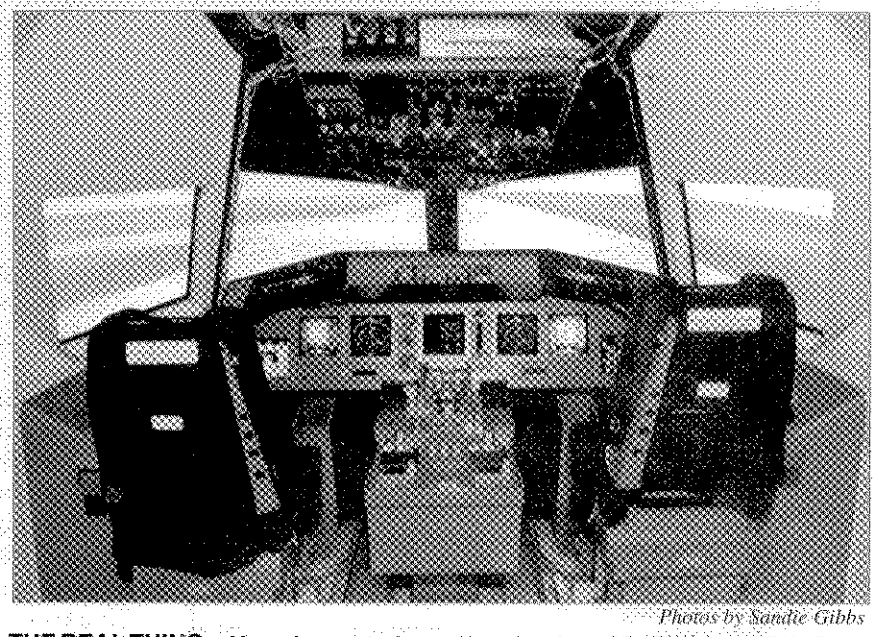
BUYING OR SELLING A HOME: Allied Brokers, Inc. real estate broker Ann Pane, a former employee of NASA Langley Research Center, will offer nearly 20 years' worth of real estate knowledge and experience in an informal after-work program sponsored by the American Institute of Aeronautics and Astronautics, April 9, 5 p.m., Langley Room, H.J.E. Reid Conference Center. A question-and-answer period will follow. Reservations are not required. Refreshments will be provided. For more information, call Robin Hardy at ext. 47159.

STARGAZING: The Skywatchers Astronomy Club will host a free evening of telescopic viewing of the heavens, April 11, 8 p.m.-midnight, at the club's observatory, Building 1231A, 100A Lindbergh Way. Skywatchers older than age 16 must show a civil service, military or government contractor (with after-hours authorization) photo identification at the main NASA gate. For more information, call Marilyn Ogburn at ext. 41175.

LANGLEY ALUMNI ASSOCIATION meets the second Tuesday of each month at noon in the Langley cafeteria's private dining room. For more information, call 874-1004.

GET IMAXED: IMAX film ***Super Speedway*** is now showing at the Virginia Air & Space Center in Hampton. Admission is $5.50 for adults; $4.50 for NASA, military, seniors, children. For more information, call 727-0900.





Photos by Sandie Gibbs

THE REAL THING – Above is an exterior and interior view of the Research Flight Deck Simulator (RFD). The RFD is the first of four cockpit simulators to be built in Langley's new Cockpit Motion Facility (CMF). The RFD will be used to research the aviation system's safety and capacity. The CMF will allow individual simulators to function independently or to be integrated with a shared motion base. The CMF is located in a new addition to Building 1268A and is expected to be operational this summer.

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Inside:
Special section – NASA administrator's "The Three Pillars of Success" speech, pages 3-6

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 7 ❖ April 11, 1997

Hyper-X: NASA selects Microcraft, Inc. team to fabricate hypersonic vehicles

Langley/Dryden project aims to soar at speeds faster than one mile per second

BY KEITH HENRY

NASA has selected a team led by MicroCraft, Inc., Tullahoma, Tenn., to fabricate a series of small, unpiloted experimental vehicles that will fly up to ten times the speed of sound. The five-year project, known as Hyper-X, will demonstrate hypersonic propulsion technologies.

When the Hyper-X flies, it will be the first time a non-rocket engine has powered a vehicle in flight at hypersonic speeds – speeds above Mach 5, equivalent to about one mile per second or approximately 3,600 miles per hour at sea level. A booster rocket will carry each experimental vehicle to its flight-test speed and altitude, where it will be launched to fly under its own power.

The cost-plus-incentive fee contract is worth an estimated $33.4 million over the next 55 months. It specifies that the first of four Hyper-X vehicles is to be delivered in time for the first scheduled flight early in fiscal year 1999.

Team members working with MicroCraft will be Boeing North American, Inc., Seal Beach, Calif.; GASL, Inc., Ronkonkoma, N.Y.; and Accurate Automation Corp., Chattanooga, Tenn.

The Hyper-X project is conducted jointly by NASA Langley and Dryden Flight Research Center, Edwards, Calif. Langley will manage the overall project, while Dryden will conduct the flight tests.

"We're embarking on an ambitious series of Hyper-X flights to expand the boundaries of aeronautics and to develop new technologies for space access," said Daniel S. Goldin, NASA Administrator. "Most impressively, these flights will begin less than two years from now. Under old ways of doing business, it might have taken ten years to reach flight tests."

Phase I is a five-year, approximately $150 million program to flight validate scramjet propulsion, hypersonic aerodynamics and design methods. As envisioned, Phase II would use the data, technologies and design methods derived from Phase I to design and build a larger, reusable X-plane, which would cover the speed range below Mach 5.

MicroCraft will be responsible for fabrication and flight-test support. This will include not only the four research vehicles but also one research vehicle-to-booster adapter for mating of the research vehicles to the nose of an expendable booster rocket. Each vehicle will be approximately 12 feet long with a wing span of about five feet.

"We are ready to prove this technology – to be the first to fly an air-breathing vehicle at hypersonic speeds," said NASA Langley's Vince Rausch, the Hyper-X project manager.

Program managers plan to demonstrate hydrogen-powered, "air-breathing" propulsion systems that could ultimately be applied in vehicle types ranging from hypersonic aircraft to reusable space launchers.

A rocket carries its own oxygen for combustion. An air-breathing vehicle, the experimental Hyper-X will burn oxygen in the air scooped from the atmosphere. Because of this, air-breathing hypersonic vehicles should carry more payload and/or offer longer range than equivalent rocket-powered systems.

Four flights are planned – one each at Mach 5 and 7 and two at Mach 10. The Mach 7 flight comes first. The flight tests will be conducted within the Western Test Range off the coast of southern California.

Each Hyper-X vehicle will ride on the first stage of an Orbital Sciences Corp., Dulles, Va., booster rocket, which will be launched by the Dryden B-52. For each flight, the booster will accelerate the Hyper-X research vehicle to the test conditions (Mach 5, 7 or 10) at approximately 100,000 feet. There, it will separate from the booster and fly under its own power and preprogrammed control.

The Hyper-X research vehicle will be separated from the booster rocket by two small pistons. Shortly after separation, the Hyper-X scramjet engine will operate for five seconds to demonstrate forward thrust in flight. When the scramjet engine test is complete, the vehicle will go into a high-speed glide to collect 10 to 15 minutes of hypersonic aerodynamic data. The vehicle will then maneuver to reduce speed and fly to a mission completion point.

Ground tests and analyses of both vehicle and engine will be performed prior to each flight in order to compare flight and ground-test results. In addition, the Hyper-X Mach 7 and 5 vehicles will be tested prior to flight in Langley's 8-Foot High-Temperature Wind Tunnel. The vehicles, with a fully operating ramjet/scramjet propulsion system, will be put through tests in the tunnel simulating many, but not all, Mach 7 and 5 flight conditions.

A ramjet operates by subsonic combustion of fuel

(see HYPER-X, page 7)

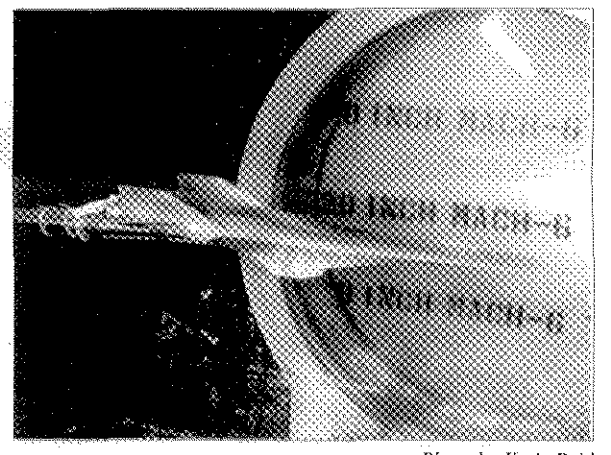


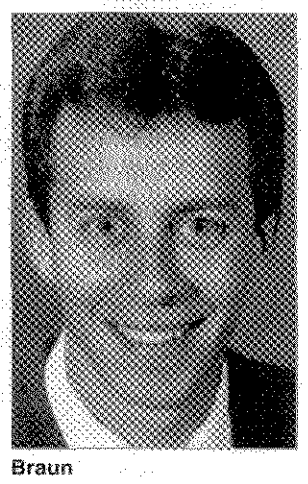
Photo by Katie Reid

Wind tunnel tests show good aerodynamic and propulsion performance for the Hyper-X configuration. Langley has logged more than 1,000 wind tunnel tests of the configuration. The Hyper-X program is an ambitious series of experimental flights to expand the boundaries of high-speed aeronautics and to develop new technologies for space access.

Colloquium Communiqué

Headed for the future: NASA enters new era of planetary exploration

Dr. Robert D. Braun, aerospace technologist in the Space Systems and Concepts Division, will deliver Langley's May colloquium lecture on May 6, 2 p.m., in the H.J.E. Reid Conference Center. The talk is entitled "A New Era of Planetary Exploration."



Braun

He will present a related talk, emphasizing NASA's current Mars exploration strategy, at 7:30 p.m. the same evening as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

The design and development of a series of small planetary exploration spacecraft is proceeding rapidly at NASA and industry centers across the country. Poised for flight in the coming decade, these projects should continue to expand our knowledge of the solar system long after the Mars Pathfinder landing and Mars Global Surveyor orbital insertion later this year. While providing scientists and the public with new data, insight and images of Mars, these missions are operating with a "better, faster, cheaper" philosophy. As a result, flight of this aggressive series of landers and orbiters poses numerous technological challenges, including design of micro-spacecraft, sample-return systems, the first flight of an aerocapture system, autonomous precision landing and design of lightweight, high-speed entry systems.

Braun will discuss NASA's robotic planetary exploration strategy. He will present mission and science objectives, emphasizing the technological challenges ahead.

He will also address the complementary elements of the robotic and piloted exploration programs, as well as Langley's past contributions, present role and possibilities for future involvement.

Braun has been working on the development of aeroassist elements for robotic and piloted planetary exploration since 1987. He has been a member of the Mars Pathfinder design team since 1992 and is the only member of the Pathfinder entry, descent and landing operations team not from the Jet Propulsion Laboratory (JPL) in Pasadena, Calif.

He has led Langley's Mars Pathfinder analysis efforts, for which he received the NASA Exceptional Achievement Medal in 1996. He has also worked on the design of the New Millennium Mars Microprobes, scheduled for launch in January 1999, and leads Langley's Mars 2001 aerocapture team. He also serves as the JPL point-of-contact for Langley's planetary entry activities.

Colloquium & Sigma Lectures

What: "A New Era of Planetary Exploration," Colloquium and Sigma Series lectures by Dr. Robert D. Braun

When: May 6
2 p.m. Colloquium
7:30 p.m. Sigma series

Where: Colloquium – H.J.E. Reid Conference Center
Sigma Series – Virginia Air & Space Center, Hampton, followed by IMAX film *The Dream Is Alive*
(Admission to film for NASA and contractor employees and family with ID is $4.50. For more information, call 727-0900.)

News Briefs

Around the Agency

NASA ENTERPRISES AGREE TO JOINT ROBOTIC MARS LANDER MISSION – In a cooperative activity intended to advance scientific knowledge and to help lay the groundwork for a future decision on whether to send humans to Mars, NASA's Space Science and Human Exploration and Development of Space enterprises have agreed to jointly fund and manage two robotic missions to Mars due for launch in 2001. NASA intends to launch two separate spacecraft to Mars, a small orbiter and a small lander, in March and April 2001, respectively. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-051.txt.***

HALE-BOPP OBSERVATIONS SURPRISE ASTRONOMERS – (Goddard Space Flight Center, Greenbelt, Md.) Completing an unprecedented year-long study of comet Hale-Bopp using two NASA observatories, the Hubble Space Telescope and the International Ultraviolet Explorer, astronomers report that they are surprised to find that the different ices in the nucleus seem to be isolated from each other. They also report seeing unexpectedly brief and intense bursts of activity from the nucleus during the monitoring period. The Hubble observations suggest that the nucleus is huge, 19 to 25 miles across. The findings were published in the March 28 issue of the journal *Science*. ***For more information, see the Internet address at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-055.txt.***

HUBBLE SPACE TELESCOPE CHECKUP FINDS SUCCESSES, CONCERNS – (Goddard Space Flight Center, Greenbelt, Md.) The Servicing Mission Observatory Verification for NASA's Hubble Space Telescope, currently more than halfway through its detailed checkup prior to returning to scientific operations, has found Hubble in overall excellent health, with seven of the eight components replaced or installed during the servicing mission functioning very well to date. However, some concerns with the Near Infrared Camera and Multi-Object Spectrometer are being evaluated. ***More information is available at this Internet address – ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-054.txt.***

KIDS 'TALK' TO EXPERTS VIA 'SHUTTLE TEAM ONLINE' INTERNET SITE – (Ames Research Center, Mountain View, Calif.) It takes thousands of people to fly the space shuttle, and now students can use the Internet to communicate with shuttle workers to learn about the workers' jobs, simulate shuttle flights and suggest shuttle improvements. The "Shuttle Team Online" web site will be active until the end of May. The Internet URL is: http://quest.arc.nasa.gov/shuttle. ***For more information, see the Internet address at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-052.txt.***

Disabilities Awareness

Disabled must prepare for weather emergencies

BY DIANE FORREST

June 1 is the beginning of hurricane season. Virginia's close brush with Hurricane Felix last summer challenged Hampton Roads to re-examine disaster preparedness for its special-needs population.

Local emergency management officials have found that people expect specialized health care services to be available in public shelters for people with disabilities or special needs. Even getting them to shelters, hospitals or home from work during an emergency general population evacuation challenges transportation resources.

These expectations are a new phenomenon in disaster services that evolves from legislative action and recent changes in the health care system.

Yet individuals with disabilities have a responsibility to be aware of their own health care needs, of how a disaster or emergency situation may affect them and of the need for an emergency preparedness plan.

People who need assisted care, special medications, access to electricity or special equipment should contact their local Emergency Management Official – not 911 – to locate an accommodating shelter. Not all shelters have generators to refrigerate medications or to recharge batteries; shelters cannot provide oxygen or specialized

See DISABLED, page 3

Announcements

Deadline approaches for upgrading AIAA memberships

American Institute for Aeronautics and Astronautics National is inviting applications for membership upgrade to associate fellows. A completed four-page application form must reach AIAA HQ by April 15.

Nominees must be AIAA senior members, must have 12 years of professional experience (including higher education) and must furnish three references from members who are associate fellows or higher grades. Only one associate fellow for every 150 voting members may be upgraded annually.

For application blanks and reference forms to nominate candidates, contact Paresh Parikh, local honors and awards chair, at ext. 42244, e-mail at p.c.parikh@larc.nasa.gov.

Technical Forum topics announced for April

The next Langley Technical Forum, April 16, 10 a.m.-noon, in the Pearl Young Theatre, will cover these topics:

▲ Open Architecture Dynamic Data System for the TDT – *Charles S. Bryant, Sherwood T. Hoadley*

▲ CCD-Based Mosaic Digital Mammography: An Innovative Solution Based on Langley-Developed Remote Sensing Technology – *James A. McAdoo*

▲ The Guidance and Control Software Project: A Software Engineering Case Study – *Kelly J. Hayhurst*

▲ STS-74/MIR Photogrammetric Appendage Structural Dynamics Experiment – *Michael G. Gilbert, Sharon S. Welch, Richard Pappa*

▲ Graphite-Composite Primary Structure for Reusable Launch Vehicles – *James Wayne Sawyer*

Career transition workshop offered

"Managing Career Transitions: Managing Yourself Through Job or Career Turbulence," a workshop for engineers and managers, will be held April 19, 9 a.m.-4 p.m., at the Old Dominion University Peninsula Center in Hampton.

The Institute of Electrical and Electronic Engineers, the American Institute of Aeronautics and Astronautics and Women in Aerospace sponsor the event. The cost is $30 for members and spouses of sponsoring organizations and $45 for nonmembers. Fees include registration, workbook, refreshments and lunch.

Preregistration is required by April 12.

For more information, contact Marilyn Ogburn at ext. 41175, or e-mail to marilyn_ogburn@qmgate.larc.nasa.gov; or Michael Stark at 396-8290, e-mail to m.stark@ieee.org.

Helicopter forum set for Virginia Beach

The American Helicopter Society's Forum 53 will be held April 29-May 1, at the Virginia Beach Pavilion and Convention Center.

This vertical flight event, open to the public, will include more than 80 exhibits from U.S. rotorcraft manufacturers and suppliers, plus most participants in the Joint Strike Fighter efforts. For more information, contact John Cline at ext. 43966, or e-mail to j.h.cline@larc.nasa.gov.

In memory of Henry A. Smith

Henry A. "Hacksaw" Smith, 75, died March 19. A graduate of the NACA/NASA Apprentice School, he retired from NASA in 1979 after 37 years of service.

In memory of Hubert E. Lloyd Jr.

Hubert Eberley Lloyd Jr., 54, died March 20. He had been a scientific and technical photographer in the Information Systems and Services Division at NASA Langley for 31 years.

Lloyd's expertise in high-speed photography led to his assignment to document joint NASA-Federal Aviation Administration crash test programs to determine passenger survivability and airliner fire suppression. He also photographed spin and stability characteristics of high-performance aircraft using drop test models.

He worked on the Viking and Lunar Orbiter projects and received several special achievement awards for his contributions to NASA research.

Photo by Hubert Lloyd

BASKETBALL CHAMPS – The NASA Basketball Association champions for the 1996-97 season include "C" League champions, the "Gougers," who include, from left, Larry Bement, Dale Bess, Greg Nowicki, Woodrow Whitlow, Calvin Mackey, Bob Lee, Dave Throckmorton, Ronnie Stephenson, Craig Humes, David Dausch and Don Humes. Not pictured are Bobby Fox and Matt Hooker.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Goldin outlines agency's aeronautics plans

'The Three Pillars of Success for Aviation and Space Transportation in the 21st Century' details NASA's aeronautics strategy for the new millennium

NASA Administrator Daniel S. Goldin delivered the following speech before the Aero Club of Washington, the American Institute of Aeronautics and Astronautics and the National Aviation Club on March 20 in Washington, D.C.:

It is a day in May. May 10, to be exact. The air is electric. It is a sensation – this excitement – unlike any felt before. The spectators have come a long way.

Utah. North of the Great Salt Lake, 56 miles west of Ogden. A little place no one's ever heard of before called Promontory Summit.

In the center of the crowd stand several men and two trains. One heading east, one heading west. The men having their photos taken smile. They are making history, and they know it. The year is 1869. The man in the forefront, with the place of honor, is Leland Stanford. Businessman, future governor of California, and currently the president of the Central Pacific railroad.

Before him this day are five spikes – two of gold, one of silver, one a blend of gold, silver and iron. But the fifth is a regular spike. And Leland Stanford, the man credited with connecting the east with the west, will personally pound the last spike into place, the ordinary one. It is ordinary, except in one respect. It is wired to a telegrapher's key, and when Leland Stanford hammers it into place, the country will celebrate the first transcontinental railway. America would never be the same.

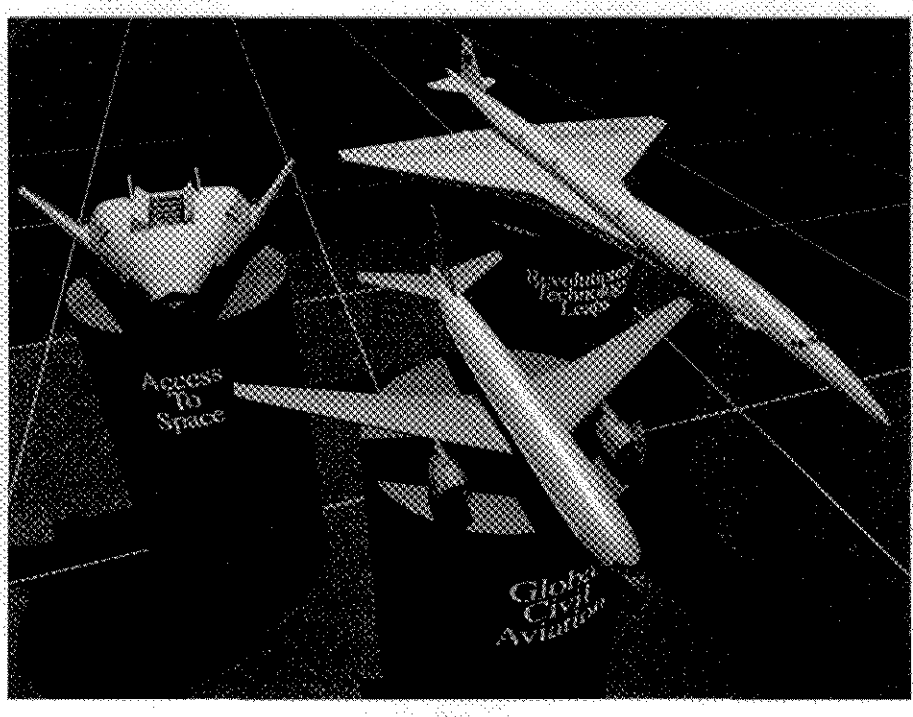
This is how it's been throughout history – the inextricable link between transportation and communications in opening new frontiers for economic development. With each new development in transporting people and goods, there have been dramatic economic gains.

First, there was an era of discovery. The earliest caravans opened trade routes connecting Asia and Europe. Sailing ships discovered new continents, and the shores of this country were opened to exploration and colonization. Covered wagons spurred expansion to the West.

Then Leland Stanford provided the transportation backbone which opened an era of national growth. The railroads and telegraph opened the interior of the United States. There was a wealth of natural resources for manufacturing and power. It allowed for an expansion of our workforce and the rapid transport of people and goods.

Then interstate highways and telephones networked the rail system and the rest of the country. We became more diversified. We had transportation for people and transportation for small and large cargo.

The economic gains were twofold. There was a huge growth in the infrastructure, including motor vehicle and associated industries, and also a huge growth in commerce, using the new communication and transportation systems. After World War II, it took a while for the idea of regular air travel to take hold. But take hold it did. It changed the way we run our lives.



In 1960, the Gross Domestic Product was $515 billion. In 1995, it was $7.2 trillion. That's a 14-fold increase. During the same time, U.S. exports went up almost 30 fold, from $19.6 billion to $584.7 billion. None of that would have happened without consistent, reliable, air transportation and communications. And this is only the beginning.

Indispensible air travel

Air transportation has now become essential to economic progress for the people and businesses of America. Without it, we can't participate in the increasingly global marketplace. Air transportation makes it possible to quickly move millions of people and billions of dollars worth of goods to markets around the world. It touches some part of our daily lives, from our mail to our fresh produce.

There are no practical alternatives to air transportation.

Now, it's the era of globalization. For the past 30 years, aviation has established itself as the preferred mode of high-speed travel. Today, the most rapid industrial growth is in long-haul aviation and in terrestrial and satellite communication systems, spurred by global economic opportunities. Aviation is absolutely crucial to the American economy.

Given the challenge of getting people and freight safely and efficiently to anywhere in the world at a reasonable cost – what are the keys to making this happen? First, air travel must be ultra-safe. It must provide around-the-clock reliable service and must be quiet and environmentally friendly. It must also be fast and low-cost. And why limit ourselves to the atmosphere?

At NASA, I consider it our responsibility to push the technology frontier in all these areas.

'Stretch goals' for the future

Last July, I issued a challenge before the Aero Club to work together to develop bold goals for the future. I felt we needed to re-examine our goals to be sure they supported the long-term health of America's air transportation system, and ultimately, our economy.

Over the next three months, we met with industry leaders and others to define and quantify technology goals for continued leadership 50 years from now. In October, I gave an interim report to the aviation community at the World Aviation Congress to say, "This is where we are. What do you think?"

The general consensus from industry, and especially from the chief executive officers present, was "Dan, your goals are not specific enough, and they are not aggressive enough."

We listened, and now the culmination of our work is stated in ten goals. I call them "stretch goals" because they will stretch the boundaries of our knowledge and capabilities. I don't have time to go into detail on each goal, but as you leave today, we have our new Enterprise brochure available so you can read about them

Three pillars, ten goals

The ten goals of the Enterprise are framed by three technology "pillars" – Global Civil Aviation, Revolutionary Technology Leaps, Access to Space.

Global Civil Aviation focuses on our goals for safety, affordability, and the environmental compatibility for subsonic aircraft. Revolutionary Technology Leaps tackles these challenges for a new generation of both subsonic and supersonic aircraft.

In Access to Space, we will merge aeronautics technologies and operating principles with revolutionary new launch vehicle technologies. Again, this is about how new transportation systems will open the doors for economic growth in new sectors such as space.

You'll notice that the goals are framed in terms of a final outcome, which is something that NASA does not control. We've stated the goals as the anticipated benefit of our technology once it has been incorporated by industry. As this implies, we cannot achieve these goals alone. Each will require partnership and coordination with manufacturers, airlines, the industry, the Department of Defense and the Federal Aviation Administration.

Pillar 1:
Global Civil Aviation

In our Global Civil Aviation pillar, the number-one goal is aviation safety. This goal is to provide the technology that will reduce the aircraft accident rate by a factor of five within 10 years and by a factor of 10 within 20 years.

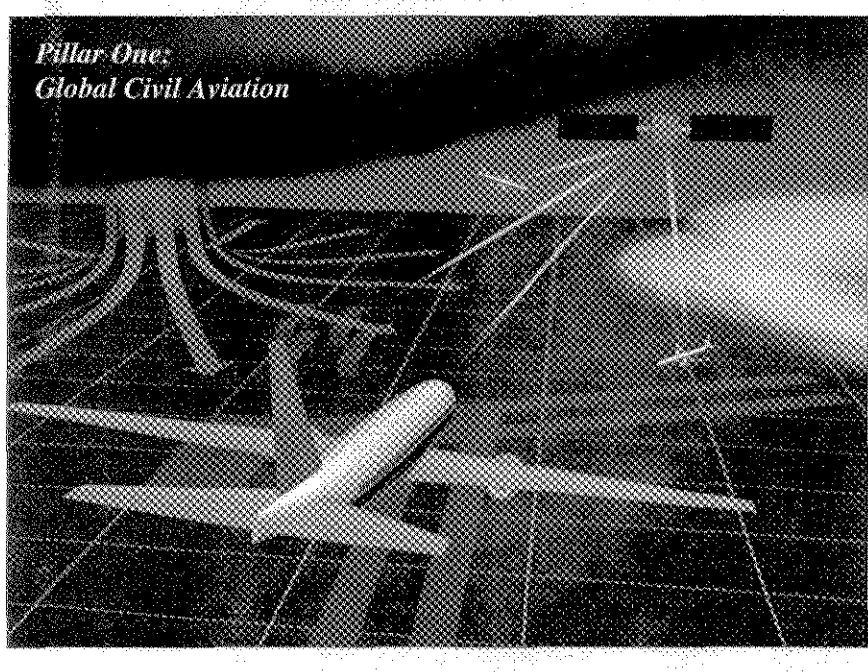
In February, the president and the White House Commission on Aviation Safety and Security challenged NASA to assist in reducing fatal aircraft accident rates five-fold within ten years. This is a challenge not only for NASA, but also a joint challenge for all of us – the FAA, DoD and our industry partners. This will not be an easy goal, but it is a crucial one. I believe in it, and NASA will spend a half billion dollars on this effort over the next five years.

People are concerned about safety; we read about it daily.

Experts predict that air traffic will double in 12 years and triple in 20. That's good news for the country. However, it won't be good unless we do

(continued on pages 4-6)

Three Pillars of Success for Aviation and



something about flight safety. We had a major drop in jet aircraft accident rates in the 1960s, but since then, we have not made significant improvements. The rate has been flat for the past 20 years.

I'm talking about one major air accident a week, like a few of the accidents we experienced last year. Imagine opening your paper every Tuesday morning to a weekly column to see what new airline catastrophe has happened in the world. It isn't a matter of statistics; it's a matter of perception. People who have never flown will refuse to do so. People who absolutely must fly will be terrified.

Eventually, companies will not be able to encourage people to fly and conduct business. It will shake the economy of the country. It's the domino effect. That is not the future I subscribe to. So we must do something about safety.

The major safety problem is human error, which is a factor in 60 to 70 percent of all aircraft accidents. Other major causes of accidents are mechanical problems, which account for roughly 17 percent, and then weather, at about 5 percent. Therefore, one of the keys to improving aviation safety is to provide improved information for the human beings in the system: the flight crew, air-traffic managers, aircraft maintenance and operations personnel.

Pilots need clear information on their situation. They need displays that provide information on the aircraft's condition and precise location, where other nearby aircraft are, and terrain and weather hazards. The objective is to avoid a crisis situation.

Information technology advances offer the opportunity for handling vast amounts of information in ways that were never before possible. The challenge is to apply this and other technologies to identify and display potential safety hazards so that they are avoided.

For example, health monitoring systems are being developed to detect electrical or mechanical problems before they become serious.

Global positioning system technology, already underway to avoid terrain, could be expanded to avoid other hazards such as dangerous weather conditions and other aircraft. Further breakthroughs will be achieved when this information can be used strategically, not just tactically, and distributed to the people who need it.

We know we cannot prevent human error. We can, however, provide a high level of confidence that the results of a human error will not lead to an accident.

So far, we've made our planes safer. What's next?

Goal #2

Our second goal, while maintaining safety, is to triple the aviation system throughput, in all weather conditions, in 10 years.

It is estimated that congestion and delays at airports cost the American economy at least $4 billion a year. Four billion! That, again, is not just the aviation industry. It's the cost to companies because their people are sitting in airports instead of doing their jobs. It's the costs that all of industry suffered from dealing with airport delays.

And this is only going to get worse. Major airports are already showing the stress of more traffic than they can handle. What are we going to do when air traffic triples?

Just look at what a simple condition like fog can do. Right now, when fog occurs, the aircraft landing and takeoff spacings are increased and the rates are slowed down. That means delays. It costs money. Not just to us, who have a vested interest in the aviation industry, but to everyone.

National Airport in Washington, D.C., handles almost 900 arrivals and departures every day. When it has to close or reduce flights because of weather, that impacts everyone in this city. Turn on the news after a bad delay at National; it's covered by the press because it ripples through this town. That's one airport. But it doesn't stop with one airport. Delays at National affect flights at Pittsburgh and Boston and Chicago and Denver. You get the picture.

With this goal, we are trying to triple the current capability under adverse weather conditions. This is within 10 years and is targeted at the busiest airports. What that means is the planes will fly through fog as if it were a clear day.

If we can increase the capacity at airports that are overburdened, then more planes will fly. Right now, airports serving the 30 largest metropolitan areas generate more than $250 billion in economic activity, $80 billion in wages and support four million people in direct and indirect jobs.

What will this mean for those 30 airports, and others, when we triple the demands on our system over the next two decades? Hopefully, it's a win-win proposition.

However, environmental concerns continue to impose limitations on our aviation system. Many

Advanced Crew Interface Designs To Improve Performance for Safe Air Travel

airports have curfews because of aircraft noise, and in some locations, taxes are being imposed on aircraft emissions. In order to remove these limitations, we need to pursue technology for the future development of much quieter aircraft with lower engine emissions.

Goal #3

Our third goal is to reduce emissions of future aircraft by a factor of three within 10 years and by a factor of five within 20 years.

Our environmental goals are stretch goals. We have this goal on emissions and a goal on noise. We publicize them to stimulate people, to stretch the imagination and the creativity of our researchers. We need to keep the global competition in mind, and we want to lead the way.

We do not have the technology to meet the goals today, and so they should not be used as a guide for unrealistic regulations. However, by pursuing these goals, we will determine what is feasible and what is required, such that environmental regulations do not impose inappropriate safety or cost burdens.

I'd like to digress a minute to describe this with more technical detail – particularly as it relates to our research for future supersonic transport aircraft. In our High-Speed Research program, we are using a parallel approach to address environmental impact.

On one hand, we are developing impact assessments of aircraft emissions on the atmosphere, using scientific experts worldwide with the best aircraft, satellite and computer tools available. These assessments will provide the information basis for establishing meaningful international emission standards.

On the other hand, we are developing the technology for controlling emissions. This requires major advances in fuel and air mixture control and breakthough composite materials made of high-temperature ceramics for the combustor liner. We know we can achieve these ultra-low-emission goals in our labs. The challenge is to simplify the designs in order to also provide enhanced operability, reliability and affordability for the real thing.

Goal #4

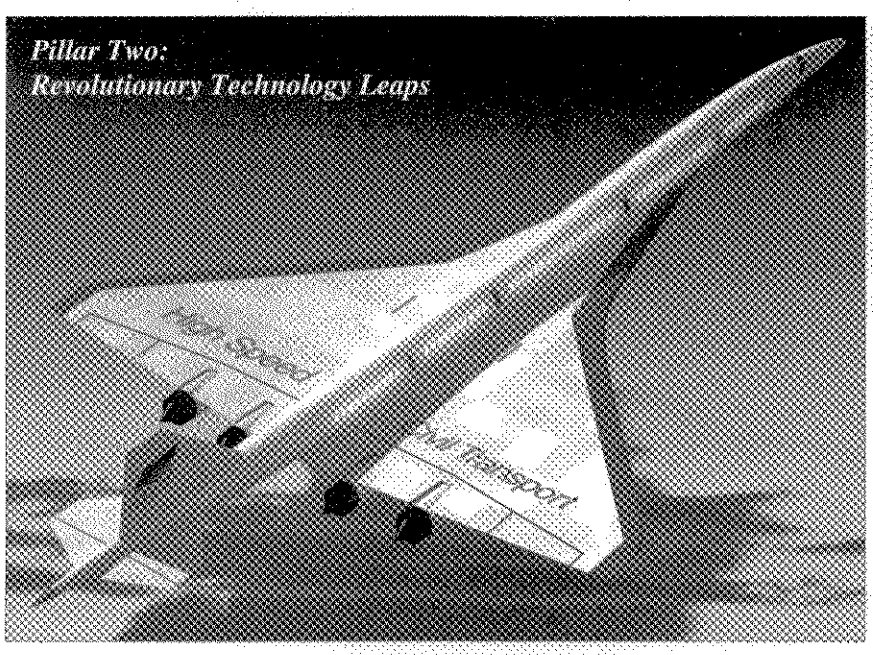
The need for quieter aircraft brings me to our fourth goal, to reduce the perceived noise levels of future aircraft by a factor of two from today's subsonic aircraft within 10 years and by a factor of four within 20 years.

Imagine you are on the way to the airport. You're running late, and as the shuttle bus drops you off, something catches your eye overhead. You look to see what it was. It's a jet. Nothing surprising about that. You are at an airport. The thing that is surprising, is that you didn't hear it. Even watching it overhead, the only noise you can hear is the rumble of the shuttle bus as it drives away.

With aircraft that quiet around airports, airlines can fly more, increasing the number of passengers they take every day. National Airport, which closes from 10 p.m. to 7 a.m. might stay open round the clock. There would be less congestion. There would be more business for the aviation industry. The benefits would trickle down to the business travelers and vacationers.

It is a great goal to work toward. NASA has conducted noise reduction research which is now being engineered into new aircraft. Further research with composites, engines and airframes will help give us

Tiltrotor for Urban Accessibility



Pillar Two: Revolutionary Technology Leaps

more design strategies for producing quieter aircraft.

Now, I want to reemphasize the point I made earlier: These environmental goals must be accomplished within our other goals for safety and affordability. It is the combination of these three goals that will produce the most competitive aircraft for our nation.

Goal #5

Our final global civil aviation goal is to reduce the cost of air travel by 25 percent within 10 years and by 50 percent within 20 years.

In his speech before the World Aviation Congress in October, Phil Condit, the CEO of Boeing, showed a chart that just blew me away. It had two lines on it. One line was for revenue versus time, and the other was for aircraft cost versus time.

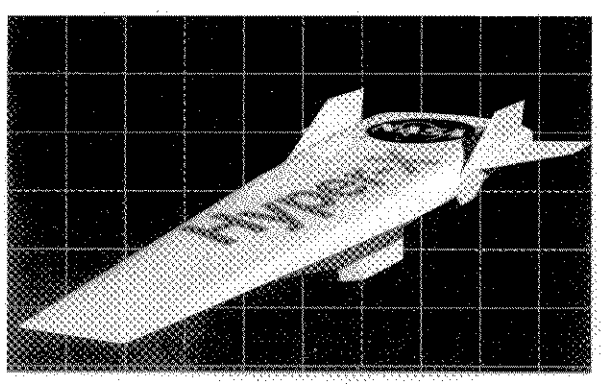
From 1960 to 1980, the revenue and cost lines tracked very closely. Since then, they have separated dramatically. Starting around 1980, the chart showed a steep increase in aircraft cost, while revenue continued to decline. If we keep up this trend, providing air transportation will become unaffordable. It's imperative that things change. We have to get the costs down. That's why we have this goal.

So how are we going to do this? You don't just wave a magic wand and – "poof" – get lower-cost aircraft. Affordability is a part of both Pillar One and Pillar Two.

Pillar 2:

Revolutionary Technology Leaps

A 25 percent improvement in cost may be achieved with advancements in materials, structures, aircraft systems and manufacturing process technology. However, to achieve a 50 percent reduction in cost, we will need revolutionary changes. This leads us to our second pillar, Revolutionary Technology Leaps.



Goal #6

One goal in this pillar is to provide next-generation design tools and experimental aircraft to increase design confidence and to cut the development cycle time for aircraft in half.

The sooner we can help industry develop these aircraft, the quicker they'll be out there, competing for work around the globe at better prices, while costing less to operate and maintain.

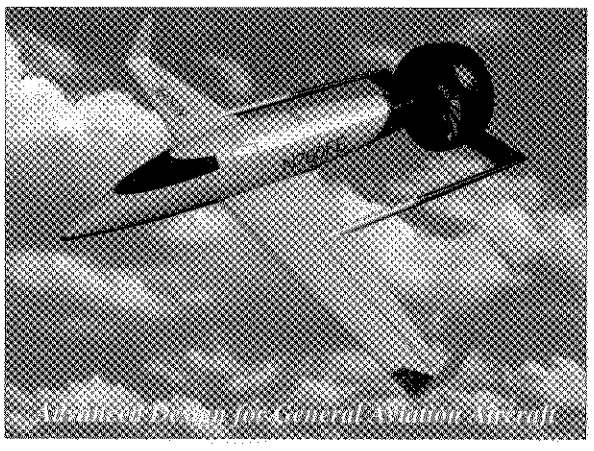
These new tools will integrate multidisciplinary product teams, linking design, operations and training databases to dramatically cut design cycle times. It's a long way from the days of drafting boards with a sheet of paper and pencil. We're not quite there yet, but simulation-based design tools will provide incredible new capabilities. Technology like neural networks and artificial intelligence will help determine the best path to take in that difficult world of design.

Increasing the confidence in aircraft design as well as design of flight critical software will dramatically reduce costs associated with the certification of new aircraft. Again, safety and affordability will be enhanced.

On the flip side of the design-tool coin are experimental aircraft. I can't stress how important experimental aircraft are. They test and validate innovative, high-risk concepts. They allow us to accelerate the development into design and technology applications.

The pioneering spirit at work in the X-1 and X-15 projects is being recaptured through the renewed emphasis of X-planes. The breakthrough work accomplished by future X-planes will move our country forward with an improved base of technical knowledge.

I've talked a lot about the big aircraft. Now, let's talk about the small aircraft. They play a very different, but very important role in our society.


Advanced Design for General Aviation Aircraft

Goal #7

The seventh goal is to invigorate the general aviation industry, delivering 10,000 aircraft annually within 10 years and 20,000 aircraft annually within 20 years.

General Aviation is a $15 billion industry and an integral part of our national transportation system. General Aviation includes aircraft from long-range corporate jets to two- and four-passenger light aircraft. It provides on-the-spot efficient and direct air service that commercial aviation does not provide.

I believe general aviation can have a tremendous future in our country. We have seen a major decline in the past 20 years, but I think we can turn that around. In 1978, the general aviation manufacturers produced 17,811 planes. That number dropped to an all-time low of 928 planes in 1994. Things started to turn around after the General Aviation Revitalization Act of 1994, which reduced the liability for GA manufacturers.

Let me tell you about the future I see for General Aviation: The safety of the light planes of the future will be far superior to traveling by car. These new aircraft should only cost about as much as today's high-end luxury automobile. Then businessmen, rural commuters and small businesses can afford to fly routinely.

With fail-safe avionics, ultra-reliable engines, whole-airplane parachutes and the simplifications enabled by "Free Flight," which allows pilots to choose their own routes, small airplanes can enjoy the levels of safety previously standard only on larger aircraft.

The next generation of turbofan-powered general aviation aircraft will fly more than 100 mph faster than today's aircraft. The reliability of these aircraft and avionics will be an order of magnitude better than for today's light planes.

One of the other major concerns is the airports. Public-use airports are lost at the alarming rate of 74 per year. That means every week at least one airport is closed. In a little more than 20 years, we lost almost 1,500 public-use airports. Once that runway is turned into a strip mall, it is gone forever. And if we have no runways, the advantage of flying general aviation aircraft will be lost. We need to get those aircraft in the skies and those runways regularly utilized while we still have them.

And we are taking action. Through our work on the Advanced General Aviation Transport Experiments (AGATE) consortium, we have worked to develop glass cockpit technologies with graphic displays of weather and guidance information, along with on-board traffic avoidance systems.

Our work through the General Aviation Propulsion (GAP) program will develop technologies and manufacturing processes for revolutionary low-cost, environmentally compliant new engine designs. With the infusion of new technology for safety, reliability and lower cost into the general aviation industry, I can see a boom ahead. I can imagine that future sales will make 1978 look like a lean year.

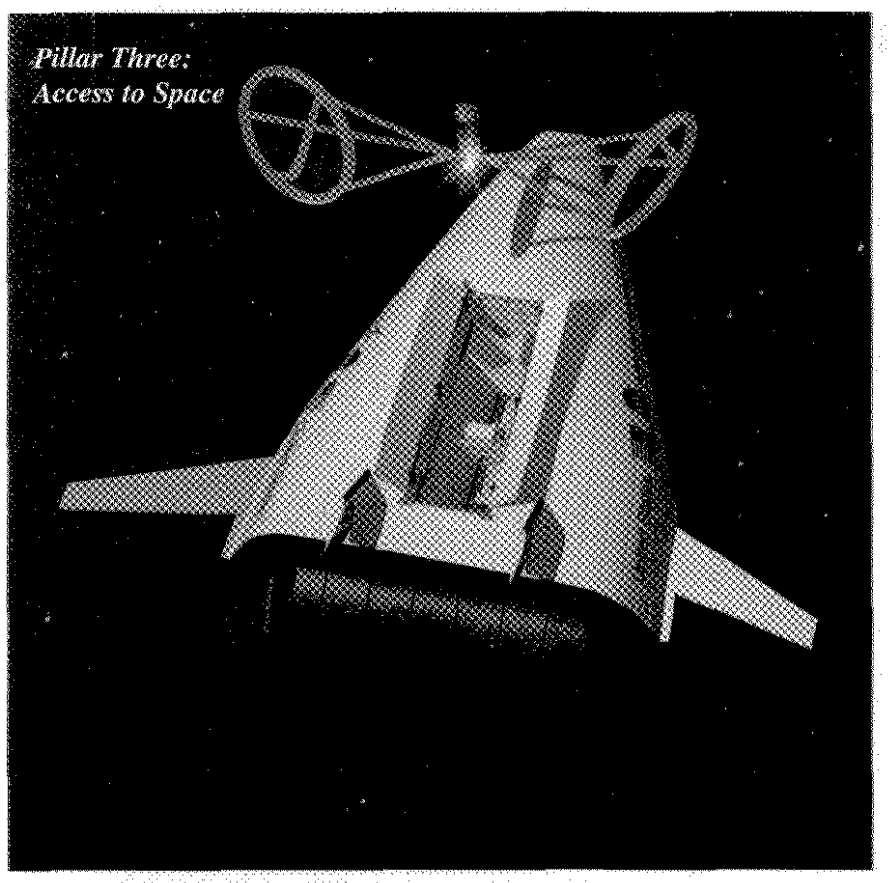
Getting people and cargo to their destinations is fundamental to our industry. In the global economy, we are talking about greater distances and the need for speed. If we don't do it, someone else will.

Goal #8

That's why we have our eighth goal – to reduce the travel time to the Far East and Europe by 50 percent within 20 years and to do so at today's subsonic ticket prices.

America is a society with a vibrant economy that allows us to have an exceptional standard of living. We out-travel everyone else on the globe by at least three-to-one for business and pleasure. The rest of the world does not live that way. But they are going to, and they are going to do it soon. The gross domestic product of the world is expected to grow by at least 3.2 percent annually. As the world economy expands, people in places like China, Southeast Asia and Russia are going to travel more and to buy more imported goods.

Worldwide, tourism is a $3 trillion per year business, employing 127 million people. Tourism is



among the top three employers in 37 out of 50 of our states, and it employs 8 percent of the total population. It contributes 6.4 percent to our gross domestic product. People want to travel, but they don't want to spend their time in transit. They want to get where they're going.

With the new High-Speed Civil Transport, we could go across the Pacific and back in the same day. If costs are similar to subsonic fares, it wouldn't be a hard choice on what to fly. For the airlines, it's a cost benefit, too, to have that aircraft flying more revenue miles in the same period.

Building a High-Speed Civil Transport could provide the U.S. with $200 billion in sales and with 140,000 highly skilled jobs, contributing to our economy and technological strength.

So, where do we go from here? Is the sky really the limit? Let's go beyond the stratosphere and see what the future holds.

Pillar 3: Access to Space

Now we come to our Access to Space pillar, where we have the last two goals.

Goal #9

The ninth goal is to reduce the payload cost to Low Earth Orbit by an order of magnitude, from $10,000 to $1,000 per pound within 10 years.

We will reduce the cost of the access to space through our Reusable Launch Vehicle program. The Reusable Launch Vehicle program will benefit from system study capabilities and from the airframe, materials, and propulsion technology available through the aeronautics enterprise.

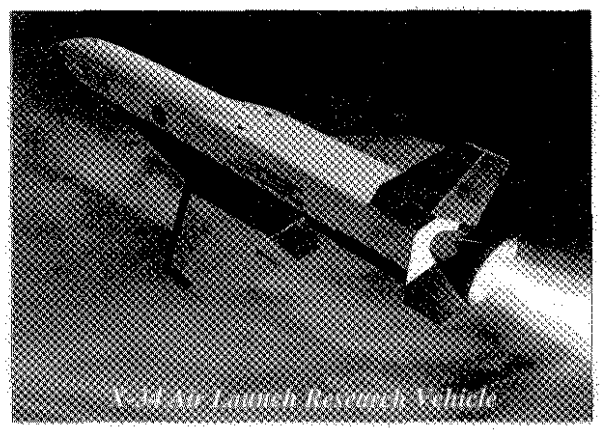
This is why we've merged our aeronautics and advanced space transportation technology efforts into one Enterprise. The major benefits are reductions in program cost and risk. The benefit to the aeronautics program is an expansion of its capabilities and technological horizons.

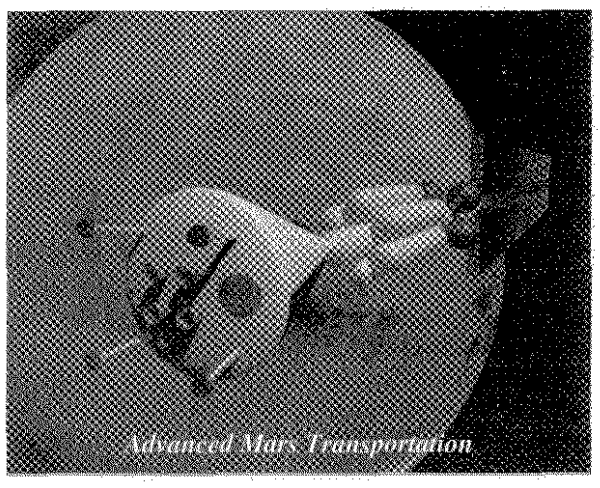
We are already building hardware on the X-33, our prototype for a Reusable Launch Vehicle. We are on our way to reducing the probability of failure to one in 1,000. To put this in perspective, the probability of failure for today's shuttle system is one in 145.

In addition, for the RLV we are looking for operational turn-around times of days, not months, with small ground crews similar to aircraft operations. This is what we need to make space access an affordable and safe reality. This has obvious benefits to commercial users and to our national security.

Goal #10

The tenth and final goal is to reduce the payload cost to Low Earth Orbit by an additional order of magnitude, from thousands of dollars to hundreds of dollars per pound by 2020.


X-34 Air Launch Research Vehicle


Advanced Mars Transportation

Our far-term research and development efforts will address a recognized need for a second order-of-magnitude reduction in cost. Some of the key requirements to making this work are high reliability – a probability of one failure in 1,000,000; low operating costs – about $300 per pound; quick turnaround – a matter of hours; and environmental compatibility with airfields.

One major technology advance, and another reason for combining aeronautics and space transportation technology, is the use of air-breathing propulsion systems combined with rocket systems. Using some air avoids the need to carry all the oxidizer on board, significantly enhancing overall system performance, reducing vehicle size and improving operational margins.

Once we accomplish our 10th goal and have truly affordable access to Low Earth Orbit, we can then use that technology to take the next big steps – reaching out beyond Earth. We could be sending Low Earth Orbit spacecraft on regularly scheduled flights to a space station like the Pan Am shuttle in the movie *2001 – A Space Odyssey*.

From there, we could be using advanced concepts built on this technology to reach the moon. Is there water at the South Pole of the moon? If we could afford to send a team of geologists to explore the craters, we might find the answer.

Once the cost of opening up the space frontier is no longer prohibitive, we could explore some of our neighboring planetary bodies. We could send people and equipment to Mars to search for more signs of life and the resources to support life. We could place a research station on an asteroid.

One day, we could open up exploration throughout our solar system. Then, we could answer the questions that people have been asking about the distant planets since they were first discovered. We would have a renaissance – about space and the knowledge and power it holds. It is our destiny.

But we must make the leap from expensive space flight to low-cost space flight. We must invest in the technology. We must invent the next generation of launch vehicles and the ones after that. Those grandchildren of the vehicles we are working on today will turn science fiction into science fact.

The key to the next era of exploration and expansion, beyond globalization, is to make access to space reliable, affordable and safe. We must do it. We are going to do it.

These are our Three Pillars, with their ten challenging goals.

The future of air transportation: NASA's vision, challenge, responsibility

Leland Stanford and his associates stuck to their vision. They made it happen. We at NASA will stick to our vision too. We like stretching the boundaries. We like proving that things that couldn't be done yesterday will be done tomorrow. We like making the extraordinary happen.

But that is not the only reason we are doing this. America needs a vital, strong, competitive aerospace industry. We at NASA have a responsibility to help this nation remain the world leaders, no matter what developments happen in the rest of the world. We want to be the best and to remain the best.

The men driving the intercontinental railroad had five spikes to join the east to the west. We have our Three Pillars to connect the old way of air transportation to the new way. We are not ready to "plant them in the ground" and get our pictures taken. Not yet.

But like those men who changed America forever, who improved the travel time across the country and invigorated businesses, we, too, are ready to stand up and say, "This is the way to make it happen."

Reserve your copy of 'Three Pillars'

To reserve a copy of the color brochure, "Aeronautics & Space Transportation Technology: Three Pillars for Success," NASA Langley employees may call the Public Inquiry Center at ext. 43293.

Video Teleconferencing System brings NASA centers together

BY ELIZABETH JOHNSON

Langley's Video Teleconferencing System (ViTS) allows center personnel to conduct "face-to-face" video meetings with colleagues at other NASA centers and off-site locations.

The ViTS room here can accommodate up to 19 people; other NASA ViTS rooms can seat from eight to 50 people.

Langley's ViTS room features tiered seating, specially selected colors and furnishings, and special lighting. The seating arrangement allows the cameras unobstructed views of all participants, who also have a clear view of the video projection screens.

A room operator records the proceedings and transmits graphs, photographs, videotapes and computer presentations. The service is currently funded by NASA Headquarters.

In addition to the full-service ViTS room, Langley has several Low Bandwidth Video (LBV) systems which research organizations use to collaborate with companies nationwide who are working on Langley projects, said Bob Gates, the video teleconferencing coordinator here.

Using specially configured dial-up phone lines, the LBV system can communicate with any other compatible LBV system. This service can be used alone or as an alternative when the full-service ViTS room is unavailable.

"We have seen an increase in usage of both the ViTS and LBV systems mainly because of the decrease in Langley's travel budget," said Gates. "The cost of a video conference is small compared to travel expenses for an on-site meeting.

"More people are able to participate in or observe a video teleconference than the number of people who would normally travel to attend a meeting."

The ViTS room "has improved communications with the other NASA centers' technical libraries," said Langley technical library employee Charlie Davis of Computer Sciences Corporation. "We meet once monthly using the ViTS system, and we also use the room for training purposes."

The room has allowed the technical library to conduct one-session training, Davis said. The trainer goes to one site which is then linked to other locations.

The room is largely booked a year in advance, but ViTS operator and scheduler Jill Barnard tries to accommodate all requests. Schedule openings often occur due to cancellations. Still, conferences should be scheduled as far in advance as possible, said Gates.

For more information or to reserve the ViTS, call Barnard at ext. 47383, providing desired and alternative conference dates and times; conference length; all sites involved, with points of contact; conference title; and organization name.

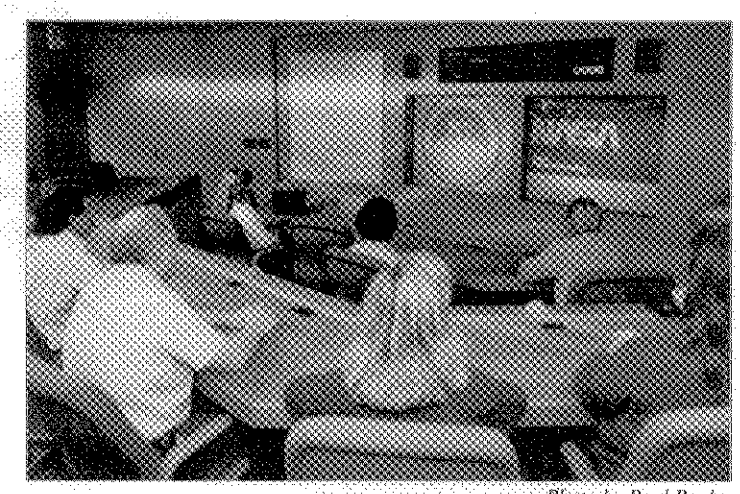


Photo by Paul Bagby

The Video Teleconferencing System can serve to bring several NASA centers together in one room.

Technical library observes National Library Week

BY CINDY S. CHURCH

During the week of April 14-18, the Langley's technical library will celebrate National Library Week by lending its information specialists to employees throughout the center.

Employees may borrow an information specialist to provide one-on-one guidance in how to access electronic resources from their own desktop computers. Information specialists also may conduct workshops for any branch or section. Sessions may last from 30 minutes to two hours.

To reserve these services, call ext. 42368, send e-mail to tech-library@larc.nasa.gov, or fill out the form on http://nasagalaxie.larc.nasa.gov/nlwform.html and designate one or more sessions from these categories: general, library-produced databases, commercial databases and subject-specific sessions.

General session

Session 1 – Library Overview: In addition to an on-site tour of the library or demonstration of electronic resources available from the desktop, an information specialist will present an overview of NASA GALAXIE and commercially available databases. This is the only session held in the technical library.

Library-developed database sessions

Session 2 – NASA GALAXIE: NASA's Gateway to Libraries for Aerospace Information Exchange (GALAXIE) is the library's on-line system which contains records for all its books, journals and approximately 500,000 technical reports. The database includes the library collections of all NASA centers.

DigiDoc is a digital documents system that provides users desktop delivery of full-text images of technical reports through NASA GALAXIE. Full-text images for a number of NASA documents are available through hypertext links from NASA GALAXIE citations to the DigiDoc system.

Session 3 – CoreAero: This database is a single point of access for aerospace information through NASA GALAXIE. It contains about 2 million unclassified and unlimited citations from NASA's Research Connection (RECON), covering 1960 to the present.

Commercial database sessions

Session 4 – UnCover Journal Contents: UnCover provides access to tables-of-contents of approximately 17,000 journals on all subjects. UnCover also provides an automatic alerting service, known as Reveal, which allows a researcher to set up an awareness profile for specific journals.

Session 5 – FirstSearch Databases: FirstSearch is an electronic reference system which provides access to many types of commercial on-line databases through a single World Wide Web interface. More than 30 databases are available in subject areas such as engineering and technology, education, science, public affairs and general reference.

Session 6 – WebSpir Databases: The technical library provides Internet access to six databases, including ABI/Inform and Applied Science and Technology. The databases provide references to journal articles and conference papers.

Session 7 – Electronic Journals: E-journals are available from the technical library's home page. Titles include *Physics of Fluids*, *Review of Scientific Instruments*, and *SIAM Review*. Several offer full-text access.

Subject-specific sessions

Session 8 – Finding Aerospace Information

Session 9 – Finding Business and Company Information

Session 10 – Finding Electronic and Computer Information

Session 11 – Finding Structures and Materials Information

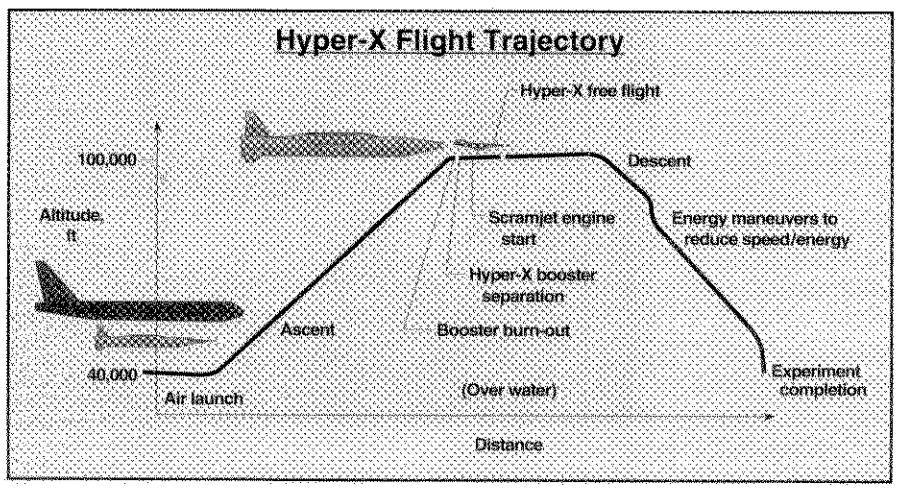
HYPER-X

(continued from page 1)

in a stream of air compressed by the forward speed of the vehicle itself. In a conventional jet engine, the compressor section (the fan blades) compresses the air.

A scramjet, or supersonic-combustion ramjet, is a ramjet engine in which the air-flow through the whole engine remains supersonic. Scramjet technology is challenging because only limited testing can be performed in ground facilities. Hyper-X takes the next essential step in developing hypersonic, air-breathing technology.

See related graphics on page 8.



NASA illustration

Each of the Hyper-X research vehicles will achieve test speed and altitude with the help of the NASA Dryden B-52 aircraft and an expendable booster rocket, as shown in this simplified flight trajectory.

DISABLED

(continued from page 1)

equipment. Even doctors or nurses cannot provide all needed medications.

People with disabilities should be responsible for a plan of action during emergency evacuation that will provide them with transportation and a shelter that will accommodate their needs.

For NASA Langley employees, that plan may include staying home (liberal leave policy), working from home until the storm passes (telecommuting or variable workplace) or arranging transportation home or to a shelter.

For more information about Langley's emergency policies, call the Safety Office at ext. 47233.

Editor's note: Forrest, of the Office of Equal Opportunity Programs, works with emergency evacuation committees to document the numbers of people with special needs and to inform them of what the emergency shelters, Virginia Power and the 911 Emergency Response people can and cannot do to help them.

AdVentures

TAX TIME: Income tax preparation by a member of the National Association of Tax Practitioners. Electronic filing and direct deposit offered at no extra charge. Small business bookkeeping. We travel to you. Call 874-3121 for appointment.

TAX TIMES 2: Income tax preparation by member of National Association of Enrolled Agents. Call Nancy Taylor at 723-5227.

TAX TIMES 3: Specializing in personal and small business income tax returns; accurate computerized tax preparation, reasonable rates with referral discounts and valuable information to reduce 1997 tax liability. Bachelor's degree in accounting, annual certification through the IRS. Call Wanda at 838-6546 for quote and appointment.

WANTED: Roommate to share 3-BR, 2-bath rancher in Gloucester Pt.; 1,500 sq. ft. with attached garage on wooded lot; in secluded neighborhood, next to Coleman Bridge with access to York River. $400/month, plus half phone and electric, water included. For more information, call 499-3079 or 684-3620.

FOR SALE: 2 burial plots at Peninsula Memorial Park, Sermon on the Mount, Section T, Lot 864. $1,500. Call 966-9122.

FOR SALE: Sony 8mm camcorder, custom Sony hardside case, 2 new Ni-Cad batteries, A/C adapter, tape, other accessories and instruction book. Needs minor repair. $300. Call 874-3121.

FOR RENT: 2-BR condo on Oceanview Ave. overlooking Chesapeake Bay; washer/dryer included; available May 1. $800/month. For more information, call 800-484-6800 (pin 6262).

FOR SALE: Mac PowerBook 5300cs laptop computer, 100 MHz PowerPC 603e, 750 MB hard drive, 56 MB RAM, 33.6 modem, Ethernet, 8x CD-ROM, 10.3-inch color screen, carrying case. $2,800, negotiable. Call Craig at 599-1267.

FOR SALE: Mac Performa 6300CD, 100 MHz PowerPC 603e, 1.2GB hard drive, 48 MB RAM, 33.6 modem, 4x CD-ROM, A/V card. $1,000. Add Apple 15-inch monitor, keyboard, mouse, speakers for $400 more. Prices negotiable. Call Craig at 599-1267.

STARGAZING: The Skywatchers Astronomy Club will host a free evening of telescopic viewing of the heavens, April 11, 8 p.m.-midnight, at the club's observatory, Building 1231A, 100A Lindbergh Way. Skywatchers older than age 16 must show a civil service, military or government contractor (with after-hours authorization) photo identification at the main NASA gate. For more information, call Marilyn Ogburn at ext. 41175.

IT'S SPRING IN SURPRISING SUFFOLK: The Suffolk Spring Spectacular, April 11-13 at the Suffolk airport on Route 13, features an aeronautics theme and includes precision flying of stunt planes and military aircraft, ground displays of military aircraft, NASA exhibits, and hot-air balloons, plus entertainment, an auto show, food, crafts and a carnival. Hot-air balloon competitions begin at 5:30 p.m. all three days, and mornings on Saturday and Sunday, with a grand illumination April 12, 8:30 p.m. For more information, call 539-6751.

VIRGINIA SYMPHONY IN THE BIG APPLE: Virginia Symphony concert at Carnegie Hall, New York City, on April 15. Symphony CDs available from *CD Music and the Arts* magazine or by calling 623-2310. Works by Hailstork, Barber and Elgar at Chrysler Hall, April 12-13. Student tickets $6. Symphony season brochures, raffle tickets for a convertible and information on Carnegie Hall travel packages available at the Langley Exchange Shop. For tickets, call 623-2310. Visit the Virginia Symphony web site at http://www.windborne.com/wbpi/VASymphony/

RETIREMENT SOCIAL for Charles Marushi, chief facilities engineer, Facility Systems Engineering Division, is scheduled for April 24, 6 p.m., Fort Monroe Officers' Club, with cash bar, buffet dinner and program. Cost is $18 per person or $35 per couple; checks payable to Judy Hoyle. On-site employees may send checks to Pam Howard or Judy Hoyle, Mail Stop 436. Off-site guests may call 864-7291 before April 17 for reservations and may mail check to Judy Hoyle, 21 E. Sandy Point Road, Poquoson, Va., 23662, to be received before April 17.

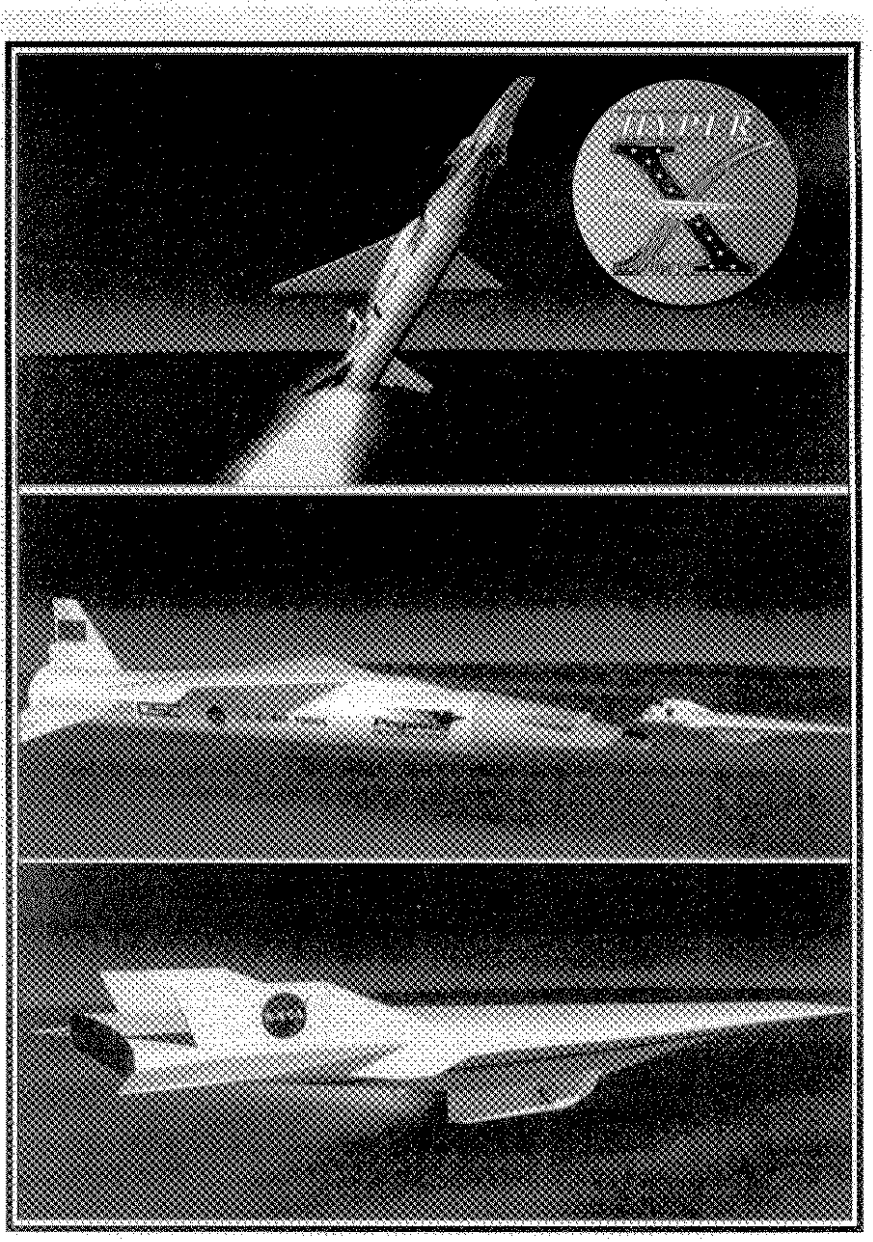
LAA SPRING FLING: Spring social, April 25, 4-9 p.m., H.J.E. Reid Conference Center, featuring music by Double Take, plus giveaways from M. Price Distributors. For more information, call ext. 46369.

SAY GOODBYE to soon-to-be-retiree Shirley Crockett, May 1, 2:30-4:30 p.m in Building 1244, Room 223. Send gift donations to Kate Spruill at Mail Stop 265. For more information, call ext. 42936.

GROUP RETIREMENT: A retirement dinner honoring W. Skinner Jones, William Roy Hutto and John B. Kovtun will be held May 2, 6:30 p.m., H.J.E. Reid Conference Center. $15 per guest (cash or check payable to "Cash"), gift included, donations for gift only will be accepted. To make reservations, call Bill Fogle at ext. 47625 or Mark Griffith at ext. 45480 by April 30.

SHOW YOUR TRUE COLORS: Satin rope badge cords in a selection of school colors are available at the NASA Exchange Shop: black, red, blue, green, purple and gold. For more information, call ext. 41585.

GET IMAXED: IMAX film ***Super Speedway*** is now showing at the Virginia Air & Space Center in Hampton. For more information, call 727-0900.



NASA illustrations

HYPER-X-PRESS – Hyper-X will ride on a booster rocket which will be launched by the Dryden B-52. For each flight, the booster will accelerate the Hyper-X research vehicle to the test conditions (Mach 5, 7 or 10) at approximately 100,000 feet, where it will separate from the booster and fly under its own power and preprogrammed control.

Researcher News

National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23681-0001
Official Business. Penalty for Private Use $300.

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National Aeronautics and Space Administration
Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 8 ❖ April 25, 1997

Economic impact document offers unique perspective of NASA Langley's contributions to Virginia, nation

BY DONNA ROPER

If you've ever wondered how much money NASA Langley kicks into the local, state and national coffers – and the impact all those dollars have – check out all the facts and figures in the center's ***Fiscal Year 1996 Economic Impact*** document.

But don't stop where the bucks do. The recently updated document offers more than bottom lines; it's also a collection of snapshots of us – the NASA Langley workforce.

Find out just where in Hampton Roads many of your Langley coworkers live, or what Virginia colleges and universities they went to, or how many have advanced degrees.

The Economic Impact document was recently distributed to key stakeholders such as local, state and national government representatives, as well as industry leaders. The document provides an overview of the institutional, research and financial impact that the center has on the nation and the Commonwealth of Virginia.

The document includes the latest information on a variety of topics to meet the needs of the many different customers we serve: contracts, distribution of small business awards and procurements, contract and civil service support, educational grants, total obligations by state, major facilities, program year budget and funding and significant research accomplishments.

Employees can access the document online from the NASA Langley Home Page and from URL:

http://oea.larc.nasa.gov/org/impact96/

To obtain hard copies of the document, call Jeane Shanks, Public Inquiry Center, at ext. 43293.

(see IMPACT, page 4, for more statistics)

Langley's FY 1996 Contribution

Virginia economy	$210.0M
Hampton Roads economy	$180.7M

Note: Hampton Roads figures are included in Virginia figures. Does not include civil service and contractor payroll.

Civil Service Residential Distribution

Hampton	617	25.1%
York County	520	21.1%
Newport News	461	18.7%
Poquoson	229	9.3%
Williamsburg	148	6.0%
Gloucester	119	4.8%
Norfolk	48	2.0%
Virginia Beach	41	1.7%
Chesapeake	28	1.1%
Suffolk	24	1.0%
Portsmouth	19	0.7%
Other	208	8.5%
Total	**2,462**	**100%**

Civil Service Workforce Educational Mix

Highest degree earned		
Doctoral	291	11.8%
Masters	588	23.8%
Bachelor	617	25.0%
Associate	431	17.5%
Some college	302	12.2%
H.S. diploma	227	9.2%
Less than H.S. diploma	6	0.5%
Total	**2,462**	**100%**

Civil Service Workforce Skill Mix

Scientific/engineering	1,237	50.1%
Administrative	286	11.6%
Tech/craft/production	735	30.0%
Clerical	204	8.3%
Total	**2,462**	**100%**

Note: Workforce educational mix and workforce skill mix are as of Sept. 30, 1996.

Above are a few examples of the statistics available in NASA Langley's Fiscal Year 1996 Economic Impact Statement.

X-33 models undergo wind tunnel tests here

BY ANN C. GAUDREAUX

Scale models of the X-33 flight test vehicle, a technology demonstrator leading to the nation's next-generation space transportation system, are undergoing extensive wind tunnel testing at NASA Langley.

Several models are being tested in a half-dozen tunnels at Langley as part of a joint NASA-Lockheed Martin effort to develop the technologies for a space transportation system that would provide faster and cheaper access to space than current systems. The technology will first be tested in a suborbital vehicle known as the X-33.

The wind tunnel tests are providing information about how the vehicle's design performs aerodynamically over a range of speeds from takeoff to hypersonic flight approaching a Mach number of 15 (15 times the speed of sound).

In the early phases of the program, screening tests were conducted in the Langley 22-Inch Mach 20 Helium Tunnel. The helium tunnel was chosen for initial testing because it operates at room temperatures, which allows testing to be performed on six-inch plastic models that can be made quickly and inexpensively.

"These tests measure the high Mach number aerodynamics that must be understood to design an aerospace vehicle for flight in this speed regime," said Bill Scallion, an engineer in the Aerothermodynamics Branch who heads aerodynamic testing for the X-33.

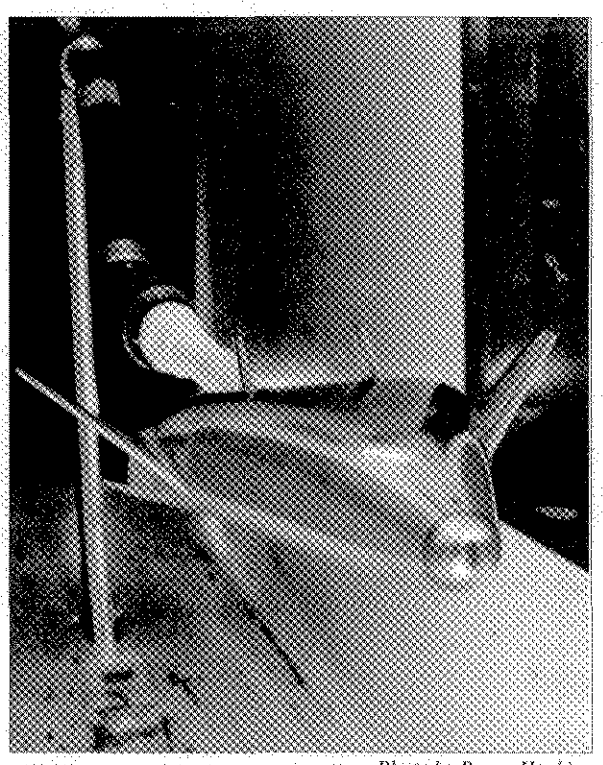


Photo by Peggy Hopkins

A metal model of the X-33 reusable launch vehicle undergoes testing in the Low Turbulence Pressure Tunnel.

An aluminum and stainless steel model of the X-33 – about 15 inches long by 15 inches wide – was also recently tested in the Low Turbulence Pressure Tunnel (LTPT) at Langley.

"These subsonic tests were conducted at the speed of Mach 0.25," said Kelly Murphy of the Aerothermodynamics Branch. "Aerodynamic force and moment testing in this tunnel lasted about one week."

The same model was tested in Langley's 16-Foot Transonic Tunnel through mid-April. The 16-Foot tunnel runs at speeds near the speed of sound. Following these tests, the model was moved to the Langley's Unitary Wind Tunnel for supersonic (Mach 1.5 to 4.5) testing through early May.

Additional tunnel testing of X-33 models is scheduled through June in tunnels in the Hypersonic Facilities Complex, and from mid-June to mid-July in the Langley 14-by-22-Foot Subsonic Tunnel.

Marshall Space Flight Center in Huntsville, Ala., is the lead NASA center for managing the Reusable Launch Vehicle (RLV) program, an industry-led effort that NASA Administrator Daniel S. Goldin has declared the agency's highest priority new program.

The RLV Technology Program is a partnership among NASA, the Air Force and private industry to develop world leadership in low-cost space transportation. The goal of the program is to develop technologies and new operational concepts that can radically reduce the cost of access to space.

The RLV program also hopes to speed the commercialization of space and improve U.S. economic competitiveness by making access to space as routine and reliable as today's airline industry, while reducing costs and enhancing safety and reliability.

The RLV program combines ground and flight demonstrations. The use of experimental flight vehicles like the X-33 will help verify vehicle systems performance in a realistic environment.

See related photo on page 6.

News Briefs

Around the Agency

NASA REVISES INTERNATIONAL SPACE STATION SCHEDULE – (Johnson Space Center, Houston, Texas) NASA will begin its on-orbit assembly of the International Space Station (ISS) no later than October 1998, and is looking at options that will allow the agency to work around the delay caused by the late arrival of a key station module.The on-orbit assembly of the ISS originally was scheduled to begin this November with the launch of the NASA-financed/Russian-built and launched Functional Cargo Block. Inadequate funding by the Russian government to the Russian Space Agency and its contractors for building another key station element – the Service Module – has put construction up to eight months behind schedule. ***For more information, check the Internet, NASA Public Affairs Home Page, 1997 News Releases, at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-065.txt.***

NEW IMAGES HINT AT WET AND WILD HISTORY FOR EUROPA – (Jet Propulsion Laboratory, Pasadena, Calif.) Chunky ice rafts and relatively smooth, crater-free patches on the surface of Jupiter's frozen moon Europa suggest a younger, thinner icy surface than previously believed, according to new images from Galileo's spacecraft.The images were captured during Galileo's closest flyby of Europa on Feb. 20, when the spacecraft came within 363 miles of the Jovian moon. These features, which lend credence to the idea of hidden, subsurface oceans, also are stirring up controversy among scientists who disagree about the age of Europa's surface. ***For more information, see the Internet address at ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-066.txt.***

LOW OZONE MEASURED OVER NORTH POLE – (Goddard Space Flight Center, Greenbelt, Md.) Unusually low levels of ozone over the Arctic were measured during March by satellite-based monitoring instruments operated by NASA and the National Oceanic and Atmospheric Administration (NOAA). Centered in a stable, nearly circular region over the North Pole, the average March 1997 ozone amounts were 40 percent lower than the average March amounts observed between 1979 and 1982. This follows ozone amounts in March 1996 that were 24 percent lower than the 1979-82 average, although this low was off center of Earth's pole toward the North Atlantic. ***More information is available at this Internet address – ftp://ftp.nasa.gov/pub/pao/pressrel/1997/97-064.txt.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "In a competitive marketplace, it is necessary to keep a competitive edge through innovation and problem solving. Diverse teams are more effective and creative in this increasingly competitive economy." – from "Facts About Diversity," National MultiCultural Institute.

▲ April 27 is Holocaust Memorial Day (Yom ha-Shoah), commemorating the death of six million Jews at the hands of the Nazi regime.

▲ To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Disabilities Awareness

NASA scientists help child to overcome cerebal palsy

NASA scientists Dr. Craig Streett and Dr. Michele Macaraeg, also husband and wife, volunteer their time to help 11-year-old cerebal palsy victim Jennifer McIntosh.

Born with the condition, Jennifer retains full voluntary motion of only her eyes, with limited control of her head. A gifted child with only physical limitations, she is an honor roll student at Watkins Elementary School in Newport News, and she says she would like to become a pediatrician.

Streett, a senior research scientist in the Flow Modeling and Control Branch, and Macaraeg, the assistant branch head for the Aerodynamic and Acoustic Methods Branch, met Jennifer through Pat Link in the Office of Education. Link had been raising funds for Jennifer's support, including the purchase of specialized equipment to allow her to use a personal computer. However, this particular commercial interface crashed frequently and was awkward to use.

Streett and Macaraeg began working with Jennifer last summer, and during the course of one year, Streett constructed a custom computer interface allowing her to use a mouse and keyboard with a single switch, controlled by a head motion.

Using spare parts, personal funds and time, as well as an innovative approach, he built the entire

Cont'd on pg. 3

Announcements

New training system debuts on center

Langley announces the premiere of the NASA Safety and Mission Assurance Training System. A demonstration will be held on April 29, at 1, 2 and 3 p.m., and on April 30, at 8, 9 and 10 a.m, and at 1, 2 and 3 p.m., in the Evaluation and Information Center, Building 1130T3, Room 1.

For more information, call Chuck Zeitman at ext. 43371.

Career seminars set for May

The Career Transition Assistance Program Center offers the following workshops in May:

▲ "Money Matters – Benefits, Options and Plans, May 1, 1:30-4 p.m.

▲ "Starting Your Own Business," (four parts) May 6-7, 13-14, 1-4 p.m.

▲ "Retiring for Fun, Not Profit," May 20, 9 a.m.-noon

▲ "Communicating Effectively with Your Supervisor," May 22, 9 a.m.-noon

▲ "The Net and Career Development," May 27, 9 a.m.-noon; 1-4 p.m.

The seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required.

For more information, call ext. 45000.

Braun to deliver May colloquium

Dr. Robert D. Braun, aerospace technologist in the Space Systems and Concepts Division, will present the center's May colloquium lecture, May 6, 2 p.m., at the H.J.E. Reid Conference Center. The lecture is titled "A New Era of Planetary Exploration."

At 7:30 p.m. the same evening, he will repeat the talk as part of the Sigma Lecture Series at the Virginia Air & Space Center in Hampton.

Board meeting set

The Airworthiness Safety Review Board meets on the first Wednesday of the month, 1 p.m., in Building 1209, Room 180. The next meeting is May 7.

GWU offers engineering courses

The George Washington University School of Engineering and Applied Science at NASA Langley will offer a new set of courses leading to the master of engineering management degree, beginning in the fall semester. Individual interviews will be conducted at the center on May 28.

For more information on this or other GW programs, call ext. 41982, fax to ext. 45894, or e-mail atgwu+jiafs@larc.nasa.gov

Training offered

The Employee Development Branch will offer the following program management and control courses:

▲ **Work Breakdown Structure**, April 30-May 1, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103

Topics covered include:

- Fundamentals of a WBS
- Requirements and guidelines for preparation of a program/project WBS
- Preparation of a program and project WBS
- Requirements and guidelines for the contract WBS
- Preparation of preliminary and extended contract WBS
- WBS relationship to: agency-wide coding structure, contractor's reporting of correlated cost and performance data performing organizations, project management organizations, and program control process

Course prerequisite is the Program Management and Control Fundamentals course or the equivalent.

▲ **Parametric Cost Estimating**, June 17-18, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103

Topics covered include:

- Cost estimating process
- Parametric estimating process
- Cost estimating relationships (CER)
- Subsystem CER-based cost estimating models
- Project level costs
- Beta curves for spreading costs
- Risk analysis
- Application of the time value of money in a cost estimating process
- Application of learning curves in a cost estimating process
- Reusable reentry satellite cost estimating case study
- Overview of the PRICE hardware and software models

Course prerequisite is the Program Management and Control Fundamentals course or the equivalent. Calculators are required for this class.

For more information, call ext. 42599.

In memory of Stacey M. Mills

Stacey McNeil Mills, 75, died March 30 at the University of Virginia Medical Center following a long battle with throat cancer. He retired from NASA Langley in 1977 after 34 years of service.

In memory of Margaret Livingston

Margaret A. Livingston, 74, died April 2 in Fort Pierce, Fla. She retired from NASA Langley in 1973.

In memory of John P. Morgan

John Porter "J.P." Morgan, 82, died April 2 in Hampton. A former branch head of the Aerospace Model Development Branch, he retired from NASA Langley in 1972 after 31 years of service.

In memory of George F. Black Sr.

George Fleming Black Sr., 78, died April 7. He retired from NASA Langley in 1980 as a pyrotechnic technician after 40 years of service.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.f.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Division rewards inventiveness

This year's winners of the Innovation Award, bestowed by the Aerospace Mechanical Systems Division (AMSD), are Larry Bement and Elvin Ahl.

Bement received the award for his "Augmented Shock Wave Severance of Aircraft Canopies," an innovative approach to separate military aircraft canopies in the event the crew must eject.

Ahl was recognized for his "2 X 2 Camera Array Mount for the HSR B737" innovation.

Management personnel of AMSD created the Innovation Award last year to recognize division employees who created a significant innovation.

"Innovation" is defined as the introduction of novel or improved products and/or processes and may be hardware, software or administrative.

To qualify for the award, the product or process must have been developed within the last three years and must be primarily conceived and/or developed by AMSD personnel. Candidates submit a short description to the Innovation Award team, which consists of a member from each AMSD branch.

After initial screening, the Innovation Award team assigns mentors to those candidates who are asked to prepare a presentation, after which the team evaluates the candidates for their innovativeness, for demonstration of its actual or potential impact and influence, and for the significance of its benefits.

The team then recommends to the AMSD management which individuals or groups should receive the Innovation Award.

Photo by Peggy Hopkins

Elvin Ahl poses next to his swivel plate pointing device. The innovation serves as a camera mount for the 737 aircraft, enabling pilots to view the runway during the high-angle-of-attack landings of high-speed transports.

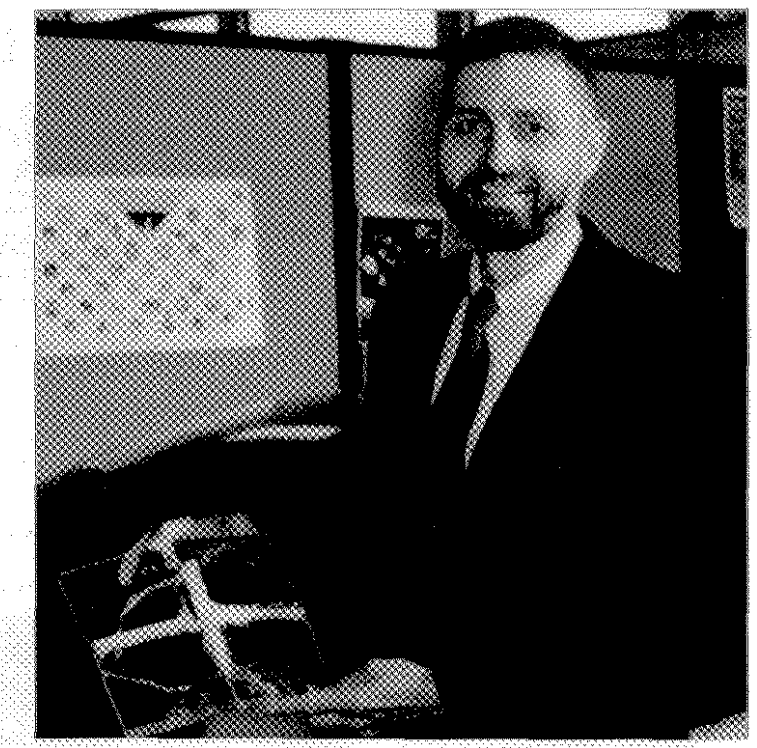


Photo by Bill Salyer

Larry Bement holds an explosively fractured canopy specimen, which was removed from an F-16 canopy like the one shown behind Bement.

CHILD

(continued from page 2)

system at a fraction of the cost of similar commercially available equipment. Streett's interface has proven to be more reliable and flexible than the one Jennifer had been using; it works with a wide range of computer systems and can adjust to include hand or arm movement.

In addition, he is working on a robotic arm hooked to the interface that will grasp and lift – perhaps allowing Jennifer to feed herself.

The new interface currently allows Jennifer a newfound independence in communication, including working a TV, activating her mother's pager and doing homework.

"She has an exceptional memory," said Jody McIntosh, Jennifer's mother and a single working parent. "But communicating with those around her is nearly impossible without this equipment. It has opened a whole new world for her."

"We are proud to be able to work with Jennifer," said Macaraeg. "We fully believe that, with all the advances coming our way in computer technology, Jennifer can become a great pediatrician one day."

"The most important aspects of an individual's success are his intellectual capabilities and his degree of motivation to attain personal goals," said Streett. "Jennifer is well above average in both of these attributes."

Working with her at least once a week, Streett and Macaraeg determine what tasks Jennifer may be able to accomplish.

"This little girl thrives on any opportunity to do more and more on her own – and surprises all of us with her cleverness in using any advantage to accomplish a given task," said Macaraeg. "It's worth our time and effort just to see a special little girl smile with triumphant joy at her newfound capabilities."

Photo by Peggy Hopkins

Using the interface developed by Craig Streett (standing), 11-year-old Jennifer McIntosh, right, communicates with Peggy Overbey of the Data Analyis and Imaging Branch during a visit to Langley arranged by Gerry Rankin of the center's Satellite Committee for People with Disabilities.

New contractor offers medical support for employees during international travel

In an effort to maintain employee safety, ensure customer satisfaction and to deliver high-quality emergency medical care when necessary to employees located overseas, NASA has instituted a new contract with International SOS Assistance INC. This contractor will provide civil servants and contractors engaged in official NASA business with many services upon request during a medical or personal emergency.

SOS provides medical service in all remote areas of the world through a network of multilingual staff trained to help resolve travel, medical, legal and security problems.

Its critical care and aeromedical specialists operate nonstop from SOS Alarm Centers around the world. Services range from telephone advice and referrals to full-scale medical evacuations. Services are not limited to medical problems, so a member can call at any time and for any of the following services:

Medical assistance

- ▲ Pretrip referral information
- ▲ Dispatch of a doctor
- ▲ 24-hour worldwide medical assistance
- ▲ Emergency evacuation
- ▲ Emergency medication
- ▲ Medically supervised repatriation
- ▲ Hospital deposit guarantee
- ▲ Repatriation of mortal remains
- ▲ Medical monitoring

Personal assistance

- ▲ Embassy and consular information
- ▲ Emergency personal cash
- ▲ Lost document assistance
- ▲ Legal Access
- ▲ Emergency message transmission
- ▲ Translation and interpreters

Prior to international travel, call the Occupational Medicine Clinic, at ext. 43193, to receive an SOS ACCESS card and an ACCESS service guide.

Langley contractor wins NASA's Low award

Newport News-based Langley contractor Dynamic Engineering Inc. won one of four George M. Low awards presented April 18 in Washington, D.C. The prestigious national award is presented annually to NASA contractors who demonstrate an exceptional level of quality and technical performance in NASA-related contracts or subcontracts.

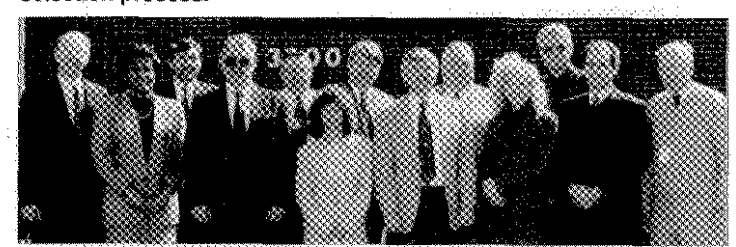
Another of Langley's contractors – Wyle Laboratories of Hampton – was among the six national award finalists.

The award signifies NASA's recognition of its outstanding prime- and subcontractors in four categories: large and small business, product and service, and small business, product and service.

As part of the selection process, the award validation board visited both DEI and Wyle last month.

Photos by Bill Salyer

Validation board members visited with DEI employees (above) and with Wylie Laboratories employees (below) during March as part of the selection process.



School kids keep their heads in clouds

BY CATHERINE E. WATSON

During the school day, most teachers prefer that their students keep their heads in the classroom. At two local elementary schools, however, teachers are encouraging their students to keep their heads in the clouds.

Fourth-graders at Poquoson Elementary School and sixth-graders at Peasley Middle School in Gloucester are learning to observe clouds as part of a NASA Langley global cloud measuring project – the Students' Cloud Observations On-Line (S'COOL) project. The S'COOL project provides ground-based cloud measurements in support of a Langley-developed satellite experiment to be launched in November.

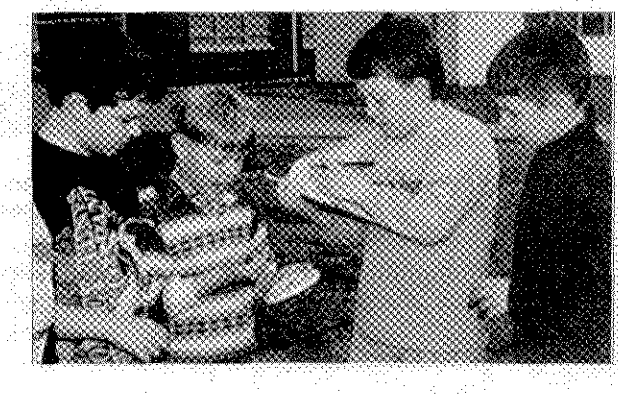
The students' initial cloud observations are being compared to data taken from a weather satellite orbiting the Earth. Later this year, after the students have perfected their cloud observing techniques, they will make cloud observations that Langley researchers can compare to their new satellite experiment, the Clouds and the Earth's Radiant Energy System (CERES) instrument.

Researchers from the Radiation Sciences Branch taught the students how to determine the types of clouds above their school, the clouds' altitudes and how much of the sky is covered by clouds at the time of their observation. Working in teams, the students form a consensus of their observations. Then, via the Internet, the students place their data in the Langley Distributed Active Archive Center (DAAC), where the data is stored for further analysis.

"I know [the students are] learning things," said Carol Mitchell, a fourth-grade teacher at Poquoson Elementary School. "They've learned all the way across the curriculum. Their math skills are involved, all their language arts skills are involved; their comparison skills, their observing skills are sharpened.

Photos by Peggy Hopkins

Students at Poquoson Elementary School observe clouds as part of the Students' Cloud Observations On-Line (S'COOL) project.



I've seen a lot of good things happen with this [program]."

"It's a great opportunity for students to get involved in a real scientific project with real scientists," said David Young, a researcher in the Radiation Sciences Branch and a mentor to the students.

CERES will be a follow-on to Langley's highly successful Earth Radiation Budget Experiment that was launched in 1984. CERES will provide long-term global data on the Earth's clouds and energy budget, and will be launched in November aboard the Tropical Rainfall Measuring Mission satellite as part of NASA's Mission to Planet Earth program.

"Clouds are important because they help modulate the climate," said Young. "We're looking for signals from possible global warming, and it's been shown that clouds are a very important aspect [of global warming]."

"One of the hardest jobs for CERES is the determination of clear sky; that's the easiest part of the observation for the kids," said Lin Chambers, a researcher in the Radiation Sciences Branch. "S'COOL observations will allow us to improve the CERES clear sky algorithms and will help the kids understand how clouds connect to climate."

"At the time we're making cloud observations (with CERES), we're going to have students across the country making observations of cloud amount and cloud height that we can use to help validate our measurements," said Young.

"So far, I have schools in Pennsylvania, South Dakota, Georgia, Arizona, New York and, of course, Virginia," said Chambers.

The Langley researchers also plan to enlist students worldwide to observe clouds for the S'COOL project.

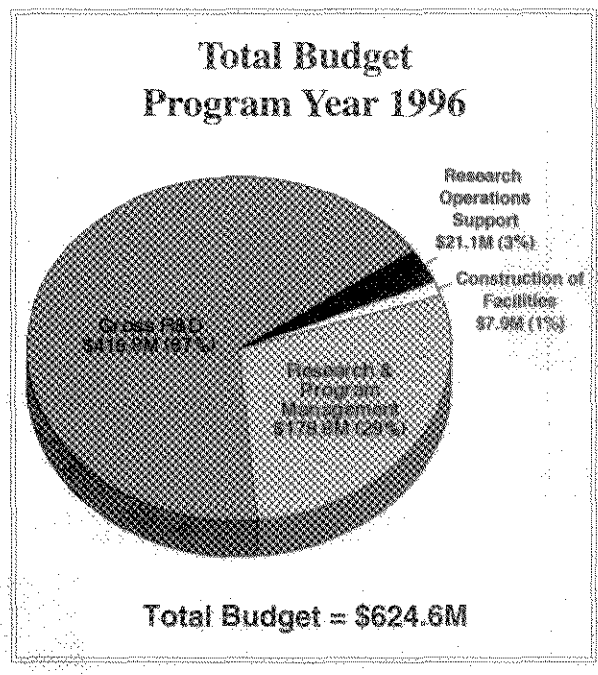
"I'm already working with contacts in Chile, South Africa, Korea, Australia and the Philippines for later global tests," Chambers added. "The importance of global coverage is that we need to compare to satellite results in as many different places as possible."

IMPACT

(continued from page 1)

Graduates From Virginia Schools

School	Number
Averett College	1
Christopher Newport University	72
College of William & Mary	82
College of William & Mary: Central Office	4
Richard Bland College of William & Mary	1
Eastern Shore Community College	1
Emory and Henry College	2
George Mason	1
Hampden-Sydney College	1
Hampton University	11
James Madison University	6
J. Sargeant Reynolds Community College	2
Longwood College	1
Lynchburg College	2
Mary Washington College	2
New River Community College	1
Norfolk State University	16
Northern Virginia Community College	1
Old Dominion University	203
Radford University	1
Randolph-Macon College	1
Rappahannock Community College	2
Roanoke College	1
Tidewater Community College	21
Thomas Nelson Community College	419
University of Richmond	8
University of Virginia	84
University of Virginia: Central Office	1
Virginia Commonwealth University	15
Virginia Polytechnic Institute and State University	234
Virginia State University	6
Virginia Union University	1
Virginia Wesleyan College	2
Washington and Lee University	1
Total Langley civil service employees with at least one degree from a Virginia school:	**1,207**



NASA Langley Employment

Fiscal year	Total employment	Civil service employment	Contractor employment
Actual:			
1994	4947	2927	2020
1995	4726	2751	1975
1996	4395	2562	1833
Projections:			
1997	4127	2550	1577
1998	4001	2500	1501
1999	3879	2500	1379
2000	3654	2416	1238

'Sun 'n Fun' features NASA aero exhibits

BY DONNA ROPER

Nearly 700,000 people attended the 23rd annual Sun 'n Fun Experimental Aircraft Association (EAA) Fly-In in Lakeland, Fla., April 6-12, the second largest event of its kind in the world.

As visitors entered the huge tent that housed the NASA exhibits, they were immediately enticed to take a spin in the F/18 flight simulator provided by NASA Goddard.

The next eye-catcher was NASA Langley's multimedia kiosk, where visitors could learn how the center's aeronautics research will make future aircraft faster, safer and more affordable.

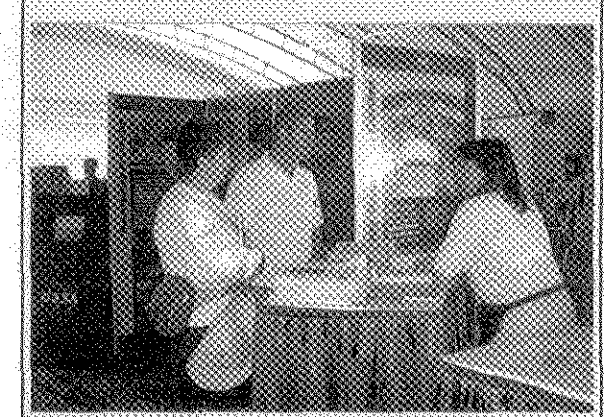


Photo by Karen Crudeur

Donna Roper, right, of Langley's Public Services Office, answers the questions of two Sun 'n Fun visitors at the NASA Langley exhibit.

Langley also offered a panel exhibit that described its work in aeronautics, technology transfer, materials, structures and space. Public affairs specialists from the center answered questions, while visitors picked up 757 airplane gliders and fact sheets on high-speed research and general aviation.

Aviation enthusiasts hovered around the panel exhibits of the Advanced General Aviation Transport Experiments consortium. Pilots were especially interested in the model engines that highlighted work from NASA Lewis's general aviation propulsion program. Other popular exhibits detailed recent NASA work in aviation safety, high-speed research and technology transfer.

(see SUN 'N FUN, page 5)

New deputy director for program assessment office settles in at Langley

BY MARY GRAVES

As Langley's new Independent Program Assessment Office (IPAO) gets into full swing this spring, David J. Pine joins the office as deputy director under IPAO Director William M. Piland. Pine is the former director of the Systems and Cost Analysis Division at NASA Headquarters, Washington, D.C.

The 30-year NASA veteran had also served as the deputy program manager for the Hubble Space Telescope in the Office of Space Science. He arrived here in mid-March.

The functions of the IPAO have been transitioning to Langley from Headquarters over the past several months. The office performs two NASA-wide tasks: It conducts independent assessments of proposed new systems concepts, prior to agency approval for development, and it organizes and conducts evaluations of proposed and ongoing programs in support of the NASA Headquarters' Program Management Council (PMC).

Photo by Sandie Gibbs

IPAO Deputy Director David Pine

This latter function is Pine's major charge. His staff of six supports nonadvocate reviews, which occur before a program is approved for development, and performs independent annual reviews, which occur during a program's development and operational phases.

"The agency reviews all of its major programs annually, and that's what my division (at HQ) used to do," said Pine, "And now that function has transferred to Langley.

"We'll be leading the effort – pulling teams together to go out to do the reviews on the order of two dozen major programs annually."

After residing in Maryland for more than 30 years, Pine's move to Langley was "totally my choice," he said, when the impending transfer of the IPAO function became apparent – the result of a directive issued by NASA's Deputy Administrator General John R. Dailey in February 1996.

"We were in the process of implementing our downsizing plan at Headquarters that reduced our office from 10 to four analysts," he said. "Of the original 10, three people came to Langley with the movement of the functions, all within about a year from the original directive."

A year well spent, Pine said.

"We took our time in selecting the staff of the new organization," he said. "I think it's paid off in that we have a top-notch group of people.

"We have three people with a lot of prior experience and three who are brand new. We'll use this year to bring the new people up to speed. Then, starting in the next fiscal year, they'll be leading their own reviews."

As the IPAO gets on its feet, Pine says, "We'd like to see a seamless transition [from HQ to Langley] so that our customer – the PMC – doesn't detect any start-up problems or growing pains."

Festival season kickoff

Spring rain surprises Suffolk event

BY MEGHAN WOODCOCK

Despite an intermittent problem with the wind and rain, about 125,000 visitors attended the Suffolk Spring Spectacular & Balloon Fest, April 11-13, which included exhibits from NASA Langley. Only half of the nearly 40 hot-air balloons to be featured at the event braved the gusty winds Friday and Sun-day to fly, with rain cancelling all balloon flights on Saturday.

"We were all a little disappointed," said Linda Stevens, director for Suffolk Festivals, Inc., of the weekend battle with the elements, "but we still had a wonderful event."

Photo by Jeane Shanks

The Suffolk Balloon Fest was one of the largest festivals of its kind on the East Coast. Nearly 40 hot-air balloons floated through the event, including one "giant purple people-eater" (second from right).

Besides the hot-air balloon displays, festival-goers were treated to an abbreviated air show Saturday and a full air show on Sunday.

Those aeronautics enthusiasts who wanted to see even more on flight found their way to Langley's exhibits inside the commercial exhibits tent. Langley provided the Suffolk crowd with a panel exhibit and a video kiosk describing NASA Langley's support of a massive Federal Aviation Administration-led effort to prove aircraft communications, navigation and surveillance concepts at the 1996 Summer Olympic Games in Atlanta, Ga. The government-industry effort was part of Advanced General Aviation Transport Experiments, a research program to revitalize single-pilot general aviation.

Langley's Eric Cooper, Audrey Coppedge and Jeane Shanks came out to the Suffolk event to answer questions from festival-goers and to hand out publications from the Public Inquiry Center.

SUN 'N FUN

(continued from page 4)

The NASA tent also showcased the revolutionary CarterCopter designed under a NASA Small Business Innovative Research award by Jay Carter of CarterCopters Inc., in Wichita Falls, Texas. The CarterCopter is a gyroplane that will take off and land vertically and will fly at low speeds, like a helicopter, while still matching the high speeds, long range, high altitude and efficiency of a regular airplane. A full-scale version of the CarterCopter is scheduled for flight testing this fall.

Outside the NASA tent, representatives from Mod Works Inc. talked about how they used NASA human factors engineering research to retrofit the general aviation cockpit of a Mooney 221 ES. The cockpit redesign work was the result of a NASA Small Business Technology Transfer award won by Mod Works and the Florida Institute of Technology.

Photo by Donna Roper

Joni Richards, left, of Kennedy Space Center, Sid Siddiqi, EAA representative, and Sonja Englert, of Mod Works, Inc., stand by the Mooney 221 ES.

Langley retiree authors book exploring Williamsburg battle

Former Langley aerospace engineer Earl C. Hastings Jr. and his son David have co-authored a book about the Civil War's Battle of Williamsburg, to be published next month by White Mane Publishing, Shippensburg, Pa.

A Pitiless Rain: The Battle of Williamsburg, 1862 is the first full-length study of this two-day battle and its strategic importance, with much of its material based on original sources previously unpublished.

At its height, the conflict involved more than 20,000 troops in combat. The Hastings reconstruct the action and highlight the stories of military and civilian participants in the battle and its aftermath. The book's extensive appendix describes the location of the battlefield – adjacent to which Earl Hastings resides – and includes descriptions of extant key sites.

Author Earl Hastings

A native Virginian and U.S. Air Force veteran, Hastings retired from the Flight Research Branch in 1990 after 39 years of service with NASA Langley.

The book's appearance will coincide with the 135th anniversary of the battle on May 4 and 5.

Former SHARP student wins full college scholarship

Matthew Baker, a graduating senior at I.C. Norcom High School in Portsmouth and a participant in last year's NASA Summer High School Apprenticeship Research Program (SHARP), received North Carolina State University's prestigious Park Scholarship. The full scholarship will cover all expenses for Baker's college education. He will graduate with a bachelor of engineering degree in 2001.

As a result of his performance in Langley's SHARP program, Baker's mentors, Richard Schwartz and James Meyers of the Measurement Science and Technology Branch, asked him to return to work here during the school year.

SHARP is in its 18th year of offering rising high school seniors an opportunity to participate in an intensive science, engineering and research environment. A recent survey of 166 former SHARP students indicated that more than 95 percent majored in science, mathematics or engineering in college.

For more information, call Walt Darden at ext. 44848.

AdVentures

FOR SALE: SONY 8mm camcorder, custom-fit SONY hardcase, two new Ni-Cad batteries, tape, other accessories, all instruction manuals, needs minor repair. $300 or best offer. Call 874-3121.

FOR SALE: Kiln Creek/Westgate home, 2,400 square feet, 4 BR, 2.5 baths, brick front, large lot on cul-de-sac, security system. $149,000. Call 877-3955.

FOR SALE: One-year-old color laptop computer, 120 MHz, 1.3 GB HDD, 16 MB RAM, 4X CD, new battery, Windows 95, plus lots of software. Paid $3,500; will sell for $1,700. Call Greg at 627-5839.

FOR SALE: 1985 blue Pontiac Sunbird; 107,000-plus miles; dependable in-town transportation; rebuilt engine; recent engine tune-up; new muffler, battery, front/rear brakes. Inspected 10/96. $750, negotiable. Call 838-9391.

FOR SALE: Two time-share condos, SeaScape Beach and Golf Villas, Kitty Hawk, N.C., Unit G-1, Week 43, $4,000; Ocean Villas II, Milepost 16, Nags Head, N.C., Unit 204, Week 38, $3,000. Call Paul Hunter at 380-6011.

FOR SALE: Hot Point window air conditioner, 12,000 BTU/HP, 110 volts. $125. Call 596-3394.

FOR RENT: One-year-old house at Kiln Creek, 2 BR, 2.5 baths, large kitchen with breakfast area, lots of storage, two-car garage, fenced back yard, convenient to shopping, easy access to I-64. Call 989-0940.

WANTED: Roommate to share 2 BR, 2-bath house in Hampton/Wythe from mid-May to mid-December; furnished or unfurnished. $300/month plus half utilities. Call 244-6003.

TENNIS, ANYONE? The Langley Tennis Club will hold a spring picnic/doubles tournament, April 26, at the Langley Activities Assocation picnic grounds and courts. For more information on club activities and/or membership application forms, call Marco Egoavil at ext. 47247 or Tom Yager at ext. 41304.

MAY FUN RUN: The Langley Fitness Center and the Runners' Club are cosponsoring a 2-mile walk/run May 1, open to everyone, to kick off National Fitness Month. A reception will follow the 5 p.m. race. The Fitness Center is also offering chair massages on May 8, 11 a.m.-2 p.m., at $10 for 10 minutes. For more information, call ext. 46387.

NATIONAL DAY OF PRAYER: All members of the Langley community are invited to join in an observance of the National Day of Prayer, May 1, 7:30-8 a.m., at the headquarters flagpole, rain or shine; plus a prayer-and-praise service, 11:30 a.m.-12:30 p.m., at the Pearl Young Theater (come and go as your schedule permits). For more information, call ext. 44604.

AIAA AWARDS BANQUET: This annual event, sponsored by the American Institute of Aeronautics and Astronautics, will be held May 6, 6 p.m., Langley Air Force Base Officers Club. Featured guest speaker, former astronaut Dr. Norman E. Thagard, will discuss his experiences on the Mir Space Station during the Mir 18 mission in 1995. Cost is $16 for members and guests; $17 for nonmembers; $10 for students; payable at the door. Nonmembers who join AIAA at this event will receive a complimentary dinner. To make reservations by April 30, contact Odilyn Santa Maria at ext. 45104 (o.l.santamaria@larc.nasa.gov) or Lynda Foernsler at ext. 48146 (l.j.foernsler@larc.nasa.gov)

LANGLEY'S ALUMNI ASSOCIATION meets the second Tuesday of the month; next meeting is May 13, 11:30 a.m., NASA Langley cafeteria; subject is Newport News Waterworks – Future Community Impacts. For more information, call 864-7330.

FORE!! In the NASA Golf Association's kickoff tournament at Langley's blue course on March 28, 112 golfers teed off in a 4-person captain's choice format. The team of Gary Bayless, Bill Yeager, Matt Wilbur and Mike Taylor shot the low round of the day, a 60, 12 under par. For membership information and a NGA tournament schedule, call Richard Russell at ext. 41935 or Tom Yager at ext. 41304.

GONE GOLFING: The American Institute of Aeronautics and Astronautics sponsors its sixth annual golf outing, June 26, 1:30 p.m. shotgun start, at Eaglewood, the Langley Air Force Base golf course. $35 per player, or $140 per team, to cover greens fee, cart, tournament prizes, and to benefit the AIAA Scholarship Fund. For more information or to register, contact John Paulson at ext. 45071 or e-mail at j.w.paulson@larc.nasa.gov

AIAA SPRING PICNIC: This annual event, sponsored by the American Institute of Aeronautics and Astronautics, will be held June 26, 4:30-7 p.m., at the picnic grounds of the H.J.E. Reid Conference Center. $5 for members, guests, golf outing players; $7 for nonmembers; $3 for student members; $2 for children ages 6-12; free for children under age 6; payable at the door. To make reservations by June 23, contact Lynda Foernsler at ext. 48146 or e-mail at l.j.foernsler@larc.nasa.gov; or contact Paresh Parikh at ext. 42244, or e-mail at p.c.parikh@larc.nasa.gov

ULTIMATE FRISBEE AT LANGLEY: Come toss the frisbee twice a week, 5-7 p.m., for men and women of all skill levels. For more information or to get on the e-mail list, contact jrrjr@icase.edu, or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 4-31, 1998, to Whisler/Blackcomb, British Columbia. The trip is open to all NASA personnel, contractors, retirees, their friends and family. For more information, call Michael Schooley at ext. 48524 or at 867-8093.

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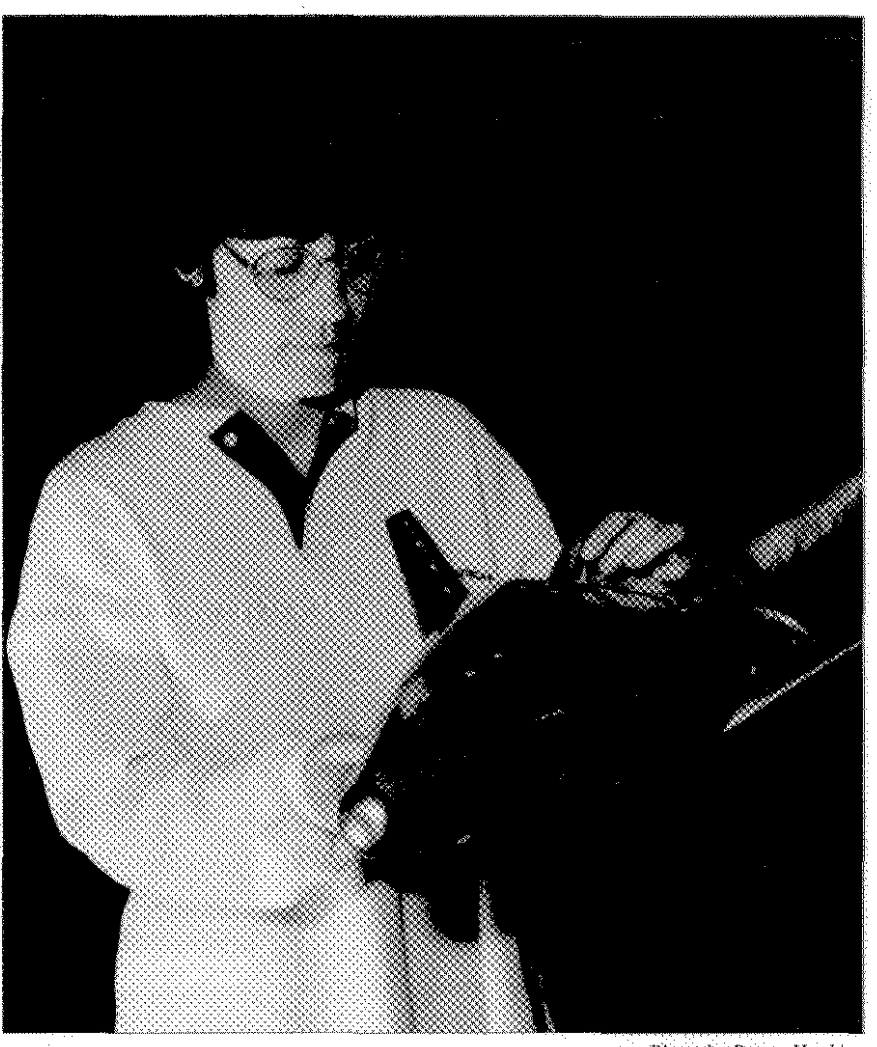


Photo by Peggy Hopkins

X-TENSIVE TESTING – Kelly Tarkenton, a technician in the Operations Support Division, prepares a metal model of the X-33 for testing in Langley's 16-Foot Transonic Tunnel. Other wind tunnel testing of various X-33 models continues here through July.

National Aeronautics and
Space Administration
Langley Research Center

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 9 ❖ May 9, 1997

Heat-resistant material licensed for high-performance pistons

California company first to use Langley-tested carbon-carbon pistons

BY KEITH HENRY

NASA Langley has granted a California company the first license to use a tough, heat-resistant, space-age material to make high-performance pistons for internal combustion engines.

Hitco Technologies, Gardena, Calif., was granted exclusive rights to make, sell and use carbon-carbon pistons for high-performance automotive applications and co-exclusive rights for competition racing and small-to-large-bore diesel engines in the United States and certain foreign countries. The company intends to develop and manufacture the pistons at its factory in Gardena.

Carbon-carbon pistons offer significant weight savings and improved thermal performance over their aluminum and steel counterparts, as well as improving performance and reducing emissions.

The material was originally developed in the 1960s as a high-strength heat shield material for strategic missile applications. Today it is widely used for brakes in aircraft, clutches in Formula One and Indy race cars and for military and aerospace applications, including space shuttle wing leading edges and nose cap.

Researchers at NASA Langley have successfully tested prototype pistons in various size gasoline engines and have patented a number of concepts relating to carbon-carbon pistons for internal combustion engines. A carbon-carbon composite will maintain its strength and stiffness at operating temperatures well above 2,500 degrees Fahrenheit and has nearly zero thermal expansion.

Pistons used in high-performance internal combustion engines are usually made of an aluminum alloy. The strength and stiffness of aluminum alloy decreases rapidly as material temperatures rise above 350 Fahrenheit. (The alloy's melting temperature is approximately 1,100 Fahrenheit.) Aluminum alloy also expands significantly with heat.

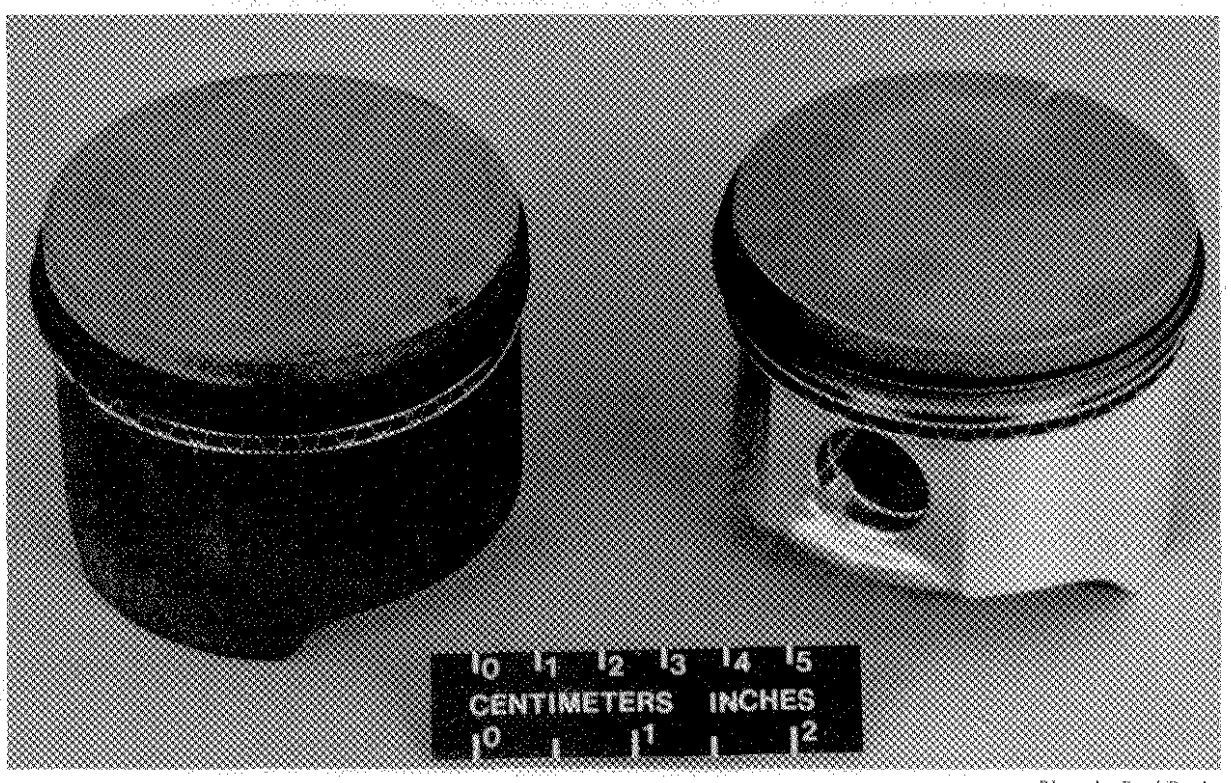


Photo by Paul Bagby

A carbon-carbon piston, left, is compared to a standard aluminum piston for a 9-horsepower utility engine, like those used in lawn mowers and snow-blowers. The 3-inch-diameter bore engines are supplied by Briggs and Stratton under a Memorandum of Agreement with Langley and are used for durability and oxidation protection studies.

"Carbon-carbon is the material of choice for the most demanding applications," said Burton Northam of Langley's Environmental Interactions Branch, and a carbon-carbon piston researcher.

Northam worked with Langley researchers Philip Ransone, Kevin Rivers and Philip Glaude in carrying on the pioneering work of Langley's Allan Taylor begun in the mid-1980s.

"We are excited to add this promising technology to our carbon-carbon portfolio," said Dan Pichler, Hitco's vice president of marketing. "We look forward to taking the lead in commercializing this technology."

Langley's Technology Applications Group is seeking additional licensing partners for carbon-carbon piston technology, as well as for related technologies for cylinder liners, exhaust manifolds, engine valves, turbo-charger housings and rotary engine components.

Extra! Extra!

The *Researcher News Electronic Extra* has posted President Clinton's statement to Congress on the nation's commitment to science and technology. To view the complete text, see this Internet address: ***http://oea.larc.nasa.gov/RN_Extra/RN_Extra.html***

Colloquium Communiqué

Expert in Computational Fluid Dynamics to discuss methodology

Dr. Paul E. Rubbert, of the Boeing Company, Seattle, Wash., will deliver Langley's June colloquium lecture on June 3, 2 p.m., at the H.J.E. Reid Conference Center. The talk is titled "The Evolution of Aerodynamic Design with Wind Tunnels, Computational Fluid Dynamics and Computational Optimization."

Over the span of Rubbert's career, the practice of aerodynamic design has evolved, guided by theoretical aerodynamics, wind tunnel testing and the ever-increasing role of Computational Fluid Dynamics (CFD). Until the 1990s, progress had occurred at a rate paced by the growth of computer power; computation optimization in the design process had become viable.

The early 1990s brought a period of major adjustment and realignment, as airplane companies adapted to a new kind of industrial competitiveness. During this period, the focus changed from product performance to process performance. The practice of optimization switched from maximizing the mission performance of an airplane to maximizing customer satisfaction. The relationship between aerodynamic design shaping and the manufacturing processes was becoming a key aspect of aerodynamic design. Timeliness had become the dominant theme.

New directions in wind tunnel methodology, CFD and computational optimization were launched at Boeing in the early 1990s as a response to this new competitiveness. Those developments have now matured to the point where their impact is being felt in an increasing number of airplane development activities. We have entered a period where improvements to aerodynamic design process are taking place at an unprecedented rate.

Rubbert

Rubbert's lecture provides a number of examples of recent airplane design activities that illustrate how advances in wind tunnel, CFD and optimization methodology are producing some truly dramatic and inspiring advances.

Rubbert is an international expert and leader in the development and application of CFD in aerodynamic design. He holds bachelor's and master's degrees in aeronautical engineering from the University of Minnesota and a Ph.D. degree in aerodynamics from the Massachusetts Institute of Technology.

He began his career at the Boeing Company in 1960, where he lead aerodynamic design activities for transonic transport aircraft. In 1972, he became the manager of a world-renowned CFD research group, and subsequently became the director of Boeing's CFD laboratory. Today he is a Boeing Technical Fellow and is leading the transformation of aerodynamic engineering in a quality movement that is revitalizing an increasing number of U.S. corporations.

FYI

What: Langley Colloquium Lecture
Dr. Paul E. Rubbert, the Boeing Company
"The Evolution of Aerodynamic Design with Wind Tunnels, Computational Fluid Dynamics and Computational Optimization"
When: June 3, 2 p.m.
Where: H.J.E. Reid Conference Center
Info: ext. 44918

News Briefs

Around the Agency

DISCOVERY MISSION PROPOSALS SELECTED FOR FEASIBILITY STUDIES – (NASA Headquarters, Washington, D.C.) NASA has selected five proposals for detailed study as candidates for the next missions in the agency's Discovery program of lower-cost, highly focused scientific spacecraft. The proposals selected would send spacecraft to study Mercury, the atmosphere of Venus, the moons of Mars, comets and the solar wind. NASA will select one or two of the investigations in October for full development as the next Discovery program flights.

NASA SELECTS PHASE II SMALL BUSINESS PROJECTS – (NASA Headquarters, Washington, D.C.) NASA has selected 14 additional research proposals for negotiation of Phase II contract awards for NASA's Small Business Innovation Research (SBIR) Program. The selected projects, which have a total value of approximately $8.4 million, will be conducted by 13 small, high-technology firms located in nine states.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.

Asian-Pacific American Heritage Month observed

BY DOLLIE MCCOWAN

May is Asian-Pacific American Heritage Month nationwide. The theme of this year's observance is "Asian-Pacific Americans United – One Vision, One Mission, One Voice."

Asian-Pacific Americans are a valued part of the ethnic diversity that enhances our culture and that is so essential to America's strength and vitality. Through their talents and contributions, they have enriched the American experience. Today, 87 Asian-Pacific Americans are employed at Langley.

During May, Langley's cafeteria will serve special Asian-Pacific dishes, and several Asian-Pacific films are available for previewing. For more information, call ext. 43561.

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "The bulk of the entering workforce in the 1990s will be people of color, white women, and immigrants, accounting for 85 percent of the net growth of the nation's labor force. By 2000, women will comprise 47 percent of the labor force. Diversity is here to stay." – from "Facts About Diversity," National MultiCultural Institute

▲ May 29 – National Action Council for Minorities in Engineering Meeting in Washington D.C., (212) 279-2626

▲ To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Management instructions, policy directives now on-line

The Logistics Management Office (LMO), Internal Operations Group (IOG), in conjunction with the Information Systems and Services Division, IOG, reached a major milestone last month. Langley Management Instructions and Langley Policy Directives are now available on the World Wide Web with full-text search, retrieval and printing capability.

This completes Phase I of the Langley Directives Management System (LDMS). The LDMS is linked to the NASA Online Directives Information System (NODIS II) which was developed by NASA Headquarters. NODIS II will eventually house directives from all NASA installations.

Marjorie B. Turner, LMO; Jeanette W. George, Information Systems and Services Division; and NCI employees Alan Leybold, Annette Bermudez, Mike Johnson, Theresa Hines and Glen Braden all helped in this effort.

Phase II of this project will be the development of a management system with the capability to create, view, comment and approve directives. Phase III will consist of putting Langley Handbooks and Langley Procedures and Guidelines on the World Wide Web.

With the advent of the LDMS, Langley employees may easily access directives online. Hard copy distribution of directives is under evaluation and will probably be discontinued in the near future.

The URL address is ***http://misbss20/LDMS/ldmshome.html.*** The instructions and directives will also be available on the Langley Internal Home Page and the Secretaries' Home Page. To submit comments or suggestions, send an e-mail to Marjorie Turner at m.b.turner@larc.nasa.gov.

Announcements

CTAPC offers seminars

The Career Transition Assistance Program Center (CTAPC), Langley's career center, offers the following training seminars during May and June:

▲ "Retiring for Fun, Not Profit," May 20, 9 a.m.-noon

▲ "Communicating Effectively with Your Supervisor," May 22, 9 a.m.-noon

▲ "The Net and Career Development," May 27, 9 a.m.-noon or 1-4 p.m.

▲ "Hone Your Negotiating Skills," June 5, 1-4 p.m.

▲ "Conflict Management for Managers," June 11, 9 a.m.-noon

▲ "Networking for Career Development," June 17, 9 a.m.-noon

▲ "So, You Want To Be a Consultant," June 25, time to be determined

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Technical Forum topics announced for May

The next Langley Technical Forum, May 21, 10 a.m.-noon, in the Pearl Young Theater, will cover these topics:

▲ Polar Ozone Depletion: A Three-Dimensional Chemical Modeling Study of Its Long-Term Global Impact – *Richard S. Eckman*

▲ Near Net Forming of Advanced Aluminum Alloys – *Marcia S. Domack, John A. Wagner*

▲ Textbook Multigrid Efficiency for the Euler Equations – *T. W. Roberts, R. C. Swanson*

▲ A Description of the Hardware Element of the NASA Electromagnetic Environment Flight Test Experiment – *Kenneth L. Dudley*

▲ The Blended-Wing Body: A Revolutionary Subsonic Transport Concept – *Robert E. Mckinley Jr.*

June board meeting set

The Airworthiness Safety Review Board meets June 4, 1 p.m., in Building 1209, Room 180. Bruce Fisher and Frank Benkert will discuss the B-757 Transport Research Facilities Project. In addition, Denise Jones and Steve Young will present the Operational Safety Review for the B-757 Low Visibility Landings and Surface Operations Project. For more information, call ext. 47069.

Security procedures aim to facilitate traffic

NCI/DynCorp Security Services requests your help moving traffic onto Langley. If a vehicle has a NASA Langley decal and if the occupants display a NASA badge, the security officer may wave you right through the gate. The decal must not be hidden under the visor.

If a vehicle does not have a NASA decal, the officer must examine the employee's ID card or badge to confirm that it belongs to the person displaying the ID. This process slows vehicles' access, especially during the morning rush.

To help security move traffic quickly and smoothly, display the NASA decal in a highly visible location on your vehicle windshield or bumper.

Speakers Bureau March activities

Rob Rivers visited the student chapter of the American Institute of Aeronautics and Astronautics, University of Florida, to talk about flight research at Langley and addressed the university's aerospace department seminar regarding the development of a flight test program.

He also spoke to the Langley Air Force Base Chapter of the Daedalian Society about the history of flight research at Langley Research Center.

John Mouring discussed "Archaeology to Aerospace" as part of the Forum Series in Portsmouth.

Natlie Rivers spoke to elemen-tary school students in Sacramento, Calif., about rockets.

Jane Hogge visited Fairview Magnet Elementary School in Roanoke to talk about working in space.

Bobby Braun spoke to students at O.P. Evans Middle School and at East Coweta High School, Newnan, Ga., about Pathfinder's mission to Mars.

Frank Farmer traveled to Southeastern Community College, Whiteville, N.C., to discuss medical and technological discoveries from our space exploration program.

Christine Darden spoke about NASA's High-Speed Research Program to the Piedmont Council of Engineering and Technical Societies and to the faculty and students of North Carolina A&T State University, Greensboro, N.C. She also talked to Bethel Manor Elementary School students about being an engineer.

Jack Fishman addressed the American Chemical Society meeting at Christopher Newport University on "Atmospheric Ozone: Why Is It Good, Why Is It Bad, and What Have We Done About It?"

Mary Ann Smith spoke to chemistry students at Peninsula Catholic High School about "Cryogenics and the Ideal Gas Law."

Frank Thames addressed the GSA Trail Boss Program Implementation at the Hampton Radisson Hotel on "Experience with a Multiple Acquisition Trail Boss Process."

George Hickman Jr. spoke to the CHROME Club at Yates Elementary School in Newport News about using math and science for environmental testing.

Mary Wusk was a speaker for Gir Scout Career Day in Goldsboro, N.C.

Ruth Martin participated in Old Dominion University's 1997 Spring Semester Seminar Series, Department of Aerospace Engineering. Her topic was "Applications of 'Active Structures' to Challenges in Rotorcraft Aeromechanics."

Retiree sends thanks

"I would like to thank all friends who attended and participated in my recent

(see ANNOUNCEMENTS, page 3)

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley teams cited at NASA Continual Improvement and Reinvention Conference on Quality Management

BY SALLY LINDBERG

Two teams at Langley presented the results of their work at the 12th annual NASA Continual Improvement and Reinvention Conference on Quality Management, held in Alexandria on April 18.

Eight teams, selected agency-wide, demonstrated to NASA senior management and contractors their efforts to improve continuously the agency's products and services.

Lawrence E. Putnam, assistant chief for Facilities, Aero- and Gas-Dynamics Division, represented Langley's Wind Tunnel Test Operations Re-engineering Team and presented their results. Ronald G. Lamica of Ames Research Center, Moffett Field, Calif., presented the results of the Project Reliance Fabrication/ Manufacturing Co-Op Team on which Langley and Ames, as well as Dryden Flight Research Center, Edwards, Calif., and Lewis Research Center, Cleveland, Ohio, participated.

Prior to charter of the Wind Tunnel Test Operations Re-Engineering Team, all wind tunnels at Langley operated under separate management and in a "research" mode, focusing on obtaining data to meet research objectives.

Customers frequently expressed concern about Langley's inability to meet schedule commitments, inconsistent processes and procedures across the range of facilities, data quality, and lack of a single point of contact for test scheduling. Such concerns resulted in implementation of several actions to improve productivity and customer satisfaction.

As a result of team efforts, major wind tunnels went under one organization, the Research Facilities Branch of the Aero- and Gas-Dynamics Division, and newly formed teams focused on meeting measurable goals for each facility and the ensemble of facilities.

Other results include the development of a test simulator for test planning and process improvement assessment; implementation of uncertainty analysis principles for pretest planning and for instrument investment and process improvement decision-making; detailed cost/ benefit analyses for all proposed improvements; and implementation of centralized test scheduling through a single point of contact.

The team also developed specific goals and measures of performance to determine progress towards mission accomplishment. As a result, cost per data point for four major facilities decreased by 38 percent; productivity increased by a factor of 2.6, with data quality/accuracy meeting customer requirements and final data routinely provided to customers within two hours following test run; and customer satisfaction is measured regularly and is improving continuously.

NASA expects to realize $16.5 million in cost savings and productivity gains over the next five years as a result of this team's work.

For further data on team results, see the World Wide Web at ***http://fsed-www.larc.nasa.gov/cam/Reeng/***

The Langley, Ames, Dryden and Lewis Fabrication/Manufacturing Reliance Co-op Team aimed to develop a research manufacturing organization that effectively integrates the resources of the four centers.

To that end, the co-op continues to develop smarter ways to do business through sharing of best practices; cost savings – as well as cost avoidance –through coordinated capital equipment purchases; better use of available equipment; increased use of surplus equipment and materials; increased efficiencies through Computer Aided Manufacturing standardization; and innovation in advanced manufacturing process and product technology.

NASA expects to realize $16.5 million in cost savings and productivity gains over the next five years as a result of this team's work.

At the close of the conference, NASA Administrator Daniel S. Goldin presented each team representative with a plaque recognizing the team's achievements.

ANNOUNCEMENTS

(continued from page 2)

'roasting.'

"Special thanks to Vicki Boyer, Becky Sample and George Palko for coordinating this effort and to the NCO Club for the luncheon.

"It was a privilege and an honor to have worked with so many excellent Langley workers of all levels and responsibility over the past 36 years. Without this great team effort, Langley would not be what it is today – first class, the best government agency in existence. Those still working have the challenge to continue the effort to keep Langley in the forefront of everything it does, and to keep Langley's positive history in balance and improving.

"When one leaves, a little piece of that history leaves, also. Thanks for allowing me to a part of the team. Best to all for a bright future. Keep the faith."

– Bill Tennis, retiree

In memory of McCreary Beasley

McCreary G. "Mac" Beasley, 75, died April 15 at Riverside Regional Medical Center. He retired from NASA Langley as an engineering technician in 1981 after 23 years of service.

In memory of Harvey T. Forrest

Harvey T. Forrest, 90, died April 27. He retired from NASA Langley as a model maker in 1977 after 35 years of service.

Information Services and Systems results from reorganization

BY NANCY FINN

The new structure of the Information Systems and Services Division (ISSD) is the result of two separate mergers.

The first, in 1994, brought together the Analysis and Computation Division, which focused on scientific and engineering computing requirements, and the Business Data Systems Division, which dealt primarily with business and administrative computing support.

In 1995, the Scientific and Technical Information Division merged with Information Services Division, bringing with it library, technical editing and printing, graphic arts and photographic functions.

"This action formed the current ISSD, which provides centralized, customer-focused, cost-effective support of the functions of the parent organizations," said Frank Thames, ISSD chief engineer. "The mergers have created an organization with improved economies of scale and critical mass to support its mission elements."

"When ISSD was formed, we could have mixed and matched the branches," said Rob Kudlinski, assistant division chief. "Instead, we spent a year observing and learning the functions of each branch; then, we mixed and matched them."

ISSD consolidated eight branches into four, each of which specializes in a few core functions. The Communications and Computer Systems Branch

(see ISSD, page 4)

Long-Duration Exposure Facility sends data to World Wide Web

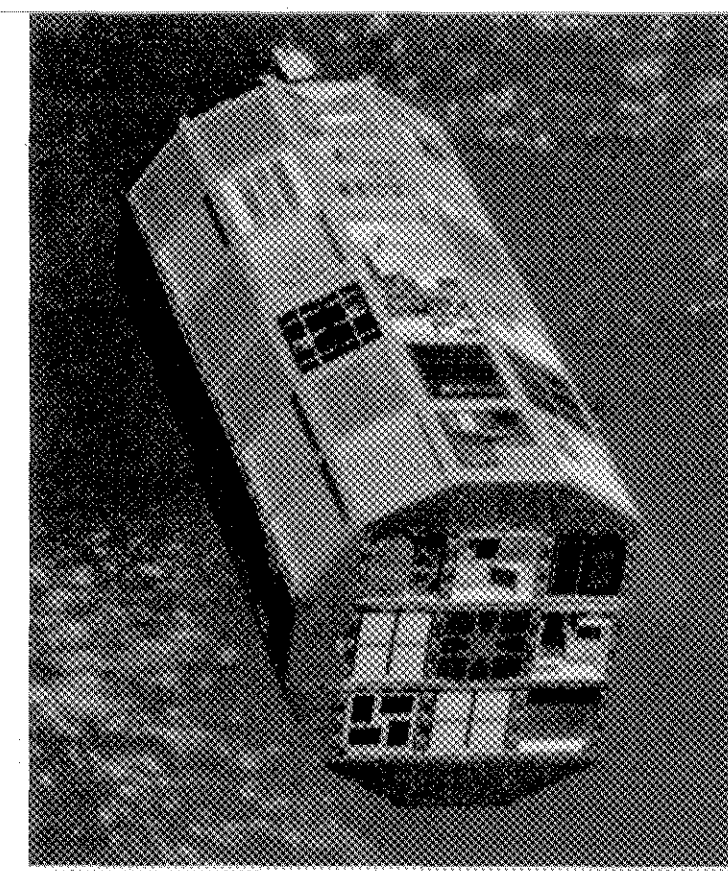
BY ELIZABETH JOHNSON

The Long-Duration Exposure Facility (LDEF), a spacecraft which carried scientific experiments into space when it launched on April 7, 1984, is now on the World Wide Web. To view photos and data from the LDEF, check out these Internet addresses: ***http://lisar.larc.nasa.gov/LISAR/BROWSE/ldef.html*** and ***http://lisar.larc.nasa.gov/LISAR/BROWSE/browser.html.***

Dr. Arlene S. Levine, former program analyst in the LDEF science office, expected the LDEF to remain in space for only one year – as did everyone else in NASA, she said. But due to scheduling changes and delays, it spent more than five-and-a-half years in space, returning to Earth on Jan. 12, 1990.

It was the first spacecraft to carry experiments into space for an extended time and then to return to Earth for analysis. The 57 onboard experiments helped give researchers a better understanding of the space environment and the effects of prolonged exposure on spacecraft.

"After 69 months in space, LDEF has provided unique and valuable information on how the space environment impacts different materials, electronic components and optical systems," said Levine. "This information will have important implications for future long-duration space missions, such as the International Space Station, the robotic and human exploration of the planets and Earth orbiting spacecraft to study our own planet."



NASA photo

The LDEF was deployed north of Hawaii shortly after the launch of STS 41-C on April 6, 1984. After release, the shuttle was maneuvered away from the LDEF to minimize any contamination by the shuttle propulsion or reaction control system.

Microgravity Science Laboratory mission reset for July; remaining 1997 shuttle schedule adjusted accordingly

NASA NEWS RELEASE

JOHNSON

Columbia's Microgravity Science Laboratory (MSL) mission will fly again in early July to complete the mission cut short last month because of a fuel cell problem. The remaining 1997 space shuttle flights have been adjusted to accommodate Columbia's mission, which will fly as STS-94.

Air Force Lt. Col. Jim Halsell and the rest of the STS-83 crew will fly this mission and will conduct proficiency training until the flight. Space shuttle program managers have formally baselined the STS-94 mission to follow Atlantis' sixth docking with the Russian space station Mir this month.

Astronaut Jerry Linenger will return home on STS-84 following a four-month stay on Mir, and Mike Foale will replace him as a station crew member.

"While shortening STS-83 was disappointing, we now are in a position to do everything possible to complete the MSL mission with minimal impact to downstream flights," said Space Shuttle Program Manager Tommy Holloway. "Also, it provides us with a unique opportunity to demonstrate our ability to respond to challenges such as this one."

Reflying Columbia in July dictated that downstream flights for the remainder of the year change slightly. Following STS-94, Discovery will fly in early- to mid-August on the STS-85 mission to deploy and retrieve a science satellite to study Earth's atmosphere. The flight also will demonstrate the use and operational capability of a robot arm that will be deployed outside the Japanese Experiment Module of the International Space Station.

The seventh shuttle-Mir docking mission on Atlantis is targeted for mid- to late-September. STS-86 will include the return of Foale from Mir and delivery of his replacement, astronaut Wendy Lawrence.

The eighth and final mission scheduled in 1997 will be the STS-87 flight of Columbia slated for mid- to late-November. The 16-day mission includes the conduct of science experiments associated with the fourth flight of the U.S. Microgravity Payload and the deployment and retrieval of a science satellite.

Space Shuttle Flight Schedule

The shuttle schedule is currently undergoing a major review. The dates and payloads of flights after STS-84, particularly those involving assembly of the International Space Station, are likely to change in many, if not all, cases. Dates shown for STS-84, STS-83R/94, STS-86 and STS-87 are the tentatively rescheduled dates. The information below must be considered preliminary and is subject to change at any time. For further shuttle schedule updates, see the Internet address at ***http://www.osf.hq.nasa.gov/shuttle/futsts.html***

Flight	Orbiter	Launch Date	Crew	Inclination	Duration	Mission
STS-84	Atlantis	May 15, 1997	6	51.60 d.	9 (+1) days	Mir-Docking/6, SpaceHab-DM
STS-83R/94	Columbia	July 1, 1997	7	28.45 d.	16 days	Microgravity Science Lab MSL-1 Reflight
STS-85	Discovery	Aug. 7, 1997	5	57 degrees	11 (+1) days	CRISTA-SPAS-2 JEM Flight Demo
STS-86	Endeavour	Sept. 25, 1997	5u/6d	51.60 d.	9 (+1) days	Mir-Docking/7, SpaceHab-DM
STS-87	Columbia	Nov. 13, 1997	5	28.45 d.	16 days	USMP-4, SPARTAN-201-4
STS-88	Endeavour	Dec. 4, 1997	5	51.60	7 (+2) days	1st Space Station Assembly Flight ISS-1 (Node 1, PMA 1/2)
STS-89	Discovery	Jan. 15, 1998	6	51.60 d.	9 (+1) days	Mir-Docking/8, SpaceHab-DM
STS-90	Columbia	March 19, 1998	7	28.45 d.	16 days	Neurolab
STS-91	Discovery	May 29, 1998	6	51.60 d.	9 (+1) days	Mir-Docking/9, AlphaMagnetic Spectrometer, SpaceHab-SM

Scientists discover fountain, antimatter clouds in Milky Way

NASA NEWS RELEASE

GODDARD

Scientists using data from an instrument on NASA's Compton Gamma Ray Observatory (CGRO) have discovered two unexpected clouds of antimatter in the Milky Way Galaxy which scientists call "antimatter annihilation radiation."

Scientists from Northwestern University, Evanston, Ill., the Naval Research Laboratory (NRL), Washington, D.C., and other institutions used CGRO's Oriented Scintillation Spectrometer Experiment (OSSE) to make the discovery, which points to the existence of a hot fountain of gas filled with antimatter electrons rising from a region that surrounds the center of the Milky Way galaxy.

The nature of the furious activity producing the hot antimatter-filled fountain is unclear, but could be related to massive star formation taking place near the large black hole at the center of the galaxy. Other possibilities include winds from giant stars or black hole antimatter factories.

The researchers used maps of gamma ray sources from CGRO, which they expected to show a large cloud of antimatter near the galactic center and along the plane of the galaxy. The maps, surprisingly, also show a second cloud of anti-matter well off the galactic plane. The second cloud may be caused by the explosions of young massive stars.

"The origin of this new and unexpected source of antimatter is a mystery," said William R. Purcell, research scientist and assistant professor of physics and astronomy at Northwestern University.

"The antimatter cloud could have been formed by multiple star bursts occurring in the central region of the galaxy, jets of material from a black hole near the galactic

(see ANTIMATTER, page 5)

ISSD

(continued from page 3)

(CCSB) provides center-wide communications services, including Langley's local area network and telephone and video distribution systems.

Other capabilities inherent in CCSB's mission include access to NASA's consolidated supercomputing facility at Ames Research Center, Moffitt Field, Calif.; large-scale mass storage systems; and central support for the integration of Langley's distributed computing infrastructure.

Two focused laboratories of the Data Visualization and Analysis Branch (DVAB) supply functional support for Langley's researchers in geometry and grid generation and data visualization and analysis, respectively. DVAB also provides administrative support in photographic services, graphic arts and printing and reproduction.

The Information Management Branch develops, deploys, maintains and operates systems to manage, archive, access and circulate data and information, i.e., the Langley technical library.

The provision of cradle-to-grave, real-time flight simulation systems is under the leadership of the Simulation Systems Branch (SSB). SSB develops, maintains, operates and manages Langley's flight simulation facilities, including state-of-the-art, computer-generated image and platform motion systems.

ISSD also contains four small offices devoted to specialized functions. Langley is a key player in the agency's Earth Observing System Data Information System (EOSDIS) program through its onsite Distributed Active Archive Center (DACC). The EOSDIS DAAC Project Office manages this facility.

The Scientific and Technical Information (STI) Program Office manages NASA's STI Program. Langley became the agency lead for STI last year.

Issues related to information technology policy and resources is the province of the Chief Information Office. This office is a part of the government-wide Chief Information Officer initiative mandated by the Information Technology Management Reform Act of 1995.

Finally, the Program Integration Office provides internal support to ISSD by managing the division budget, contracts, facilities and capital equipment.

The ISSD reorganization is also intended to provide a more consistent approach to locate customer services and information by eliminating duplication. This allows Langley employees to call one office for all their information technology needs.

The new organization is consistent with new center workforce guidelines and policies to improve services with fewer workforce resources. It also provides greater flexibility in responding to rapid technology escalation and everyday changes in programs and priorities.

"[We need] good communication, good data processing and to be able to get information out to the public," said Ron Baker, assistant division chief. "The new ISSD organization should promote these goals."

NASA Langley Child Development Center celebrates 'Week of the Young Child'

BY KATHY SKINNER

The NASA Langley Child Development Center celebrated the "Week of the Young Child," April 14-18, with a variety of activities which were planned to emphasize the importance of learning during the early years of a child's life.

The "Week of the Young Child" is an annual celebration each April sponsored by the National Association for the Education of Young Children (NAEYC), the nation's largest organization of early childhood professionals with more than 90,000 members. The purpose of the occasion is to focus public attention on the needs of young children and their families and to support the early childhood programs and services that meet those needs.

Other activities at NASA Langley Child Development Center during the week included:

▲ NASA Day – Children and staff wore blue and white.

▲ Disney Day – Children dressed as favorite Disney characters.

▲ Parent Appreciation Day – Children gave parents special surprises which they made at school.

▲ Sports Day – Children and staff dressed as favorite sports figures.

▲ Community Service Day – Children presented items collected during the week to a local shelter.

▲ Pony Rides

▲ Spring Party – Culminating activity.

Photo by Heidi Meeks

Members of the Child Development Center's kindergarten class enjoy Disney Day, April 15.

NASA student competition winners honored at National Space Science Symposium

Langley to host Maryland high school student for 1998 summer wind tunnel internship

NASA NEWS RELEASE

WASHINGTON, D.C.

Leslie Shope, a student at Montgomery Blair High School, Silver Spring, Md., will participate in a wind tunnel internship at Langley during the summer of 1998 as one of 27 students from public and private schools across the United States to win national recognition in NASA's 17th annual Space Science Student Involvement Program competition. Shope will conduct research in aerodynamics with Langley scientists and engineers.

The students and their teachers were honored at the National Space Science Symposium, May 3-7, in Washington, D.C.

Fostering academic skills

The competition, cosponsored by NASA and the National Science Teachers Association, is an interdisciplinary program designed to address the need for greater literacy in science, critical and creative thinking, mathematics and technology. More than 10,000 students in elementary, junior high and high school competed in five competition categories, using their skills in mathematics, science, technology, art and creative writing.

The National Space Science Symposium brings together the 27 national winners and their teachers to recognize their academic achievement in an environment designed to further challenge their talents. The trip to the symposium includes formal presentations of their entries by the students.

In addition to their recognition in Washington, other awards include opportunities to intern at a NASA field center for a week during the summer, Space Camp scholarships, medals, ribbons and certificates. Winners of the Interplanetary Art competition will see their artwork displayed at the Marriott Metro Center Hotel during the symposium. After the symposium, artwork will be on display in museums, schools and other public sites throughout this year.

Competition categories

The competitions included:

▲ Mars Science Experiment

Students in grades 9-12 planned and developed a trip to Mars and proposed an experiment to be conducted along the way. Students were required to follow scientific research guidelines when designing the study.

▲ Interplanetary Art Competition

Students in grades 3-12 expressed their talents in science and art by creating a two-dimensional illustration depicting a scene from interplanetary space and by writing an essay describing the picture.

▲ Future Aircraft/ Spacecraft Design Competition

Students in grades 3-5 worked in teams to design a futuristic aircraft or spacecraft. The students created three illustrations and wrote an essay describing the spacecraft.

▲ Mission to Planet Earth

Students in grades 6-8, worked in three-person teams to create an interdisciplinary project using satellites to study the effects of human activity on the Earth's ecosystem. They used research methods and an understanding of technology to search for solutions to society's ecological problems.

▲ Aerospace Internship Competitions

Students in grades 9-12 competed for a one-week internship with their teacher/ advisor at a NASA facility. Students were chosen on the basis of a written proposal of an experiment that could theoretically be performed at one of the facilities.

▲ Supercomputer Internship

▲ Space Station Internship

▲ Wind Tunnel Internship

▲ Microgravity Internship

▲ Spacelab Internship

▲ Space Telerobotics Internship

▲ Space Astronomy Internship

▲ Launch Operations.

For a complete listing of the winners, see the Internet address at ***ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1997/97-084.txt***

ANTIMATTER

(continued from page 4)

center, the merger of two neutron stars, or it could have been produced by an entirely different source," said James D. Kurfess, head of the Gamma and Cosmic Ray Astrophysics Branch at the Naval Research Laboratory.

The researchers presented their findings at the Compton Symposium in Williamsburg. The results have been submitted for publication in the *Astrophysical Journal*.

A second paper presented at the conference, titled "The Annihilation Fountain in the Galactic Center Region," examines theoretical models for one possible source of the antimatter – star bursts in the central region.

Dr. Charles Dermer and Dr. Jeffrey Skibo of NRL authored the second paper. They note that the gamma-ray observations permit us to see clearly, for the first time, a new part of our galaxy made of a hot column of gas filled with antimatter electrons, or positrons, and they argue that the antimatter electrons come from newly created elements produced by exploding stars formed near the center of our galaxy.

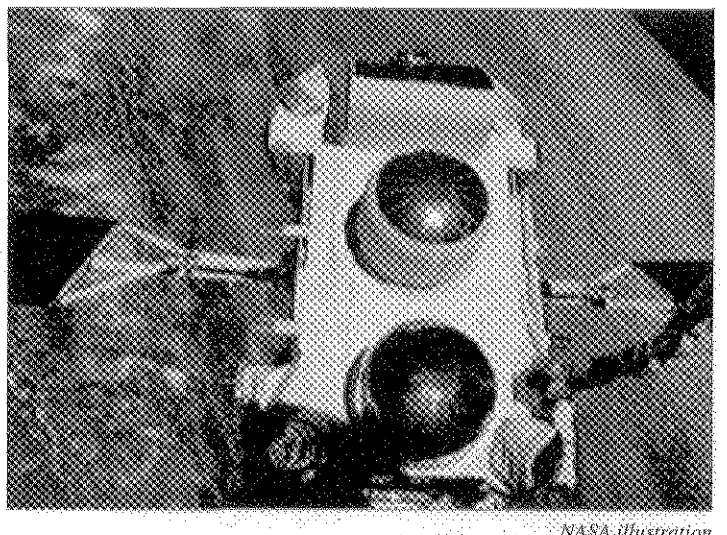
"No one is certain whether the antimatter comes from exploding stars, black holes or something entirely different," said Dermer, "and that is what makes this discovery so exciting."

Evidence points to the existence of a black hole with the mass of a million suns at the very center of our galaxy. Unlike in other galaxies which harbor huge black holes, very little light comes from this source. Huge dense clouds of gas also surround the galactic center. Prolific star formation, powerful stellar winds from massive stars and supernovae are all found here.

Another theory, based on observation of radio emissions showing some black holes produce X-rays and jets, is that such outflowing jets could be made of antimatter.

The Compton Gamma Ray Observatory, launched from the space shuttle in 1991, views the universe in a search for gamma rays and their source. Gamma rays are extremely energetic light photons produced by high-energy particles, by the decay of excited nuclei and by the mutual annihilation of matter and antimatter.

Antimatter cannot be found in large quantities on Earth because it would instantly vaporize anything it came into contact with. Using the OSSE experiment, the OSSE team found antimatter positrons to be annihilating with normal matter electrons at an astonishing rate.



NASA illustration

This image shows the deployment of the Gamma Ray Observatory from the space shuttle.

AdVentures

WANTED: Roommate to share 3-BR, 2-bath rancher in Gloucester Pt.; fireplace; washer/dryer; 1,500 sq. ft.; attached garage; 1/2 acre; in secluded area near Coleman Bridge; access to York River. $400/month, plus half utilities. For more information, call Naomi at 684-3620 or 499-3079.

FOR SALE: Black futon bunk with mattresses; twin size top, full-size bottom. $350. Call Gresha at 766-2085.

FOR SALE: Young Chang 52-inch professional upright piano, rosewood, Queen Anne legs. $6,500. Young Chang 7-foot high-gloss ebony semi-concert grand piano, hardly used. $16,000. Call 850-4266.

FOR SALE: Sony 8mm camcorder, custom Sony hardside case, 2 new Ni-Cad batteries, A/C adapter, charger, tape and other accessories and instruction book. Needs minor repair. $150 or best offer. Call 874-3121.

FOR SALE: 2 burial plots at Peninsula Memorial Park, Sermon on the Mount, Section T, Lot 864. $1,500. Call 804-966-9122.

FOR SALE: Elizabeth Lakes home on cul-de-sac; 3 BR; 3 baths; 2,650 sq. ft.; fireplace; many upgraded and custom features; screened porch; large bonus room; $154,000. Call 851-1187.

FOR RENT: Glen Laurel townhouse, York County, end unit, 3 BR, 2.5 baths, dining room, fireplace, appliances, garage, security system, no pets or smoking. $850/month; 1 month deposit, 1 year lease, available June 1. Call 867-9441.

BUSY BEES: The NASA-Langley Apicultural Club (Honeybunch) meets May 19, 5:30-7:30 p.m., at the home of club president Maywood Wilson, 403 Calthrop Neck Road, Yorktown. Weather permitting, the Virginia state honey bee inspector will demonstrate honey bee colony inspection. Topics include colony populations, potential swarm preparations, egg and brood pattern, pollen stores, nectar and honeystores. Everyone is welcome; bring your own veil. For more information, call Henk at 566-3911 or Wilson at 868-9284.

ARE YOU FIT? To commemorate National Employee Health and Fitness Day, May 21, Langley Fitness Center will offer free blood pressure checks and body composition analyses, as well as fitness challenges throughout the day. Test your skills in push-ups, pull-ups, crunches, long jump and hand grip strength, and win a chance at free movie passes and Putt Putt tickets. An area chiropractor will offer a posture analysis demonstration, 4-6 p.m. For more information, call ext. 46387.

PUMPED UP PICNIC: The L.A.A. Aerobics Club sponsors its annual powerwalk workshop and picnic, May 21, 4:30-6:30 p.m., at the NASA picnic area. Learn proper fitness-walking techniques and take a powerwalk on the NASA grounds. Stay for the healthy cookout/picnic with homemade breads and low-fat snacks. Powerwalk class starts at 5p.m. Cost is $5 per person. To preregister, call ext. 42295/42230 or send an email to m.g.macaraeg@larc.nasa.gov, or register at the site.

BLOOD DRIVE: The next Bloodmobile will be May 28, 9 a.m.-3 p.m., in the H.J.E. Reid Conference Center. Charge your time to B1004. For more information, call ext. 43191.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to Whisler/Blackcomb, British Columbia. The trip is open to all NASA personnel, contractors, retirees, their friends and family. For more information, call Michael Schooley at ext. 48524 or at 867-8093.

SPACEWALK OF HONOR: The SpaceWalk of Honor, a joint project of the Astronauts Memorial Foundation and the NASA Alumni League, Florida Chapter, is accepting donations for personal inscriptions at $75 each. The SpaceWalk of Honor, at the Kennedy Space Center Visitor's Center, will be paved with more than 22,000 bricks, each inscribed with the name of an individual who has contributed to the U.S. Space Program. To qualify for an inscription, an individual may have worked for NASA, its contractors or subconstractors, or may have actively supported the space program in some other way. Applications, which may include a statement of up to 50 words about the qualified individual's relationship to the space program, may be submitted by the individuals themselves or by others in their name. A portion of the proceeds from donations supports the NASA Scholarship Fund. For more information and applications, call 1-888-99SPACE.

VIRGINIA CHORAL SOCIETY: The Virginia Choral Society will present "A Tale of Two Requiems," May 16, 8 p.m., at Ogden Hall on the campus of Hampton University, and May 17, 8 p.m., at Thalia Lynn Baptist Church, Virginia Beach Blvd., Virginia Beach. The society's 16-voice ambassador ensemble, Opus II, will also appear, as well as the Virginia Children's Choir. Tickets are $7 regular admission and $5 for seniors, military and students, and are available at the door. Group rates are also available in advance. For more information, call Pam Hull at 934-1950.

WILLIAMSBURG SYMPHONIA: The Williamsburg Symphonia will present the final concert in the 1996-97 subscription series, "Music in the Air," May 18, 8:15 p.m., at Phi Beta Kappa Memorial Hall in Williamsburg; and May 20, 8:15 p.m., at Christopher Newport University's Gaines Theatre, as part of the "Sampler Series." A pre-concert discussion at 7:15 p.m. will precede the Williamsburg performance. Tickets are $15-$28 for May 18; $12-$18 for May 20; student tickets are $8. For more information or to order tickets, call 229-9857.

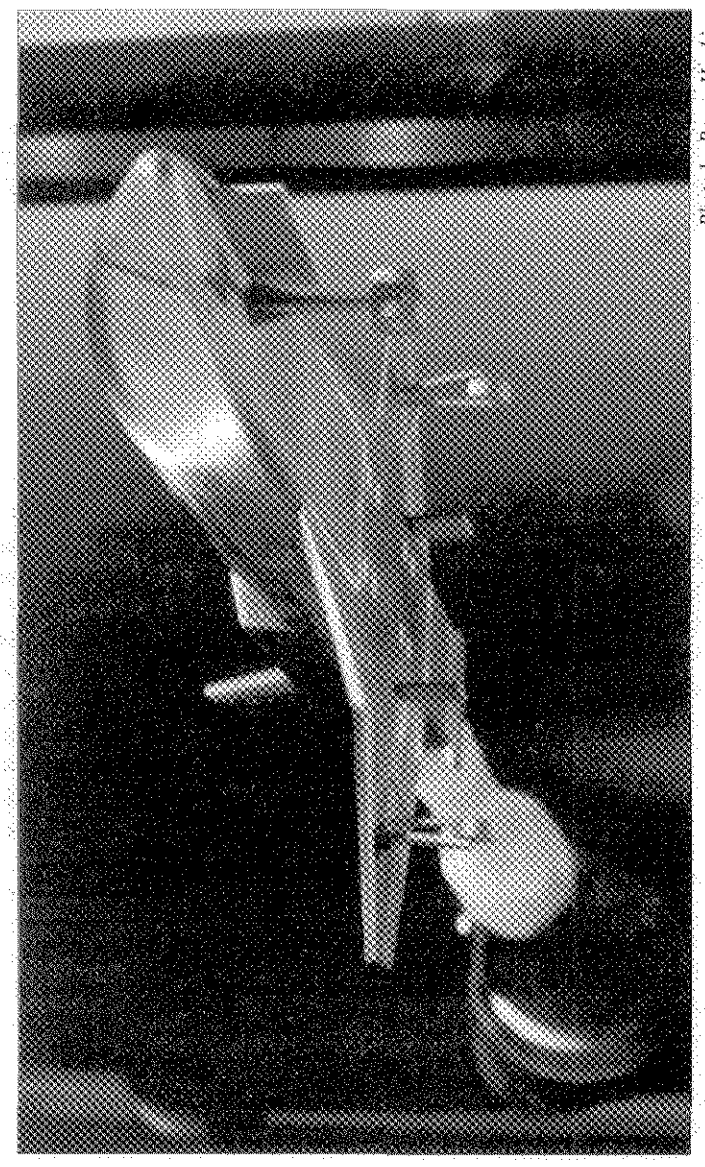


Photo by Peggy Hopkins

X-34 TESTING – A model of the X-34 Technology Testbed Demonstrator is tested in Langley's Low Turbulence Pressure Wind Tunnel. These subsonic wind tunnel tests will access the X-34 vehicle's low speed flight characteristics. Here, the model is being tested in the landing configuration with the gear extended, similar to the actual X-34 vehicle prior to landing. The X-34 will be a suborbital vehicle launched from an L-1011 airplane, at altitudes up to 250,000 feet and speeds up to Mach 8, or eight times the speed of sound.

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Researcher News

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National Aeronautics and
Space Administration
Langley Research Center

Researcher News

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 10 ❖ May 23, 1997

X-34 technology testbed demonstrator begins wind tunnel tests here

BY ANN C. GAUDREAUX

Models of the X-34, a technology demonstrator for NASA's Reusable Launch Vehicle efforts, are undergoing a series of tests in several NASA Langley wind tunnels to obtain an aerodynamic database for the flight vehicle.

Tests in Langley's Low Turbulence Pressure Tunnel were conducted to obtain the vehicle's low-speed flight characteristics. A scale model, designed and fabricated in Langley's machine shops, was tested in its landing configuration with the gear extended to simulate final approach conditions just prior to touch down.

Tests have also recently been completed in Langley's 16-Foot Transonic Tunnel to obtain aerodynamic characteristics near the speed of sound (Mach 1.0), and testing will soon begin in the Langley Unitary Plan Wind Tunnel at speeds ranging from Mach 1.6 to 4.5. The models testing will continue here throughout the summer and fall and will include entries in Langley's subsonic 14- by 22-foot, 20-inch Mach 6, and the Mach 6 CF4 tunnels.

"Langley's role is to develop the vehicle's aerodynamic database," said Davy Haynes of Langley's Space Transportation Programs Office. "We are testing models of the X-34 configuration in wind tunnels, at speeds throughout the flight range, from low to hypersonic speeds. Langley researchers will extract the aerodynamic data, analyze the results and generate the database. The database will then be used to predict the way the actual vehicle will respond in flight."

Transonic tests in the 16-Foot Tunnel generate a crucial part of the database, according to Haynes.

"After it is launched from the carrier aircraft, the X-34 must traverse the critical transonic flight regime between subsonic and supersonic flight, where the aerodynamic forces on the vehicle are at a maximum," he said. "The facilities and expertise at Langley are playing a major role in producing this database that is crucial to controlling the vehicle in flight."

Langley's work on the database will continue until the first flight of the vehicle in late 1998.

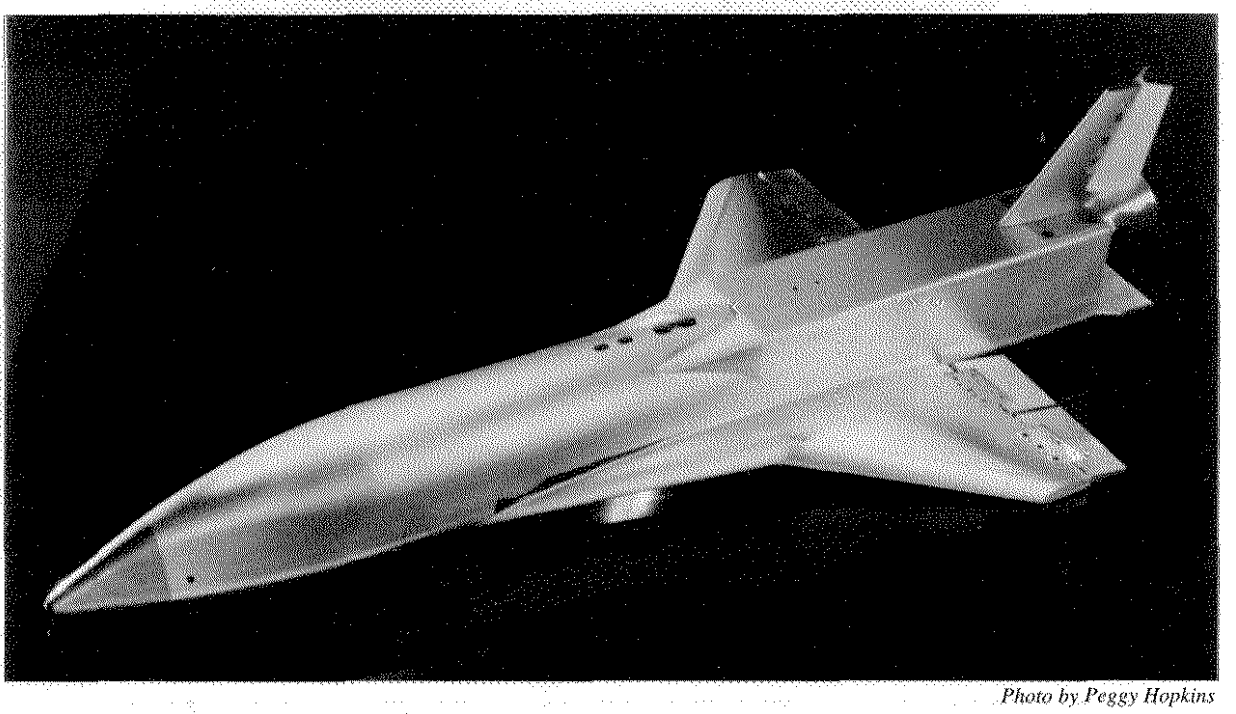


Photo by Peggy Hopkins

A 1/30th scale model of the X-34 technology testbed demonstrator is prepared for wind tunnel testing here. This model, designed and fabricated in the Langley machine shop, will be tested in the 16-Foot Transonic and Unitary Plan Supersonic wind tunnels at speeds ranging from Mach 0.4 to Mach 4.5.

The X-34 will be an air-launched vehicle that will reach altitudes up to 250,000 feet and speeds up to Mach 8, or eight times the speed of sound. The intent of the X-34 program is to show key vehicle and operational technologies applicable to future low-cost Reusable Launch Vehicles. It will demonstrate the ability to fly through inclement weather and land horizontally at a designated landing site. The X-34 is also expected to develop technology applicable to future reusable launch vehicles, according to Haynes.

The X-34 is designed to be capable of 25 flights within one year at an average recurring flight cost of about $500,000. It will also demonstrate the capability for a 24-hour turnaround between flights using a small work force.

The X-34 contract is managed by Marshall Space Flight Center's RLV office, Huntsville, Ala., and the team members are led by Orbital Corp. of Dulles, Va. Industry team members include AlliedSignal Aerospace, Tempe, Ariz. (control actuators and hydraulics); Oceaneering Space Systems, Houston, Texas (thermal blankets); and Draper Laboratory, Cambridge, Mass. (entry guidance and flight software).

Government team members include Marshall (main propulsion system, including the Fastrac engine); Langley (wind tunnel testing, analysis and aerodynamic database development); Ames Research Center, Mountain View, Calif. (thermal protection system); Dryden Flight Research Center at Edwards, Calif.; Holloman Air Force Base, N.M.; White Sands Test Facility, N.M.; and White Sands Missile Range, N.M. (testing and flight support operations).

Langley's High-Intensity Radiated Field lab tests Boeing electronics

NASA Langley researchers are testing an engineering version of a Boeing engine data processor (EDP) system in the recently completed High-Intensity Radiated Field (HIRF) lab.

This is the first use of a special test laboratory known as a mode-stirred chamber to test commercial avionic equipment. This lab, which operates much like a microwave oven, simulates the electromagnetic fields inside an aircraft.

Electronic systems are being used increasingly in aircraft safety critical systems. These systems may be upset or damaged by High-Intensity Radiated Fields that are caused by high-power radar and radio transmitters that may be miles away.

NASA has become concerned about the threat that HIRF poses to the safe operation of civilian airliners and is funding an investigation at Langley, through the Error-Proof Flight Deck program, to find ways to reduce this threat.

The mode-stirred chamber consists of a room with metal walls, floor and ceiling and a metal paddle wheel set off-center. Microwave fields are radiated into the room via an antenna, while the paddle wheel rotates so that the fields are evenly distributed throughout the room. The HIRF lab houses three such chambers.

Experiment manager Karl Moeller, of the Electromagnetics Research Branch, said he believes that testing

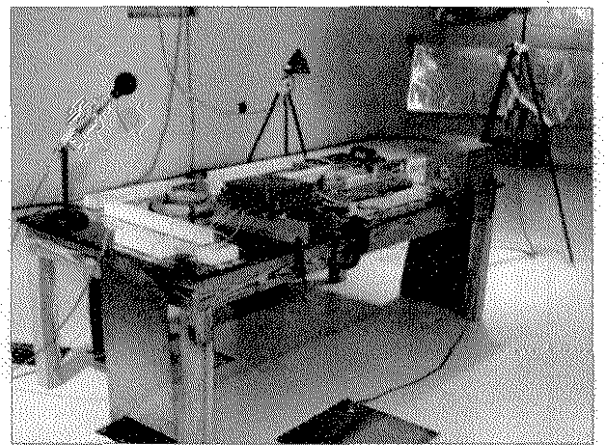


Photo by Sandie Gibbs

Above is the engine controller for the Boeing 757 aircraft, including the throttle mechanism, which comprises the engine controller system being tested in Langley's High-Intensity Radiated Field lab.

avionics in mode-stirred chambers offers a number of advantages over test methods currently in use by the commercial transport industry. He and the other NASA members of the HIRF lab team – test engineers Troung Ngyuen and Jay Ely, and technicians Ken Dudley and Reuben Williams – hope to demonstrate improved measurement accuracy and repeatablity by testing the Boeing EDP.

Mode-stirred chambers are a relatively new concept; only two other operational test laboratories exist in the country, one is operated by the U.S. Navy and the other by the National Institute of Standards and Technology (NIST). NIST recently completed a series of calibration measurements on Langley's mode-stirred chambers and concluded that the quality and repeatability characteristics are the best in the world.

The Federal Aviation Administration has proposed a rigorous set of HIRF certification tests for aircraft to verify the safety of their designs. Certification authorities will use Langley's test results to help develop testing requirements. Langley will also set standards for the commercial aviation industry's use of mode-stirred chambers in performing HIRF certification tests.

The Boeing EDP system that is being tested is an engineering-test version of a system that is currently being flown on eight Boeing 757 aircraft as part of a Boeing in-service evaluation program. This system includes an engine control computer, normally mounted under the engine cowling; an optical interface controller, normally installed in the electronics bay of the aircraft; and a thrust lever sensor, normally located in the cockpit aislestand.

Prior to its delivery to Langley, the EDP system was tested at Boeing using current state-of-the-art test methods. The new test results will allow Langley researchers to quantify the differences between mode-stirred chamber tests and those using current methods.

News Briefs

Around the Agency

SPACECRAFT WATCH FOR COMET HALE-BOPP TAIL DISRUPTION – (Goddard Space Flight Center, Greenbelt, Md.) A fleet of spacecraft for the International Solar Terrestrial Physics (ISTP) program is watching for a break in Comet Hale-Bopp's plasma ion tail. Amateur astronomers around the world have been on watch since the beginning of May, after scientists studying data from ISTP spacecraft estimated that Comet Hale-Bopp's ion tail likely would be disrupted when it enters a region around the sun known as the "current sheet."

NASA EARTH SCIENCE RESEARCH AIRCRAFT SOARS TO NEW HEIGHTS – (Ames Research Center, Mountain View, Calif.) A NASA ER-2 aircraft, complete with science instrument packages, recently conducted its first operational mission at an altitude of 70,000 feet, a key region for atmospheric research. The vehicle is deployed to Alaska for missions over the North Pole in support of project POLARIS – Photochemistry of Ozone Loss in the Arctic Region In Summer. The vehicles are newly lighter, more fuel efficient and more productive. Over the next year, these improvements will increase significantly the size of science payloads and will enhance the altitude performance of the ER-2s in support of NASA's Mission to Planet Earth enterprise. For additional information about POLARIS, see this Website: ***http://cloud1.arc.nasa.gov/polaris.***

SHUTTLE-MIR DOCKING MISSION VIDEO AVAILABLE OVER INTERNET – (Johnson Space Center, Houston) NASA's Shuttle Web will provide continuous audio and video coverage of the STS-84 Shuttle-Mir mission in a second test of the latest technology for streaming video over the internet. Working with commercial internet service and content providers, NASA will use a product called "WebCam" to transmit live video of the activities of the combined Atlantis-Mir crew, mission briefings and the daily "Mission Update" program – all over the World Wide Web. Links to the video stream are available on the NASA Shuttle Web, at ***http://shuttle.nasa.gov.***

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "To get good workers, organizations will have to put aside old definitions of 'fit' and employ people of different colors and cultures. Those with the best reputations for managing diversity will win the competition for the best personnel, which is increasingly important as the composition of the labor pool changes." – from "Facts About Diversity," National MultiCultural Institute

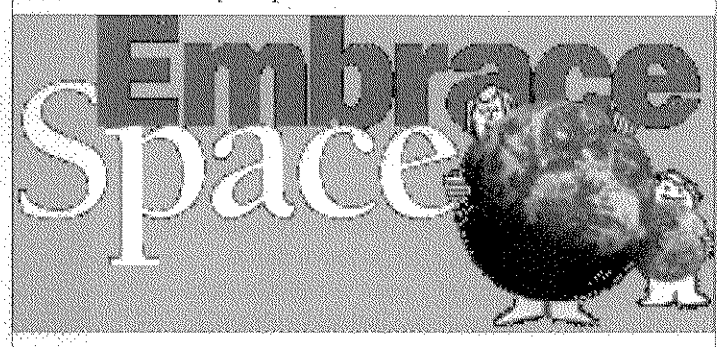
▲ May 29 – Asian-Pacific American Heritage Month Cultural Event: "Our Children, Our Future," Washington, D.C., 703-305-6117

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Space Day becomes national event

The first annual Space Day, May 22, was celebrated nation-wide in commemoration of President John F. Kennedy's call to America in May 1961, "to land a man on the moon and return him safely to Earth before the end of the decade."

Space Day is dedicated to the extraordinary achievements, benefits and opportunities in the exploration and use of outer space. It is a day to mobilize American enthusiasm about space; to advance science and math education through the excitement of space technology; and to inspire future generations to realize the vision of our space pioneers.



U.S. Senator (D-Ohio) and former astronaut John Glenn issued the call to observe Space Day during an address to junior high students in Washington, D.C., on February 20 – the 35th anniversary of his history-making orbit of the earth.

"Space exploration will continue to change the way we live on Earth with advances in ... science, environment, communications, health and materials," said Glenn. "Space Day will give us a moment to celebrate and reflect together on the great achievements and future opportunities in space."

Dozens of the nation's space associations joined with sponsor Lockheed Martin to focus on educational activities and community involvement, including science fairs and charity events.

Space Day's Web site, at ***www.spaceday.com***, offers a yearlong comprehensive, interactive resource of space information for students, teachers, parents and other "cybertravelers."

Announcements

CTAPC offers seminars

The Career Transition Assistance Program Center (CTAPC), Langley's career center, offers the following training seminars during May and June:

▲ "The Net and Career Development," May 27, 9 a.m.-noon or 1-4 p.m.

▲ "Hone Your Negotiating Skills," June 5, 1-4 p.m.

▲ "Conflict Management for Managers," June 11, 9 a.m.-noon

▲ "Networking for Career Development," June 17, 9 a.m.-noon

▲ "So, You Want To Be A Consultant," June 25, time to be determined.

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Spacecraft propulsion conference set

A Spacecraft Propulsion Systems conference is set for May 28-30 in Falls Church, Va.

The fundamentals of spacecraft propulsion, with an emphasis on engineering and system design, will be the discussion conducted by Profs. Robert Sackheim and David Lewis at the Launchspace Training Center in Falls Church. For more information or to register, call Launchspace at 1-800-553-5907.

Rubbert to present June colloquium

Dr. Paul E. Rubbert, of the Boeing Company, Seattle, Wash., will deliver Langley's June colloquium lecture, June 3, 2 p.m., at the H.J.E. Reid Conference Center. The talk is titled "The Evolution of Aerodynamic Design with Wind Tunnels, Computational Fluid Dynamics and Computational Optimization."

June board meeting set

The Airworthiness Safety Review Board meets June 4, 1 p.m., in Building 1209, Room 180. Bruce Fisher and Frank Benkert will discuss the B-757 Transport Research Facilities Project. In addition, Denise Jones and Steve Young will present the Operational Safety Review for the B-757 Low Visibility Landings and Surface Operations Project. For more information, call ext. 47069.

Technical Forum topics announced for June

The next Langley Technical Forum, June 18, 10 a.m.-noon, in the Pearl Young Theatre, will cover these topics:

▲ Field Acoustic Measurement Systems – *Kenneth D. Wright*

▲ Visual Communication – *Friedrich O. Huck*

▲ Nonlinear Analysis of the Space Shuttle Superlightweight External Fuel Tank – *Michael P. Nemeth*

▲ Flight Evaluation of a Variable-Grain Output Feedback Longitudinal Control Law for the NASA F/A-18 High Alpha Research Vehicle (HARV) – *Aaron J. Ostroff*

▲ Inflatable Antenna Technology with Preliminary Shuttle Experiment Results and Potential Applications – *Thomas G. Campbell and Marion C. Bailey*

Environmental office to distribute mugs as thanks for recycling

In the next few weeks, the Office of Environmental Engineering will distribute mugs made from recycled glass to all Langley civil servants and on-site contractors in appreciation for their support of the Langley Recycling Program. In continuing to practice pollution prevention, use these mugs as a substitute for disposable cups.

It is important to separate materials for recycling. In order to receive top dollar, the contamination levels must be kept down and the "trash" kept out of designated collection bins. Proceeds from the sale of recyclables are returned to the center to purchase equipment and other items to support the recycling and pollution prevention programs.

We're Number One!

According to a survey by PC Meter, NASA's Web sites combine to create the most popular site in the world.

PC Meter provides audience measurement of the World Wide Web sites and online services. Unlike other Web measurement systems, PC Meter obtains information from a sample of households that is demographically balanced to represent the population of U.S. PC owners.

In addition, *PC Magazine* has selected SpaceLink as the "Best of the Net" top picks for May.

Mars info to go on line

As the Mars missions collect more and more data from the Red Planet, NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., will make most of the information available to all Internet users, via the World Wide Web, in real-time. Anyone with internet access will be able to get the newest Mars information at the same time as JPL scientists.

Pending a successful landing by Mars Pathfinder and successful instrument/radio functioning, the first images should be available by the end of the day on July 4 and will be found on the Pathfinder home page at ***http://mpfwww.jpl.nasa.gov/*** and under "News Flashes" on the JPL Home Page at ***http://www.jpl.nasa.gov***

In memory of Martin A. Weiner

Martin A. Weiner, 78, died May 7. He retired from NASA Langley as an engineer in 1980.

News Researcher

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley takes its daughters to work for 4th annual observance

BY PATSY CAMPBELL

NASA Langley's fourth annual "Take Our Daughters to Work Day, April 24, aimed to broaden young girls' horizons to include the possibilites of careers in mathematics and science, while addressing the issue of gender bias in education. The program expanded this year from 50 to 100 daughters, ages 9-15, of Langley and contractor parents.

In addition, a group of 10 center employees offered eight "outside Langley" girls, from the Virginia Peninsula Council on Domestic Violence, the opportunity to participate in the program. **Dr. Catharine Fay, Sharon Lowther, Dr. Trish McDaniel, Dr. Mia Siochi, Dave Kessler, Harry Belvin, Bert Cano, Jennifer Young, Marie Lane** and **Suzanne Zaremski** also organized an afternoon agenda to benefit these girls.

Girls who are not daughters of Langley employees have been included in the Take Our Daughters to Work program for the past three years in an effort to reach those students who would not otherwise have the opportunities that employees' daughters have.

The event's planning committee had adopted the song "The Power of the Dream" as this year's Take Our Daughters to Work Day theme to emphasize to the girls, "If you can dream it, you can achieve it." As the April 24 program got underway, Katie Vance and Donna Upchurch, daughters of **Bill Vance,** Internal Operations Group, and **Geraldine Pardue**, Advanced Subsonic Technology Program Office, offered a musical signing of the song.

The parents'/sponsors' day included briefings on gender bias in education and tips on how to help children overcome difficulties in math and science skills from Linda Koutoufas and Karen Tagg of the Newport News Branch of the American Association of University Women.

The girls' group leaders – Nancy Jane Bains, retiree; **Yvonne Beyer**, Office of Human Resources; **Laura Brewer**, Office of Space and Atmospheric Sciences Program Group; **Dana Dunham**, Research and Technology Group; **Kathy Skinner**, Child Development Center; and **Patricia Williams**, Internal Operations Group – led the girls through interactive workshops and a center tour.

Gaudy Bezos-O'Connor, from the Technology Applications Group, conducted an "It's an Airplane" workshop, and **Michelle Ferebee**, from the Office of Space and Atmospheric Sciences Program Group, presented "The Development of an Earth Science Mission."

Kathy Young and **Sharon Padula**, from the Research and Technology Group, presented an "Aircraft Noise Reduction" workshop. The girls used household articles such as spoons, door bells, soda cans and tape recorders to learn about noise production, propagation and measurement. Each experiment had some application to aircraft noise problems studied at Langley.

Susan Voight, from the Office of Space and Atmospheric Sciences Program Group, briefly introduced the girls to the laws of physics which govern orbital space flight. The "Toys in Space" workshop participants experimented with 10 toys, including a pop-over mouse, gravitons (spinners), paddle board, jacks and a Slinky. After each of the girls demonstrated a toy, they watched a video clip of that toy demonstrated onboard the space shuttle. This prompted a discussion of the behavior of objects in microgravity.

Debbie Martinez and **Miguel Alvarez**, from the Internal Operations Group, demonstrated the differential maneuvering simulator and the visual motion simulator during the flight simulator tour.

Frank Quinto, of the Research and Technology Group, guided three groups of girls through the 7- by 10-Foot High-Speed Tunnel. He explained model testing in the different wind tunnels and the benefits of that testing. Each group visited the control room, the test section, and the drive fan. In addition, they saw various aircraft models that were tested in different NASA Langley wind tunnels.

The afternoon allowed parents and sponsors to share some time with the girls at the workplace.

"Take Our Daughters to Work Day" gave parents a chance to shine in their own achievements while sharing some valued family time with their daughters. Langley touched 100 young minds with the importance and real-world application of math, science and the technology NASA provides to this country and the world.

The Federal Women's Program Committee, the Hampton Roads Section of Women in Aerospace, the Newport News Branch of the American Association of University Women and the Langley Federal Credit Union cosponsored the event.

See related photo, page 6.

Photo by Paul Bagby

Crane operator Bruce Trauger demonstrates to Amanda Blakeslee, 14, the operation of a 265-ton crane, as her father, Robert Blakeslee, of the Office of Safety and Facility Assurance, looks on.

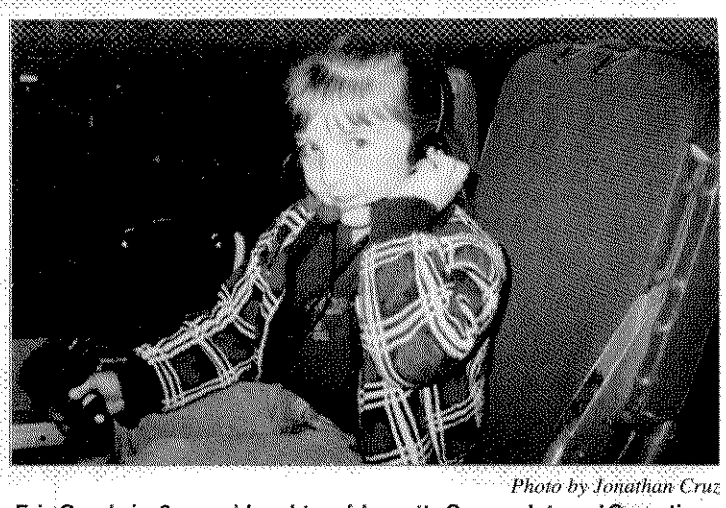


Photo by Jonathan Cruz

Erin Goodwin, 6, granddaughter of Jeanette George, Internal Operations Group, takes the controls at the visual motion simulator.

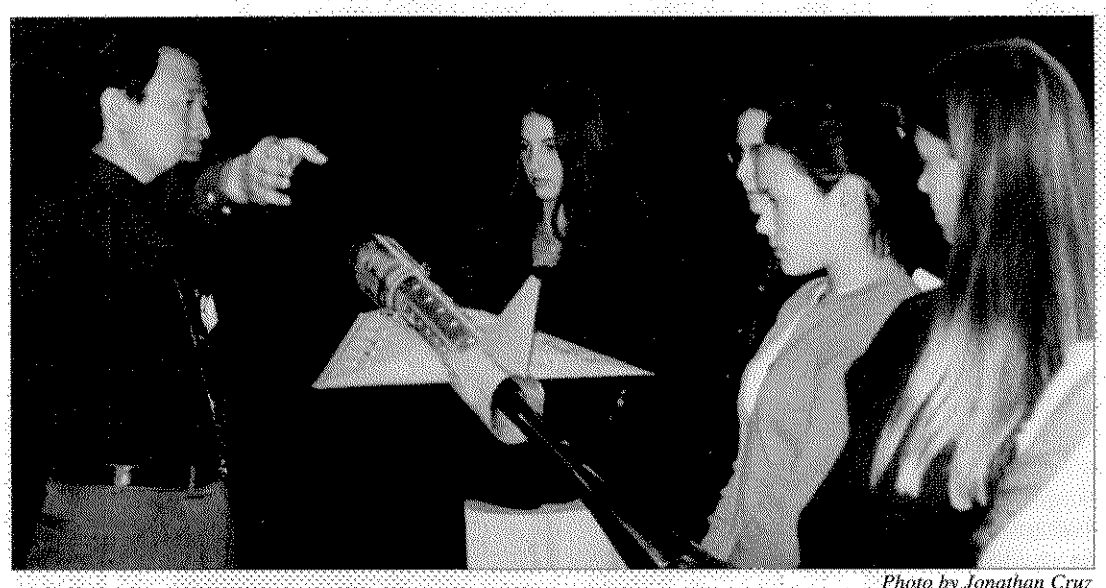


Photo by Jonathan Cruz

Frank Quinto, of the Research Facilities Branch, tells a group of girls about the use of a $250,000 model in a wind tunnel at an airflow of 650 mph.

Photo by Jonathan Cruz

Bridget Buehrle, 9, daughter of Ralph Buehrle, of the Analysis and Test Engineering Branch, asks workshop leader Gaudy Bezos-O'Connor, "Does the space shuttle land like an airplane?" as Nancy Jane Bains, of the American Association of University Women, looks on.

AdVentures

FOR SALE: Hampton rancher, 3 BR, 2 baths, near Langley; 1,500 sq. ft., large detached workshop. $93,900. Call 865-7755.

FOR SALE: 1984 Honda Accord LX, 4-door, 5-speed, white, 200,000-plus miles, perfect car for a teen-ager. $2,000. Call Shawn at 874-6162.

VAN DRIVERS/HOSTS NEEDED: Retirees are wanted as van tour hosts/drivers for the Virginia Air & Space Center NASA Langley Summer Tours. It's an excellent opportunity for retirees to share their Langley knowledge and experience. Driver training workshops/tours will be held during the month of June. For more information, call Steve Devan at 898-9290.

RESPONSE PENINSULA: Response Peninsula is a nonprofit volunteer organization that provides support services such as hospital companion services, a crisis hotline and counseling, for victims of sexual assault. Response Peninsula is looking for volunteers to serve as companions, educators and hotline workers. Call Carolyn McDonald at 838-1829.

BLOOD DRIVE: The next Bloodmobile will be May 28, 9 a.m.-3 p.m., in the H.J.E. Reid Conference Center. Charge your time to B1004. For more information, call ext. 43191.

MASTERING MANAGEMENT: The George Washington University School of Engineering and Applied Science at Langley is offering a new set of courses leading to a master's degree in engineering management. Classes begin in the fall semester. Individual interviews will be conducted here May 28. For more information, call ext. 41982.

SIDE OUT: Registration for summer outdoor grass volleyball is June 2-13; the season starts June 17. Register for one of three levels: beginner, Wednesdays; intermediate, Tuesdays; or advanced, Thursdays. Fee is $40 per team. Roster forms are available in the gym starting June 2. For more information, contact league representative: for beginner, Tom Britton, t.c.britton@larc.nasa.gov, ext. 46619; for intermediate, Wes O'Neal, a.w.oneal@larc.nasa.gov, ext. 41132; for advanced, Lou Glaab, l.j.glaab@larc.nasa.gov, ext. 41159.

LAA SUMMER FLING SOCIAL: The annual Langley Activities Association Summer Fling Outdoor Social is set for June 6, 4-9 p.m., with music by Double Take. Picnic-style food will be available for purchase, and M. Price Distributing Company will raffle off prizes. The playground area will be open for children. For more information, call ext. 46369.

LANGLEY ALUMNI ASSOCIATION: The next meeting of the Langley Alumni Association is June 10, 11:30 a.m., in the private dining room of the center cafeteria. The topic will be "Issues, Concepts and Possibilities for Supersonic Commercial Aircraft." Watch the Researcher News for a notice about our July 9 covered-dish supper, held in lieu of the regular luncheon meeting. That meeting will feature a NACA panel on Langley World War II activities. For more information, call 864-7330.

SPACE CAMPS: Virginia Air & Space Center offers the following Summer Space Camps for children:

▲ Sparks, Bits and Microchips – June 23-27, 9 a.m.-3 p.m., ages 7-12, $105

▲ Astro-Archaeology – June 30-July 3, 9 a.m.-3 p.m., ages 7-12, $90

▲ Mars Landing – July 7-11, 9 a.m.-3 p.m., ages 7-12, $110

▲ Astronaut Adventure I – July 14-18, Aug. 18-23, 9 a.m.-3 p.m., ages 7-12, $110

▲ Astronaut Adventure II – July 21-25, Aug. 18-23, 9 a.m.-3 p.m., ages 7-12, $115

▲ Just Plane Fun – July 28-Aug. 1, 9 a.m.-3 p.m., ages 7-12, $110

▲ Science of Sports – Aug. 4-8, 9 a.m.-3 p.m., ages 7-12, $105

▲ Aliens R' Awesome – June 30-July 2, 9 a.m.-noon, ages 5-6, $45

▲ Beyond Aliens – July 28-30, 9 a.m.-noon, ages 5-6, $50

For more information, call 727-0900, ext. 780.

LAA CARNIVAL IS COMING: The Langley Activities Association plans its annual summer carnival, set for Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with rides, games and other activities for the whole family. For more information or to volunteer to help, call ext. 46369.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to Whisler/Blackcomb, British Columbia. The trip is open to all NASA personnel, contractors, retirees, their friends and family. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

ARMED FORCES SYMPOSIUM: The Armed Forces Communications and Electronics Association, Tidewater Chapter, hosts its 17th annual symposium, June 10-11, at the Hampton Holiday Inn. This year's theme, "Information Assurance – Controlling the Fifth Dimension of Warfare," features more than 60 exhibits, two technical presentations and high-ranking speakers focusing on protecting command, control, communications, computer and intelligence systems. Gen. Richard Hawley, commander, Air Combat command, is the keynote speaker for June 10. Admission is free and open to all; lunch for one day is $12.50, for both days, $20. To register by May 30 or for more information, call 764-6540, or visit ***www.artiscorp.com/afcea/symposium.html.***

Photo by Jonathan Cruz

GROUP DYNAMICS – Michelle Ferebee of the Data Management Office talks to a group of "daughters" about the phases of an earth science mission they will complete during their visit to NASA Langley during "Take Our Daughters to Work Day," April 24. The students broke into three groups: a science team, an engineering team and a project management team. The students learned about the different occupations needed for a successful earth science mission, as well as the importance of good oral and written communication skills in addition to math, science and engineering skills.

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Volume 11 ❖ Issue 11 ❖ June 6, 1997

Langley to lead new aviation safety program

Goal is tenfold reduction in aircraft accident rate

BY MIKE FINNERAN

NASA Langley Research Center has been selected to lead a national aviation safety initiative whose goal is to reduce the aircraft accident rate fivefold within 10 years, and tenfold in the next two decades.

"This is an exciting challenge that will have a significant benefit for every man, woman and child in this country who steps on an airplane," said Dr. Jeremiah F. Creedon, director of NASA Langley. "Flying already is the safest way to travel. Now it will be even safer."

The Aviation Safety Program was created in response to a report from the White House Commission on Aviation Safety and Security, chaired by Vice President Al Gore. The program also is part of a new "Three Pillars for Success" initiative that spells out what NASA will do to achieve national priorities in aeronautics and space transportation technology.

NASA will work the safety program in partnership with the Federal Aviation Administration (FAA), the Department of Defense (DoD) and the aviation industry.

Langley was selected to lead the safety program by NASA Headquarters in Washington, D.C. Critical roles in the program, however, also will be played by three other agency field installations: Ames Research Center in Mountain View, Calif.; Dryden Flight Research Center in Edwards, Calif.; and Lewis Research Center in Cleveland, Ohio.

"Each of these other centers has areas of world-class expertise, so their participation is indispensable," said Langley's Michael Lewis, who has been named manager of the new program. "This is a team effort."

Dr. Robert Whitehead, associate administrator for NASA's Office of Aeronautics and Space Transportation Technology in Washington, D.C., praised the selection of Lewis to run the program.

"NASA is fortunate to have a program manager with Mike's talent and proven leadership in aviation safety research and technology to lead this critical national program," Whitehead said.

Major strides have been made in the last 40 years to make flying the safest of all major modes of transportation. More technological advances are needed, however, to prevent a rise in accidents if air traffic triples as predicted in the next 20 years.

The safety program will emphasize not only accident reduction, but also a decrease in injuries when accidents do occur. The safety initiative will include research to reduce human-error-caused accidents and incidents, to predict and prevent mechanical and software malfunctions, and to eliminate accidents involving hazardous weather and controlled flight into terrain.

It also will use information technology to build a safer integrated aviation system to support pilots and air traffic controllers. The FAA will help define requirements and actions to enact many of the safety standards. The DoD is expected to share in technology development as well as to apply safety advances to military aircraft.

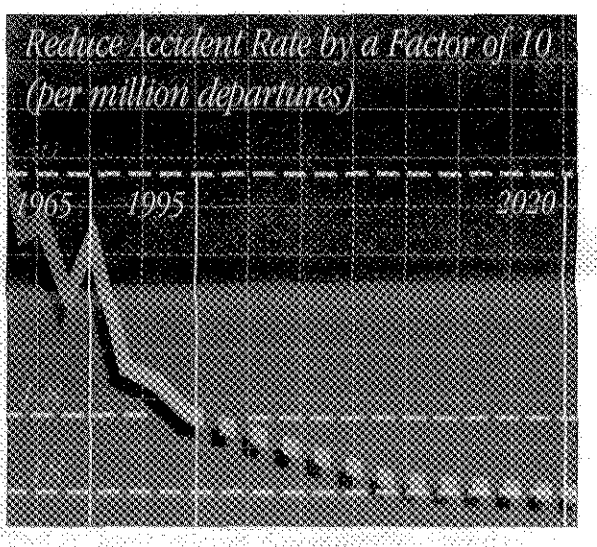
NASA has planned for about $500 million over five years for this and related safety programs. Additional funding is expected to follow. Funding will come from reprogramming existing aeronautics funds, and by reassigning people and the work of NASA facilities.

NASA, in partnerships with the FAA and private industry, has made significant accomplishments in aviation safety. Some examples include:

- ▲ Providing technology for advanced warning of wind shear
- ▲ Designing advanced air-traffic-management equipment and procedures
- ▲ Developing ways to ensure older aircraft are as structurally sound as new ones
- ▲ Improving engine reliability, systems and displays
- ▲ Developing advanced ice-protection concepts to improve aircraft operations
- ▲ Improving the control of general aviation aircraft stall and spin.

Photo by Jeff Caplan

Mike Lewis, manager of the new program, stresses that this is a team effort among four NASA centers.



Aircraft safety is one of the goals of Pillar One, Global Civil Aviation, as laid out in NASA's *Three Pillars of Success for Aeronautics & Space Transportation Technology*.

NASA helps to feed hungry planet with solar energy data

BY CATHERINE WATSON

In refugee camps in East Africa, women and children must often search for hours to find enough firewood to cook for their families. In some African cities, the urban poor spend more than half their annual income on cooking fuel.

Now volunteers are using data from NASA's Mission to Planet Earth program to help the people of East Africa learn to cook using solar energy.

"We have found the NASA Surface Solar Energy data set to be a wonderful resource – providing reliable data for any location on Earth," said Jay Campbell, a director for the non-profit Solar Cookers International (SCI). "This quality of information is simply unavailable from other sources, and allows us to make better decisions for our consultations and project plans."

Worldwide solar cooking

SCI is a small, non-profit group promoting solar cooking technology worldwide. SCI manages solar cooking training in several refugee camps and lesser developed areas, and responds to requests for information from individuals worldwide. According to Campbell, the Surface Solar Energy (SSE) data set has become invaluable to SCI in choosing sites where solar cooking will most useful to the local population.

"Unfortunately, 40 percent of the people in the world have no electricity," said Dr. Charles Whitlock, a senior research scientist at NASA Langley who led the team that developed the SSE data set. "It is hoped that the SSE data can be used to improve designs of solar-assisted power systems to give electricity to some of these rural people."

"I think that this type of satellite data has a very wide range of energy and agricultural applications over the long term," Whitlock added. "We have now seen that solar energy is a growing industry. The cost of solar cells has dropped from $100 per watt to $2

(see SOLAR, page 4)

1917 - 1997
80 years of excellence
NASA Langley Research Center

Coming July 19 – NASA Langley's 80th Anniversary Celebration and Open House

News Briefs

Around the Agency

HUBBLE FINDS CLOUDY, COLD WEATHER FOR MARS-BOUND SPACECRAFT – (Goddard Space Flight Center, Greenbelt, Md., and Jet Propulsion Laboratory, Pasadena, Calif.) As two NASA spacecraft speed toward a mid-year rendezvous with Mars, astronomers using the Hubble Space Telescope are providing updated planetary weather reports to help plan the missions. Hubble's new images show that the "martian invasion" of spacecraft will experience considerably different weather conditions than seen by the last U.S. spacecraft to land on Mars 21 years ago. Martian atmospheric conditions will affect the operation of both the Mars Pathfinder landing on July 4, and the Sept.11 arrival of the Mars Global Surveyor, which will map the planet from orbit.

BIENNIAL ASTRONAUT SELECTION PROCESS BEGINS – (Johnson Space Center,. Houston, Texas) NASA is accepting applications for mission specialist and pilot astronauts for the current selection cycle. Interested individuals may apply until the cut-off date of July 1. Applications received after the deadline will be eligible for consideration in the next selection cycle. Successful pilot applicants typically have extensive piloting experience in high-performance jet aircraft and flight experience. Successful applicants for the mission specialist positions typically have significant backgrounds in engineering or the sciences. After a six-month process, including screening applications and conducting interviews and medical evaluations, selections will be announced in early 1998 with the new astronaut candidates reporting to the Johnson Space Center in the summer of 1998.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.

TU-144LL FLYING LABORATORY TAKES OFF – (Dryden Flight Research Center, Edwards, Calif.) The Tu-144LL Flying Laboratory flew its first supersonic flight in support of NASA's High-Speed Research program on May 20 and flew a second mission above Mach 1 on May 30. The flight crew took the research aircraft to Mach 1.4, where they were to perform engine inlet compatibility studies, said Dryden Tu-144LL Chief Project Engineer Neil Matheny. Further data collection on the Propulsion System Thermal Environment Data Base and the Dryden-developed Slender Wing Ground Effects experiment were among NASA test points on the flight card.

Multicultural Facts

▲ "Our diversity creates a talent pool of unprecedented breadth and width. The very heart of creativity comes from merging these differences and having them rub up against one another. That's why we must capture this diversity in its fullest, most positive form, increasing the proportion of women, minorities and people with disabilities in the work force." – John Gibbons, assistant to the president for science and technology and director of the White House Office of Science and Technology Policy.

▲ June is Gay Pride Month.

▲ See the MCLT home page at *http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.* To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV.

Worldwide aerospace events plentiful in summer months

The following national and international aerospace events are scheduled throughout the summer:

▲ June 9-11 – Advanced Composites. A new course on composite materials and structures, presented by Dr. George Springer, Paul Pigott Professor of Engineering and chairman of the Department of Aeronautics and Astronautics at Stanford University. For more information or to register, call Launchspace at 800-553-5907.

▲ June 12-13 – Unmanned Vehicles '97 Conference & Exhibition, Le Meridien Hotel, Paris, France. For more information, call 44 (0) 1628 604764, fax: 44 (0) 1628 664075/664334.

▲ June 15-22 – 42nd Paris Air Show, U.S. Pavilion Hall 3, Le Bourget, France, 201-652-7070; fax: 201-652-3898.

▲ June 23-25 – Spacecraft Power System Design and Analysis. A comprehensive coverage of the spacecraft power system operation, design and analysis, presented by consulting power engineer Dr. Mukund Patel. For more information or to register, call Launchspace at 800-553-5907.

▲ June 23-25 – Engineering Defense Systems for the 21st Century, short course, Monterey, Calif. Call the University Consortium for Continuing Education at 818-995-6335, fax: 818-995-2932 or e-mail: ucce@aol.com.

▲ June 25-27 – Astronomy and Planetary Science for the Aerospace Professional. Focuses on lessons learned from missions Apollo through Voyager, presented by Dr. Alan Stern of the Southwest Research Institute's Geophysical Astrophysical and Planetary Group. For more information or to register, call Launchspace at 800-553-5907.

▲ July 7-10 – Third International Airborne Remote Sensing Conference and Exhibition: Development, Integration, Application and Operations. Copenhagen, Denmark. For information about media and exhibits, contact Wendy Raeder at 313-994-1200, ext. 3453, fax 313-994-5123 or by e-mail at raeder@erim.org.

▲ Aug. 18-22 – Avionics and Weapons System Flight Test short course, Washington, D.C. Call the University Consortium for Continuing Education at 818-995-6335, fax: 818-995-2932 or e-mail: ucce @aol.com.

Excerpted from Aerospace Daily, May 14, 1997.

Announcements

Tech Expo show here

Tech Expo '97, a technology and computer exposition, will be held June 10, 10 a.m.-2 p.m., at the H.J.E. Reid Conference Center.

The latest in current and developing technologies will be represented at this free show. More than 20 exhibitors will be showing: Mac software, test equipment, networking, workstations, office equipment, presentation systems, secure computing products, time management products, laptops and more.

It's bond season

The Langley Research Center 1997 Federal U.S. Savings Bonds Campaign is ongoing through July 18. This year's theme is "U.S. Savings Bonds – A Great Way To Save." The current interest rate is 5.68 percent for bonds purchased after May 1. Some 6.8 million Americans buy bonds regularly through payroll savings programs; 55 million Americans now hold savings bonds.

At the end of the Langley campaign, the payroll office will hold a drawing for two free $100 bonds – one to go to a new bond-buyer and one to a current purchaser who has increased his bond deduction. Winners will be announced in a future issue of the *Researcher News.*

To sign up for the payroll savings plan for buying U.S. savings bonds, complete the form you will receive in the mail and return it to the payroll office, Mail Stop 133. You will be automatically entered in the drawing for the $100 bonds.

Training offered for June, July

The following training courses are offered during June and July:

▲ Parametric Cost Estimating, June 17-18, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103. Prerequisite course is Program Management and Control Fundamentals or the equivalent. Calculators are required.

This course will help clarify parametric cost estimating and will provide guidance on how to work effectively with those who do parametric cost estimating.

▲ Configuration Management, July 16-17, 8 a.m.-4:30 p.m., Peninsula Graduate Center, Room 103. Prerequisite course is Program Management and Control Fundamentals or the equivalent.

This course will cover how to work with configuration management experts in implementing configuration control and how to know what role they should play.

To enroll for any of these classes, send an Application for On-Site Training (NASA Langley Form 24) for each class to DeAnna Wooster at Mail Stop 137, or fax to ext. 48543. For more information, call Tony Maturo at ext. 42590.

Technical Forum topics announced for June

The next Langley Technical Forum, June 18, 10 a.m.-noon, in the Pearl Young Theatre, will cover these topics:

▲ Field Acoustic Measurement Systems – *Kenneth D. Wright*

▲ Visual Communication – *Friedrich O. Huck*

▲ Nonlinear Analysis of the Space Shuttle Superlightweight External Fuel Tank – *Michael P. Nemeth*

▲ Flight Evaluation of a Variable-Grain Output Feedback Longitudinal Control Law for the NASA F/A-18 High Alpha Research Vehicle (HARV) – *Aaron J. Ostroff*

▲ Inflatable Antenna Technology with Preliminary Shuttle Experiment Results and Potential Applications – *Thomas G. Campbell and Marion C. Bailey*

Retiree offers thanks

"I sincerely thank all my friends who made my retirement social a very special occasion. I will cherish your good wishes, gifts and mementos. It has been a joy and privilege to work with each of you through the years. You made my career a wonderful experience."

– Shirley Crockett

In memory of Lillian M. Wentz

Lillian M. Wentz, 69, died May 6. A Hampton resident for 35 years, she retired from NASA Langley as a technical editor in 1993.

In memory of Mallory S. James

Mallory Southall James, 68, died May 7. A Hampton native, he retired from NASA Langley in 1984 as an electrical engineer after 33 years of service.

In memory of Martin A. Weiner

Martin Aaron Weiner, 78, died May 7. A Peninsula resident for 56 years, he retired from NASA Langley in 1980 after 40 years of service.

In memory of Charles N. Leeper

Charles Noel Leeper, 78, died May 18. A Poquoson resident for 51 years, he worked in Langley's Flight Instrument Research Division and retired in 1974 after 35 years of service.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), QuickMail (Mary Graves), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

Photojournalist . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

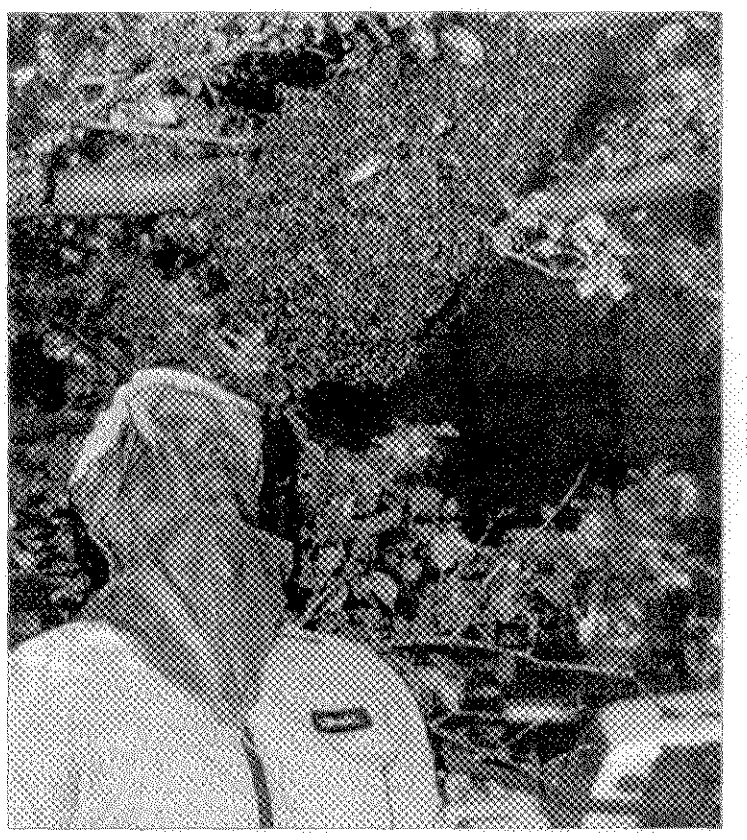


Photo by Bill Salyer

Gale Harvey examines the swarm of bees before attempting to remove them from the tree.

Apicultural Club 'rescues' some 50,000 honey bees

BY NANCY M. FINN

A few "lucky" spectators watched as Gale Harvey, Aerospace Mechanical Systems Division, and Ronnie Henk, Facility Systems Engineering Division, captured a prime swarm of honey bees May 14.

"Prime swarms were common several years ago," said Harvey, "but are rare now because of high colony mortality from varroa and tracheal mites."

The swarm of honey bees, first reported at noon, had set up residency in a tree on South Wright Street, across from Building 1192. By 2 p.m., Harvey and Henk, Langley Apicultural Club members, were prepared to move it to a safer location.

Harvey carefully splashed a weak solution of sugar water on the swarm.

"Bees do not sting when they have full stomachs," he said. The mixture also soaked their wings and inhibited flight.

As Harvey held a cardboard box, Henk gently but quickly bent the tree branch, dropping the bees into the box. The men sealed the box and cut a small hole in the side. Shortly, the swarm began to settle.

"If the queen is in the box, the others will follow," said Henk. "However, we won't know for several hours."

Later that evening, Harvey and Henk discovered that they had indeed captured the queen.

"The queen is busy laying eggs now," said Harvey, "while the workers are happily establishing a hive and foraging for nectar and pollen at my apiary in Hampton."

The Langley Apicultural Club meets monthly at the Regency Health Care Center in Yorktown to discuss the various aspects of bees and their environment. The club works to promote beekeeping and to provide educational information about honey bees.

For more information about the Apicultural Club, call Maywood Wilson at 868-9284 or Ronnie Henk at 566-3911.

NASA Langley included in international project management study

Ten Langley project management personnel participated in a day-long assessment session last month conducted by Lynn Crawford, a project management professor from the University of Technology, Sidney, Australia.

Gregory Stover, Space Projects Office; Robert Dillman, Space Systems Engineering Office; Kelli Willshire, Subsonic Transportation Office; Paul Schutte, Crew/Vehicle Integration Branch; Mike Blythe, Electronic Systems Branch; Mike Cisewski, Lockheed Engineering and Sciences Co.; Preston Carraway, Technology Applications Group; Sandra Smalley, Projects Controls Branch; Jennifer Comella and Debbie Carraway, Space Projects Office, all represented NASA Langley's project management efforts in this first phase of an international study involving several companies in the U.S., Australia and Europe.

The Australian university is evaluating organizations known internationally for success and excellence in project management to determine their strengths and key competencies, as well as areas of needed improvement, in this arena, and further to develop a successful international project management profile.

Langley, NASA's lead center for project management, was chosen as a U.S. sample group because of its reputation for excellence in the agency's project management development process, led by Dr. Ed Hoffman of NASA Headquarters in Washington, D.C.

Feedback from data collected at Langley will become available later this summer. The study will continue for about one year and will result in several publications from Sidney's University of Technology. The published data will be used to evaluate effective project management components worldwide.

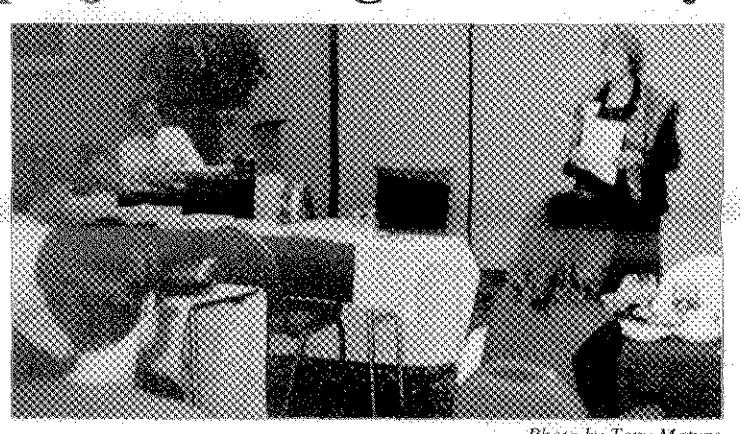


Photo by Tony Maturo

Lynn Crawford, right, of the University of Technology in Sidney, Australia, addresses NASA Langley's project management personnel at an assessment session last month at the Radisson Hotel in Hampton.

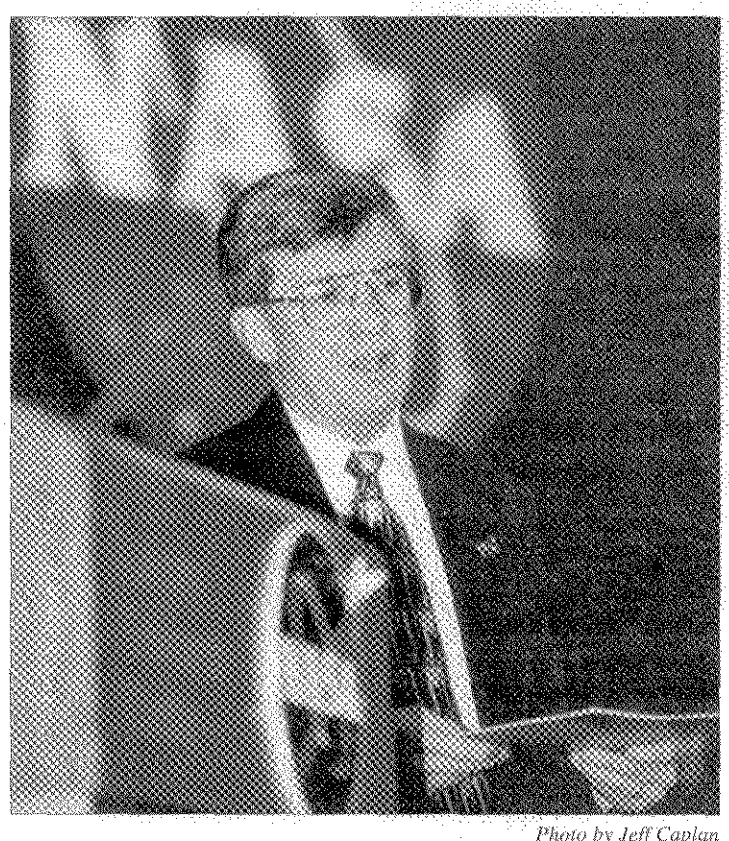


Photo by Jeff Caplan

THREE PILLARS OF SUCCESS—Dr. Robert Whitehead, associate administrator of the Office of Aeronautics and Space Transportation Technology (OASTT), talks to Langley employees May 16 in the H.J.E. Reid Conference Center. Whitehead outlined OASTT's "Three Pillars for Success" in aeronautics and space transportation technology. The document is a blueprint for achieving national priorities in aeronautics and space transportation and is available on the Internet at *http://www.aero.hq.nasa.gov/oastthp/brochure/brochure.html.*

NASA team honored nationally for problem-solving achievements

The NASA Acquisition Internet Service (NAIS) was recognized recently by the Ford Foundation and Harvard University for its original work in getting NASA acquisition information to contractors.

The NAIS is the federal government's first agency-wide acquisition service on the Internet. The NAIS team established this service that delivers NASA's acquisition documents to industry over the Internet while reducing paperwork and saving time and money. Companies get the electronic version of a solicitation immediately upon release, avoiding several days of document reproduction and mail time.

The NAIS was chosen as a semifinalist in the Innovations in American Government Awards Program sponsored by Harvard and the Ford Foundation. Only 99 of the 1,540 applicants were chosen as semi-finalists.

The Innovations Program's goal is to find and celebrate outstanding examples of creative problem-solving in the public sector. Since it began 11 years ago, the program has recognized 180 innovative programs, awarding $12 million in Ford Foundation grants.

The NAIS team has been nominated for the finalist selection. Twenty-five finalists will be chosen and awarded $20,000 grants for replication and dissemination of their programs. Additionally, 10 of the finalists will be chosen as winners in October and will receive an additional $80,000, for a total of $100,000.

The NAIS is a unique service that has been created and run at the working level, involving procurement and technical personnel from every NASA center. Langley's representatives are **Sandi Ray**, **Mary Deuell**, **Kennie Jones** and **John Kusterer**.

The NAIS' Internet address is ***http://procurement.nasa.gov.***

President orders seat belt use for official government business

President Clinton signed an executive order in April mandating all federal workers – including military personnel – to securely fasten their seat belts when driving on government business.

In signing the order, Clinton also directs seat belt use by all drivers and passengers traveling through defense installations and national parks. Passengers in vehicles equipped with seat belts and child restraint systems will use those systems while their vehicles are moving through these areas.

Although not mandated, Clinton is also requesting government contracting agencies to encourage contractors to adopt and enforce on-the-job seat belt policies for contract employees.

To further push mandatory seat belt use, Clinton is directing all federal executive branch agencies to promote and expand their existing seat belt programs.

The president said this includes conducting education programs for federal employees about the importance of wearing seat belts and the consequences of not wearing them.

Clinton is also directing the Department of Defense and the National Park Service to consider regulatory changes on enhanced seat belt use requirements and standard enforcement of those requirements on their installations.

– From the Armed Forces News Service

Langley Handbook mandates seat belt use as safety measure

NASA Langley personnel may find the center's safety regulations in the Langley Handbook, September 1994, in the section titled "Facility Safety Requirements, General Vehicle Safety (Seat Belts)".

"The purpose of this safety standard is to reduce the number and severity of motor vehicle injuries and accidents. All drivers and passengers using U.S. government registered motor vehicles for official NASA travel are required to use available lap and shoulder safety belts whenever their use is possible, reasonable and safe.

"It is a violation of this safety standard to remove, disable or physically circumvent the proper use of lap and shoulder safety belts that are presently installed.

"Exceptions: This safety standard is not applicable to NASA and contract drivers and passengers if:

▲ The motor vehicle is not equipped with lap and shoulder safety belts.

▲ The driver frequently stops and leaves the vehicle or delivers property from the vehicle and the speed of the vehicle between stops does not exceed 15 miles per hour.

▲ The driver or passenger possesses a written indication from a physician that he/she is unable for medical or physical reasons to wear a lap or shoulder safety belt.

▲ The driver possesses a certificate or license endorsement issued by a state motor vehicle department, or a similar agency in another state or country, indicating he/she is unable for medical, physical or other valid reasons to wear a lap or shoulder safety belt.

▲ The use of the shoulder belt would interfere with operation of research vehicles or those modified to support research operations."

Legislative update

Commercialization of space growing rapidly

BY DR. DIANA LAMBERT

Editor's note: Dr. Diana Lambert is a legislative affairs specialist in the Office of Legislative Affairs at NASA Headquarters, Washington, D.C.

May 27 – The commercialization of space – once a futuristic concept – has arrived and is riding high on the congressional agenda; the House Space and Aeronautics Subcommittee recently completed two days of hearings, May 21-22, on the general subject of the promotion of commercial ventures in space, with the intent of crafting a Commercial Space Act of 1997.

Actually, the private sector has long been involved in space activities. Within a decade of the establishment of NASA, communications satellites became a reliable and cost-effective addition to long-range communications, and the Communications Satellite Corporation (COMSAT), the manager of the International Telecommunications Satellite Consortium, became a huge financial success.

Since then, private enterprise has undertaken the development and manufacturing of many communications satellites, and the federal government, through the National Telecommunications and Information Administration, has encouraged commercial satellite operators to become involved in educational, health services, and basic communications services for remote areas by facilitating market aggregation and technology transfer, among other efforts.

Later, NASA and other federal agencies worked to attract private investment and direct participation in civil remote sensing systems.

With the commercialization of geosynchronous satellites well underway, the Administration of Ronald Reagan embraced the notion of the commercialization of space launch vehicles. The spectacular conclusion of the Apollo era, with the docking of the Apollo-Soyuz spacecraft in 1974, and NASA completion of the research and development phase of the space shuttle, left the country without a clearly enunciated space policy.

On July 4, 1982, President Reagan announced a space policy to set the direction of American efforts in space for the next decade, efforts which would include an expansion of the private sector investment and involvement in civilian space activities.

The following year, Reagan stated that the "U. S. government fully endorses and will facilitate commercial operations of Expendable Launch Vehicles (ELVs) by the private sector." In subsequent years, Congress has wrangled with how exactly to accomplish this task.

The Commercial Space Launch Act of 1984, reflecting Reagan's policy, designated the reusable space shuttle as the government's primary launch vehicle and encouraged commercial launch of expendable launch vehicles.

The law prohibited anyone from launching satellites or other space objects from the U.S. without a license, and gave the Department of Transportation the authority to issue these licenses. This act proved to be pivotal; in the following years, aerospace companies modified the launchers they had developed for the Defense Department and offered their launch services for a hefty fee. The federal government and the communications companies proved to be their best customers.

Langley honors local schools for participation in KidSat

BY LADONNA HAYNES

NASA Langley, with the help of astronaut Marsha Ivins, recognized nearly 150 students from Crittenden and Yorktown middle schools and from Point Option High School May 5 for their participation in the KidSat program. The students presented highlights of their earth science investigation, shared sample images obtained from the digital camera onboard the shuttle and disclosed findings.

Through KidSat, middle school students can actively participate in observing the Earth by commanding cameras onboard the space shuttle and by using these images to conduct scientific inquiry in support of their middle school curriculum.

The next space shuttle flight to carry KidSat cameras is scheduled for September onboard STS-86. The pilot project will be expanded to include 40 middle schools nationwide. Twelve of these sites will be within Langley's five-state precollege region. The Education and Learning Technologies Offices at Langley will be working closely with these sites throughout the summer.

SOLAR

(continued from page 1)

per watt since 1970, and it's expected to drop to one third the current price by 2010."

Multiple benefits

In addition to being a relatively cheap fuel source, solar cooking reduces smoke and air pollution; is clean, convenient and safe around children; and can be used to pasteurize drinking water to prevent disease.

According to Whitlock, the present SSE data also are expected to allow more efficient design of solar-assisted electricity systems for homeowners, communications stations, oil platforms and weather monitoring instruments in remote locations of the world.

Internet availability

Now, via the Internet, the SSE data set is available to anyone. Users need only enter their latitude and longitude to receive information on the available solar energy in their area. The data set, a synthesis of data from several weather satellites, contains 52 monthly averaged variables which are useful for a variety of solar energy technologies.

The SSE data set can be accessed through the NASA Langley Distributed Active Archive Center at: ***http://eosweb.larc.nasa.gov/DATDOCS/Surface_Solar_Energy.html***

The new Internet site is designed to accommodate a variety of user and computer system capabilities. Any user can easily access information about a particular location and produce a one-page printout. For those users with more advanced systems, text files, color and contour plots on a global scale also are available.

"The release of this data to the Internet will not only help us answer questions faster, but will allow more specific advice to be given," SCI's Campbell said. "Solar cooking provides tremendous health, environmental and financial benefits to those who can use it. Better identification of target areas will help spread this powerful tool farther and faster than before."

21st-century applications

As NASA's Mission to Planet Earth progresses into the next century, NASA Langley researchers will take advantage of all the latest data.

"Working with the energy and agricultural communities, we expect to create an improved data set that accounts for smoke from biomass burning, and to add quantities that are not included in the first data set," Whitlock said. "The additional quantities will enable new commercial applications in both the energy and agricultural industries. We also expect to use Mission to Planet Earth CERES measurements to create a data set that has a higher resolution."

The CERES (Clouds and the Earth's Radiant Energy System) instrument is scheduled for launch this November aboard the Tropical Rainfall Measuring Mission.

Mars revisited

Viking mission yielded scientific surprises

BY CARY SPITZER

Exciting – What a rush! Intriguing – Eat your heart out, Sherlock. Important – Very.

Those of us blessed with being a part of the Viking science team remember well those once-in-a-lifetime experiences, and we can claim some truly unique scientific discoveries.

Surprises were commonplace from the time the Viking spacecraft first orbited Mars until the last image was returned.

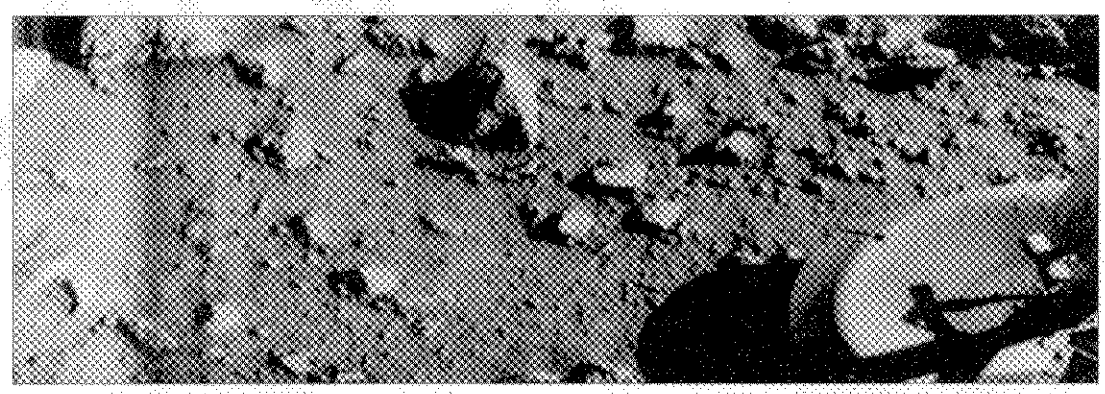
Selecting a landing site was the first challenge; those carefully pinpointed before launch by the best planetary geologists and mission operation specialists in the nation were found to be too rough once we could look at them relatively up-close from orbit. Too much risk of damaging or upsetting the lander when it landed. After a couple of weeks of searching and confirming the analysis, the first landing site selected was in Chryse Planitia, several hundred kilometers northwest of the original chosen site.

The first picture taken by the lander, just 25 seconds after touchdown, contained strange bright and dark vertical bands that triggered the first of many interdisciplinary discussions among the scientists. After a couple of days of debate, they agreed that the bands were caused by a small dust cloud and its shadow. The cloud was raised by the blast from the rocket engines used to slow the lander in its final 100 feet of flight.

The results from one of the biology experiments caused the greatest excitement and debate; in fact, some biologists still harbor questions.

After only three or four hours of analysis of the first biology data, and as the press was breathing down the scientists' necks for the latest information, biological findings did seem to suggest evidence of life. But now we know that we were looking at the result of inorganic reactions involving previously unknown superoxides in the planet's surface material – not proof of life on Mars.

Among the countless other surprises from the Viking mission: snow, the incredible similarity in the composition of surface samples at the two widely separated landing sites and a new type of magnetic mineral – all good material for future "Mars Revisited" articles.



NASA photo

Shot by Viking 1 minutes after its landing July 20, 1976, this is the first photograph ever taken on the surface of Mars. Both rocks and granular sand or dust are depicted. Many of the small foreground rocks are flat with angular facets; several larger rocks exhibit irregular surfaces with pits. At right is a portion of a Viking lander footpad.

Historically black colleges, universities send summer scholars to NASA Langley

BY GERRI RANKIN

Fifteen students from three historically black colleges and universities – Florida A&M University, Tallahassee, Fla., and Morehouse College and Spelman College, both in Atlanta, Ga. – arrived at NASA Langley May 27 to begin their summer research programs. The students are participants in the Women in Science and Engineering (WISE) program, in the Increasing Minority Access to Graduate Engineering (IMAGE) program and in Strategic Preparedness Advancing Careers in Engineering (Project SPACE).

These programs are specifically designed to encourage minority enrollment in science and engineering courses in institutions of higher learning. Working in a "mentoring" atmosphere with selected NASA scientists, engineers and technologists, students receive a highly motivating and supportive challenge to enhance their studies in science and engineering career fields.

Mentors volunteer 10 weeks of their time to help with the students' research and learning experience. This summer's mentors include Dr. Sang Choi, Materials Division; Dr. Stanley Woodard, Structures Division; Dr. Celeste Belcastro; Flight Systems Assessment Technology; Martha Brown, Fluid Mechanics and Acoustics Division; and Robin Cravey, Flight Electronics Technology Division.

Belcastro, a supervisor in charge of the Electromagnetic Environment Digital Upset Program, is mentoring Lawrence Cole, a junior electrical engineering major from Florida A&M University.

Cole will help with the center's efforts to alleviate the problem of electromagnetic threats to present and future aircraft safety and security.

Mentor Patricia McDaniel, Operations Support Division, gets student Davon Snipes started on his intern project – improving adhesive properties for high-performance polymers.

"I strongly feel that, when students are assigned to an internship here, it should be one that is realistic," said Belcastro.

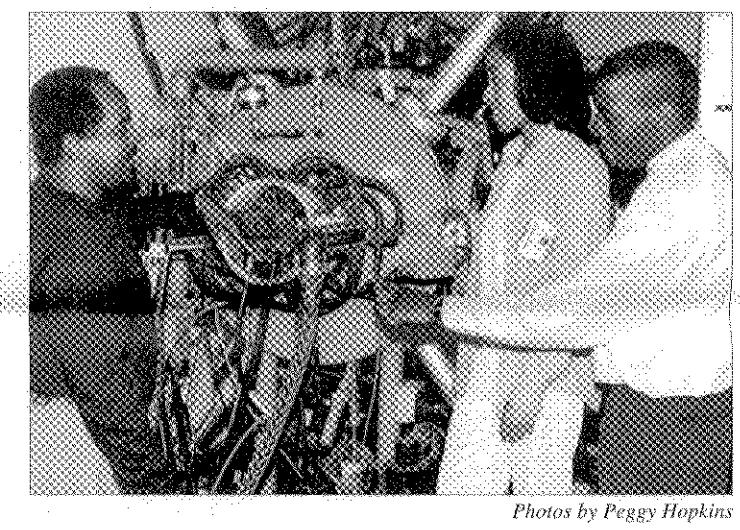
Summer intern students often receive assignments that are structured only to cover the period of time they will intern, she said. But she believes that their contributions while at the center should be realistic, valuable and worthwhile, so that future prospects for employment with NASA have a definite basis.

Amanda Haynes, a Spelman College sophomore, will conduct research in the Structures / Materials Operation Section. She is pursuing both a degree in mathematics at Spelman and a degree in mechanical engineering at Georgia Tech.

Haynes and her mentor, Everitt Brown, are working with the Hypersonic Materials Environmental Test System Mach 4 Airflow, 3,000 degrees Fahrenheit, arc jet.

"This system is unique in that it permits materials to be tested at convective heating conditions similar to hypersonic flight, while simultaneously applying loads to a test specimen," said Brown.

Davon Snipes, a junior at Morehouse College, returns to Langley for his second summer internship. His mentor, Dr. Patricia McDaniel of the Operations Support Division, will assist him in his project – improving adhesive properties for high-performance polymers.



Photos by Peggy Hopkins

Mentor Everitt Brown, left, Operations Support Division, explains the operation of equipment in the Structures Materials Section to students Amanda Haynes and Reginald Hutchinson.

NASA Langley employees named AIAA fellows, associate fellows

Lana Couch, of the Hypersonic Vehicles Office, and Ernest V. Zoby, of the Aerothermodynamics Branch, have been named fellows of the American Institute of Aeronautics and Astronautics (AIAA).

Fellows are persons of distinction in aeronautics or astronautics who have made notable and valuable contributions to the arts and sciences and to the technology thereof. A special fellow grade committee reviews associate fellow nominees from the membership and makes recommendations to the board of directors, which makes the final selections. One fellow for every 1,000 voting members is elected each year.

In addition, these NASA Langley employees and contractors were named AIAA Associate Fellows: Dr. Khaled Abdol-Hamid, Analytical Services and Materials, Inc.; P. Doug Arbuckle, Flight Dynamics and Control Division; Darrell R. Branscome, Space and Atmospherics Sciences Program Group; Richard L. Campbell, Transonic/Supersonic Aerodynamics Branch; Dr. Thomas S. Gates, Mechanics of Materials Branch; Dr. Karen E. Jackson, Structural Mechanics Branch; Dr. Jamal A. Masad, High Technology Corporation; Richard W. Powell, Vehicle Analysis Branch; and Long P. Yip, Vehicle Performance Branch.

Associate fellows have accomplished or have been in charge of important engineering or scientific work, have done work of outstanding merit or have otherwise made outstanding contributions to the arts, sciences or technology of aeronautics or astronautics. Only one associate fellow is elected for every 150 voting members.

AdVentures

FOR SALE: Bed liner for a full-size Ford F-150 $25; Jacuzzi pump, $25. Call 867-7841.

FOR SALE: Adult's 3-wheeler bike, 20-inch wheels, $200. Call 596-3394.

FOUND: Eyeglasses in Building 1146, Room 115, a few weeks ago. Call Althea Brown at ext. 43016, or come to Building 1146, Room 117.

VAN DRIVERS/HOSTS NEEDED: Retirees are wanted as van tour hosts/drivers for the Virginia Air & Space Center NASA Langley Summer Tours. It's an excellent opportunity for retirees to share their Langley knowledge and experience. Driver training workshops/tours will be held during the month of June. For more information, call Steve Devan at 898-9290.

RESPONSE PENINSULA: Response Peninsula is a nonprofit volunteer organization that provides support services such as hospital companion services, a crisis hotline and counseling, for victims of sexual assault. Response Peninsula is looking for volunteers to serve as companions, educators and hotline workers. Call Carolyn McDonald at 838-1829.

NASA Langley's 80th anniversary

Virginia Air & Space Center to admit NASA folks free

In commemoration of Langley Research Center's 80th anniversary, the Virginia Air & Space Center is offering FREE exhibit admission July 5-6 to all badged personnel – civil servants and contractors.

The VASC will celebrate the July 4 Mars landing all weekend. To be a part of that historic event, present your badge as your admission ticket July 5-6.

NASA Langley's official visitor center, the VASC is located on the waterfront in downtown Hampton and is open from 10 a.m. to 7 p.m.

LANGLEY ALUMNI ASSOCIATION: The next meeting of the Langley Alumni Association is June 10, 11:30 a.m., in the private dining room of the center cafeteria. The topic will be "Issues, Concepts and Possibilities for Supersonic Commercial Aircraft." Watch the Researcher News for a notice about our July 9 covered-dish supper, held in lieu of the regular luncheon meeting, which will feature a NACA panel on Langley World War II activities. For more information, call 864-7330.

HI TIDES: Meet the Norfolk Tides at the Virginia Air & Space Center, June 21, 11 a.m.-1 p.m. Explore baseball physics and meet Tides players and team mascot Rip Tide. Admission is $6 for adults; $4 for NASA, military, seniors and children under age 12. For more information, call 727-0900.

OUT GOLFING: The American Institute of Aeronautics and Astronautics' 6th annual Golf Outing is scheduled for June 26, 1:30 p.m., at the Eaglewood Golf Course, Langley Air Force Base. Shotgun start. $35 per player; $140 per team. Proceeds benefit the AIAA Scholarship Fund. Captain's choice with teams of four players. Join the picnickers at the AIAA picnic, H.J.E. Reid Conference Center, after the round. For more information, contact John W. Paulson Jr. at ext. 45071, Mail Stop 408A; e-mail j.w.paulson@larc.nasa.gov.

AIAA PICNIC: Bring family and friends to the 18th annual AIAA Hampton Roads Section Spring Picnic, June 26, 4:30-7 p.m., at the picnic grounds of the H.J.E. Reid Conference Center. Members, guests, and golf-outing players,$5; Non-members,$7;student members, $3; children under age 12, $2;children under age 6, free; pay at the door; checks payable to L.A.A. To make reservations by noon, June 23, contact Lynda Foernsler at ext. 48146 or at l.j.foernsler@larc.nasa.gov; or contact Paresh Parikh at ext. 42244 or at p.c.parikh@larc.nasa.gov. Visit the AIAA Web site for information on upcoming events: ***http://www.seva.net/~aiaa/calendar.html***

SPACE CAMPS: Virginia Air & Space Center offers the following Summer Space Camps for children:

▲ Sparks, Bits and Microchips – June 23-27, 9 a.m.-3 p.m., ages 7-12, $105

▲ Astro-Archaeology – June 30-July 3, 9 a.m.-3 p.m., ages 7-12, $90

▲ Mars Landing – July 7-11, 9 a.m.-3 p.m., ages 7-12, $110

▲ Astronaut Adventure I – July 14-18, Aug. 18-23, 9 a.m-3 p.m., ages 7-12, $110

▲ Astronaut Adventure II – July 21-25, Aug. 18-23, 9 a.m.-3 p.m., ages 7-12, $115

▲ Just Plane Fun – July 28-Aug. 1, 9 a.m.-3 p.m., ages 7-12, $110

▲ Science of Sports – Aug. 4-8, 9 a.m.-3 p.m., ages 7-12, $105

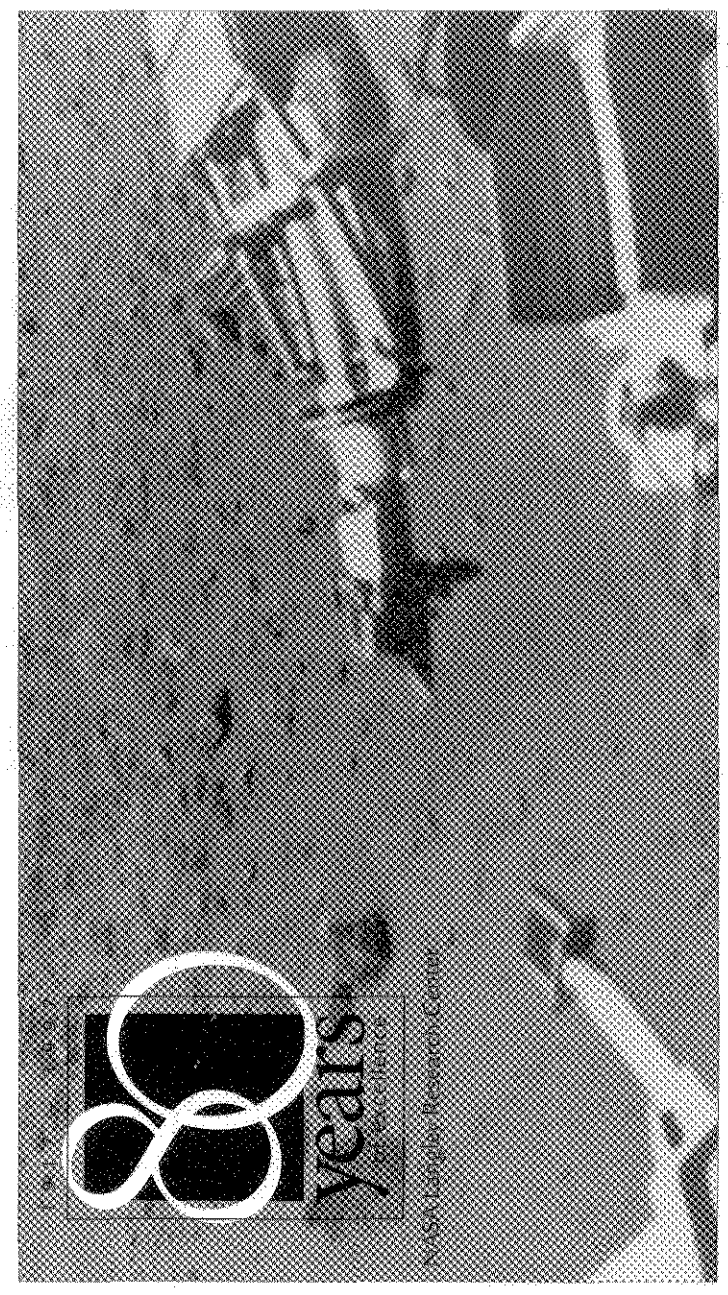
▲ Aliens R' Awesome – June 30-July 2, 9 a.m.-noon, ages 5-6, $45

▲ Beyond Aliens – July 28-30, 9 a.m.-noon, ages 5-6, $50.

For more information, call 727-0900.

LAA CARNIVAL IS COMING: The Langley Activities Association plans its annual summer carnival, set for Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with rides, games and other activities for the whole family. For more information or to volunteer to help, call ext. 46369.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to Whisler/Blackcomb, British Columbia. The trip is open to all NASA personnel, contractors, retirees, their friends and family. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.



NASA photo

THE RED PLANET – This photo of Mars was taken by the Viking I Lander in July 1976. In commemoration of the 80th anniversary of NASA Langley, the center remembers Viking as one of Langley's major projects in the country's space exploration programs. See related story, page 5.

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News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 12 ❖ June 20, 1997

Weather-piercing camera may reduce air traffic delays

NASA Langley collaborates with industry/government consortium to increase air traffic safety

BY KEITH HENRY

Air traffic delays due to poor visibility caused by weather can be virtually eliminated if technology being developed by U.S. industry and government looks as good in the air as it does on the ground.

NASA Langley is working with a consortium led by TRW Space & Electronics Group, Redondo Beach, Calif., that is preparing to demonstrate in flight a weather-piercing camera that has allowed researchers to see through fog, smoke and clouds. System checkout will begin later this month, followed by 60 hours of test and demonstration flights in September.

Through the camera's eye

The camera "sees" in the millimeter wave portion of the electromagnetic spectrum, a portion that is invisible to the human eye. It produces video images that enable a pilot to discern features like runways, obstacles and the horizon.

These features are sufficient to safely land, take off, roll out and taxi at any airline terminal in the country – not just the three dozen or so major airports that have costly systems to aid in low-visibility approach and landings. The camera is a passive sensor that does not emit signals in an airport environment, allowing multiple equipped aircraft to operate simultaneously on the ground without risk of interference.

"This sensor program directly supports NASA's new goal to safely triple capacity at our nation's commercial airports within the next ten years – regardless of fog, clouds, smoke and dust or other conditions that normally limit pilot visibility," said Tom Campbell, head of Langley's Electromagnetic Research Branch.

Government/industry effort

In 1994, the TRW-led Passive Millimeter Wave Camera Consortium was awarded a multi-year, $15 million cost-sharing contract under the Department of Defense Advanced Research Projects Agency's Defense Dual-Use Technology Initiative to adapt this technology to an airborne camera for military and civilian users.

Langley serves as the government's principal representative and funds the flight test element of the program.

In addition, Langley is performing lab tests to determine which materials are most "invisible" to millimeter waves and, therefore, are good candidates for the protective nose radome that will house the camera on the flight test aircraft. The tests also will provide the consortium's radome design team with data about optimum material thicknesses, protection from rain erosion and protection from static build-up.

Fisheye focus: 'Speckled Trout'

The aircraft is a one-of-a-kind Air Force C-135-C aircraft nicknamed the "Speckled Trout," to be fitted with the millimeter-wave camera and its new radome this summer. Once installed, the camera will generate video images of the forward scene in low-visibility conditions. These images will be displayed on a see-through heads-up display suspended between the pilot and the windscreen.

The sensor uses a focal plane array of about 1,000 receivers made up of monolithic millimeter wave integrated circuits developed by TRW. Each of these complex circuits, formed on a sliver of gallium arsenide, replaces bulky, heavy and costly components, resulting in a compact device.

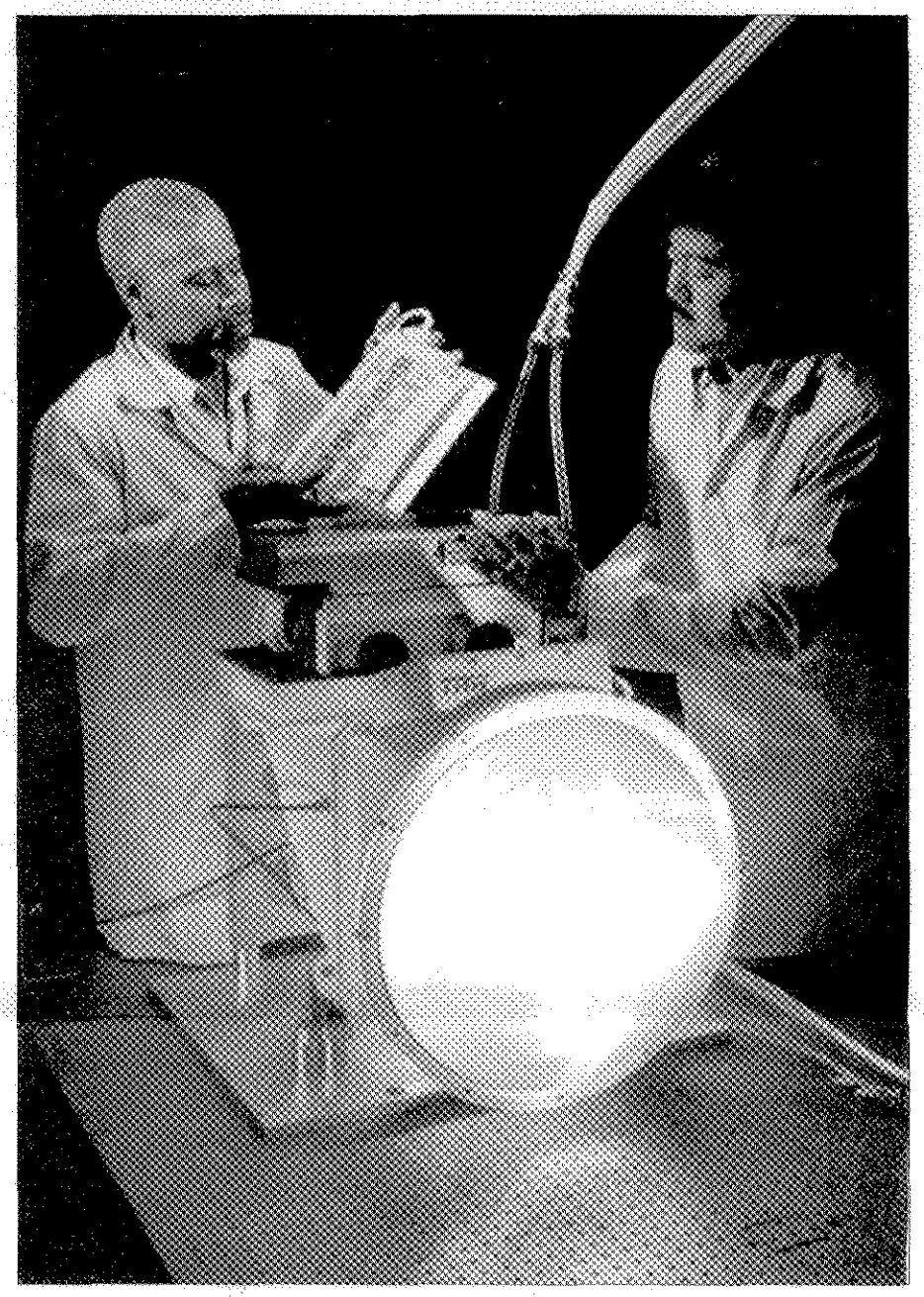

Photo courtesy TRW

Engineers at TRW, Redondo Beach, Calif., inspect the Passive Millimeter Wave Camera, a weather-piercing camera designed to "see" through fog, clouds, smoke and dust. The engineer on the left holds a compact, lightweight circuit board that forms the basis for the camera's 1040-element focal plane array.

Aviation sight-saver

"We're very excited about what we have produced under this program," said Dr. Steven Fornaca of TRW, the consortium's program manager. "Based on the images we have acquired under low-visibility conditions, and the quality of the receivers we've developed, we are confident that we are bringing to the aviation market a needed product that can be manufactured efficiently and at low cost."

Other consortium members are McDonnell Douglas, Long Beach, Calif.; Honeywell, Minneapolis, Minn.; Composite Optics Inc., San Diego, Calif.; NASA Ames Research Center, Mountain View, Calif.; U.S. Air Force Wright Labs, Dayton, Ohio; U.S. Air Force Flight Test Center, Edwards Air Force Base, Calif.; and the U.S. Army Research Lab, Adelphi, Md.

NASA studies high-altitude radiation with upgraded ER-2

BY MIKE FINNERAN

Using an upgraded NASA ER-2 aircraft, researchers at NASA Langley have begun a month-long campaign to measure radiation at high altitudes.

This campaign, funded by NASA's High-Speed Research program, is the first of several that will measure naturally occurring radiation from cosmic and solar rays at altitudes between 52,000 and 70,000 feet.

The data will be used to characterize the radiation environment for the aircrew and frequent-flying public on a future High-Speed Civil Transport. The High-Speed Civil Transport, a conceptual supersonic airliner, would carry 300 passengers at 2.4 times the speed of sound, at altitudes of up to 68,000 feet.

"The broad aim of the Atmospheric Ionizing Radiation ER-2 flight-measurements campaign is to understand the composition, distribution and intensities of cosmic and solar radiation at commercial supersonic transport-cruise altitudes," said Allen Whitehead, the High-Speed Research environmental impact manager.

"Our primary concern is the level of uncertainties in the knowledge of the upper atmosphere's radiation environment and the human body's response to that type of environment," said Dr. John Wilson, the Atmospheric Ionizing Radiation chief scientist.

"Radiation measurements will be obtained by an array of instruments from the United States, Canada, Germany, United Kingdom and Italy in a collaborative effort devised by Dr. Wilson," said Donald Maiden, the Atmospheric Ionizing Radiation project manager. "The instrument types which make up the array were recommended by the National Council on Radiation Protection in a study sponsored by the High-Speed Research program.

"The primary thrust is to characterize the atmospheric radiation and to define dose levels at high altitude flight. A secondary thrust is to develop and validate dosimetric techniques and monitoring devices for protection of the aircrew who work many hours at cruise altitudes.

"Even though the exposure levels are higher at the higher cruise altitude," Maiden continued, "the typical flying public will actually receive less radiation exposure than on today's subsonic transports because of the higher speed of the High-Speed Civil Transport. This is another advantage for speed."

The flight program is a collaborative effort with the Department of Energy's Environmental Measurements Laboratory; NASA's Johnson Space Center; the Canadian Defense Research Establishment and

(see RADIATION, page 3)

News Briefs

Around the Agency

COLUMBIA PASSES MILESTONE TOWARD QUICK REFLIGHT – (Kennedy Space Center, Fla.) NASA's space shuttle program has passed a major milestone on its way to reflying the orbiter Columbia and the first reflight of the same payload and crew in space shuttle history. Columbia, which saw an abbreviated mission in April due to indications of a faulty fuel cell, was transported from the Kennedy Space Center Orbiter Processing Facility to the Vehicle Assembly Building, where it was to be mated with an external tank and solid rocket boosters in preparation for roll-out to Launch Pad 39A. With the spacelab payload secure in the orbiter's cargo bay, NASA remains on track for a targeted July 1 launch date for reflight of the Microgravity Science Laboratory mission

GALILEO FINDS WET, DRY SPOTS, NEW VIEW OF JUPITER'S LIGHT SHOW – (Jet Propulsion Laboratory, Pasadena, Calif.) Jupiter has both wet and dry regions, just as Earth has tropics and deserts, according to new images and data from the Galileo spacecraft. The data may explain why Galileo's atmospheric probe found much less water than scientists had anticipated when it dropped into the Jovian atmosphere in December 1995. The area where the probe entered was a clearing in the clouds – a dry spot through which deeper, warmer layers can be seen. By studying various areas, the Galileo orbiter has helped scientists understand the probe results. Images and other data received from Galileo are posted on the Galileo home page at ***http://www.jpl.nasa.gov/galileo.***

NASA JOINS FIGHT AGAINST DIABETES – NASA's Office of Life and Microgravity Sciences and Applications and the Juvenile Diabetes Foundation are forming a cooperative partnership to conduct research that addresses the treatment and monitoring of diabetes and diabetes-related problems. The two parties signed a Space Act Agreement on June 8, enabling NASA and the Foundation to initiate joint research activities that will build on the strengths of the two organizations and support their respective goals. The agreement provides for technology transfer to make techniques and technologies developed by NASA researchers available to the diabetes research community. While NASA does not have a diabetes research program, the agency is conducting research that would have an impact on the fight against diabetes. NASA sponsors research in the areas of protein crystal growth, three-dimensional tissue culturing and noninvasive diagnostic technologies that can support the development of improved treatments.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "To get good workers, organizations will have to put aside old definitions of 'fit' and employ people of different colors and cultures. Those with the best reputations for managing diversity will win the competition for the best personnel, which is increasingly important as the composition of the labor pool changes." – from "Facts About Diversity," National MultiCultural Institute

▲ May 29 – Asian Pacific American Heritage Month Cultural Event: "Our Children, Our Future," Washington, D.C., 703-305-6117

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Langley engineer wins *Discover Magazine* award

BY NICOLE FOREST

NASA Langley engineer Mark Froggatt, an electrical engineer in the Nondestructive Evaluation Sciences Branch, was named one of the winners in the 8th annual *Discover Magazine* Awards for Technological Innovation last month for his fiber strain sensor that will benefit the space shuttle.

Froggatt was one of four finalists from more than 4,000 entries in the aviation and aerospace category.

"I am very surprised," Froggatt said. "I think what I do is fairly mundane and uninteresting to other people."

Originally designed as a structural testing device, the fiber optic sensor can be used to measure stress damage on the space shuttle without dismantling the craft, which will save time and money. The fiber optic cables would be glued to shuttle components, allowing stress detection by measuring light beamed through the cable from a built-in mini-laser. Any movement in the fiber optics would indicate change in the shape of the structure. The sensors are lighter and more compact than conventional electronic sensors and can be used in a variety of structures, from planes to bridges.

Photo by Jeff Caplan
Discover Magazine **award winner Mark Froggatt**

Ann Druyan, widow of the late Carl Sagan, presented Froggatt with the award at Disney's Epcot Center in Orlando, Fla. The July issue of *Discover* will feature the winners and finalists.

Froggatt earned bachelor's and master's degrees in electrical engineering from Virginia Polytechnic Institute and State University. He began his career with NASA Langley in 1990. He is pursuing a doctorate degree from the University of Rochester, Institute of Optics.

Announcements

Langley project wins Telly Award

A Quality Assurance and Inspection Branch (QAIB) video project, produced at Langley, received a Telly Award last month. The project, which received an honorable mention, is an introduction and brief explanation of QAIB's role on center.

The Quality Assurance and Inspection Branch, headed by Roland "Bill" Lee, ensures that NASA Langley's scientists and researchers receive only top-quality tools and equipment. QAIB's role is paramount in maintaining Langley's status in the aeronautics and space research community.

Development, fabrication and testing of models and flight hardware are done on site in QAIB's laboratories. Along with ensuring the quality and usability of hardware used within Langley's many laboratories and test facilities, QAIB specialists adhere to all procedures and requirements outlined in the center's regulations. Inspection records are closely kept on CD rom and are easily cross-referenced.

The Telly Awards, founded in 1980, showcase and recognize outstanding non-network and cable TV commercials. The competition was recently expanded to include film and video productions and non-network programming. Over the years, the Telly Awards have gained respect in both the news and advertising industries, as well as in higher education, as a mark of excellence and innovation. A panel of television production professionals judged the more than 9,000 entries in the 1996 competition.

Career center offers summer workshops

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars during the summer:

▲ "So, You Want To Be a Consultant," June 25, 1-4:30 p.m.

▲ "Resume Reality," July 8, 1-4 p.m.

▲ "Starting Your Own Business," (one seminar in four parts) July 16-17 and 23-24, 8:30 a.m.-noon

▲ "Cover Letters and Thank-You Notes," July 30, 1-4 p.m.

▲ "Interview Basics," Aug. 13, 9 a.m.-noon

▲ "Life After NASA – What Will I Do Next?" Aug. 20, 1-4 p.m.

▲ "Making Yourself Indispensable at Work," Aug. 27, 1-4 p.m.

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Speakers Bureau May activities

Dick Davis talked about the weather to students at Sparrow Road Intermediate School in Chesapeake.

Clyde Medley spoke about electrical gadgets to students at B.M. Williams Elementary School in Chesapeake.

Dwight and Dwane McSmith addressed Amelia County Public School about careers in space.

Christine Darden spoke to the Phoebus Community Center about engineers at NASA. She also spoke at a luncheon in Hampton sponsored by the National Council of Negro Women on "We Are the Village."

Angela Mason addressed students at Carver Elementary School in Newport News about science, engineering and technology.

Larry Huebner talked to third-graders at Tabb Elementary School in Yorktown about the solar system and space exploration.

Bobby Braun delivered a Sigma Series lecture, "A New Era of Planetary Exploration," at the Virginia Air & Space Center in Hampton. He also spoke to Bassette Elementary School students in Hampton about Mars Pathfinder.

Al Ragsdale talked to fifth-graders from Richneck Elementary School in Newport News about careers in aerospace.

Mark Saunders told students at Seaford Elementary School in Yorktown about Langley and space science missions.

Vince Rausch addressed the Newport News Rotary Club on Hyper-X.

Larry Bement spoke to the men's group of Hilton Presbyterian Church in Newport News on "Explosive Fracturing of Fighter Aircraft Canopies To Allow Through-Canopy Crew Egress."

William F. Wood talked to students at Saunders Elementary School in Newport News on "Space, Planes and Deaf Researcher Experience."

In memory of Milton L. Williams

Milton L. Williams, 67, died May 21. He retired from NASA Langley as an engineer in 1977.

In memory of George W. Holden

George Wilbur Holden, 78, died May 30. He retired from NASA Langley as an inspector in 1981 after 20 years of service.

News Researcher

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

Photographer..... Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Mars revisited

Viking orbits had Langley researchers going in circles

BY BOB TOLSON

Editor's note: While Mars Pathfinder heads towards its July 4 landing on the Red Planet, the Researcher News asked Langley veterans to reminisce about their experiences during NASA's first Mars project, Viking.

As the new year began in 1977, the Viking Landers had completed the 90-day primary missions.

Meanwhile, the Viking Orbiters were busily photographing every surface feature in sight. Global mapping of the surface was a high priority for the imaging team. Even so, only nine months earlier, they had reluctantly agreed to the Phobos and Deimos flyby experiments proposed by NASA Langley.

Part of the Viking radio science effort at Langley required precision calculations of the Viking orbits. In the fall of 1974, Ed Daniels evaluated the need to include the gravitational attraction of Phobos and Deimos – Martian satellites – in these trajectory calculations.

Daniels found that the moons could be neglected; however, their influence increased toward the end of the primary mission. Daniels, Bob Blanchard and I drew orbits on the blackboard all afternoon until we finally understood why: Due to orbital precession, the Viking orbits would periodically cross the orbits of both Phobos and Demios. Further, with a few small orbit trim manuevers, it would possible to perform multiple flybys of both moons.

The implications were obvious. Blanchard wrote of the scientific benefits, I did the navigation analysis and Daniels did trajectory calculations. Within a week, we had finished a paper for a 1975 conference. The paper received the 1978 H.J.E. Reid Award.

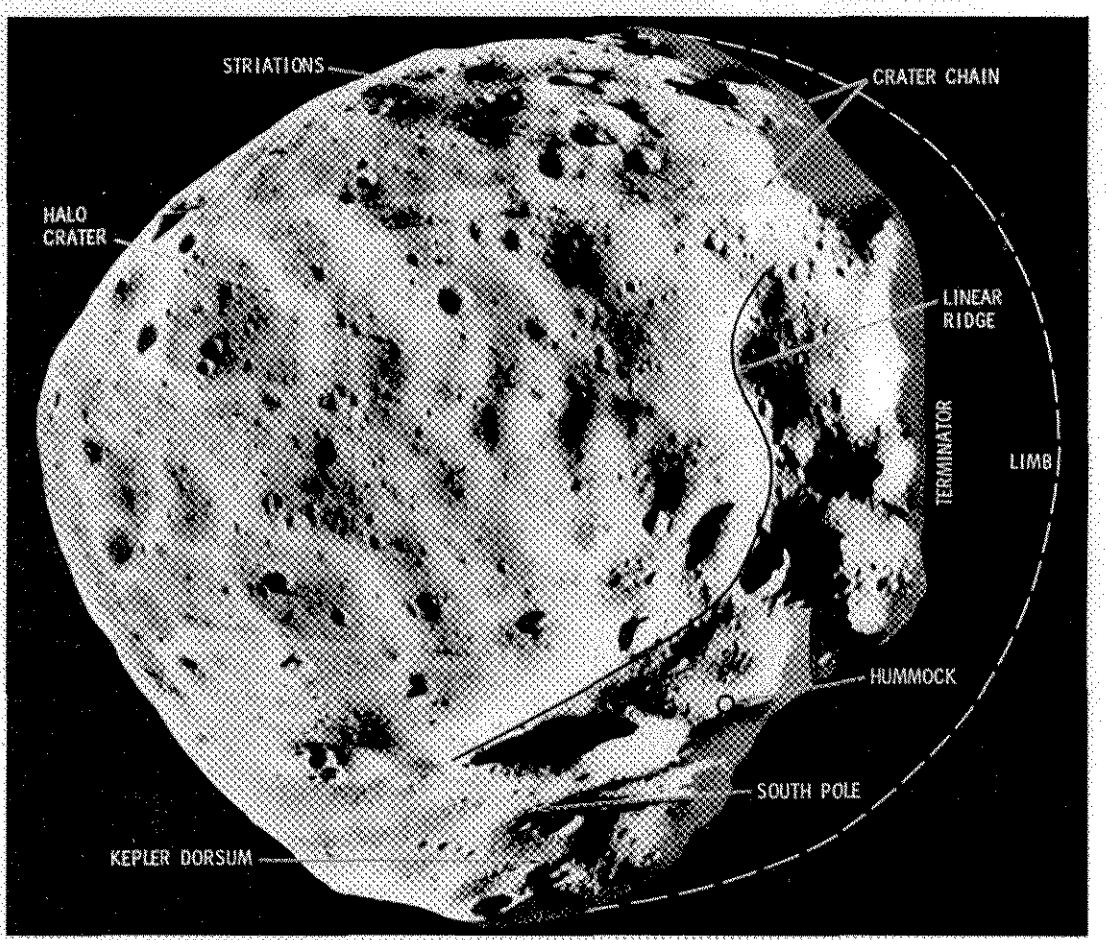
The following spring, with the Vikings lazily drifting toward summer encounters with Mars, the project called for scientific investigations for the extended mission. The Phobos-Deimos Flyby Experiment was selected, and the experiment team members from Langley, NASA's Jet Propulsion Laboratory, Cornell University and California Institute of Technology designed photo sequences for 10 encounters in February. Orbit trim manuevers were performed in January to phase and synchronize the Viking orbit with that of Phobos. Commands for the first seven encounters were loaded on the spacecraft.

The first encounter produced 22 pictures of a very black sky. The next encounter was only 22.95 hours away; it was the middle of the night on a three-day weekend. The team had no idea of what had gone wrong, and no one was willing to wake project manager Jim Martin to secure the authority to change the commands on board the Orbiter.

A few hours of frantic analysis revealed that the error must be due to an overestimate of the mass of Phobos. The only way to recover was to send up new commands. Reached by phone at a more decent hour, Martin authorized the team to change the timing of camera initiation, and the experiment was completed as planned.

Encounters occurred again with Phobos in May 1977. Flybys of Deimos as close as 30 kilometers that October produced 2-meter resolution images.

Twenty years later, Blanchard and I are on the way back to Mars with the Mars Global Surveyor.



NASA photo

This full picture of the Martian satellite Phobos, taken by Viking in 1977, shows ridges, craters and knolls.

Area students check out aerospace careers

BY SHERI BEAM

Langley contractors and NASA employees have reached more than 5,500 local middle school students during April, May and June, as part of the center's Aerospace Careers Presentations, an outreach program for area youth. This year, the Langley Contractor Steering Council headed up this educational initiative for middle schools on the Peninsula.

The volunteers and their presentations introduce Langley as an aerospace research center where people working in many different areas dedicate themselves as a team to investigate aeronautics, space and space-related problems and research projects. Sixth-grade classes were chosen in an effort to challenge students to begin thinking about career goals at this critical point in their education.

The center's Office of Education provided volunteers with training and materials to distribute to the students.

Participating contractors, employees and their "adopted" schools included:

▲ Advex Corporation – Mary Mayer – Eaton Middle School

▲ Analytical Services & Materials, Inc. – David Glass, Sankara Sankaran, Mike Card, David Moore, Jason Issac, Andrew Lovejoy – Lindsay Middle School

▲ CalSpan – Orby Wright, John Ertle – Crittendon Middle School

▲ Computer Sciences Corporation – Sheri Beam, Marilyn Bowers, Anna Estes, Kate Ferrall, Joey Ponthieux, Jack Richardson – Grafton Middle School; Franklin Fitzgerald, Chris Bulle-Hagn, Frank Preston, Ernestine Rodgers, Naomi Sinor, Kim Tatum – Dozier Middle School

▲ Dynamic Engineering – Michelle Krohn, Rob O'Connell – Dunbar Middle School

▲ I-NET – Robert Tattle, Geni Bedwell, Toni Arviola, Clarke Morledge – Tabb Middle School

▲ Lockheed Martin Engineering & Sciences – Alan Stockwell, Jim Russell – Poquoson Middle School

▲ Modern Machine and Tool Co. – Brent Meadors, Thomas Stokes, Thomas Davis – Syms Middle School

▲ SAIC – Greg Fletcher, Marta Fenn, Karen Sage, Susan Thomas, Mark Vaughan, Susan Walters – Guildersleeve Middle School

▲ Science and Technology Corp. – Wayne Ewing – York Middle School

▲ Technology Applications, Inc./DynCorp I & ET – Stephanie Heath, Buck Tumminello, Dick Kreassig, Tod Lockhart – Hines Middle School

▲ Wylie Laboratories – Allan Grayston, John Iacobucci – Spratley Middle School

▲ Unisys Corporation – Rolf Duerr, Al Ragsdale – Queens Lake Middle School

▲ ZEL Technology – Jerry Benson, Jennifer Shappell – Huntington Middle School.

In addition, the following NASA volunteers visited sixth-graders at Reservoir Middle School: Clifford Obara, Susan Rickard, S. Naomi McMillin, Donner Grigsby, Sally Johnson, Clayton Turner, Laurence Bement.

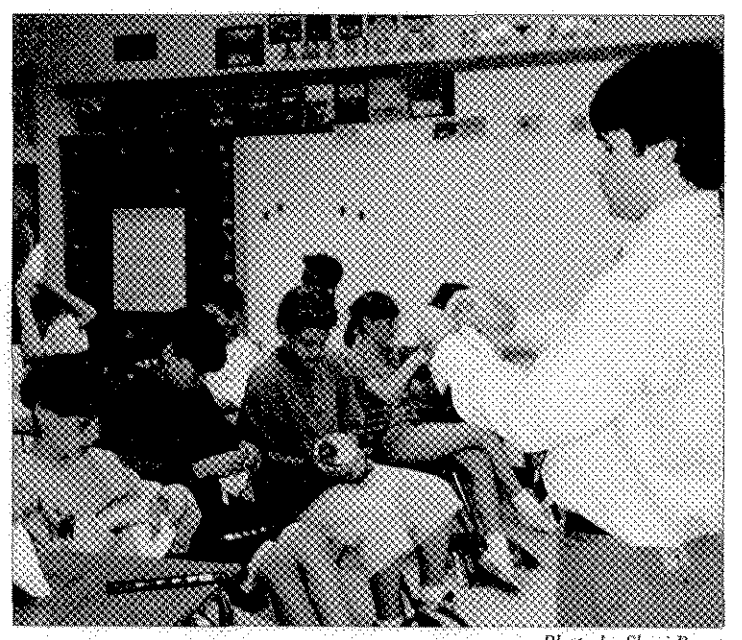


Photo by Sheri Beam

Joey Ponthieux, Computer Sciences Corporation, teaches students at Grafton Middle School how to make a Ring Wing Glider.

RADIATION

(continued from page 1)

Royal Military College; the German Aerospace Research Establishment; the United Kingdom's National Radiation Protection Board; the Boeing Company; and several domestic and foreign university guest investigators.

Recent modifications to the NASA ER-2, sponsored by NASA's Mission to Planet Earth program, increased its altitude capabilities, allowing it to reach easily those altitudes where the High-Speed Civil Transport will fly. The NASA ER-2 is based at NASA's Ames Research Center, Mountain View, Calif.

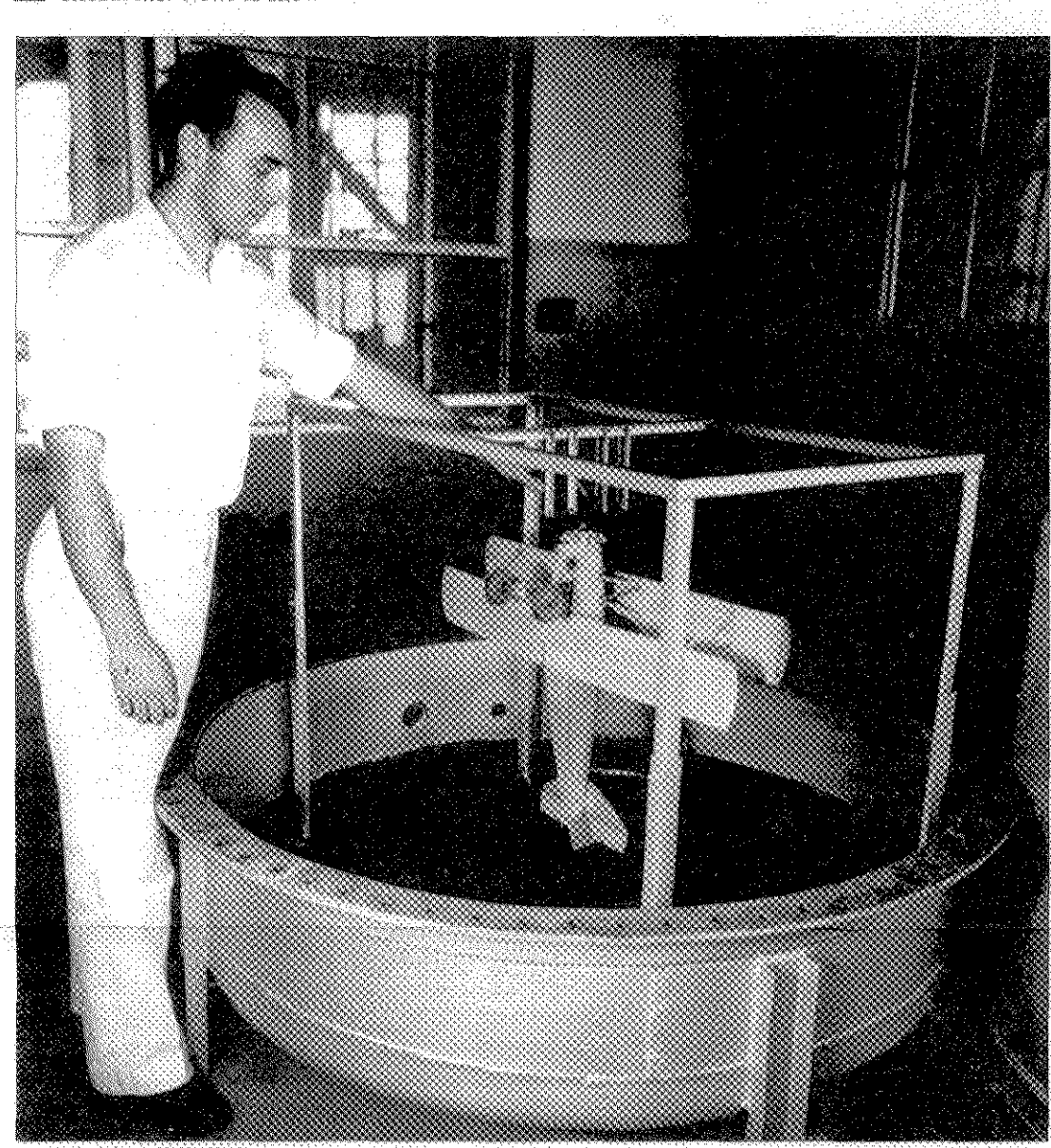
80 Years of NASA Langley:

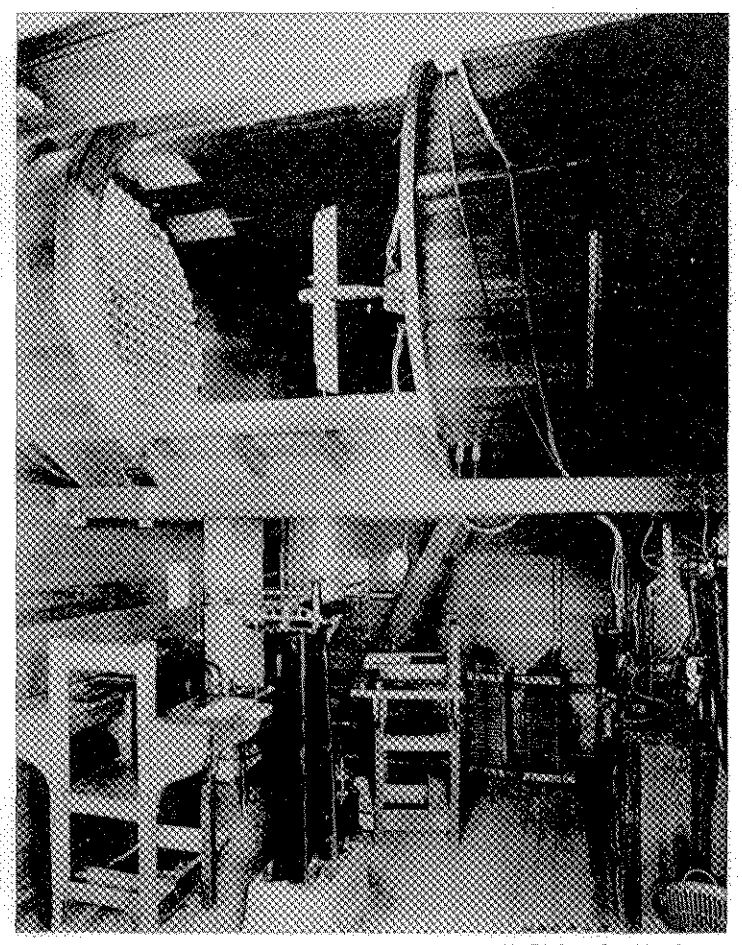
Center's history encompasses NACA's premier aero efforts

BY MARY SPRACHER

In celebration of Langley's 80th anniversary, the *Researcher News* is showcasing some of the lesser-seen photographs from the center's history – pictures that feature some of Langley's early facilities, projects, models and people, from the rustic original Atmospheric Wind Tunnel to the derby-bedecked engineer in the Propeller Research Tunnel.

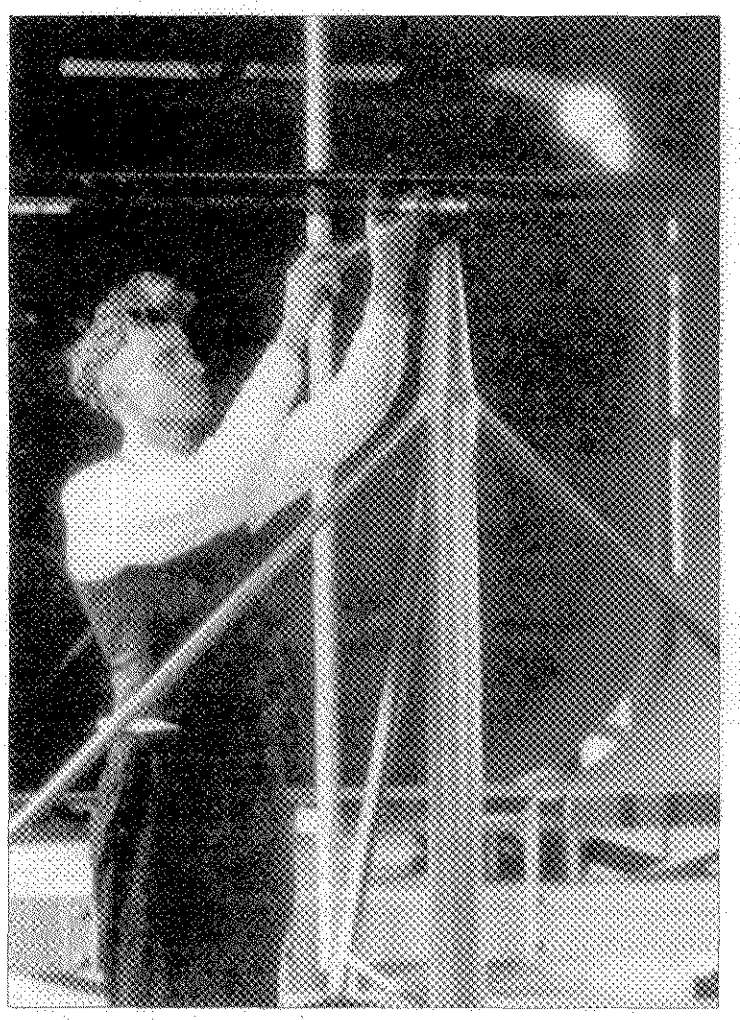
These photos depict some of the important early roots of aeronautical research at Langley and represent the evolution of that research since the center opened its doors in 1917 as the nation's first civil aeronautics laboratory.





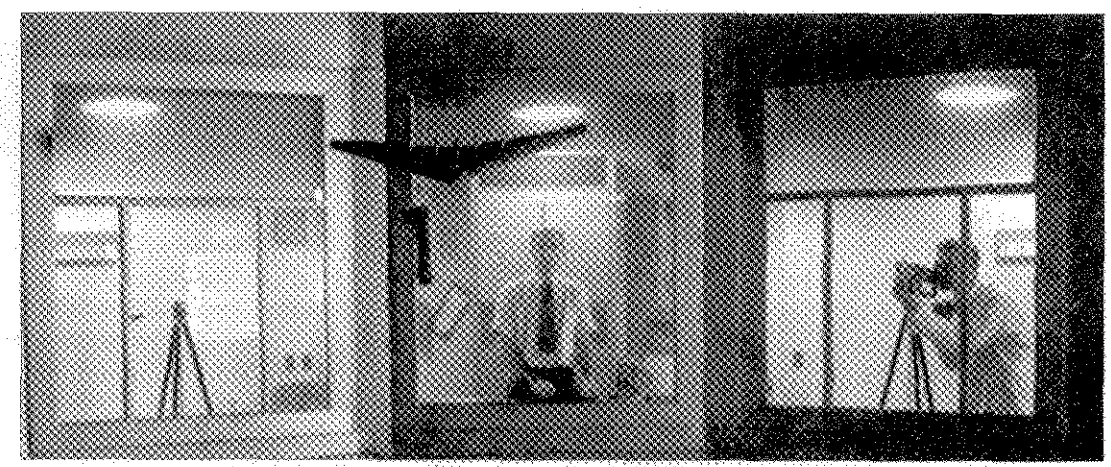
NASA Langley file photos

Above: The open-circuit Atmospheric Wind Tunnel – Langley's first – included a 5-foot test section with a closed throat. Operational in 1920, the tunnel was built to begin in-house aerodynamic testing of scale models, but was soon deemed obsolete and later replaced with the 5-Foot Vertical Tunnel and the 7- by 10-Foot Atmospheric Wind Tunnel.
Left: A Langley technician prepares to launch a one-tenth scale model of the XN2Y-1 naval training biplane for testing in the 15-Foot Spin Tunnel in 1935. The facility's opening signified the advent of a serious long-term commitment to studying the problem of aircraft spinning.



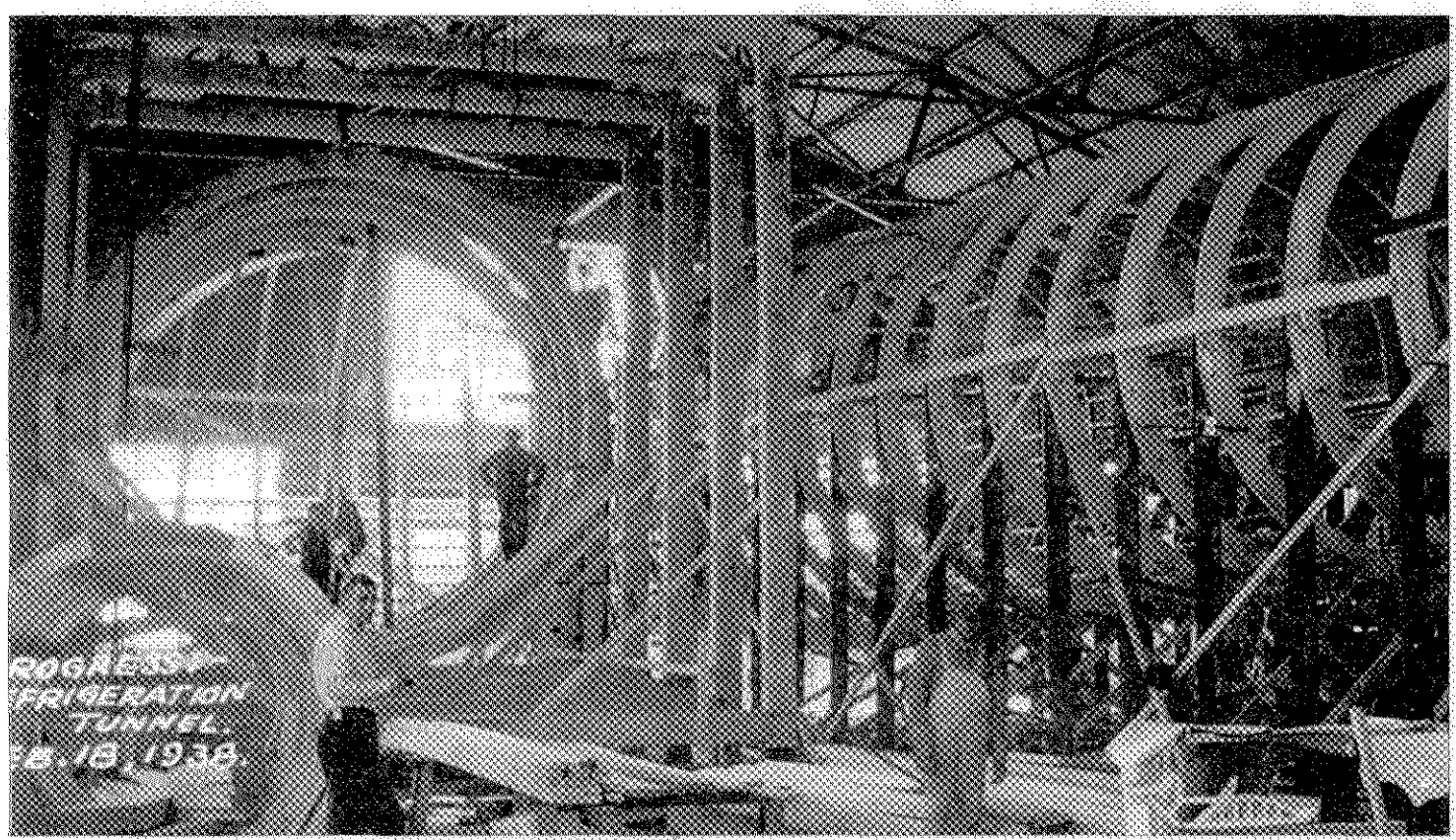
An engineer adjusts a test model of a Clark-Y airfoil used to study the coefficients of lift, drag, cross-wind force and pitching movement in the 7- by 10-Foot Atmospheric Wind Tunnel in 1931. This rectangular throat tunnel was one of two which replaced the original Atmospheric Wind Tunnel and was used mainly to study stability and control.

A Langley researcher constructs a one-sixth scale model of the hull of a Navy PH-1 flying boat in 1931. The model was made to be tested in Tow Tank No. 1, the first tank of its kind in the United States, in which models were towed through still water at constant speeds from a carriage spanning the tank. Results of model tests in the tank assisted in the development of flying boats and seaplanes.

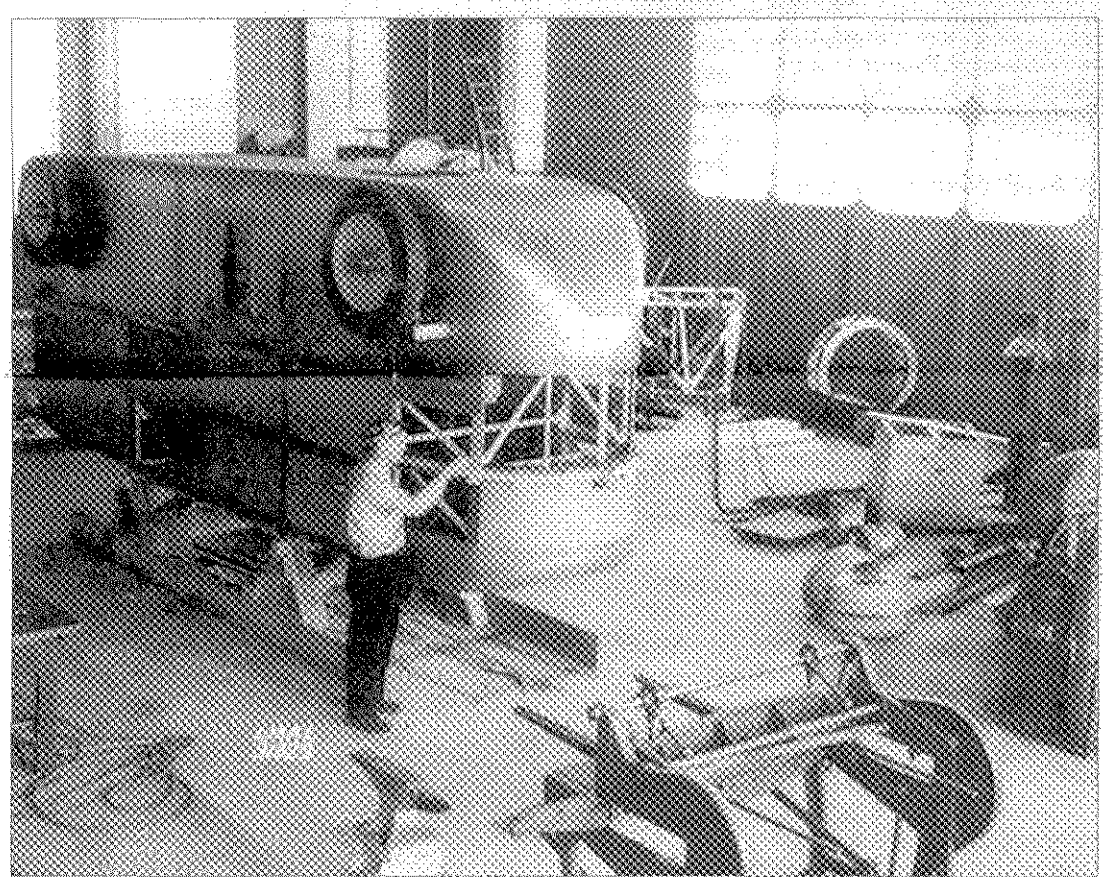


Researchers in 1943 test a Northrop XB-35 flying wing model in the 12-sided test section of the 20-Foot Spin Tunnel. The distance across the test section is 20 feet, and the vertical length is 25 feet. The free-spinning tunnel featured a propeller at the top which would thrust air upward, through turning vanes, and into the return passage.

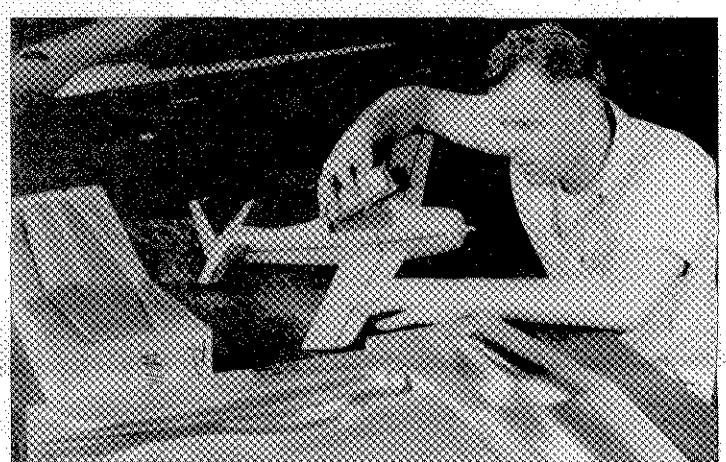
Early Aeronautical Research



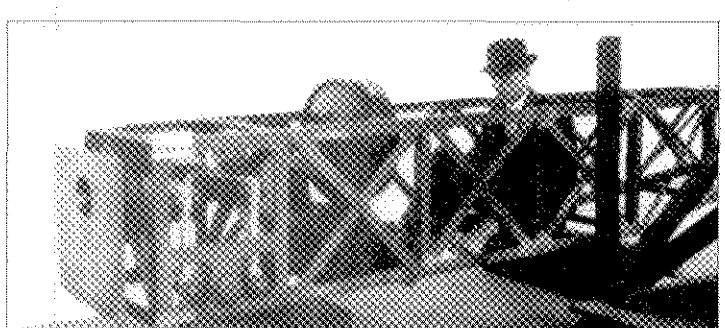
Left: NACA employees construct the wooden frame for Langley's Two-Dimensional Low-Turbulence Tunnel in 1938. Originally called the Refrigeration or "Ice" Tunnel, it was first intended to support research on aircraft icing. By 1940, that research was delegated to the new Ames Research Laboratory in California. The Ice Tunnel at Langley was then refitted, and research here turned to eliminating all turbulence in the test section.



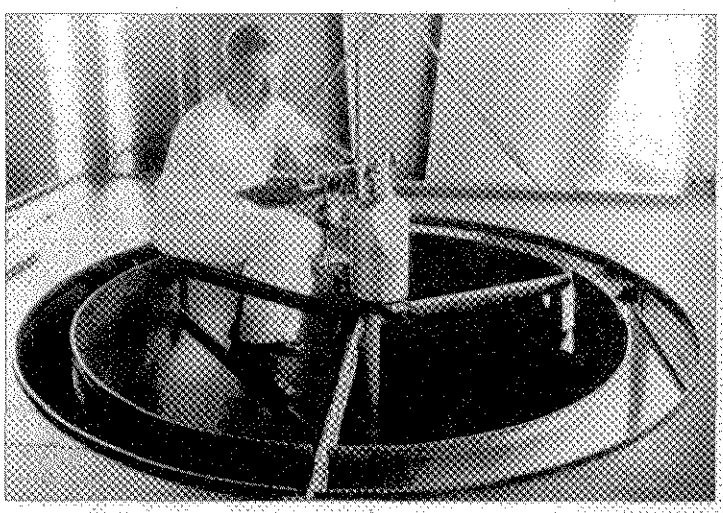
A Langley technician works to construct the carriage for Towing Tank No. 2. Authorized in 1939 and operational near the end of 1942, this tank was used to test models of floats for seaplanes and hulls for flying boats by attaching them to the overhead carriage and dragging them through seawater. The basin was 1,800 feet long, 18 feet wide and 6 feet deep, and its carriage traveled at speeds of up to 60 mph. Experiments in this tank led to radical departures from accepted hull design.



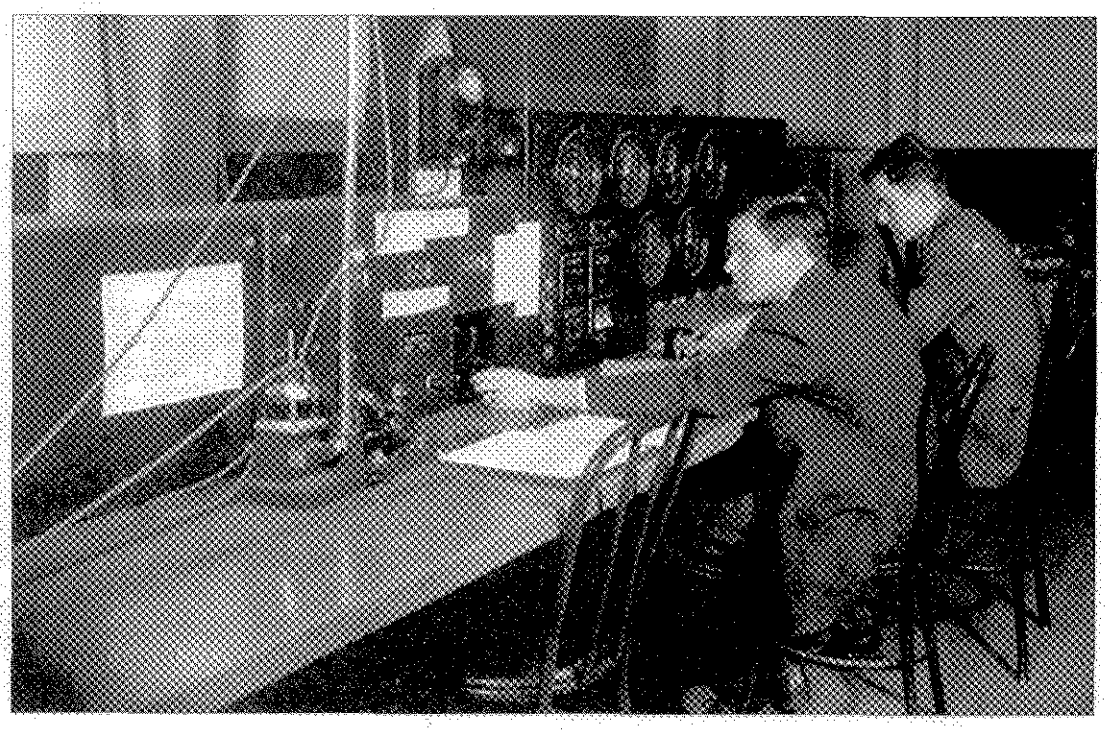
An engineer constructs a typical dynamic model to be tested in the 20-Foot Spin Tunnel in 1947. While models used in the spin tunnel were once primarily made of balsa and reinforced wood, most more recent models, including this one, are made of light, durable plastic.



An engineer sits in the steel frame of a small cross-section used to measure the torque of an operating engine in the Propeller Research Tunnel in 1927. The frame could be slipped inside a standard airplane fuselage.The test fuselage allowed the engine driving the propeller to be mounted on a dynamometer, the dial scale in the center of the picture.



Above: A researcher examines the six-component spinning balance of the 5-Foot Vertical Wind Tunnel. Developed in the early 1930s, the method measured all six force and moment components of test models and provided wind tunnel data for many spinning conditions. Construction of the tunnel was complete in 1930.
Right: Engineers operate the controls of the Stability Tunnel, completed in 1941. The single-return, closed-jet tunnel with two separate 6-foot-square test sections was designed for dynamic stability work.



AdVentures

FOR SALE: Spinet piano, completely reconditioned. Tuned and delivered for $990. Call 898-6155.

FOR SALE: 1988 Jeep Wrangler; 68,000 original miles; 4-wheel drive; power steering/power brakes; AM/FM cassette; soft top, new tires and exhaust system. $6,100. Call 564-3153.

FOR SALE: 1993 Yamaha 535 motorcycle, two helmets, rainsuit, saddlebags. $3,000. Call 851-1990.

FOR SALE: Fax modem for Macintosh; 14,400 bps data modem; 14,400 bps send-and-receive fax; throughput up to 57,600 bps; Smart One modem made by Best Data Products, Inc. Original box and contents. $35 or best offer. Call Mike at 867-7169.

FOR SALE: 1997 Dodge 1500 pickup truck, 4 x 4; 360 V-8 engine; 6,000 miles; extended cab, bedliner, tonneau cover, many extras. $26,000. Page Bill at 820-8066, or call 247-5006.

FOR SALE: Victorian home in Hampton's Wythe section, 3 BR, garage, sun room, second-story deck, water view, large modern kitchen and dining room, corner lot. $109,000. Page Bill at 820-8066.

FREE FIREWOOD: Small trunks need to be cut and split; you haul it. Call John at 868-3705.

NASA Langley's 80th anniversary

Virginia Air & Space Center to admit NASA folks free

In commemoration of Langley Research Center's 80th anniversary, the Virginia Air & Space Center is offering FREE exhibit admission July 5-6 to all badged NASA personnel – civil servants and contractors. The VASC will celebrate the July 4 Mars landing all weekend, starting with the Mars Pathfinder Landing Party on the 5th and 6th, 10 a.m.-5 p.m. (See *AdVentures* notice.) To be a part of that historic event, present your badge as your admission ticket.

NASA Langley's official visitor center, the VASC is located on the downtown Hampton waterfront and is open from 10 a.m. to 7 p.m.

MOTORING AROUND LANGLEY: The Virginia Air & Space Center in Hampton is offering guided motor tours of NASA Langley and Langley Air Force Base now through Sept. 1. Through June 30, tours run Saturdays, 10:30 a.m. and 1:30 p.m., and Sundays, 1:30 p.m. July 1-Sept. 1, tours run Monday-Saturday, 10:30 a.m. amd 1:30 p.m.; Sunday, 1:30 p.m. $4 with VASC admission ticket. For more information, call 727-0900.

OUT GOLFING: The American Institute of Aeronautics and Astronautics' 6th annual Golf Outing is scheduled for June 26, 1:30 p.m., at the Eaglewood Golf Course, Langley Air Force Base. Shotgun start. $35 per player; $140 per team. Proceeds benefit the AIAA Scholarship Fund. Captain's choice with teams of four players. Join the picnickers at the AIAA picnic, H.J.E. Reid Conference Center, after the round. For more information, contact John W. Paulson Jr. at ext. 45071, Mail Stop 408A; e-mail j.w.paulson@larc.nasa.gov.

AIAA PICNIC: Bring family and friends to the 18th annual AIAA Hampton Roads Section Spring Picnic, June 26, 4:30-7 p.m., at the picnic grounds of the H.J.E. Reid Conference Center. Members, guests, and golf-outing players, $5; Non-members, $7; student members, $3; children under age 12, $2; children under age 6, free; pay at the door; checks payable to L.A.A. To make reservations by noon, June 23, contact Lynda Foernsler at ext. 48146 or at l.j.foernsler@larc.nasa.gov; or contact Paresh Parikh at ext. 42244 or at p.c.parikh@larc.nasa.gov. Visit the AIAA Web site for information on upcoming events: ***http://www.seva.net/~aiaa/calendar.html***

MARSFEST '97: Celebrate Pathfinder's July 4 landing on Mars with the Virginia Air & Space Center's MARSFEST '97. Events include the **Mars Pathfinder Landing Party**, July 5-6, 10 a.m.-5 p.m., with *Visions of Mars*, a new permanent exhibit in the VASC's space gallery; Internet access to real-time **Mars images** from NASA's Jet Propulsion Laboratory; the **Mars Family Cookout**, July 11, 6-9 p.m., with astronaut Ken Reightler and the IMAX film *Stormchasers* ($12 for adults, $9 for VASC members, $8 for children; call 727-0900 for advance tickets); **Sigma Series lectures** – "Development, Flight and Landing of the Mars Pathfinder Spacecraft," by Anthony J. Spear, Pathfinder project manager, Jet Propulsion Laboratory, July 15, 7:30 p.m., IMAX Theater, free; and "The Early History and Evolution of Mars," by Dr. Joel Levine, NASA Langley senior research scientist, Sept. 9, 7:30 p.m., IMAX Theater, free.

LAA CARNIVAL IS COMING: The Langley Activities Association plans its annual summer carnival, set for Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with rides, games and other activities for the whole family. For more information or to volunteer to help, call ext. 46369.

FALL GOLFING: Upon return from a May 29-June 1 golf holiday at Myrtle Beach, S.C., 24 NASA Langley Golf Association members and friends plan to return to Myrtle Beach for another four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, or to get on e-mail list, contact jrrjr@icase.edu or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

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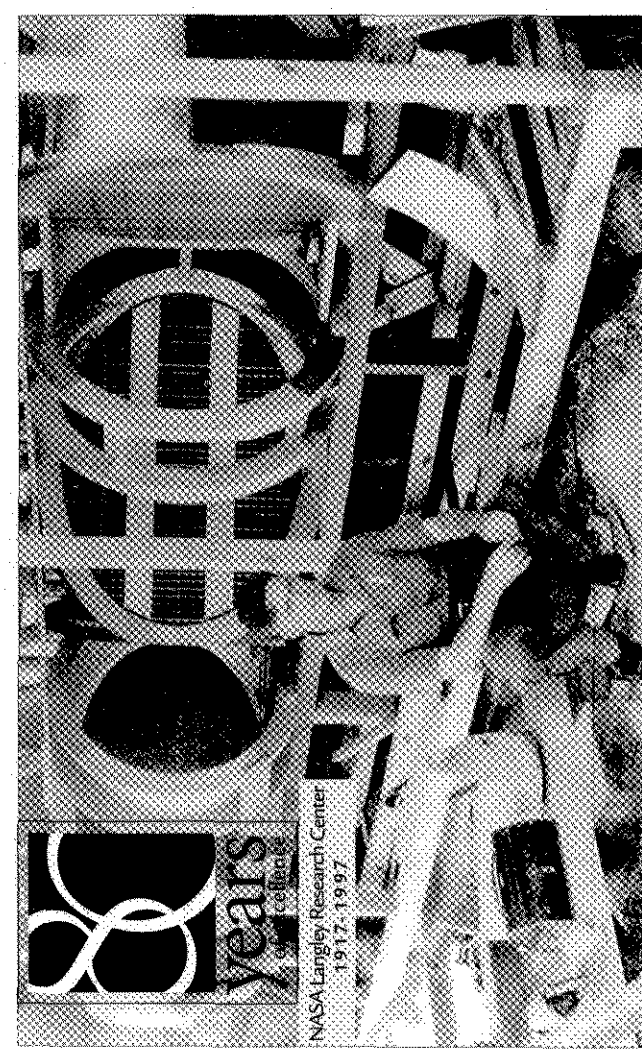
News
Researcher



NASA Langley file photo

ORIGINAL TUNNEL VISION – Workers create a one-fifteenth scale model of the Full-Scale Tunnel, built to study the airflow of what would be the first tunnel with an elliptic throat and two propellers mounted side by side. Originally designed to test airplanes and full-scale models at operational flight speeds, the final product was 434 feet long by 222 feet wide by 97 feet high and was dedicated in 1931. The NACA used the cheap materials and unemployed engineers of the Great Depression era to construct the tunnel, later known as the 30- by 60-Foot Tunnel, after the dimensions of its test section.

National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center
1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 13 ❖ July 3, 1997

It's a birthday party!

Open house kicks off NASA Langley's 80th year

BY KEITH HENRY

Reserve July 19 to bring family and friends to NASA Langley as we celebrate the center's 80th anniversary with an open house.

From 9 a.m. to 4 p.m., visitors will step inside a mammoth wind tunnel, watch a high-speed carriage run where space shuttle tires are tested, learn what is being done to increase safety of aging aircraft, experience jet noise and sonic boom demonstrations, see aircraft cockpit simulators in operation and much, much more. (See map, page 4.)

Antique autos will be on display, provided by the Colonial Virginia Model A Ford Club. The display is a recognition that – through technology spinoffs – NASA Langley has made direct and indirect contributions to the U.S. auto industry. The U.S. Postal Service will provide a special commemorative pictorial cancellation that celebrates NASA Langley's 80th anniversary. Free information on NASA programs and projects will be available.

Educational opportunities for children will include "edutainment" lectures each hour about "Living and Working in Space" and "Aeronautics – Past and Future." Demonstrations by the Amateur Satellite Observers of Southeastern Virginia and the Virginia Air & Space Center will add to the excitment. (See page 3 for related activities.)

Children can take part in model rocket launches sponsored by the National Space Society. Rocket kits will be available at prices starting at $5. Participating Boy Scouts who arrive at the NASA picnic area by 10 a.m. can earn their space exploration merit badge.

A series of atmospheric science overviews will begin at 9:15 with a special presentation for children. Thereafter, general audience presentations will begin each hour on the hour by top atmospheric scientists on subjects from clouds and climate to biomass burning and ozone.

Parking is free for the open house. Souvenirs, food and beverages will be available for purchase. Most facilities are accessible or partially accessible to the disabled.

For more information, call 864-3309, or see "Open House" on NASA Langley's home page at: *www.larc.nasa.gov/80tour/openhouse.html.*

Photo by Jeff Caplan

Office of Public Services employees Nancy Finn, left, and Meghan Woodcock, both of Science and Technology Corp., and Sandra Lemons, right, hang the open house banner on the Wythe Creek gate in preparation for the July 19 event.

Colloquium Communiqué

Mars Pathfinder poised to land on 'fourth rock from the sun'

Project manager visits from JPL, details mission's stages to date

Anthony J. Spear, manager of NASA's Mars Pathfinder Project, from the Jet Propulsion Laboratory in Pasadena, Calif., will deliver Langley's July colloquium lecture July 15, 2 p.m., in the H.J.E. Reid Conference Center. His talk is entitled "Development, Flight and Landing of the Mars Pathfinder Spacecraft." He will repeat the presentation that same evening, 7:30 p.m., at the Virginia Air & Space Center in Hampton, as a Sigma Series lecture.

The Mars Pathfinder landing on July 4 ushers in a new era of planetary exploration. Historically, spacecraft that orbit or land on a distant body carry a massive amount of propellant to decelerate. However, the Pathfinder spacecraft requires only a modest supply of fuel to navigate to Mars.

Using a Viking-derived aeroshell, the spacecraft descends through the Mars atmosphere directly from its interplanetary flightpath, deploys a parachute from about 10 kilometers above the surface, and fires solid rockets within 100 meters of the surface for final braking before airbags deploy to cushion its touchdown.

After landing, petals open to orient the lander upright. Then Sojourner, a small rover, and several science instruments deploy.

As the first Discovery mission, accomplishing this project under NASA's "better, faster, cheaper" philosophy was a pathfinding task in itself, says Spear. Pathfinder's total cost, including rover development, the launch vehicle and operations, was limited to $270 million. In contrast, the Viking project would have cost more than $3 billion in today's dollars.

Anthony J. Spear

Pathfinder, the first robotic entry system designed in nearly two decades, also required a multi-center team of experts to attack the technical challenges and to fly the mission on schedule and within cost.

Spear has been the manager of the Mars Pathfinder project since its inception in 1992. In 1991, he led the initial Jet Propulsion Laboratory studies on NASA's "better, faster, cheaper" Discovery missions.

He has worked on numerous interplanetary spacecraft, including the Mariner Mars 1964, Mars 1969 and Venus Mercury 1973, Viking and Magellan programs. He managed portions of Magellan's development and flight, serving as project manager during the Venus orbit insertion in 1990 and the completion of the high-resolution surface radar imaging map in 1991.

Colloquium & Sigma Lectures

What: "Development, Flight and Landing of the Mars Pathfinder Spacecraft," Colloquium and Sigma Series lectures by Anthony J. Spear

When: July 15, 2 p.m. Colloquium; 7:30 p.m. Sigma Series

Where: Colloquium – H.J.E. Reid Conference Center; Sigma Series – Virginia Air & Space Center, Hampton

News Briefs

Around the Agency

NASA SPACELINK SPORTS A NEW LOOK – (Marshall Space Flight Center, Huntsville, Ala.) NASA Spacelink, an electronic resource developed for use by the educational community, has been redesigned to make it more effective for teachers and students. Spacelink now features text and graphical interfaces, a new search engine, improved navigation capabilities and other enhancements that deliver information more efficiently. While Spacelink primarily connects educators and students to NASA information, services and materials, anyone may visit the web site at ***http://spacelink.nasa.gov.***

PROTOTYPE MARS ROVER COMPLETES SIMULATED MARS TREK – (Jet Propulsion Laboratory, Pasadena, Calif.) NASA's newest, six-wheeled prototype Martian rover – nicknamed Rocky 7 – has passed its most rigorous field test yet, traveling six-tenths of a mile over rugged, Mars-like terrain, while conducting science experiments and snapping 580 photographs along the way. The week-long series of field tests was designed to simulate several weeks of a real Mars rover mission and to test the rover's ability to drive much greater distances than current rovers.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

American Indian to address Langley

Yankton Sioux Phil Lane Sr., an elder with the American Indian Science and Engineering Society (AISES) and Four Worlds International, will speak at the H.J.E. Reid Conference Center, July 8, 1:30 p.m. The event is a multicultural training initiative for Native American awareness and is sponsored by Langley's Multicultural Leadership Team and Employee Development Branch, in collaboration with Hampton University's American Indian Educational Opportunities Program.

Lane is also the organizer and sponsor of the Confederated Indian Tribes at the Washington State Penitentiary, a service organization dedicated to giving prisoners renewed pride and hope for a productive life.

He will also speak at Hampton University, July 9-10. All engagements are free and open to the public. For more information, call Kelly Johnson at ext. 41563 or Dr. Paulette Molin, Hampton University, at 727-5981.

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "When a business limits its selection and promotion process to one group, it denies itself the full talents of the entire employment pool." – from "Facts About Diversity," National MultiCultural Institute

▲ American Indians did not become citizens of the United States until 1924. In some jurisdictions, Indians were not allowed to vote until the late 1960s.

▲ July 4-6 – National Organization for Women Conference, Memphis, Tenn., (202) 331-0066; July 7-11 – Federally Employed Women National Training Program, Dallas, Texas, (202) 898-0994; July 12-17 – NAACP Annual Convention, Pittsburgh, Pa., (202) 638-2269

▲ E-mail multicultural suggestions to MCLT+IDEAS@LaRC.NASA.GOV

Introspections

Coworker offers eulogy to Daljeet 'D.J.' Singh

BY RAMKI KRISHNAN
COMPUTER SCIENCES CORP.

Editor's Note: The Researcher News introduces "Introspections," a new column feature which will provide a vehicle for readers to add a personalized touch to Langley's newspaper. This first column is a tribute to a former center employee who died unexpectedly last month.

While these words comprise a eulogy to a dear friend of mine, they also express my gratitude and appreciation to someone who has touched the hearts of a lot of people in the NASA Langley community. I know I express the deep regret and anguish shared by so many friends and colleagues on the sudden demise of Dr. "D.J." Daljeet Singh.

D.J. had been associated with NASA Langley since 1986, first as an Old Dominion University research assistant working on his Ph.D. degree, and then as a contractor for Analytical Service and Materials, Inc., as a research scientist until 1995.

During his tenure here, he published more than 60 papers in journals and at conferences, both national and international. He was a prolific researcher with expertise in computational fluid dynamics, chemically reacting flows, combustion and numerical methods.

In 1995, he relocated to ASE Technologies in Cincinnati, and then, about eight months ago, he accepted a leadership position in rocket combustion at Sverdrup Technologies in Huntsville, Ala.

On June 8, D.J. suffered a massive brain hemorrhage at home and passed away the next day. He leaves behind his wife Enakshi, kids Kunal, 6, and Trishna, 4, an uncle – Dr. Jag Singh of NASA Langley – and family in India. He also leaves behind a huge number of friends at NASA and Old Dominion who were extremely fortunate to have known him. Some of us are still

(see SINGH, page 5)

Announcements

Career center offers summer workshops

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars during the summer:

▲ "Resume Reality," July 8, 1-4 p.m.

▲ "Starting Your Own Business," (one seminar in four parts) July 16-17 and 23-24, 8:30 a.m.-noon

▲ "Cover Letters and Thank-You Notes," July 30, 1-4 p.m.

▲ "Interview Basics," Aug. 13, 9 a.m.-noon

▲ "Life After NASA – What Will I Do Next?" Aug. 20, 1-4 p.m.

▲ "Making Yourself Indispensable at Work," Aug. 27, 1-4 p.m.

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Nominations sought for seminars, 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 should receive memoranda which list these programs, eligibility guidelines and recent Langley participants who can share personal experiences with a particular program.

Management education programs at the OPM management development seminar centers are one- or two-week seminars covering many topics. These seminars are open to level GS/GM-13 and above who have not attended an OPM seminar in the previous five years.

Brookings Institution conferences are for senior-level managers, GS/GM-15, and Senior Executive Service (SES). Many of these cover broad policy issues.

NASA-sponsored fellowships are available for both managers and non-managers from GS-12 to SES. The management fellowships offer an opportunity to study at Harvard, Massachusetts Institute of Technology, Carnegie Mellon, Pennsylvania State University or Syracuse University for periods from two weeks to one year.

In conjunction with the National Space Club, NASA also offers three fellowships which are open to non-management employees. These allow recipients to pursue research or coursework at any institution, in the United States or abroad, with a faculty sponsor. Competition for NASA fellowships begins at the center level. Center nominees then enter the agency-level competition, which ends in December.

Additional information, including descriptions, may be found on the internet at: ***http://gis-www.larc.nasa.gov/~mustain/develop_opps.html.***

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. The deadline for group nominations is this month. For more information, call Cecelia R. Fletcher at ext. 42339.

Order '98 calendars now

The 1998 calendars may now be ordered through GSA Advantage using government IMPAC Visa cards. Group/division/branch secretaries should submit requirements for their respective areas as soon as possible.

Stock numbers for the calendars follow:

▲ NSN: 7510-01-337-4708, wall calendar, displays three months, 11-5/8" x 8-7/8," UI: PG (10 each per PG)

▲ NSN: 7510-01-337-4713, calendar desk blotter, 17" x 22"; NSN: 7520-00-224-7238, blotter 19" x 24"; UI: EA

▲ NSN: 7510-01-363-3706, calendar pad, regular flipover, 3" x 3-5/8," UI: EA

▲ NSN: 7510-01-363-4998, calendar pad, executive flipover, 3-5/8" x 5-7/8," UI: EA

▲ NSN: 7530-01-337-4699, weekly appointment book, 11" x 8-1/2," UI: EA

▲ NSN: 7530-01-363-6708, loose-leaf appointment book refill; NSN: 7510-00-285-1765, refill for six-ring binder, binder; UI: EA.

ICASE symposium

The Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley and the Air Force Office of Scientific Research will cosponsor a symposium on Modeling Complex Turbulent Flows, Aug. 11-13, at the Radisson Hotel in Hampton. For final agenda and registration forms, check the Website: ***http://www.icase.edu/workshops/TMS.html.***

For more information, call Emily Todd at ext. 42175.

In memory of Daljeet Singh

Dr. Daljeet "D.J." Singh died June 9 at his home in Alabama. He served NASA Langley first as a research assistant in 1986 and then as a research scientist for Analytical Services and Materials, Inc., until 1995. He was the nephew of Dr. Jag Singh of Langley's Experimental Testing Technology Division.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax 1 (757) 864-8810, telephone 1 (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor: . . . . . Keith Henry

Editor: . . . . . Mary Graves
Science and Technology Corp.

Assistant Editor: . . . . . Jeane Shanks
Science and Technology Corp.

Photojournalist . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Honor Awards salute center's best

NASA Langley's annual Honor Awards ceremony, held June 19, recognized 39 individuals, as well as 10 teams. Also honored were the winners of the H.J.E. Reid Award, the Executive Excellence Award, the Presidential Rank Award and the Contractor Excellence Award.

Public Service Medal

John W. Clough III, United Way of the Virginia Peninsula, for outstanding contributions and personal commitment to NASA Langley's Combined Federal Campaign.

Paul Masson, Paul Masson Consulting, for commitment and creativity in the research leading to the formation, governance and business operations of the Advanced General Aviation Transport Experiments Consortium and the AGATE Alliance Association, Inc.

Clough

Masson

Equal Employment Opportunity Medal

Harry M. Webb Jr., presented posthumously, for outstanding achievement in the application of advanced information technologies in support of NASA's Equal Employment Opportunity programs.

Exceptional Service Medal

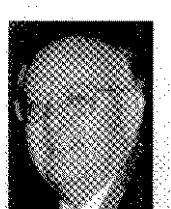
Charles D. Bailey, for exceptional technical leadership and personal contributions to the center's spaceflight programs.

Philip Brockman, for outstanding contributions and exceptional service in the development of NASA's laser remote sensing technology and capability.

Robert C. Evans, for distinguished and dedicated service to the Fabrication Division and the goals and missions of the Langley Research Center.

John B. Hall Jr., for major technical contributions to the NASA mission.

Margaret W. Hunt, for outstanding contributions and personal commitment to NASA's Freedom of Information Program.


Hall

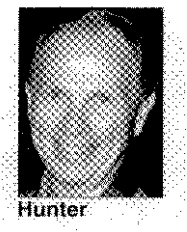
Hunt

William W. Hunter Jr., for outstanding achievements in the development of nonintrusive diagnostic measurement systems.

Arthur S. Johnson, for outstanding leadership of Langley's supply and equipment management programs.

Kennie H. Jones, for exceptional service in the development and application of advanced data management and communication tools.

Cynthia C. Lee, for exceptional contributions to NASA's flight research program and outstanding leadership of agency subsonic transport research.


Hunter

Jones

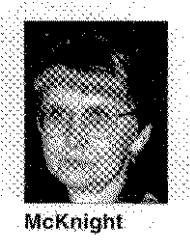
Charles B. Marushi, for exceptional systems engineering support in the development and operation of Langley Research Center's advanced aerospace research facilities.

Lee

Marushi

Linda F. McKnight, for exemplary performance and dedicated administrative support to the Operations Support Division.

David S. Miller, in recognition of sustained outstanding contributions to the Research and Technology Group.


McKnight

Miller

Richard W. Powell, for outstanding career service to NASA's space transportation programs in support of the Space Technology and Aeronautics Enterprises.

A. Gary Price, for outstanding contributions to Langley 's pre-eminent status in the nation and valued standing in the community.

Alberta W. Reid, in recognition of sustained, superior performance of administrative duties supporting key satellite missions and atmospheric science research.

Don M. Robinson, for outstanding technical contributions in optical design throughout the history of Langley's successful atmospheric remote sensing programs conducted in support of NASA's Mission to Planet Earth enterprise.

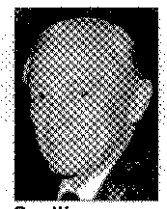
William I. Scallion, for outstanding contributions to the Nation's Space Program.

Price

Reid

Nancy N. Shields, for exceptional performance in developing engineering specifications and administering contracts for the construction of research facilities at Langley Research Center.

Robinson


Scallion

Brenda H. Simpson, for exceptional contributions in the area of office automation that have resulted in improved efficiency of administrative tasks for Langley.

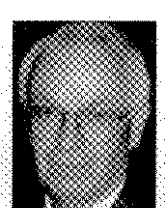
Jerry H. Tucker, for exceptional service to Langley aerospace missions in the area of microprocessor applications and embedded systems development.

Shields

Simpson

Charles H. Whitlock, for outstanding contributions to the understanding of the interaction of radiation with the Earth's surface.

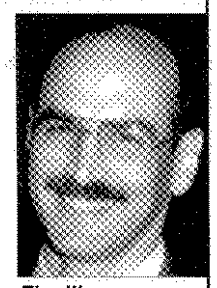
Tucker


Whitlock

H.J.E Reid Award

The H.J.E. Reid Award recognizes an outstanding publication, refereed journal article or other formal NASA archival media first-authored by a Langley employee or group of employees – Ricky W. Butler and George B. Finelli, for Outstanding Paper entitled "The Infeasibility of Quantifying the Reliability of Life-Critical Real-Time Software."

Butler


Finelli

Distinguished Honor Awards

Executive Excellence Award

Senior Executives Association Professional Development League's Executive Excellence Award recognizes career senior executives and careerists in equivalent level positions in the federal government, who have made significant contributions to the public service and who have improved the image of career Senior Executive Service – Charles P. Blankenship.

Blankenship

Presidential Rank Award

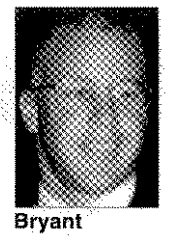
Presidential Rank Awards are bestowed annually by the president to a small number of career Senior Executive Service members for sustained accomplishments in carrying out government-wide goals and policies – Distinguished: Dr. Kristin A. Hessenius; Meritorious: Dr. Samuel E. Massenberg.

Hessenius

Massenberg

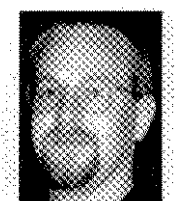
Exceptional Achievement Medal

Robert G. Bryant, for exceptional achievement in the development of LARC™-SI and THUNDER.


Bryant

Ricky W. Butler, for outstanding technical contributions in developing and demonstrating a validation methodology for high integrity digital systems.

Fox


Hester

Robert L. Fox, in recognition of outstanding technological contributions in the development and application of Thin Layer Unimorph Piezoelectric Driver Sensor (THUNDER) technology.

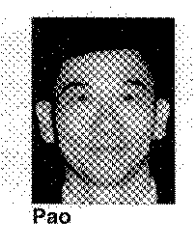
Joshua Lee Hester, in recognition of outstanding technical contributions to the National Transonic Facility.

Nancy M. H. Holloway, in recognition of outstanding technological contributions in the development of unique adhesiveless multilayer flexible circuits and cables using LaRC Soluble-Imide (LaRC-SI).

Holloway

S. Paul Pao, for exceptional contributions in the development of propulsion airframe-integration computational capabilities.

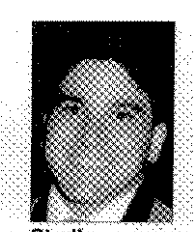
John W. Paulson Jr., for outstanding aerodynamic contributions to successful Pegasus XL Return to Flight and to Lockheed Martin Reusable Launch Vehicle/ Advanced Technology Demonstrator X-33 Concept.


Pao

Paulson

John H. Stadler, for outstanding leadership and engineering contributions including the development and successful flights of the agency's first tethered satellite experiments.

Patrick A. Troutman, for outstanding achievements in


Stadler

Troutman

(see AWARDS, page 6)

80 years of NASA Langley rockets man into space

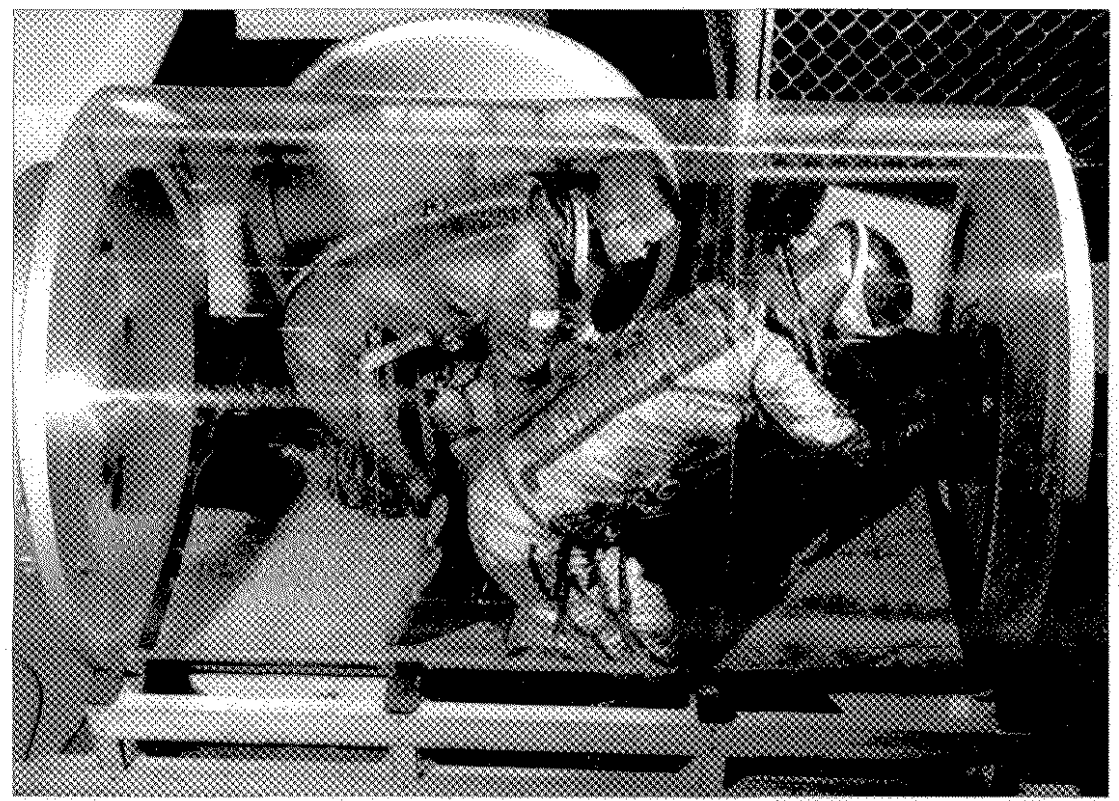
BY MARY SPRACHER

In celebration of Langley's 80th anniversary, the *Researcher News* showcases some of the rarer images representing the center's early efforts in support of the space program.

While Langley is known as a center rooted in aeronautical research, the center is actually one of the birthplaces of the American space program. Even back in the days before the National Advisory Committee for Aeronautics became NASA in 1958, Langley researchers were paving the way for the space program.

Over the years, Langley researchers have made essential contributions to such major manned space programs as Mercury, Gemini, Apollo, Skylab and the space shuttle. The center also spearheaded such unmanned exploration projects as Echo, Lunar Orbiter and Viking.

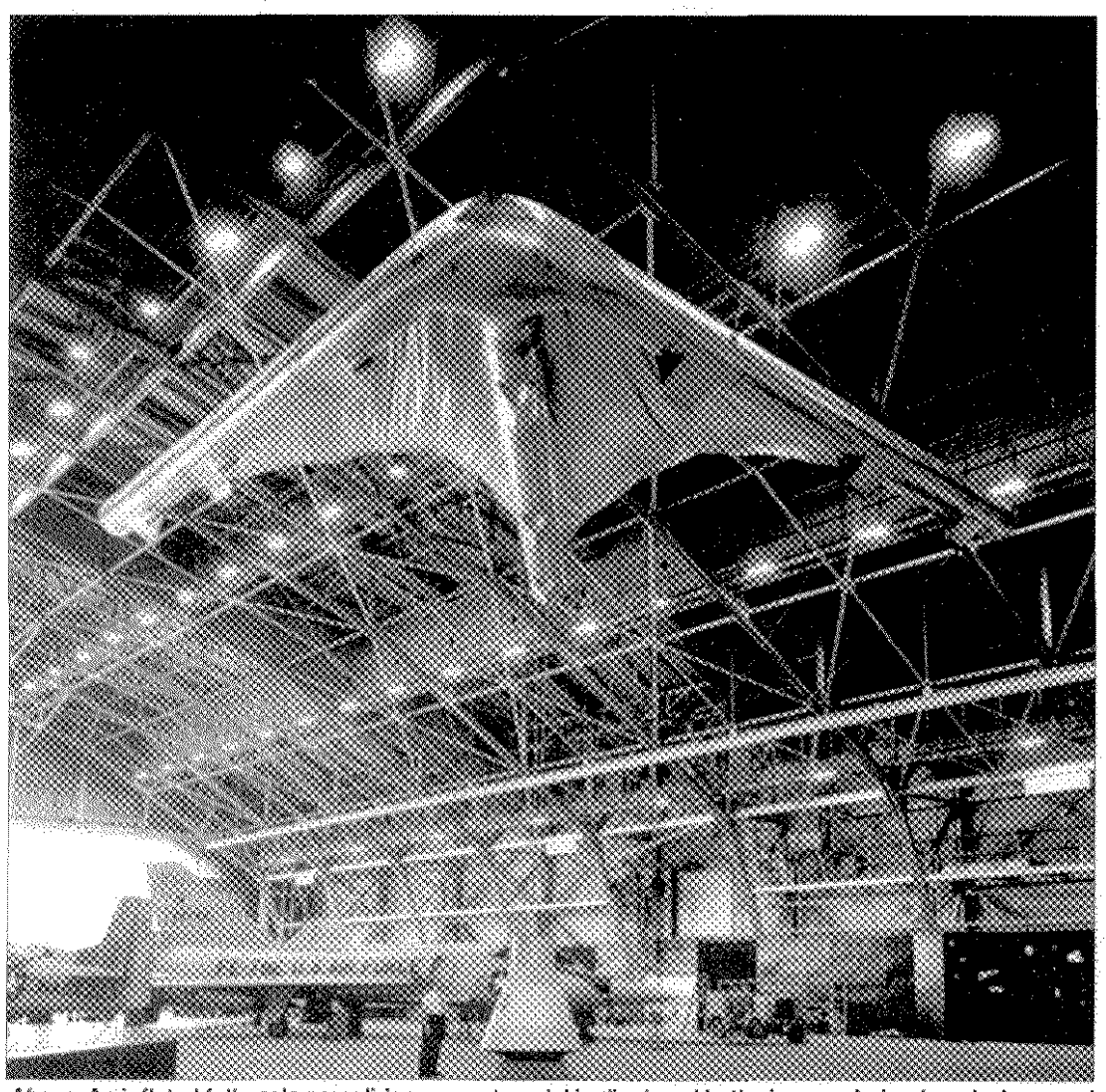
While no rocket has ever been launched here and no shuttle has ever descended upon the grounds, Langley has continued to play a crucial role in the space program throughout the years. Without the help of the fundamental information about spaceflight that only a basic research organization like Langley can provide, no space program – past, present, or future – could hope to succeed.

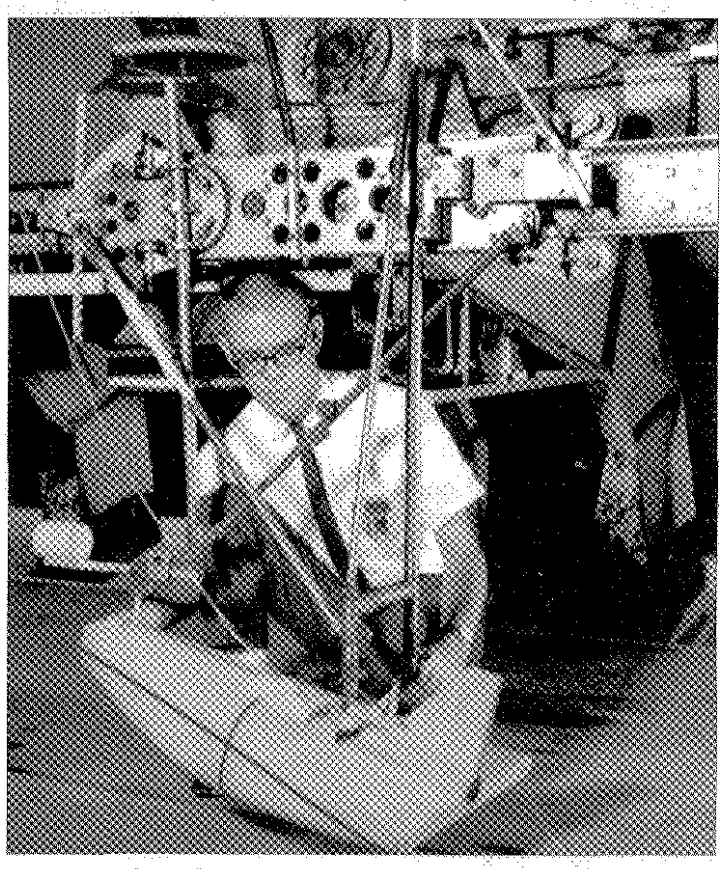


NASA Langley file photos

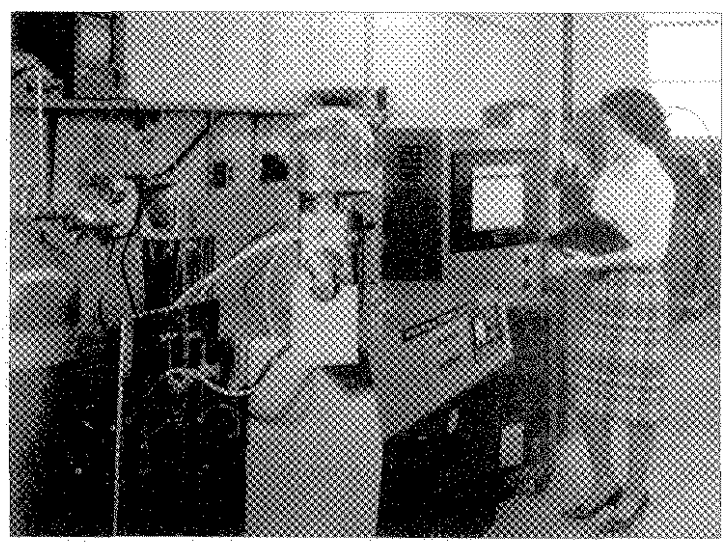
Two Langley engineers test an experimental air lock in January 1964 in support of manned space laboratory research. The air lock was designed to connect an arriving spacecraft with a space station portal.

Langley technicians prepare a full-scale Mercury capsule which would be used for the first rocket launching on March 11, 1959, at NASA's Wallops Station. The test simulated a ground-level or beach abort.





Langley engineer Sandy Stubbs tests the HL-10 lifting body for hard surface landing in 1963. Langley engineers have been studying the problems and potentials of lifting bodies – wingless bodies capable of generating lift – since the early 1950s.

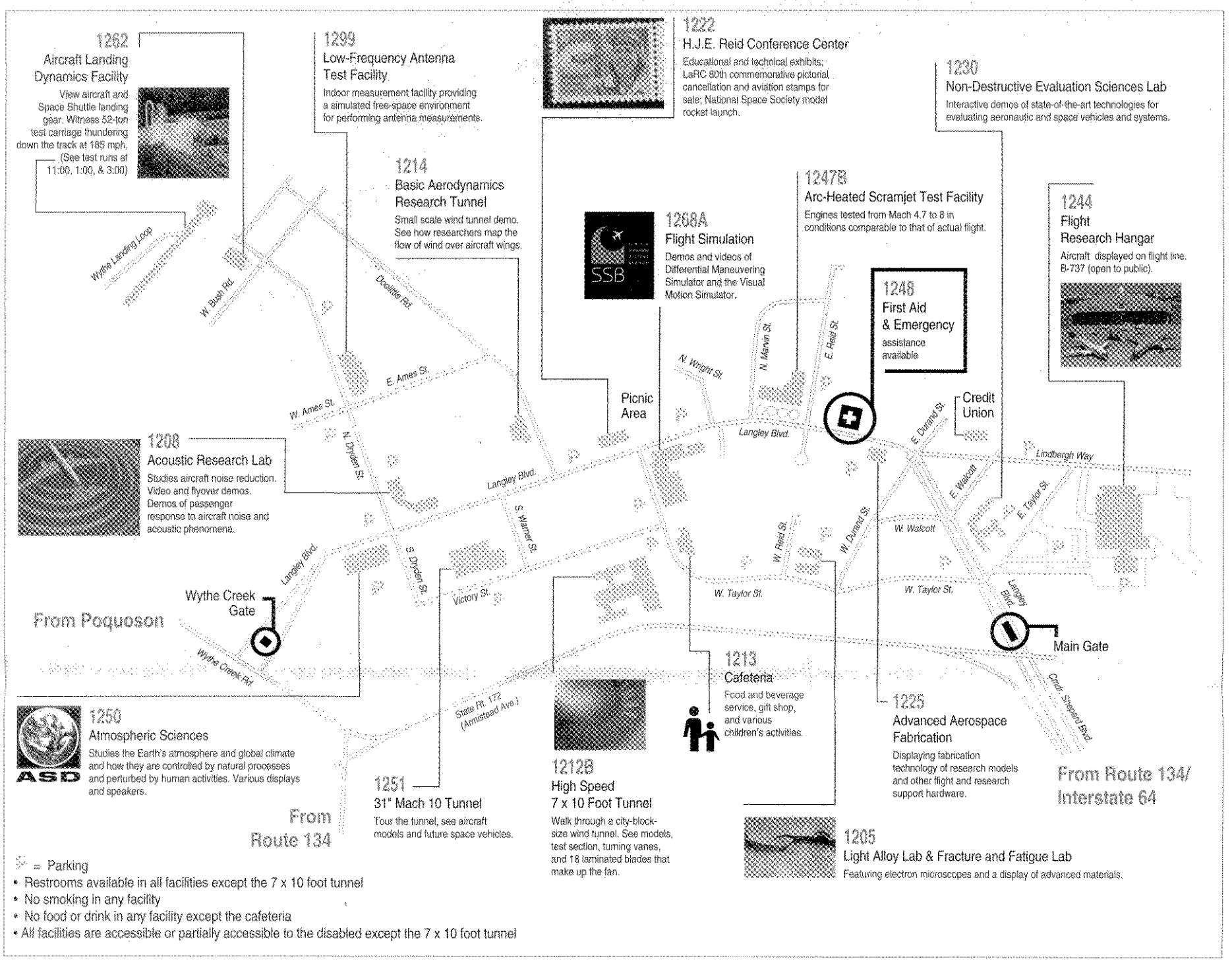


Above: **An inflated full-scale paraglider concept model is displayed in the hangar during Langley's annual inspection in 1961.**
Right: **A technician monitors instruments in a laboratory supporting the space station project at Langley in 1962.**

Open House, July 19

Center opens its gates for anniversary activities

Self-tour map details Langley visitor sites, history, events



Educational events planned throughout open house day

Reid Conference Center

▲ High-Performance Computing and Communications "ATLAS" Demo – general public; networking system for classroom internet access.
▲ Paper Kite Static Display & Demo, noon-2 p.m.

Building 1250

▲ Mission to Planet Earth Programs – grades K-12; "edutainment" discussion on spectroscopy, plus Atmospheric Sciences displays; 9:15 a.m., 3 p.m.

Building 1225

▲ Visual presentation of daily effects of atmospheric pressure, using vacuum technology – grades K-12; all day.

Cafeteria

▲ Space Ball – grades 5-12; experience weightlessness outdoors in the Virginia Air & Space Center's Space Ball
▲ Aerospace Education Services Program, featuring Spacemobilers Larry Gilbert and Stanley Jones; grades K-12; half-hour "edutainment" discussions, 10 a.m., noon, 2 p.m.; Living and Working in Space – Stanley Jones; 11 a.m., 1 p.m., 3 p.m.; History and Current Developments in Aeronautics – Larry Gilbert
▲ NASA movies – grades K-12; in private dining room; all day – *Dreams; Viking on Mars; Space – Artistic View; Flight for the Future; Life Support; Images of Earth and Space*. Special presentation of *Toys in Space*, 1 p.m., followed by demo of toys used in space.
▲ Model display and publication distribution center – general public; in private dining room; display of aircraft, rocket, satellite and shuttle models.
▲ "Reaching for the Stars" – astronomy with Amateur Satellite Observers of Southeast Virginia – grades 7-12; learn to spot the space station MIR.
▲ Virginia Air & Space Center activities – grades K-12; make-and-take projects; all day.
▲ LEGOs in Space Demo – grades K-12; experience working in space by assembling LEGOs with space gloves.
▲ ABCs of Space Coloring – grades K-4; color NASA pictures; crayons provided.
▲ Design an Airplane – grades 5-12; futuristic aircraft designs contest; materials provided.

SINGH

(continued from page 2)

struggling to come to grips with this terrible bolt from the blue.

That D.J. was an exceedingly good researcher was apparent from his academic credentials and publications; what also struck most of us very quickly was that D.J. was one of those rare humans who had a perpetual smile on his lips, a large and generous heart, a laid-back attitude toward life and a way of relating off-color jokes that could leave even the king of prudes begging for more.

I worked with D.J. for about six years and shared an office with him at NASA for more than two years. We co-authored a few technical papers during this time. When I look back on those years, I realize how effortlessly he enlivened the office environment and enriched my work experience; I can honestly say that those two years were the most enjoyable ones I've had working at NASA.

In talking with others who knew him, I was surprised to see how much they all echoed my sentiments. It is this rare aspect of providing joy and happiness to those around him that all of us will sorely miss. In all the years I knew D.J., I'd never seen him with a sad look on his face. Even in the most troublesome of situations, you could be assured of his positive outlook and his winning 1,000-watt smile.

On the morning of D.J.'s funeral, the mini-van ferrying half a dozen of us to Huntsville rumbled through the Smoky Mountains. When we reached the outskirts of Huntsville, the rain let up and the sun came out. I remembered what I'd read about an ancient culture: The sect's elders believed in the notion that, when the gods are amused and happy, our earth is blessed with rain. Not surprising, I thought to myself. It had not taken D.J. long to spread joy and happiness in his new abode.

Mars Pathfinder set for Independence Day landing

NASA NEWS RELEASE
JPL

Editor's Note: Langley's Robert Braun is at NASA's Jet Propulsion Laboratory supporting the Mars Pathfinder Navigation Team.

NASA's Mars Pathfinder mission – the first spacecraft to land on Mars in more than 20 years and the first ever to send a rover out to independently explore the Martian landscape – is set for touchdown July 4, initiating a new era of scientific exploration that will lead eventually to human expeditions to the Red Planet.

Mars Pathfinder is one of the first of NASA's Discovery class of missions, designed to foster rapidly developed, low-cost spacecraft with highly focused science objectives. Pathfinder's purpose is to demonstrate an innovative way of placing an instrumented lander on the surface of the planet. The lander will also carry a free-ranging robotic rover as a technology experiment. Landers and rovers of the future will benefit from the heritage of this pioneering mission.

Pathfinder's atmospheric entry and landing on the Martian surface are the centerpiece of the mission. Once the spacecraft hits the upper atmosphere at 10 a.m. Pacific Daylight Time on July 4, it will begin a 4-1/2-minute, completely automated sequence of events to achieve its landing on the surface of the planet.

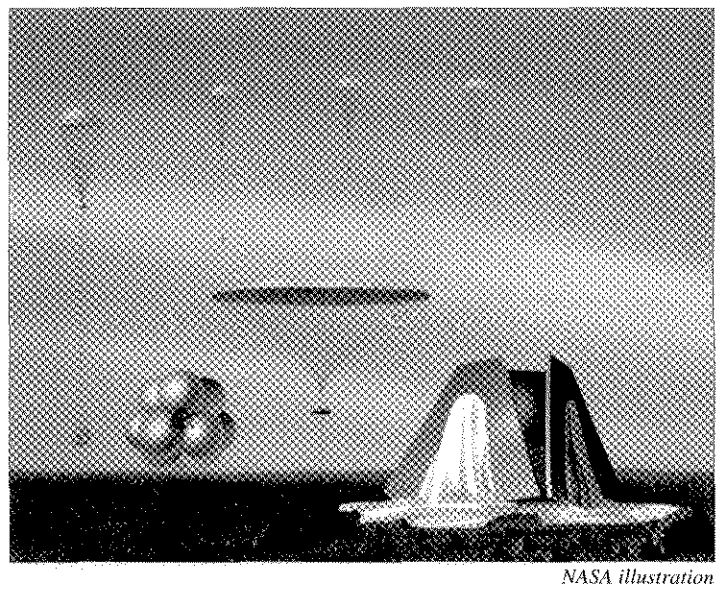
After a fiery entry, the spacecraft releases a large, billowing parachute to slow its descent through the thin Martian atmosphere. Then a giant cocoon of airbags will inflate seconds before landing to cushion the spacecraft's impact. Along its descent to the ground, Pathfinder will be collecting engineering and atmospheric science data to help scientists profile the Martian environment.

"This is a new way of landing a spacecraft on a planet," said Brian Muirhead, Mars Pathfinder Flight System Manager at NASA's Jet Propulsion Laboratory, "and the first time a U.S. mission will use airbags to absorb the shock of landing and protect the lander from the rough, rocky terrain."

"The science investigations carried by Mars Pathfinder are going to give us unique insights into the planet's atmosphere and how it varies, and our first detailed understanding of the precise composition of its surface rocks and soils," said Joseph Boyce, Mars Program Scientist at NASA Headquarters, Washington, D.C. "This knowledge is the key to helping unlock many interrelated mysteries about the history and evolution of Mars."

Diving directly into the thin atmosphere at about 16,600 miles per hour, Pathfinder will release its parachute, then jettison the heat shield that protected it from the heat of entry. A tether will be deployed to lower the spacecraft from its backshell; airbags will then inflate about eight seconds before landing. Deceleration rocket engines will fire to nearly halt the craft for an instant in mid-air just before impact.

Once the rockets have been fired, Pathfinder will free-fall up to 100 feet before hitting the ground at a speed of up to 55 miles per hour. At impact, the spacecraft, now looking like a huge beach ball, will bounce many times, possibly as high as a 10-story building, until all impact energy dissipates. The interval between initial impact and complete halt may take as long as several minutes.



NASA illustration

This artist's rendition shows the descent of the MESUR-Pathfinder through the Martian atmosphere.

Pathfinder activities on line

Internet users around the world may begin following the Mars Pathfinder spacecraft as it approaches Mars and prepares for a July 4 landing by way of a variety local mirror sites that are now on line.

The Internet sites feature updates on mission activities and will provide Pathfinder photographs of the Martian surface once they become available. The sites also feature a bird's-eye view of the Mars Pathfinder mission operations area at NASA's Jet Propulsion Laboratory, Pasadena, Calif., via a live video camera feed, updated every 15 minutes.

To accommodate the overwhelming public interest, JPL will have about 20 mirror sites around the world so that people can use the sites closest to their homes rather than trying to access the JPL site.

The site nearest to Hampton Roads is at Kennedy Space Center, Cape Canaveral, Fla., at ***http://www.ksc.nasa.gov/mars.***

AWARDS

(continued from page 3)

the design and configuration analysis of the Space Station.

Wise

Stephanie A. Wise, for exceptional contributions to the development of electronic ceramic materials and their adaptation for aerospace applications.

Exceptional Engineering Achievement Medal

Thomas J. Yager, for exceptional engineering contributions to improved runway surface treatments and friction measurements.

Yager

Exceptional Scientific Achievement Medal

John W. Connell, for developing a fundamental molecular understanding of aerospace polymers.

Connell

William L. Grose, for outstanding contributions to understanding fundamental atmospheric processes through the development of a complex, coupled atmospheric model in support of the Upper Atmosphere Research Satellite Program and through establishment of a critical theoretical and experimental research program in support of the Atmospheric Effects of Aviation Program.

Grose

Outstanding Leadership Medal

William P. Gilbert, for outstanding leadership and technical contributions resulting in significant advances in technology for the nation's military and civil aircraft.

Gilbert

Charles E. Harris, for outstanding leadership of the NASA Airframe Structural Integrity Program which developed, and transferred to industry, technologies to improve the safety of aging aircraft.

Group and Team Awards

Contractor Excellence Award

This year's award recognizes two finalists for NASA's prestigious George M. Low Award – Dynamic Engineering Incorporated (DEI); Wyle Laboratories

Group Achievement Award

▲ F-16XL Supersonic Laminar Flow Control Flight Experiment Team, for outstanding performance in designing, manufacturing, integrating and conducting the F-16XL Supersonic Laminar Flow Control Flight Experiment.

▲ First ISCCP Regional Experiment Phase II Science and Operations Team, in recognition of outstanding and continuing contributions to increasing the understanding of the role of clouds and radiation for studies of climate and climate change.

▲ Gas Permeable Polymer Materials Experiment Team, for outstanding advancement in the scientific knowledge and understanding of gas permeable materials which contributes substantially to the NASA mission.

▲ High Intensity Radiated Fields Laboratory Development Team, for the development of the High Intensity Radiated Fields Laboratory for future aerospace design applications.

▲ Hypersonic X-Vehicle Program Definition Team, in recognition of the exceptional accomplishment in the creation of the vision, program concept, technical plan and supporting rationale for the Aeronautics Enterprise's Hyper-X Program.

▲ Mars Pathfinder Entry Analysis Team, for outstanding contributions to the analysis and design of the Mars Pathfinder entry, descent and landing system through definition of Mars atmospheric aerodynamics, aerothermodynamics, and flight dynamics in support of the Space Science Enterprise.

▲ Photogrammetric Appendage Structural Dynamics Experiment Team, for exceptional and dedicated performance in the definition, design, development and operation of the Photogrammetric Appendage Structural Dynamics Experiment.

▲ Temperature Sensitive Paint Team, for exceptional contributions to the advancement of aerodynamic measurement technology in the design, development and implementation of a Temperature Sensing Paint System for Global Boundary Layer.

▲ Thin Layer Composite Unimorph Driver and Sensor Team, in recognition of outstanding contributions to innovate THUNDER technology, a new class of piezoelectric actuator and sensor materials and devices.

▲ X-33 Phase I Aerothermodynamics Team, for outstanding accomplishments to Aerothermodynamic Assessment and Optimization of Three Industry Concepts for Reusable Launch Vehicle/Advanced Technology Demonstrator X-33.

Langley bicyclist rides for health, hobby

BY NANCY FINN

When Langley opened in 1917, many of the locals referred to the scientists as "NACA Nuts." Even though this reference faded with time, NASA scientists are still willing to try the unconventional.

Gale Harvey, Aerospace Mechanical Systems Division, could be considered one of the modern "NASA Nuts."

Several years ago, he gave up the convenience of a motor vehicle for the pleasure and utility of a bicycle.

A friendly challenge

It all started with a suggestion from friend and colleague Ron Harvey (no relation). Gale Harvey took his friend up on the invitation to ride bikes to work. It worked so well that he increased the scope. He started to ride with friends on the weekend, and before long, he was riding everywhere.

Time-efficient fitness

And yes, environmental concerns play a part in his decision to bike-it, but they are really a subfactor. Harvey contends that he rides his bike to maintain a high level of fitness.

"While in a car, you are just getting from place to place," he says. "On a bike, however, you get from one place to another, but you are also exercising." Essentially, he is killing two birds with one stone and being time-effective.

Promoting safety

Harvey has turned commuting to work into a productive hobby. He is the president of the Langley Bicycle and Pedestrian Safety Club and the chairperson of the Peninsula Bicycle Association's safety committee. Through these committees, Harvey promotes safe bicycling.

He also strives to make government officials aware of the potential problems for bicyclists. Hampton Roads needs more roads with wide lanes or bike paths, he says. Most importantly, motorists need to be aware of cyclists and to share the road.

And bicyclists need to know their routes well, he says. Often it is easiest to take the most direct route, but the most direct path can be quite dangerous on a bike. So Harvey recommends traveling on the less-traveled back roads and during off-peak times.

To further increase bicycle safety measures, Harvey recommends a helmet and a rearview mirror.

"A rear view mirror is especially helpful for left turns because a bicycle must cross more lanes of traffic than a car," he says.

Facing road hazards

Most drivers give bicyclists plenty of room when they pass, he adds. But sometimes a driver will "buzz" them – pass them very closely, within 18 inches. The minimum safe distance between a passing car and a bicyclist is two to three feet – and five feet is even better.

Another danger faced by bicyclists, according to Harvey, is drivers that turn right directly in front of them, causing the bicyclist to try to come to a screeching stop. Often, they cannot stop and ride off the road, injuring themselves or even driving right into the car.

"Bicyclists should be treated like motor vehicles – they only travel slower," says Harvey.

Long-distance jaunts

Harvey not only uses his bicycle to putt around town, but he also participates in local sponsored biking events, such as "Bike Virginia" in June. This organized bike trip covers between 227 and 346 miles in five days.

Mechanical endeavors

When Harvey is not riding his bicycles, he is maintaining them – all 20 of them.

"I am fascinated by the mechanical design and performance of bicycles and enjoy working and customizing them during inclement weather," says Harvey.

His bikes are individualized for different purposes and weather conditions. His summer commuting bike has over 49,300 miles on it. Since 1980, Harvey has ridden more than 150,000 miles.

Photo by Bill Salyer

Gale Harvey rides one of his 20 bicycles to work at Langley.

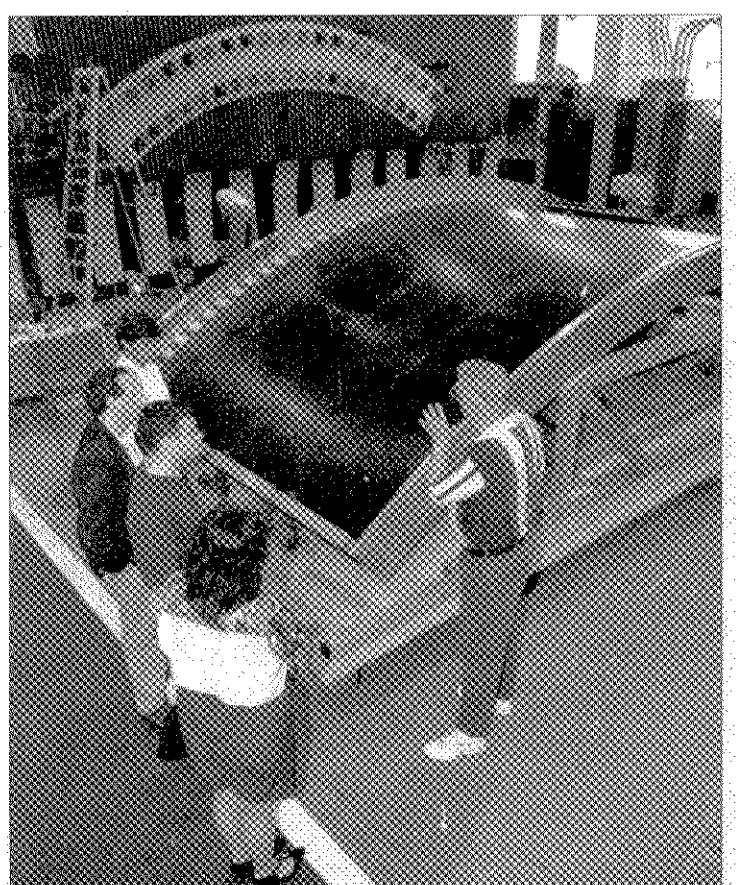


Photo by Jeff Caplan

INCREASING STAKEHOLDER VALUE – Harold Bush, right, of the Structural Mechanics Branch, explains an upcoming structural test on a component of the Reusable Launch Vehicle program to Congressional staffers who toured Langley last month.

Visiting professor shows Native American colors

BY DR. ARLENE LEVINE

George Clever, an American Society for Engineering Education Fellow in the Atmospheric Science Division, is wearing his "other" suit with his mentor, Dr. Arlene Levine. Drs. Arlene and Joel Levine, of the Spacecraft Office and the Theoretical Studies Branch, respectively, attended their first Native American Indian gathering in Jamestown, where the Clever family participated in the third annual Virginia Pow-wow on June 14.

Clever and his wife, Caroline, are mathematics professors from New Mexico State University, Dona Ana Branch in Las Cruces, N.M., working in the Atmospheric Sciences Division this summer. He is a Lenape (Delaware) Indian and traditional dancer.

Clever wears a Pennsylvania Colonial Revolutionary War regimental coat as a remembrance of the tribe's support of the American cause in the original Lenape homeland of Pennsylvania before their forced move to Oklahoma.

In addition to teaching mathematics, George is coordinator of the "Bridges" biomedical research initiative for Native American Indian students at New Mexico State University. The program is funded by the National Institute of Health and successfully recruits Native American Indian students into the science professions.

This summer, the Clevers are designing and editing a booklet that explains the mission and research of the Atmospheric Sciences Division and will begin the design of a computer-based instructional unit on an atmospheric science topic.

Photo by Joel Levine

George Clever wears a Pennsylvania Colonial Revolutionary War regimental coat at the third annual Virginia Pow-wow in Jamestown.

AdVentures

FOR SALE: Evinrude 9.9 horsepower, short-shaft outboard motor, $800 firm; Gitane "Kilo" fixed-gear track bike, $100 or best offer. Call Mike Palmer at 850-1273.

FOR SALE: 1981 Datsun pickup truck, 5-speed, inspected, good running condition except for rust and dents. $595 or best offer. Call 595-4593.

FOR RENT: 1 BR condo on Sanibel Island, Fla., on Gulf of Mexico; ground floor, walk out front door to beach; pool, tennis, full kitchen, on-site management; brochure available. $600/week, July-Sept., one-week minimum. Call Dick at 565-1849.

FOUND: Several boxes of ELMO micro camera lenses; found in a container of packing peanuts turned into Shipping and Receiving, Building 1206. To identify, call Suzanne Melson at ext. 43571.

MARSFEST '97: Celebrate Pathfinder's July 4 landing on Mars with the Virginia Air & Space Center's MARSFEST '97. Events include the **Mars Pathfinder Landing Party**, July 5-6, 10 a.m.-5 p.m., with *Visions of Mars*, a new permanent exhibit in the VASC's space gallery; Internet access to real-time **Mars images** from NASA's Jet Propulsion Laboratory; the **Mars Family Cookout**, July 11, 6-9 p.m., with astronaut Ken Reightler and the IMAX film *Stormchasers* ($12 for adults, $9 for VASC members, $8 for children; call 727-0900 for advance tickets); **Sigma Series lectures** – "Development, Flight and Landing of the Mars Pathfinder Spacecraft," by Anthony J. Spear, Pathfinder project manager, Jet Propulsion Laboratory, July 15, 7:30 p.m., IMAX Theater, free; "The Early History and Evolution of Mars," by Dr. Joel Levine, NASA Langley senior research scientist, Sept. 9, 7:30 p.m., IMAX Theater, free.

NASA Langley's 80th anniversary

Virginia Air & Space Center to admit NASA folks free

In commemoration of Langley Research Center's 80th anniversary, the Virginia Air & Space Center is offering FREE exhibit admission July 5-6 to all badged NASA personnel – civil servants and contractors. The VASC will celebrate the July 4 Mars landing all weekend, starting with the Mars Pathfinder Landing Party on the 5th and 6th, 10 a.m.-5 p.m. (See *AdVentures* notice.) To be a part of that historic event, present your badge as your admission ticket.

NASA Langley's official visitor center, the VASC is located on the downtown Hampton waterfront and is open from 10 a.m. to 7 p.m.

MOTORING AROUND LANGLEY: The Virginia Air & Space Center in Hampton offers guided motor tours of NASA Langley and Langley Air Force Base now through Sept. 1, Monday-Saturday, 10:30 a.m. amd 1:30 p.m.; Sunday, 1:30 p.m. $4, with VASC admission ticket. For more information, call 727-0900.

ALUMNI SUPPER: The NASA Langley Alumni Association will have a covered-dish supper July 9, 5:30-7 p.m., at the H.J.E. Reid Conference Center. For more information, call 864-7330.

ROCKET BOYS: In conjunction with NASA Langley's Open House, the Langley Chapter of the National Space Society sponsors a rocket-building and -launching competition for area Boy Scouts, July 19, 10 a.m., at the H.J.E. Reid Conference Center. The event satisfies requirements for the Boy Scout space exploration merit badge. For more information, call Abe Leiss at 877-2939.

SLOGAN SEARCH: In conjunction with NASA's upcoming 40th anniversary activities and programs, the agency is looking for a slogan to commemorate its founding on Oct. 1, 1958. Submit ideas in writing by July 31 to Steve Garber in the NASA Office of Policy and Plans, Code ZH, or send an e-mail to steve.garber@hq.nasa.gov. The winner will receive a special illustrated book about space exploration.

HAPPY RETIREMENT: A retirement dinner honoring Dr. John G. Davis Jr. will be held Aug. 1, 6 p.m., at the H.J.E. Reid Conference Center. Cost is $16 per guest, gift included; checks payable to Kate Spruill (Mail Stop 264). Donations for gift only are welcome. To make reservations, call Kate Spruill at ext. 41808 by July 18.

LAA CARNIVAL IS COMING: The Langley Activities Association's annual summer carnival is set for Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with activities for the whole family. For more information or to volunteer to help, call ext. 46369.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, or to get on e-mail list, contact jrrjr@icase.edu or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

(INTER)NETWORKING: "Personalizing the Internet: Moving Your Computer into the Electronic Village," a seminar from the Lifelong Learning Series of Virginia Polytechnic Institute and State University's College of Arts and Sciences, Aug. 1-3, Hotel Roanoke & Conference Center. For more information, call Ronnie Stephenson at 851-6230.

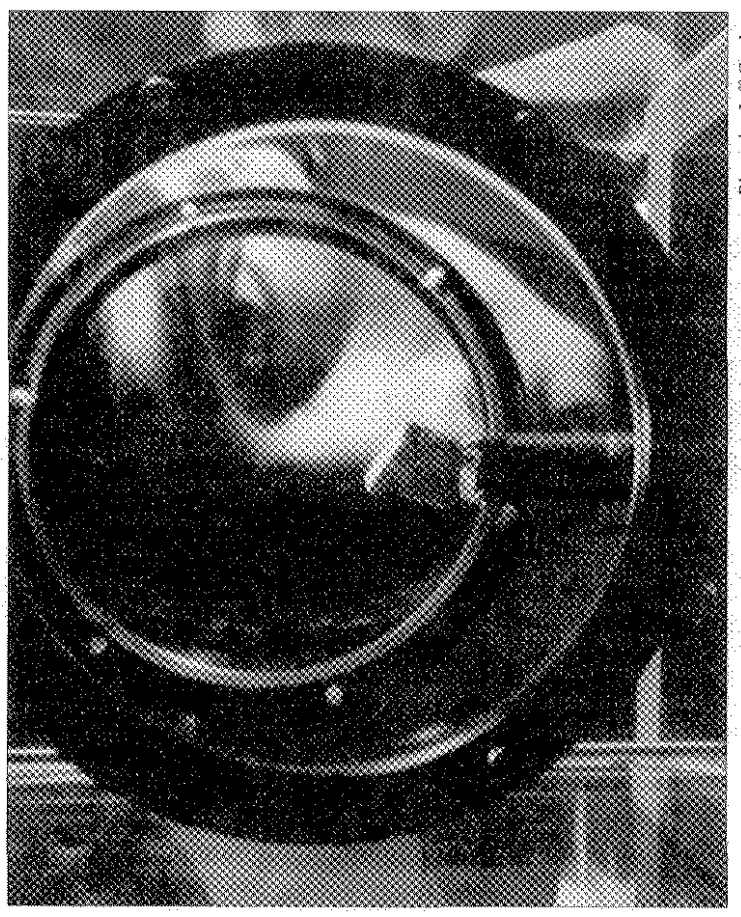


Photo by Jeff Caplan

MARS CLOSE-UP – Visitors to the Virginia Air & Space Center are invited to have a "close encounter" with a Mars meteorite. MarsFest '97 marks the opening of the VASC's newest exhibit, *Visions of Mars*. The exhibit explores mankind's relationship with Mars from ancient mythology to current exploration, highlighting the Viking landings and this weekend's planned landing of the Mars Pathfinder.

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News Researcher

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Langley Research Center

80 years of excellence
NASA Langley Research Center
1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 14 ❖ July 18, 1997

Open house

Tomorrow's event marks NASA Langley's 80th anniversary; welcomes community 'backstage' for peek at research center's past, present, future in aeronautics, space, atmospheric sciences

Photo by Jeff Caplan

'HEY, HEY, HEY' -- Tommy Snow, a retiring flight controls technician for NYMA Inc., prepares to take his last research flight on board "Fat Albert," NASA Langley's 737 aircraft, so nicknamed because of its size. The plane is one of the aircraft open to the public during the center's open house on July 19, 9 a.m.-4 p.m., and displayed on the flight line at the Flight Research Hangar, Building 1244.

Colloquium Communiqué

High-Speed Research Program explores 'generation-next' supersonic transport

Wallace C. Sawyer, director of NASA's High-Speed Research Program, will deliver Langley's August colloquium lecture, Aug. 5, 2 p.m., in the H.J.E. Reid Conference Center. He will repeat the talk as a Sigma Series Lecture at 7:30 p.m. that same evening at the Virginia Air & Space Center in downtown Hampton.

The High-Speed Research Program started in 1987 with market surveys conducted by industry and received approval in 1990 for Phase I Environmental Compatibility and Phase II Economic Viability. Phase II ends in 2002.

Boeing illustration

The High-Speed Civil Transport will help to revolutionize overseas travel in the next century.

The post-Cold War era has given rise to increased competition among the aircraft manufacturers of the world. The United Kingdom, France and Japan's Ministry of International Trade have all made substantial investments in technologies required to demonstrate an economically viable and environmentally acceptable high-speed civil transport (HSCT).

Industry experts predict that the number of flights to the Pacific Rim will quadruple by the beginning of the next century, spurring the demand for more than 500 next-generation supersonic passenger transports.

Therefore, the first country to develop a competitive supersonic transport (i.e., less than a 30 percent ticket surcharge) with existing subsonic transports stands to capture a significant portion of the long-haul, intercontinental market. Specifically, the HSCT market is estimated to be worth $250 billion and could potentially add 140,000 critical skill jobs to the economy.

In order to capture this market and to preserve the United States leadership in commercial aviation, NASA is conducting the High-Speed Research (HSR) Program to demonstrate the technical feasibility of a next-generation supersonic transport. Sawyer's presentation will address the challenges faced by the HSR program and its major accomplishments to date.

Sawyer has directed the program since 1994 and oversees NASA's focused commercial high-speed research efforts. His responsibilities include leading the development of critical technologies in aerodynamic performance; airframe materials and structures; propulsion technology; optimum systems integration methodologies; and flight deck technology.

Sawyer began his career at Langley in 1965 as an aerospace engineer. He has authored or co-authored more than 45 technical publications and has also contributed to a technical textbook.

He has served as assistant head, Supersonic Aerodynamics Branch and the head of the Concepts Analysis Section, the Fundamental Aerodynamics Branch and the Supersonic/Hypersonic Aerodynamics Branch. He has also served as assistant chief and chief of the Advanced Vehicles Division and in NASA Headquarters as the acting assistant director of aeronautics for high-performance aircraft. Most recently, he served as acting deputy director of aeronautics and as deputy director of the Aeronautics Program Group.

Colloquium & Sigma Lectures

What: "NASA's High-Speed Research Program," Colloquium and Sigma Series lectures by Wallace C. Sawyer

When: Aug. 5, 2 p.m. Colloquium; 7:30 p.m. Sigma Series

Where: Colloquium - H.J.E. Reid Conference Center; Sigma Series - Virginia Air & Space Center, Hampton

News Briefs

Around the Agency

ASTEROID MATHILDE REVEALS HER DARK PAST – (NASA Headquarters) More than 100 years after her discovery, asteroid 253 Mathilde has been sharing her secrets with scientists in the Science Data Center at the Johns Hopkins University Applied Physics Laboratory in Laurel, Md. A 25-minute flyby of the asteroid by NASA's Near Earth Asteroid Rendezvous spacecraft late in June resulted in spectacular images of a dark, crater-battered little world assumed to date from the beginning of the solar system. The Mathilde flyby is the closest encounter with an asteroid to date. Mathilde flyby images and updates are available on the Mathilde homepage at ***http://sd-www.jhuapl.edu/NEAR/Mathilde.***

TROPICAL RAINFALL MEASURING MISSION SET FOR HALLOWEEN LAUNCH – (Goddard Space Flight Center, Greenbelt, Md.) NASA and the National Space Development Agency of Japan have set Oct. 31 as the official launch date for the Tropical Rainfall Measuring Mission. The first earth science satellite dedicated to studying the properties of tropical and subtropical rainfall, the mission carries microwave and visible/infrared sensors, as well as the first spaceborne rain radar. NASA's Goddard Space Flight Center fabricated the observatory's structure and support systems, integrated and tested the spacecraft and provided two science instruments. NASA Langley and Marshall Space Flight Center, Huntsville, Ala. are providing two other instruments.

FIRST U.S. SPACE STATION COMPONENT BEGINS LAUNCH PREPARATIONS – The International Space Station Program has passed a major milestone as the first U.S. manufactured component has begun a year of launch preparations at the Kennedy Space Center, Fla. A connecting module, called Node 1, was shipped to Florida from the Marshall Space Flight Center's Space Station Manufacturing Facility in Huntsville, Ala. The node will be the first U.S-built segment for the station to reach orbit when it is launched in July 1998 aboard the space shuttle Endeavour on the STS-88 mission.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "As organizations become more diverse, the costs will increase for those who do a poor job integrating workers. Those who handle it well will have a cost advantage over those who don't." – from "Facts About Diversity," National MultiCultural Institute

▲ According to Hewitt Associates, 72 percent of companies polled say they offer flextime employment. – CNN Headline News, June 29, 1997

▲ Aug. 3-6 – National Urban League Annual Conference, Washington, D.C.

▲ See the MCLT home page at ***http://mtsbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Langley to shine at Oshkosh '97

BY KEITH HENRY AND KIRSTEN WILLIAMS

NASA Langley will make significant contributions to the NASA presence at the annual EAA Fly-In Convention, July 29-Aug. 5, in Oshkosh, Wis.

Langley research programs will be prominently displayed in the NASA exhibit area, expanded from one to two buildings this year. The additional "north" building will hold the growing multi-element general aviation exhibit. Work of the Langley-led AGATE (Advanced General Aviation Transport Experiment) consortium will anchor the exhibit, although NASA Lewis' news-making GAP (General Aviation Propulsion) program will get its share of attention this year.

Several companies participating in the agency's Small Business Innovation Research Program (SBIR) will be on hand to explain their general aviation advances.

New exhibits in the main building will include the recently announced national aviation safety initiative and Hyper-X. Langley is playing a prominent role in both of these important new programs. A full-size,12-foot model of the hypersonic Hyper-X flight vehicle will be on display. Also new since "Oshkosh '96" is a Langley display on the intriguing "blended-wing-body" super jumbo jet concept.

Other Langley work highlighted will include progress toward a future high-speed civil transport and the NASA Marshall-led X-33 program to verify technologies for a future reusable launch vehicle.

A repeat favorite is the display by NASA craftsmen from Langley, Lewis and Ames Research Centers. NASA technical forum speakers will collectively present dozens of topics on aeronautics- and space-related topics.

As noted, the Lewis GAP program will make lightplane propulsion news Aug. 1 at a news briefing led by Administrator Dan Goldin, while NASA aeronautics chief Robert Whitehead will lead the now-annual NASA-FAA AGATE R&D News Briefing.

Announcements

Order '98 calendars now

The 1998 calendars may now be ordered through GSA Advantage using government IMPAC Visa cards. Group/division/branch secretaries should submit requirements for their respective areas as soon as possible.

Stock numbers for the calendars follow:

▲ NSN: 7510-01-337-4708, wall calendar, displays three months, 11-5/8" x 8-7/8," UI: PG (10 each per PG)

▲ NSN: 7510-01-337-4713, calendar desk blotter, 17" x 22"; NSN: 7520-00-224-7238, blotter 19" x 24"; UI: EA

▲ NSN: 7510-01-363-3706, calendar pad, regular flipover, 3" x 3-5/8," UI: EA

▲ NSN: 7510-01-363-4998, calendar pad, executive flip-over, 3-5/8" x 5-7/8," UI: EA

▲ NSN: 7530-01-337-4699, weekly appointment book, 11" x 8-1/2," UI: EA

▲ NSN: 7530-01-363-6708, loose-leaf appointment book refill; NSN: 7510-00-285-1765, refill for six-ring binder, binder; UI: EA.

Voluntary Leave Transfer Program

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

The following Langley employees are approved leave recipients: Patricia G. Reagon, Debra P. Shimek, Mary Ann Steuck, Cassandra D. Stevens, Darrell A. Wood.

Employees may not donate to their immediate supervisor; employees may not donate more than one-half of the total annual leave accrued during the leave year; employees may not donate more "use or lose" hours than are left in the leave year to work.

To donate annual leave, submit the electronic form, "Request To Donate Annual Leave to Leave Recipient Under the Leave Transfer Program," to Mail Stop 174, Personnel Management Branch, or fax the form to ext. 47899. For more information, call ext. 43194.

Space Day continues

The interactive web site for last May's Space Day (***http://www.spaceday.com***) continues to remain active and will be updated throughout the year. Web masters have added a shockwave game, as well as a new section.

Development classes set

The Employee Development Branch is offering the following classes:

▲ Exploring ENVI, Aug. 20-22, 8:30 a.m.-4 p.m., Building 1216, Room 131

This course covers visualization and analysis of multi- or hyperspectral data collected from various airborne or satellite remote sensing instruments.

Course work includes advanced spectral analysis tools, topographic modeling, polarimetric radar functionality and an introduction to extending ENVI functionality through Interactive Data Language (IDL).

▲ Foundations for IDL Programming, Sept. 16-19, 8:30 a.m.-4 p.m., Building 1216, Room 131

Beginning and intermediate programmers who are starting to use IDL to explore their data will immediately become more productive in this four-day course.

Starting with IDL's basic processing power, the course covers data preparation for analysis, working with IDL graphics, math and statistics libraries and building graphical user interface-based applications. IDL experience is helpful but not necessary for this course.

▲ Advanced IDL Programming, Sept. 30-Oct. 3, 8:30 a.m.-4 p.m., Building 1216, Room 131

IDL programmers who have completed the foundations course or who have at least six months of IDL programming experience will expand and refine their skills in this four-day course.

The course covers use of IDL's tools for extensive, in-depth analysis and data visualizationand will most benefit application developers building complex programs.

To register for any of these courses, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Lawrence at Mail Stop 309, or fax to ext. 48543. For more information, call George Allison at ext. 42594.

In memory of Charlotte N. Phillips

Charlotte "Oot" Newell Phillips, 68, died June 17. The Hampton native retired from NASA Langley as a patent draftsman in 1984 after 30 years of service.

In memory of Philard C. Flansburg

Philard Charles Flansburg, 70, died June 20. The Newport News native retired from NASA Langley as an engineer/electrical technician in 1988 after 34 years of service.

In memory of Mary T. Lemke

Mary Tingle Lemke, 76, died June 22. The Norfolk native and 30-year Hampton resident retired from NASA as a personnel manager in 1978.

In memory of Thomas F. Watts Sr.

Thomas Floyd Watts Sr., 61, died June 26. The Hampton native was employed as a communications contractor at NASA Langley for Lucent.

In memory of Beulah L. Messick

Beulah Lewis Messick, 76, died June 25. The lifelong resident of Hampton's Fox Hill retired as a technical librarian at NASA Langley in 1972 after 16 years of service.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

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Science and Technology Corp.

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Mission update

Inflatable Antenna Experiment yields positive preliminary results

BY TOM CAMPBELL

Editor's Note: This follow-up report updates the May 3, 1996, Researcher News story, "Langley Supports High-Risk Shuttle Test of Inflatable Antenna."

The successful deployment of the Inflatable Antenna Experiment (IAE), flown aboard STS-77, launched May 19, 1996, has resulted in a breakthrough in the acceptance and consideration of inflatable space structures for future space mission applications.

This is a new and unique concept for space deployable antennas, and this high-risk experimental deployment of a 14.7-meter-diameter reflector antenna demonstrated many of the advantages – and disadvantages – in using inflatable structures for space applications. Candidate missions which require large deployable antennas in space include communications, Earth remote sensing and radio astronomy applications.

The inflatable antenna concept is based on technology developed by L'Garde, Inc., Tustin, Calif., during the past 25 years, which includes the design, manufacture, and ground and flight testing of inflatable space structures. Langley investigated inflatable antenna concepts and conducted experiments in 1986 for a space inflatable antenna experiment.

Subsequently, NASA Langley managed Small Business Innovative Research contracts with L'Garde, Inc. which preceded the flight test program managed by the Jet Propulsion Laboratory, Pasadena, Calif.

Serious user interest resulted in the selection of this concept for a NASA In-Space Technology Experiment (INSTEP) space-based experiment. INSTEP experiments were based on demonstrating and evaluating the performance of promising concepts with low-cost flight hardware.

The inflatable antenna was nearly 50 feet in diameter and was stowed in a package about the size of a table – 7 feet by 3 feet by 1.5 feet. The antenna struts were 92-foot-long tubes of neoprene rubber-coated kevlar, which were inflated to 3 pounds per square inch.

The antenna reflector consisted of two 0.25-millimeter facing sheets of clear and aluminized Mylar. The inflation pressure for the reflector was 0.0006 pounds per square inch.

The antenna package was attached to the Spartan spacecraft, which was attached to the space shuttle's Remote Manipulator System.

Preliminary flight data results include:

▲ The Spartan performed flawlessly

▲ The canister doors articulated nominally

▲ The deployment sequence of the inflatable structure was significantly affected by an unexpected amount of residual air in the stowed structure and the subsequent release of strained energy

▲ The inflatable support structure achieved its nominal pressure of 3 pounds per square inch

▲ The reflector structure was not completely inflated because the single inflation valve to the reflector malfunctioned

▲ The surface accuracy measurement system for the structure operated correctly and positioned the rim of the lenticular structure, but it was unable to measure the smoothness of the reflector surface because the reflector was not adequately inflated

▲ The orbiter returned outstanding photographic and video coverage.

The overall experiment was a tremendous success. The orbit demonstrated new, unique and low-cost technology:

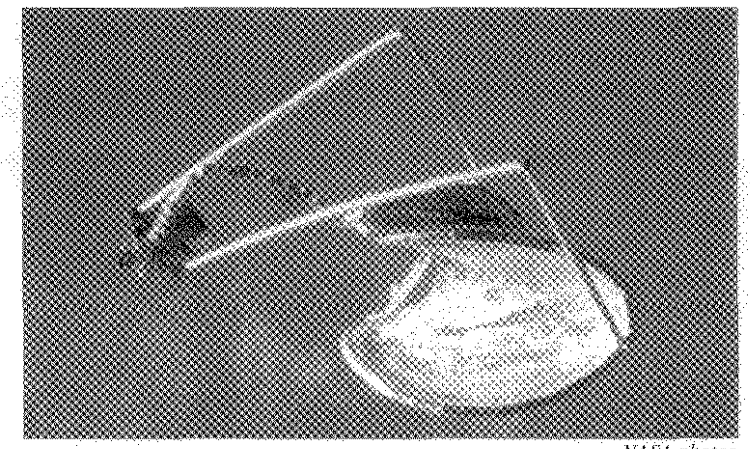
▲ A large inflatable antenna structure was built for about $1 million

▲ Efficient packaging was demonstrated by stowing a 50-foot inflatable structure in a container the size of an office desk

▲ A 14.7-meter-diameter reflector structure was manufactured with surface precision of a few millimeters

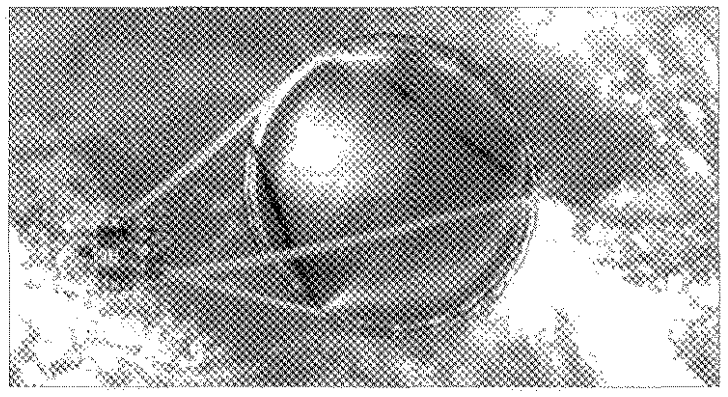
▲ Successful orbital deployment verified the robustness of a new unique reflector structure

▲ Results of this experiment will focus the direction of technology development for a new class of space deployable structures.



NASA photos

The IAE is photographed from the STS-77 orbiter, showing the inital stage of inflation from the Spartan spacecraft (above) and the fully inflated antenna (below).



NASA licenses air quality monitoring technology

BY KEITH HENRY AND ROSEMARY BAIZE

A technology originally developed for monitoring atmospheric air quality now is being used to help U.S. industries reduce smokestack pollution.

A remote gas sensor with NASA technology could detect industrial pollution in smokestacks or with a "fence" system that would allow the sensor to see around an area with the help of mirrors.

NASA is working with MERCO, Incorporated, Golden, Colo., to jointly develop and commercialize the technology through a patent license agreement.

Under the agreement, Langley will transfer its fast-response, nonmechanical, remote gas-sensing technology for monitoring gaseous pollutants emitted from petroleum refineries and chemical manufacturing facilities to MERCO.

Although originally developed to measure gases in the Earth's atmosphere from aircraft and satellite platforms, the technology's improved design makes it attractive for many Earth-based monitoring applications. The device possesses many distinct advantages over conventional gas sensors, such as the capability for remote sensing, area source monitoring, higher reliability, faster response and a more compact design.

The Mid-Continent Technology Transfer Center, College Station, Texas, facilitated the agreement. The center worked closely with MERCO by preparing a brief marketing study and then, in conjunction with MERCO and the University of Colorado, developing a milestone plan for evolving the prototype into a commercial product.

The company anticipates rapid commercialization of the instrument for use by the private sector.

NASA's budget for fiscal year 1998 awaits Congressional action

BY LEE RICH
Congressional Affairs Officer

The annual federal budget process is well underway. The House Appropriations Subcommittee on Veterans Affairs, Housing and Urban Development, and Independent Agencies (including NASA) marked up its as-yet-unnumbered bill on June 25. For fiscal year 1998, the subcommittee allocated $70 billion, versus the $64 billion it allocated for FY '97.

President Clinton's request, submitted in February, called for FY '98 NASA funding of $13.5 billion. The House Subcommittee's approved mark came in at $13.648 billion and is broken out in the markup table at right, with the additional $148 million designated as follows:

▲ $100 million for Space Station/Russian contingency (HSF line)

▲ $ 48 million for various science/education programs (SA&T line)

▲ Aero research and technology, space station, and space shuttle were fully funded.

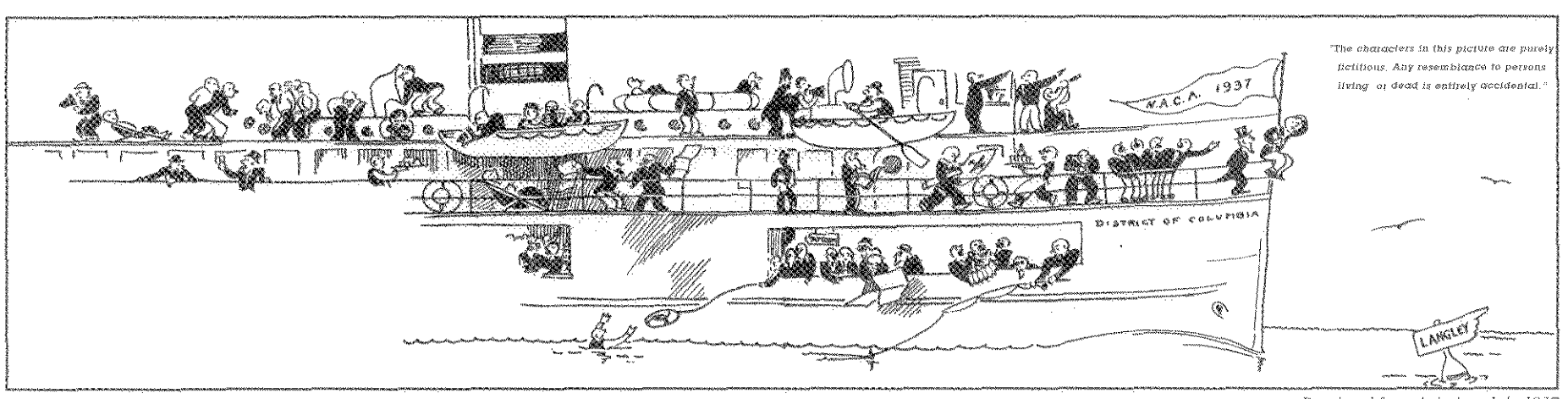
Bill language provides transfer authority of up to $150 million.

The Senate VA-HUD Appropriations Subcommittee has not announced a markup date. Once the Senate approves the bill, a House-Senate conference committee will be appointed to reconcile differences and come up with a final VA-HUD appropriations bill to be sent to the president for signing before Sept. 30.

NASA fiscal year 1998 markup table

	FY '97 enacted	President's FY '98 request	House Subcommittee bill
Human Space Flight	$ 5,362,900,000	$ 5,326,500,000	$ 5,426,500,000
Science, Aeronautics, Tech.	$ 5,767,100,000	$ 5,642,000,000	$ 5,690,000,000
Mission Support	$ 2,562,200,000	$ 2,513,200,000	$ 2,513,200,000
Office of Inspector General	$ 17,000,000	$ 18,300,000	$ 18,300,000
Total NASA	$ 13,709,200,000	$ 13,500,000,000	$ 13,648,000,000

Through others' eyes: National publications depict Langley's NACA, NASA days



Reprinted from Aviation, July 1937

This caricature accompanied a 1937 *Aviation* article, "Twelfth Annual NACA Picnic: It's lots of fun on the boat but real work out at Langley," about that year's conference and inspection at Langley Field.

BY MARY SPRACHER

Through the years, NASA Langley has received both local and national media coverage. From the inception of the National Advisory Committee for Aeronautics, through 80 years of evolution at the center, the media have kept tabs on Langley.

Just as NASA and Langley have changed over the years, so have the media and their coverage of the research center.

In recognition of our 80 years in the public eye, the Researcher News looks back at what various print media have had to say about Langley – then and now.

The colorful early days

In the years after the NACA and Langley were established, the media focused on the center's growth and various projects.

A write-up on the NACA in the March 1932 *Aviation* (later renamed *Aviation Week & Space Technology*) pointed out that, as the NACA continued to expand, Langley's contributions to the industry were growing even faster:

"During 1931, the staff at Langley Field continued its growth, unbroken since the laboratories were founded. The increase of staff, however, has been considerably less than the increase in the amount of work completed for distribution to the aeronautical industry."

Print media covered annual conferences at Langley with great enthusiasm – and creativity. *Aviation*'s articles on these annual engineering research conferences were run under such colorful headlines as "Research Symphony: The Langley Philharmonic in Opus No. 10" and "Winds Over Langley." The articles also often featured a literary tone not found in typical news articles today.

"At Langley Field: The NACA receives callers," a June 1933 *Aviation* article on the eighth annual Engineering Research Conference, began with a colorful description of the setting for and the growth of the conference:

"The annual engineering conference of the National Advisory Committee for Aeronautics has outgrown its time-worn setting, and the program has been altered in details to accommodate the ever-increasing hosts of guests and the wealth of subject matter to be presented ...Even the day has become too short in which to tell the story of the committee's many accomplishments."

The eleventh annual conference in 1936 also drew awe and praises from *Aviation* for the NACA and Langley:

"Visitors at Langley's annual conferences invariably end their day in the Chamberlin Roof Garden with tired feet and with tongues hanging out, but few have ever failed to agree that they have been amply repaid for their efforts. Dr. Ames, Dr. Lewis and their associates have a way of pulling rabbits out of hats that is well worth watching."

Aviation's coverage of the 1937 conference, dubbed the "Twelfth Annual NACA Picnic," pointed out that Langley was moving away from the unveiling of impressive new equipment and towards concentrating on applications and "the little things that make big differences."

> **"Even the day has become too short in which to tell the story of [the NACA's] many accomplishments."**
>
> *Aviation magazine, June 1933*

Langley aids war effort

As the nation took its place along the battle lines of World War II, the media followed Langley as the center turned even more of its attention to fine-tuning the country's military aircraft.

A lengthy article in the March 1941 issue of *Fortune*, "The Wind Tunnels of Langley," moved away from the previous folksy commentaries on the shiny new facilities and innovations of Langley and concentrated on the urgent wartime demands the center faced.

The article addressed the move from long-range research at Langley to urgent, real-time work:

"The designer is apt to find that the urgency of the defense program...makes it impossible for him to indulge in experimentation.

"Lately the same influence has descended on the NACA itself, with the result that Langley Field researchers and industrial designers are now working together more closely than ever, so that current military planes may be as fast and agile as ingenuity can make them."

At the same time, this article also mentioned that construction had begun on NACA facilities in both Cleveland (Lewis) and Sunnyvale, Calif. (Ames)

Stating that the NACA had long ago outgrown Langley Field, the article pointed out that expansion would serve to "relieve a research bottleneck."

As the NACA expanded, its annual inspections were rotated from center to center. In 1951, it was Langley's turn, and an article in *The Aeroplane* chronicled the inspection. While Langley was no longer the only NACA laboratory, the center still left an impression:

"The complexity of such a task (the annual inspection tours) is seen in the fact that the 1951 Langley tour required 11 different stops to hear 35 different lectures illustrated by 200 different charts and explained in about 100,000 spoken words in a single eight-hour day."

A small empire

As the NACA became the National Aeronautics and Space Administration and much of the agency's efforts turned towards the heavens, Langley continued to hold its own in the research world and in the public eye.

A November 1961 "NASA Souvenir Edition" of the *Daily Press* touted Langley as the "pioneer of the Space Age."

Just as the media once looked to Langley in awe during the early days of aeronautics, now the media was looking at the space-age Langley through an equally impressed eye:

"Buck Rogers, even in his wildest space fantasies, would never believe some of the workable contraptions being tested today at the Langley Research Center."

The issue also pointed out that Langley was continuing to make strides in aeronautical research, as well as in space:

"Playing an important role in providing basic research for space probes and aircraft refinements, the center has grown considerably since its establishment some 44 years ago. As the largest NASA center specializing in basic aerospace research, it is the international crossroads for leaders in this field...In fact, the local center has, over the years, become a small empire – changing its complexion rapidly from those early days of 1917."

Langley in the 1990s

Fast-forwarding to today, both editorial views and journalistic coverage of Langley and NASA are very different from even the "newsiest" early accounts. Today's media tend towards more critical evaluations and hard news coverage of the center, inherent in today's atmosphere of government downsizing. However, the center continues to draw its share of praise from the public.

Much of today's discussions about NASA and Langley are about funding and whether or not the agency can make cuts and still be a leader in aeronautical research. An editorial in a July 1992 issue of *Aviation Week & Space Technology* asserted that Langley was well worth financial commitment from the government:

> **"...Langley will continue to be one of the best investments Americans can make in the critical arena of research and development."**
>
> *Aviation Week & Space Technology, July 1992*

"Since its earliest days, Langley has provided the U.S. with a wealth of aeronautical expertise and world-class leadership, while consistently using taxpayer dollars wisely.

"In short, Langley will continue to be one of the best investments Americans can make in the critical arena of research and development."

Introspections

Atmospheric scientist finds link between diet, Alzheimer's disease

BY WILLIAM GRANT

Editor's Note: The Researcher News asked Dr. William B. Grant, of the Chemistry and Dynamics Branch, to tell our readers how he got involved in the research on dietary links to Alzheimer's disease which ultimately won attention from national news media.

About the time I completed my Ph.D. degree in physics at the University of California at Berkeley in 1971, I discovered the book *Diet for a New Planet,* by Frances Moore Lappe, and began to see the logic of a vegetarian diet: The Earth cannot sustain a population where everyone eats as much as Americans do, and eating lower on the food chain is healthier, too.

So I gradually changed my diet and took an interest in nutrition and health. For the past few years, I have been a fairly conscientious vegetarian. After completing my research, I added fish to my diet, as well as fish oil supplements.

In 1992, my 75-year-old mother began to develop symptoms of Alzheimer's disease, and I begin to think about what might cause it.

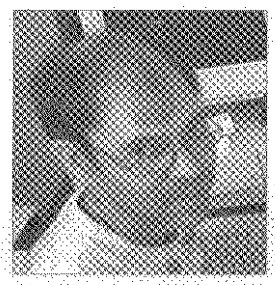
Some three years later, I undertook a project for the Sierra Club to determine the effect air pollution was having on the forests in the eastern United States. I learned how acid rain changes the soil chemistry, replacing calcium with aluminum.

The following year, while on a NASA mission to New Zealand, I read about research which showed that Japanese-American men in Honolulu, Hawaii, had 2.5 times the Alzheimer's disease rate of native Japanese. I also recalled learning that the brains of those who died with Alzheimer's disease have more aluminum. I strongly suspected the "acidic" diet of the U.S was responsible.

When I returned home to Yorktown from New Zealand and visited local medical libraries, I found most of the data I needed to conduct my own multicountry analysis.

Data from 11 countries showed that dietary fat has the highest association with Alzheimer's disease prevalence. For seven European and North American countries, increased fish consumption was associated with a lower rate of Alzheimer's disease for the same amount of dietary fat.

Early this year, several key papers on Alzheimer's disease were published supporting the hypothesis of the disease's vascular nature and the effect of dietary fat upon it. The medical profession seems to have focused too intently on genetics as the sole cause of the disease's development, and so didn't even look for a dietary link.



But once I was convinced that Alzheimer's disease had a dietary connection and was, thus, largely preventable, I hired a press agent and set up a press conference at the National Press Club in Washington, D.C. The result was both local and national media coverage, followed by invitations to speak to several medical groups.

While I consider my findings to be quite persuasive, the Alzheimer's Association and the medical community call the work suggestive at best and flawed at worst, because of the methodology.

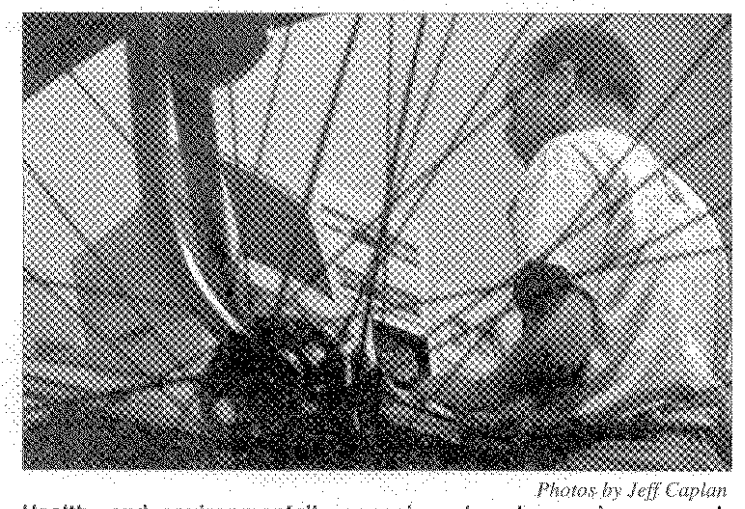
But a health reporter who contacted me recalls that similar work in the 1970s remade the connection between diet and cancer, initiated major research efforts, and led to today's common knowledge that diet, and especially fat, is a major risk factor for many types of cancer. He thinks that my work will have the same impact on Alzheimer's disease.

Now, when I sit down for lunch in the Langley cafeteria, everyone looks at their meals, looks at me, and says that they are eating the anti-Alzheimer's lunch, or they apologize for not doing so.

Sadly, my mother is unaware of the research I've done on her disease, and she barely recognizes me when I visit her.

I'm now working on finding a dietary link to rheumatoid arthritis, which my sister suffered from until she also recently became a vegetarian. Her condition seems to have been cured, and she is helping me to spread the word of the health benefits of a vegetarian diet.

Grant's published work, "Dietary Links to Alzheimer's Disease," is available on the Internet at ***http://www.coa.uky.edu/ADReview/contents.html.***



Photos by Jeff Caplan

Health- and environmentally conscious Langley senior research scientist Bill Grant rides his bike around the center during the workday and parks it in his office as he works at his computer.

Yu heads to Harvard on fellowship

BY NANCY FINN

As chief of the Experimental Testing Technology Division (ETTD), Dr. James C. Yu oversees nearly 250 Langley personnel in providing support to all ground-based and selected flight research at the center. And as a manager, he has received the Senior Managers in Government (SMG) fellowship to attend Harvard University, July 27-Aug. 8.

The SMG program is designed for senior career official and subcabinet political appointees in the federal government with significant institutional responsibilities. It also addresses the needs of private-sector executives who interface with the federal government, as well as those of senior officials of foreign governments who seek greater understanding of strategic public management. Participants with diverse intellectual backgrounds and career in-terests interact, allowing the program to sharpen managerial effectiveness by emphasizing each individual's skills.

Yu holds a bachelor of science degree in mechanical engineering from the National Taiwan University, as well as a master of science degree in aerospace engineering and a doctoral degree in mechanical engineering, both from Syracuse University. As a Sloan Fellow in 1992, Yu earned a master of science degree in management from Stanford University.

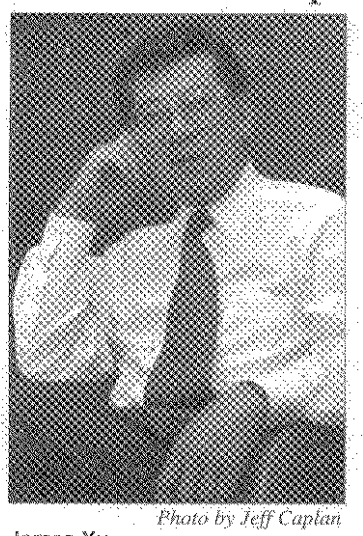


Photo by Jeff Caplan

James Yu

Yu began his NASA career in 1977. He has served as assistant head of the Aeroacoustics Branch, assistant chief of Acoustics Division, manager for Rotorcraft Research and Technology, and deputy director for Structures.

1994 NASA Scholarship winner continues academic excellence

Editor's Note: This report is an update on the academic accomplishments of a 1994 NASA Scholarship winner.

Piyush R. Gupta, son of Dr. Roop N. Gupta of the Aero & Gas Dynamics Division, and 1994 NASA Scholarship winner, has graduated with distinction from the University of Virginia and is preparing to pursue a medical degree at the Medical College of Virginia.

Piyush Gupta

While at UVA, Gupta was named an Echols Scholar, appeared on the dean's list every semester and was inducted into Phi Beta Kappa, the nation's oldest honor society.

In addition to MCV, he was accepted into the medical schools of UVA and George Washington University.

In support of his medical school studies, he has won the Florence Smith Medical Scholarship, a Lewis-Gale Foundation Medical Scholarship and an MCV scholarship.

Gupta was one of 25 NASA scholarship winners honoring the Hubble astronauts and commemorating the 25th anniversary of the first lunar landing. He was also the recipient of a Virginia Scholar Scholarship while at UVA.

Gupta ranked first out of 337 students in the Tabb High School graduating class of 1994. While at Tabb, he was active in both academic and athletic organizations. He entered UVA as a second-year student in the fall of 1994.

Beach wins AIAA award for air-breathing propulsion

Dr. H. Lee Beach Jr., NASA Langley Deputy Director, has received the American Institute of Aeronautics and Astronautics Air-Breathing Propulsion Award for 1997. He received the award at a conference in Seattle on July 8.

The award is presented for meritorious accomplishment in the science or art of air-breathing propulsion, which includes engines using atmospheric air to develop thrust, with application to aircraft or other vehicles in the atmosphere or on land or sea.

Beach is a nationally and internationally recognized authority in the field of hypersonic propulsion and has played a lead role in developing the technology for hypersonic aircraft. He was responsible for the research effort which led to the first experimental verification of an airframe-integrated supersonic combustion ramjet, providing the critical technology basis for the major commitments to hypersonic flight vehicles.

Lee Beach

The Air-Breathing Propulsion Award was established in 1975.

AdVentures

FOR SALE OR TRADE: Centurion Ironman Master 14-speed bike, 60 centimeters, full Shimano Ultegra, Araya wheels, race ready. $500 or will consider trade for comparable mountain bike in excellent condition. Call 874-3121.

FOUND: A gold-and-silver bracelet, in the vicinity of the cafeteria. Call Security at ext. 43420 to identify and claim.

FOR RENT or rent-to-own: Townhouse with 2 master bedrooms, 2 1/2 baths, pool. $600/month. Call 599-0649.

DONORS WANTED: The next bloodmobile will be held July 23, 9 a.m.-3 p.m. in the H.J.E. Reid Conference Center. Charge time to B-1004.

MOTORING AROUND LANGLEY: The Virginia Air & Space Center in Hampton offers guided motor tours of NASA Langley and Langley Air Force Base now through Sept. 1, Monday-Saturday, 10:30 a.m. and 1:30 p.m.; Sunday, 1:30 p.m. $4 with VASC admission ticket. For more information, call 727-0900.

JUST LIKE 'TWISTER': The Virginia Air & Space Center presents the 1995 IMAX film *Stormchasers*, beginning this week, daily at noon and 2 p.m.; Thursdays-Sundays as a double feature with ***Super Speedway*** at 7 p.m.; Friday and Saturday at 7 and 9 p.m. ***Stormchasers*** follows weather experts around the planet as they explore tornadoes, hurricanes, lightning, blizzards and monsoons. Actor Hal Holbrook narrates the film. The VASC also offers the following IMAX films, showing throughout the summer: ***To the Limit***, through Sept. 3, daily at 1 p.m.; ***Cosmic Voyage***, through Sept. 3, daily at 11 a.m. and 3 p.m.; ***Titanica***, through Sept. 3, 5 p.m., Thursday-Sunday; ***Ring of Fire***, through Sept. 3, shown as a double feature with ***Super Speedway***, 7 p.m., Thursday-Sunday, and 9 p.m., Friday and Saturday; ***Grand Canyon: The Hidden Secrets***, through Sept. 30, daily at 1 p.m. IMAX admission is $5.50 for adults; $4.50 for NASA, military, seniors and children under 12; double feature admission is $8 for adults and $7.50 for NASA, military, seniors and children under 12. For more information, call 727-0900.

SLOGAN SEARCH: In conjunction with NASA's upcoming 40th anniversary activities and programs, the agency is looking for a slogan to commemorate its founding on Oct. 1, 1958. Submit ideas in writing by July 31 to Steve Garber in the NASA Office of Policy and Plans, Code ZH, or send an e-mail to steve.garber@hq.nasa.gov. The winner will receive a special illustrated book about space exploration.

PH.D. PARTY: Friends and coworkers of Dr. Ralph D. Buehrle are invited to help him celebrate receiving his Ph.D. degree, Aug. 6, 4:30-5:30 p.m., at the H.J.E. Reid Conference Center. Refreshments will be provided. For more information, call George Whitehurst at ext. 47147.

LAA CARNIVAL IS COMING: The Langley Activities Association's annual summer carnival is set for Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with activities for the whole family. For more information or to volunteer to help, call ext. 46369.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, or to get on e-mail list, contact jrrjr@icase.edu or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

SEAFOOD FLING: Fort Monroe's third annual Seafood Fling, July 25-26, features a 5K run, volleyball tournament, vendors, crafts, car & boat show, local entertainment, contests. On the seawall behind the Fort Monroe Club. For more information, call 727-3151.

(INTER)NETWORKING: "Personalizing the Internet: Moving Your Computer into the Electronic Village," a seminar from the Lifelong Learning Series of Virginia Polytechnic Institute and State University's College of Arts and Sciences, Aug. 1-3, Hotel Roanoke & Conference Center. For more information, call Ronnie Stephenson at 851-6230.

TECH GOLFING: The Peninsula Chapter of the Virginia Tech Alumni Association sponsors its 19th annual open golf tournament, Aug. 9-10, at the Woodlands Golf Course, Woodland Road and Interstate 64, Hampton. $90 per two-person team; proceeds benefit the Peninsula Chapter Scholarship Fund. Register by Aug. 1. For more information, call Frank Cowling at home, 436-5627, or at work, 640-2245.

FOR A SONG: A garage sale to benefit the Virginia Choral Society will be held July 26, 8 a.m.-4 p.m., at 24 N. Mallory St., Phoebus (next to the Victorian Station restaurant). For more information, call 596-4742 or 851-9114.

VIRGINIA CHORAL CONCERT: The Virginia Choral Society will present "Afternoon Delights," a benefit concert, Aug. 3, 3 p.m., at Trinity Lutheran Church, Newport News. An ice cream social and silent auction will follow the program. Tickets are $10 at the door. For more information, call 851-9114.

AUDITIONS: The Virginia Choral Society is holding auditions for its 67th concert season, Aug. 15-16. This season's concerts include "An Evening of Gilbert and Sullivan," "A Festival of Carols," "The Legacy of Randall Thompson," Berlioz's "Te Deum" and Bizet's "Carmen." Call 881-9624.

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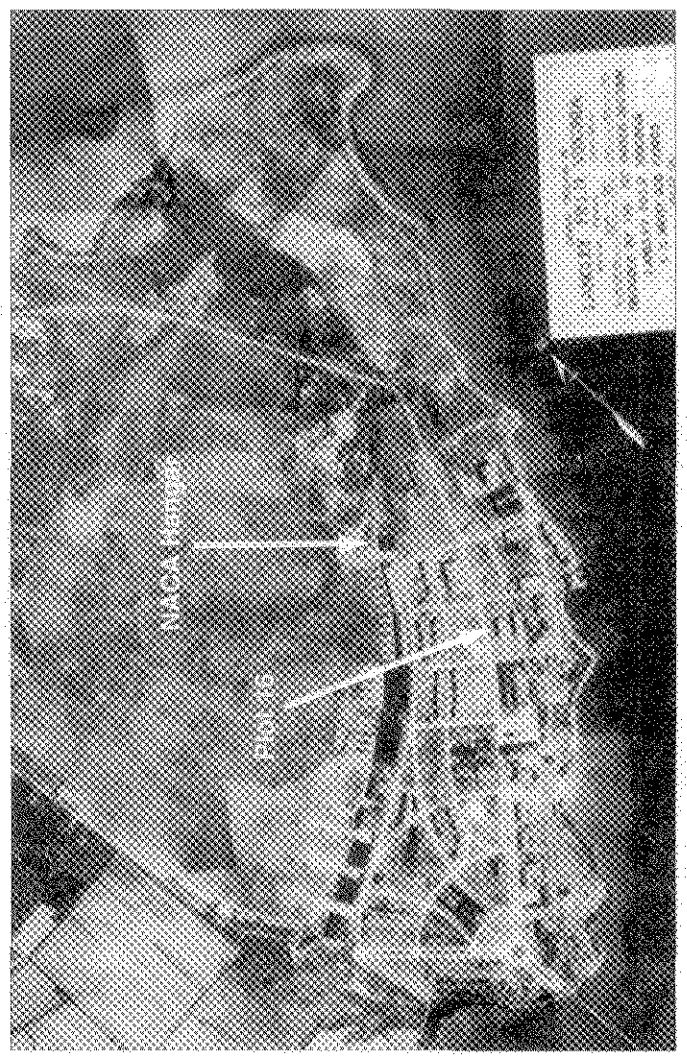

NASA photo

BIRD'S EYE VIEW – This aerial view of Langley Field in 1926 shows the NACA's earliest buildings. Located on Plot 16, a section of land granted to the NACA in 1917, these facilities housed administrative support, laboratories, a cafeteria, the Atmospheric Wind Tunnel and the Velocity Density Tunnel. A NACA hangar was also located nearby. The establishment of Langley was a joint venture of the U.S. Army Signal Corps and the NACA. After a panel reviewed potential locations, these 1,650 acres along a tributary of the Chesapeake Bay were chosen and bought for $175 an acre. The U.S. government received the title for the land Dec. 30, 1916, and groundbreaking for the main NACA building took place in July 1917.

National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

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Vice president gives 'thumbs up' to aviation safety program

Gore tours Langley's 757 during news conference at Dulles

Vice President Al Gore took a look at NASA Langley's 757 research aircraft and came away impressed during a tour and news conference July 15 highlighting aviation safety.

The event, held at Dulles International Airport in Washington, D.C., showcased technology in use or under development by NASA and the Federal Aviation Administration (FAA) as part of a national effort to improve air safety and airport capacity.

With the 757 parked at a United Airlines gate, Gore toured the aircraft. He was accompanied by Michael Lewis, manager of the agency's new Aviation Safety Program that Langley leads; NASA Administrator Daniel S. Goldin; and Transportation Secretary Rodney Slater.

"A key is giving the people who are flying, maintaining and directing our airplanes new tools to use. Today we've had a glimpse of some of those new tools...every one of them will make a very real difference," Gore said at the news conference.

The goal of the $500-million program is an 80 percent reduction in the fatal accident rate within 10 years, and a 90 percent drop in two decades.

Goldin told Gore, "We're going to deliver on this job."

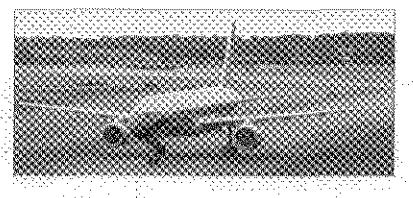
Prior to the news conference, Gore was briefed on developing technologies displayed inside the plane and at the gate area where the news conference was held:

▲ Cockpit Weather Information (CWIN), a NASA-developed system that can provide pilots with up-to-date and easily accessible weather information is taking to the air. NASA, United Airlines and McDonnell Douglas are evaluating a DC-10 equipped with an experimental cockpit weather system and other innovative technologies. Dr. Charles Scanlon, of the Crew Systems and Operations Branch, briefed the vice president.

NASA photo by Bill Ingalls

Langley division chief and pilot Harry Verstynen, front right, shows the Cockpit Weather Information system to Vice President Al Gore in the 757 cockpit. Behind Gore are, from left, Transportation Secretary Rodney Slater and NASA Administrator Dan Goldin.

▲ The Low-Visibility Landing & Surface Operations (LVLASO) and the Taxiway Navigation & Situation Awareness (T-NASA), airborne and ground-based systems aimed at improving the safety and efficiency of aircraft movements on the surface during the operational phases of landing, roll-out, turnoff, and taxi. In cooperation with the FAA, this system will be tested and evaluated using the 757 at the Hartsfield-Atlanta International Airport this month. Harry Verstynen, pilot and chief of the Flight Operations and Support Division, informed Gore about these systems.



▲ Non-Destructive Evaluation (NDE) probes, which detect hidden fatigue cracks on aircraft. Research at Langley has shown that an array of tiny cracks can suddenly coalesce and cause catastrophic failure, making detection an important part of aviation safety efforts. Russel Wincheski, of the Nondestructive Evaluation Sciences Branch, presented this briefing.

▲ Thermal Inspection System, which finds corrosion and disbonds on aircraft fuselages using heat conduction. William Winfree, also of the Nondestructive Evaluation Science Branch, explained this system to the vice president.

Gore also viewed explosives detection devices developed by the FAA.

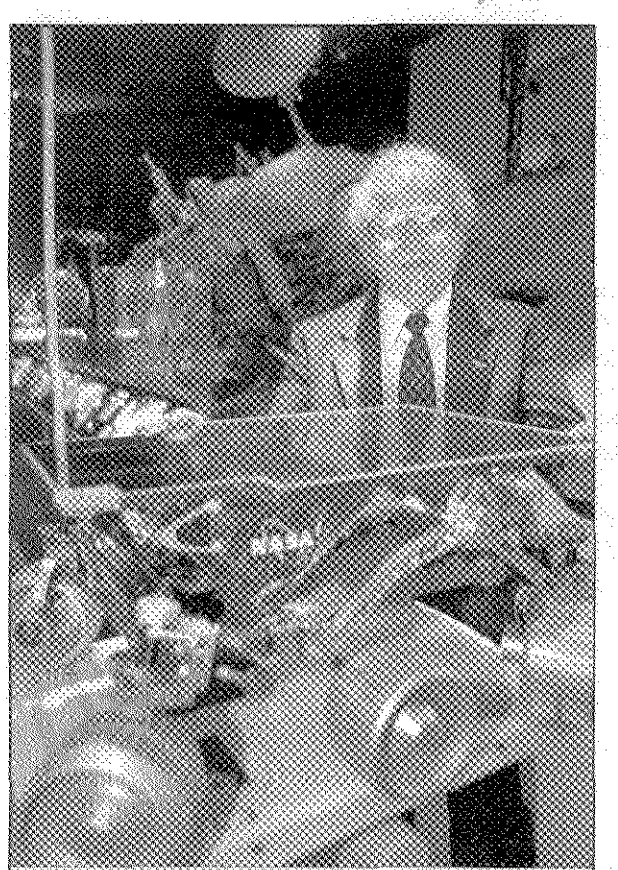


Photo by Jeff Caplan

MARS MANAGER -- Anthony Spear, manager of the Mars Pathfinder Project at NASA's Jet Propulsion Laboratory in Pasadena, Calif., stands with a replica of the spacecraft's rover, Sojourner, at the Virginia Air & Space Museum in Hampton after speaking to a full house July 15 as part of the Sigma Series lectures. A model of the Viking Lander is displayed behind him.

Director sends thanks for Open House efforts

Many thanks to all who made July 19's successsful Open House the best attended in the center's history. We all can be proud of the support and enthusiasm shown by our neighbors who took the time to visit our laboratory.

Communicating with our stakeholders -- particularly the public -- takes place through many forums. Obviously, opening our doors to our fellow citizens and allowing them a first-hand look at our work and our facilities is probably one of the best ways to communicate our mission and accomplishments.

Whether you were directly involved in the planning and staffing of the event, or whether you came out with your family to see what your colleagues are working on, you should be very proud that all responses indicate it was a very beneficial event.

I offer special thanks to the volunteers who made the day a big success, including our contractors, employees, retirees, the American Federation of Government Employees, the Activities Association, the Langley Exchange, even "our own" astronaut Charlie Camarda, who signed 2,000 autographs.

Additionally, I thank the Langley Federal Credit Union and the local media for enthusiastically helping us promote this year's Open House.

I am not sure that any organization in the federal government or any other national institution has received more media attention in recent weeks than NASA has. The positive reports on the highly successful Mars Pathfinder mission, the recent microgravity shuttle mission and the challenges of the Mir program have certainly placed the agency in the international spotlight. It was exciting to be able to localize NASA's recent achievements and to highlight Langley's contributions to aerospace.

Jeremiah F. Creedon

Again, many thanks for the highly successful 80th Anniversary Open House. Congratulations to all involved.

News Briefs

Around the Agency

NASA ANNOUNCES 1997 STTR PHASE I SELECTIONS – NASA's Office of Aeronautics and Space Transportation Technology has selected 50 research proposals for immediate negotiation of Phase I contracts in the agency's 1997 Small Business Technology Transfer Program (STTR). Small, high-technology businesses submitted more than 200 separate proposals from all sections of the United States. Research topics included Earth remote sensing; advanced technology for space science; human exploration and development of space; general aviation; advanced space transportation; and nondestructive evaluation of material properties and structural integrity.

SOFTWARE USED ON MARS PATHFINDER WINS NASA AWARD – A software program used on the Mars Pathfinder mission is the winner of the 1997 NASA Software of the Year Award. Dr. Abhinandan Jain, Dr. Guillermo Rodriguez, and Dr. Guy K. Man of NASA's Jet Propulsion Laboratory, Pasadena, Calif., developed the software called DARTS: Dynamics Algorithms for Real-Time Simulation. The DARTS software can be used to generate real-time simulations to test and verify flight software and hardware for a variety of spacecraft missions. Information about this software is available on the Web at ***www.hq.nasa.gov/office/codei/swy97win.html.***

THE OTHER PATHFINDER SETS NEW FLIGHT RECORD – (Dryden Flight Research Center, Edwards, Calif.) A sleek flying remotely piloted vehicle named Pathfinder set a new unofficial world record for high-altitude flight by a solar-powered aircraft at the U.S. Navy Pacific Missile Range Facility, Kauai, Hawaii. The new mark of more than 71,500 feet exceeds Pathfinder's previous record of 67,350 feet set in June. The Pathfinder aircraft is now being prepared to monitor coral reef degradation and deforestation around the island of Kauai.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER
Multicultural Facts

▲ "Employee absenteeism and turnover, conflict and tensions among staff, discrimination complaints, and time lost due to misunderstandings are just a few of the costs that erode the bottom line of organizations which do not manage diversity well. – from "Facts About Diversity," National MultiCultural Institute

▲ Aug. 12 – MCLT Monthly Meeting, Building 1209, Room 80, 9-11 a.m.

Aug. 12-17 – Black Data Processing Associates National Conference, Houston, Texas, 1-800-727-2372

▲ See the MCLT home page at ***http://mishss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

NASA to make news at Oshkosh

NASA will conduct four aeronautics-related news events at the annual Experimental Aircraft Association (EAA) Fly-In Convention in Oshkosh, Wis., Aug. 1-2.

NASA Aeronautics Vision: Aug. 1, 10 a.m., NASA Forum Tent

NASA Administrator Daniel Goldin will outline bold, new objectives to ensure that NASA's work in science and technology sustains U.S. leadership in civil aeronautics and space. Highlighted will be NASA's vision to revitalize general aviation, enabling U.S. industry to deliver 10,000 aircraft annually within 10 years and 20,000 aircraft annually within 20 years.

Student Design Competition: Aug. 1, 10:50 a.m., NASA Forum Tent

NASA and the Federal Aviation Administration (FAA) will present the winners of the third annual NASA/FAA National General Aviation Design Competition. The competition allows university engineering students to participate in a major national effort to rebuild the U.S. general aviation sector. Excited students will learn who takes the top prize.

EAA President Tom Poberezny will announce a new EAA-sponsored "design, build and fly" category for 1998. Goldin and Acting FAA Administrator Barry L. Valentine will present plaques and prize money, and Bruce Landsberg of the Aircraft Owners and Pilots Association's Air Safety Foundation will present a "retrofit" award.

Williams V-JET-II Unveiling: Aug. 1, 1 p.m., EAA West Ramp

An informal news briefing on the West Ramp will introduce an aircraft designed to demonstrate lightweight, quiet and affordable turbofan engine technology for future light aircraft. The Williams International V-JET-II is an outgrowth of the NASA-sponsored General Aviation Propulsion program, aimed at

(see OSHKOSH, page 3)

Around the Agency

Note to recent retirees

Due to a temporary distribution problem, some recent Langley retirees have not been receiving their copies of the *Researcher News*. We are working to fix the problem and regret any inconvenience this may have caused you.

– the Editor

George Washington U. offers degree programs

The George Washington University's School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences at NASA Langley offers the following degrees: master of science, professional and doctor of science in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, and structural engineering and structural dynamics.

Registration dates for the fall semester are Aug. 11-22. For complete course listings and telephone registration procedures, call ext. 41982; e-mail: jiafs@larc.nasa.gov; Fax: ext. 45894.

Equality Day event set

A Women's Equality Day program, Aug. 14, 1-2:30 p.m., in the H.J.E. Reid Conference Center, will feature Hampton Commonwealth's Attorney Linda Curtis, who will address "Creating Partnerships for a Safer City." The event will be combined with the Federal Women's Program Committee annual awards ceremony.

Management analysis courses offered

The Employee Development Branch is offering the following Management Analysis courses, each course building on the previous course:

▲ Introduction to Management Analysis, Aug.18-21, 8:30 a.m.-4 p.m., Peninsula Graduate Center, Room 209

As the first course in the management analysis series, this course covers the fundamental tools of analysis which will allow employees with little or no experience to conduct basic studies.

The course is geared toward management technicians, supervisors, administrative assistants, new management/program analysts and support staff who work with management analysts, with preference given to staff assistants and administrative officers.

▲ Intermediate Management Analysis, Sept. 8-11, 8:30 a.m.-4 p.m., Peninsula Graduate Center, Room 209

The second course in the management analysis series is designed for analysts who need advanced skills to conduct a full management analysis study.

The course is geared toward management analysts, program analysts, management interns, and supervisors and managers who work with management analysts. New analysts should first complete Introduction to Management Analysis.

▲ Advanced Management Analysis, Sept. 23-26, 8:30 a.m.-4 p.m., Peninsula Graduate Center, Room 209

This course will enable experienced analysts to refine their analytical skills by comparing various approaches to organizational problems.

The course is geared toward those experienced in program and management analysis, auditing, and program and project management.

To register, send an Application for On-Site Training (NASA Langley Form 24), one for each course, to DeAnna Lawrence at Mail Stop 309, or fax to ext. 48543. For more information, contact E. Rose W. Mustain, ext. 42571, e.r.mustain@larc.nasa.gov.

Speakers Bureau June activities

Dave Shuster spoke to students in grades 3-5 at the Middle Peninsula Regional Governor's School, in King and Queen County, Va., about space shuttle operations and experiments.

Al Ragsdale visited Smithfield's Blackwater Baptist Association Day Camp to discuss space flight to the moon.

Christine Darden delivered the commencement address at the Technical Career Institute in New York City. Her topic was "Be the Best that You Can Be." She also spoke to students at Hampton's Eaton Middle School about mathematics in aerospace careers.

Melvin Ferebee and Lance Bush addressed the Museum of York County and Winthrop University, both in Rock Hill, S.C., about space flight engineering.

Jane Hogge talked to 5- and 6-year-olds at the Portsmouth Public Library about visiting NASA Langley.

Schauer receives national award

Langley program analyst and former public affairs specialist Catharine Schauer, of the Space Science Support Office, has received a third place award for a public service program from the National Federation of Press Women at its annual conference in St. Paul, Minn.

Her entry, National Engineers Week, showed NASA's public service outreach to local area schools in an effort to promote the value of math, science and communications skills in school-age children.

In memory of John R. Dagenhart

Dr. John Ray Dagenhart, 47, died July 7 in Hampton. He was a research scientist in Langley's Flow Modeling and Control Branch and a Langley employee since 1974. A native of Stony Point, N.C., Dagenhart was a Peninsula resident for 26 years.

"Ray brought an enthusiastic attitude to work every day," said William L. Sellers, branch head. "He was always looking to the horizon for new and exciting ideas. Those ideas and his dynamic and caring personality will be deeply missed."

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

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Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

Photographer . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

SHARP students experience serious summer of science

BY WALT DARDEN

As part of NASA's 1997 Summer High School Apprenticeship Research Program (SHARP), 27 high school students came to work in June at Langley for nine weeks of intensive science and engineering training.

The SHARP Program, which began in 1980, is sponsored by NASA's Educational Affairs Division and participating NASA facilities. SHARP is designed for high school students who have demonstrated an aptitude for and interest in science and engineering careers. Eligible students live within commuting distance of a participating NASA facility, are U.S. citizens and are 16 years old at the time the program begins. The selected students are assigned to work with mentors – NASA scientists or engineers.

As apprentices, the students learn and earn. They participate in an orientation process that provides them with an overview of the NASA facility's mission and the activities necessary to accomplish the facility's goals and objectives.

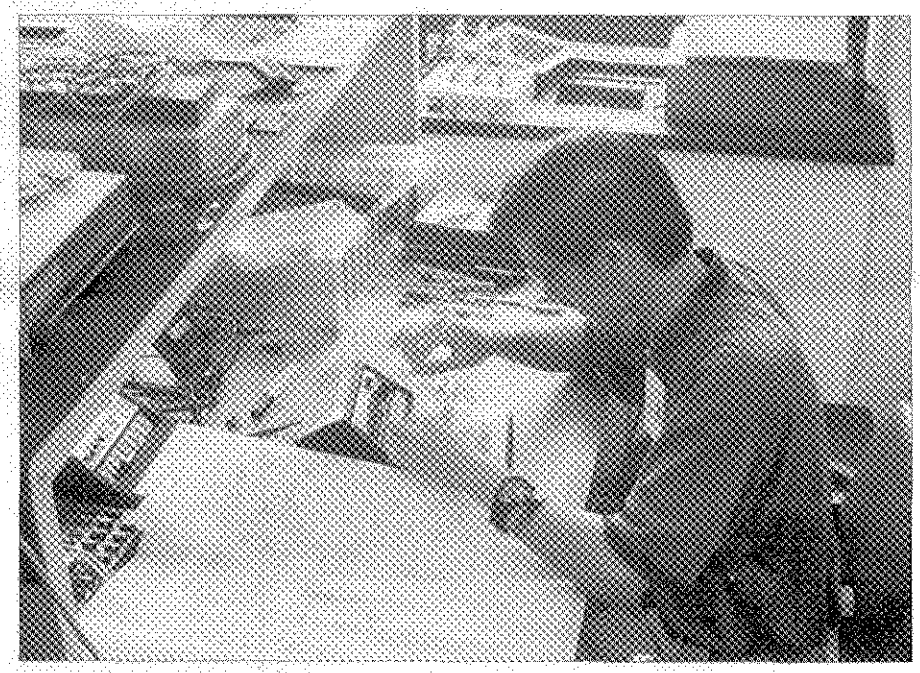
During their apprenticeship, the students complete designated assignments, prepare written reports, make oral presentations and participate in a variety of enrichment activities under the careful supervision of the SHARP program staff and the mentors.

SHARP is a feeder program that is being used to build a resource pool of potential applicants for future NASA employment in the fields of science and engineering. SHARP is specifically designed to attract and serve under-represented individuals in the NASA scientific and engineering workforce. The program provides students with first-hand experience and information that will help them make decisions about a career in science, engineering or mathematics.

Photos by Walt Darden

Darden Sinclair, of Bayside High School in Virginia Beach, changes carbon samples from a dry cycle to a wet cycle. The specimens are being tested for moisture gain and tolerance of extreme temperatures. Sinclair is working in the Structures Materials Research Support Branch this summer.

Viva Miller, a Norfolk Academy student who is working in the Materials and Flight Research Support Branch, begins an experiment on the stress-and-strain machine, which measures the cracking point of airplane parts used in passenger planes such as the Boeing 737.



Christopher Ramiro, a student at Catholic High School in Virginia Beach, constructs a circuit which digitizes analog data and holds it in a first-in, first-out buffer. Ramiro is working in the Acoustics Optical and Chemical Measurement Branch.

OSHKOSH

(continued from page 2)

revitalizing general aviation. By agreement, the company will perform engine development work that results in a next-generation demonstrator turbofan that will power the V-JET-II in demonstrations by the year 2000. Participants include Goldin and Dr. Sam Williams.

General Aviation News: Aug. 2, 11 a.m., EAA Press Tent

The NASA and FAA General Aviation Research and Development Media Briefing will include:

- A new FAA-led flight training curricula effort
- Technology breakthroughs in crash survivability and in quiet, efficient propeller design
- The national aviation safety initiative
- An update on the FAA's Flight 2000 "free flight" demonstration.

Bob Whitehead, NASA associate administrator for aeronautics, and Guy Gardner, FAA associate administrator for regulation and certification, will participate.

Langley produces another shuttle astronaut

BY NICOLE FOREST

Former Langley scientist Dr. Stephen Robinson will fulfill his dream of going into space on his first shuttle mission, Aug. 7. Robinson, a member of Discovery's STS-85 flight, was chosen as a civilian mission specialist for the 11-day mission set to study changes in the Earth's atmosphere.

The sixth shuttle flight of 1997 is targeted for a variety of mission objectives, according to Kennedy Space Center officials. Activities will include the deployment and retrieval of the Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere Shuttle Pallet Satellite payload. This experiment will use three telescopes and four spectrometers to measure infrared radiation emitted by the Earth's middle atmosphere in support of NASA's Mission to Planet Earth enterprise, a long-term, coordinated research effort to study the Earth as a global system.

A preview of future International Space Station operations will be seen aboard the shuttle with tests of the Japanese Manipulator Flight Demonstration robotic arm, along with other items. Discovery will also carry groupings of independent science experiments flying as part of either the Technology Applications and Science or the International Extreme Ultraviolet Hitchhiker payloads that will conduct research on astronomy, Earth sciences, life sciences, and materials sciences.

Robinson will join Pilot Jeffrey S. Ashby; mission specialists, N. Jan Davis, Ph.D. and Robert L. Curbeam; and Payload Specialist Bjarni V. Tryggvason.

Prior to selection as an astronaut, assigned to Shuttle Avionics Integration Laboratory for the Astronaut Office Computer Support Branch, Robinson was a Langley research scientist for four years.

Steve Robinson

In 1990, he was selected as chief of the Experimental Flow Physics Branch with responsibility for eight wind tunnels and an engineering staff engaged in aerodynamics and fluids research.

In 1993, Robinson was awarded the NASA/Space Club G.M. Low Memorial Engineering Fellowship, and was assigned to Massachusetts Institute of Technology as visiting engineer in the Man Vehicle Laboratory, where he conducted research on astronauts on the Spacelab Life Sciences 2 Shuttle Mission (STS-58).

Robinson returned to Langley in 1994, where he served as both research scientist in the Multidisciplinary Design Optimization Branch and as a leader of the Aerodynamics and Acoustics element of NASA's General Aviation Technology Program. In December of 1994, he was selected as a member of the astronaut training program. He was named to the astronaut class of 1995 after a year of training and evaluation.

Center of attention

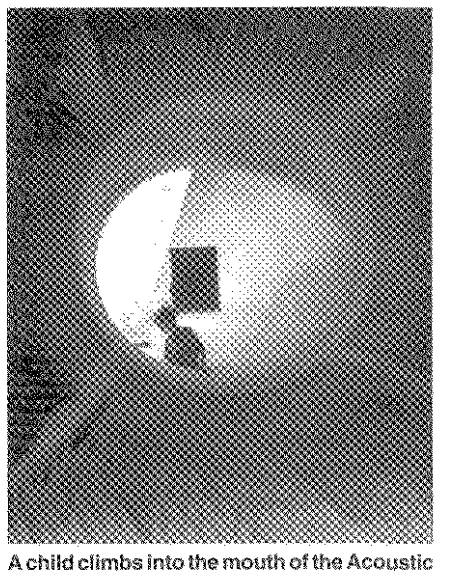
NASA Langley's 80th anniversary Open House celebration on July 19 brought thousands of curious area residents out to get a close-up look at some of the goings-on behind the center's normally restricted gates. Some were spurred by the currently hot topic of outer space exploration; others took advantage of a chance to educate themselves and their kids on what NASA and Langley Research Center are all about.

The hot, humid day didn't slow down the crowd of 16,000-plus as they wandered throughout the center grounds to see the latest in Langley-developed technology. Officials declared the event a big success, thanks in large part to all who volunteered to man the exhibits and to attend to the huge numbers of visitors.

Adults as well as children were overwhelmed by the space-age technology on display. NASA engineers and scientists dazzled the visitors with real-time flight simulations and demonstrations of wind tunnel models being cut from solid pieces of metal. And everyone wanted to see a real astronaut; astronaut candidate and former Langley researcher Charlie Camarda signed more than 2,000 photos in four hours. (See photo, page 6.)

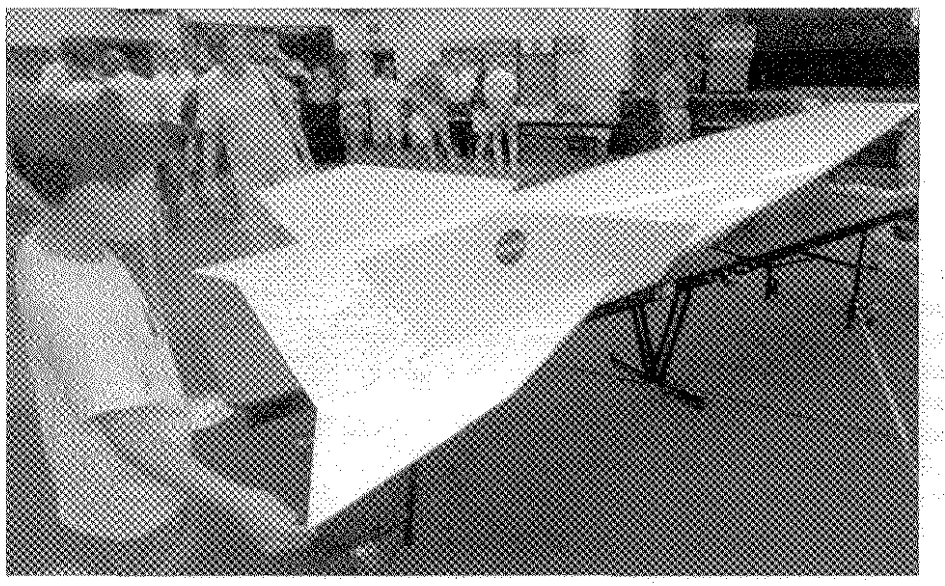
Since every facility had a different demonstration or display, visitors – even families with small children – were intrigued to try to visit them all.

Photos by Jeff Caplan

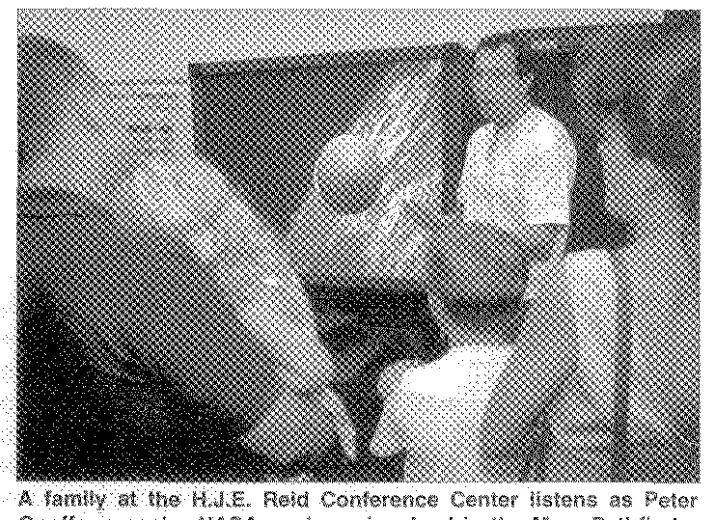


A child climbs into the mouth of the Acoustic Research Lab Facility to check out the place from which radio waves are transmitted.

Lines of visitors wind through the tarmac to get a glimpse of Langley's 737 Flying Laboratory.

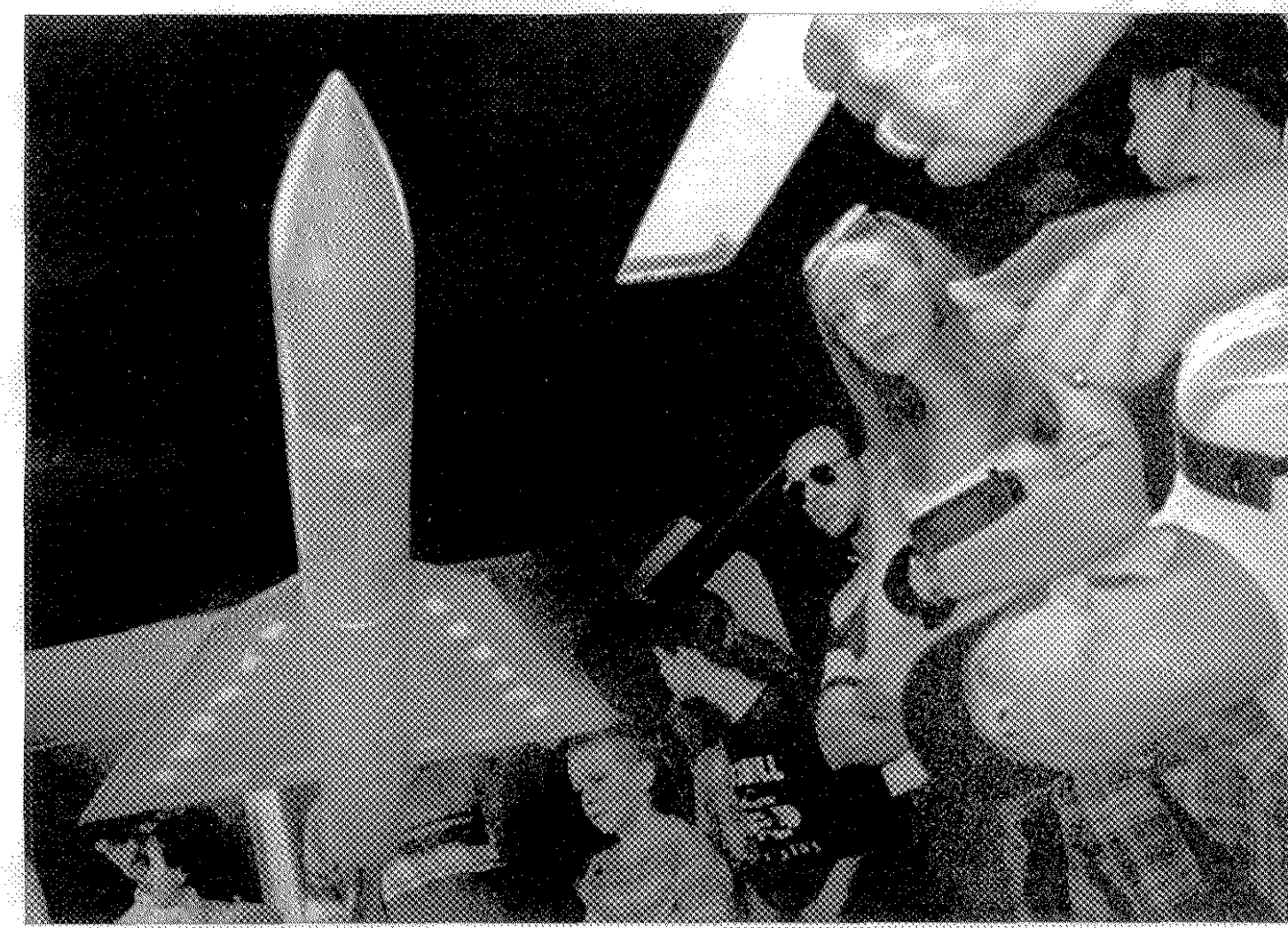


Richard Dhang, 10, of Yorktown, runs his hand along the smooth metal of a full-scale model of the Hyper-X aircraft, on display at the H.J.E. Reid Conference Center. The plane is designed to fly up to 10 times the speed of sound and will demonstrate "air-breathing" engine technology.

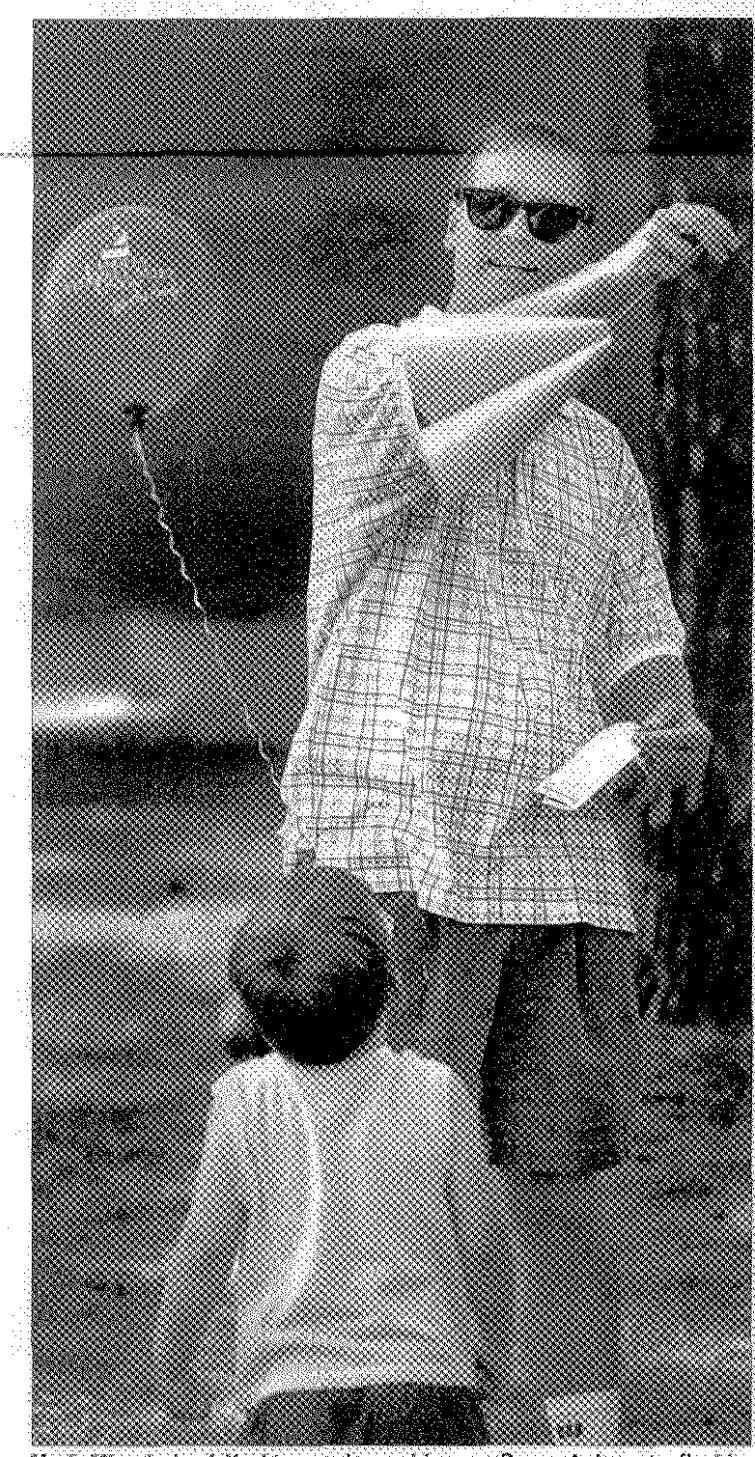


A family at the H.J.E. Reid Conference Center listens as Peter Gnoffo, a senior NASA engineer involved in the Mars Pathfinder mission, explains the center's contribution to the project. A video animation of the Mars landing plays on the screen behind him.

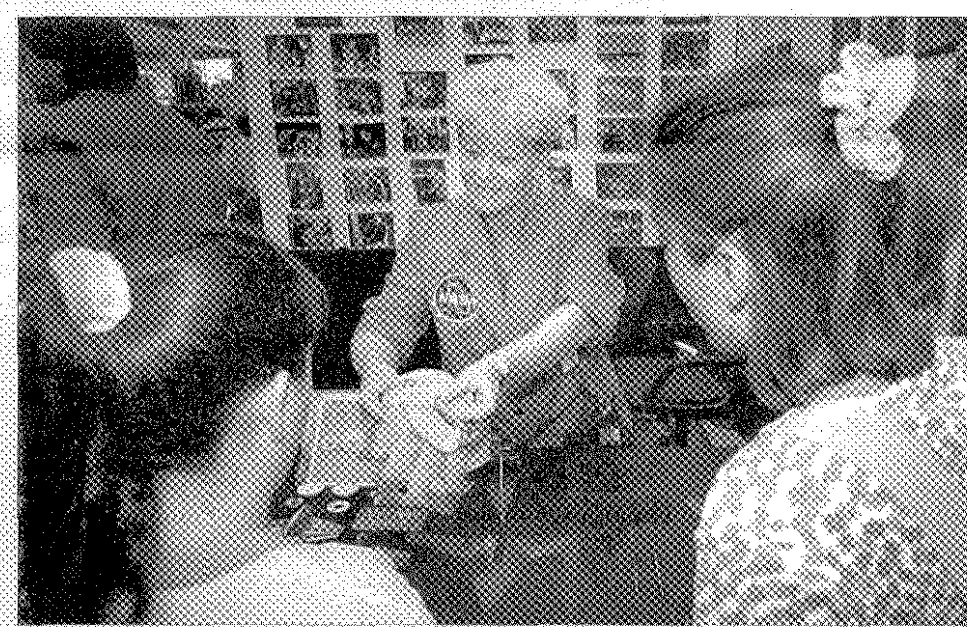
Open House Celebration



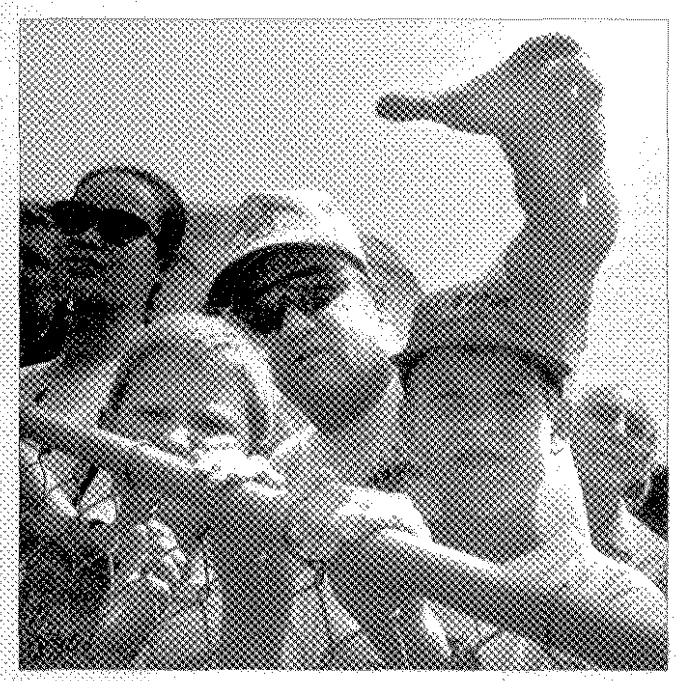
New Yorker Jake DeVries, 21, gets a closer look at a model in the High-Speed 7- by 10-Foot Wind Tunnel. Tours included a walk through the tunnel to see the fan blades, as well as an explanation of how the tunnel was used.



Mark Mierchuk of Yorktown shows his son Sean, 4, how to fly his "Flying None." The plane consists of only a single piece of paper, a string and a small piece of tape.



Kathy Kuykendoll, an engineering technician at the Advanced Aerospace Fabrication Facility, shows an astronaut's glove to Misty Gunzinger, right, and Katie Rodrigus, both of Seaford.



John Ford Davis of Virginia Beach explains to his stepsons, 12-year-old Bryan Recktonwald, right, and Phillip Giessner, 9, how a tire is tested at the Aircraft Landing Dynamics Facility.

AdVentures

FOR RENT: York/Grafton Woods house, 3BR, 2 baths, 1,500 sq. ft., no pets, available Sept. 1, $850/month. Call 890-2972.

FOR RENT: Large house in downtown Hampton, 4 BR, 2.5 baths, 2 full kitchens (great for roommates), 2-car garage, pets OK, must see to appreciate; $800/month. Call 727-9067 and leave a message.

FOR RENT or rent-to-own: Willow Green North townhouse, 2 BR, 2.5 baths, washer/dryer hookup, fenced yard, storage shed, pool; $600/month. Call 599-0649.

FOR SALE: 1987 blue Chevy Cavalier, automatic transmission, less than 100,000 miles, runs well. $575 or best offer. Call 838-0308 and leave message.

FOR SALE: Quantex IBM-compatible PC, 486DX2/66, 16MB RAM, SBW32 sound, 6X CD; 2 hard drives - 1.2GB, 320KB; 28.8 modem; 3.5/5.25 floppy drives; joystick; more. HP550C color printer, $1,250 for both. Call 456-2775.

FOR SALE: Precious Moments collectibles, Sugar Town Collection - Chapel Nite Light Set, $475; Sam's House Nite Light Set, $250; Doctor's Office Nite Light Set, $225. Prices are negotiable. Call 877-5748 after 5 p.m.

FOR SALE: 1970s comic book collection in individual protective sleeves, in near-mint or mint condition. Valued at $1,500; asking $1,000. Call 877-5748 after 5 p.m.

FOR SALE: Bowman Series football cards - 1953 Otto Graham, 1954 George Blanda, 1954 Frank Gifford; all in mint condition. $400. Call 877-5748 after 5 p.m.

FOR SALE: Coca-Cola sign, "Drink Coca-Cola Fountain Service," metal, 12 inches by 28 inches. $350. Call 877-5748 after 5 p.m.

FOR SALE: Star Wars cards, original issues from all three movies, 19 sets, including many stickers. $400. Call 877-5748 after 5 p.m.

FOR SALE: Limited edition (400) Civil War prints by D. Spalding - "Honor Answering Honor" and "Countrymen Again," commemorating the end of the Civil War; double mat (blue/gray), cherry frame, mint condition. $600. Call 490-1238.

MOTORING AROUND LANGLEY: The Virginia Air & Space Center in Hampton offers guided motor tours of NASA Langley and Langley Air Force Base through Sept. 1, Monday-Saturday, 10:30 a.m. and 1:30 p.m.; Sunday, 1:30 p.m. $4 with VASC admission ticket. For more information, call 727-0900.

JUST LIKE 'TWISTER': The Virginia Air & Space Center presents the 1995 IMAX film ***Stormchasers***, beginning this week, daily at noon and 2 p.m.; Thursdays-Sundays as a double feature with ***Super Speedway*** at 7 p.m.; Friday and Saturday at 7 and 9 p.m. ***Stormchasers*** follows weather experts around the planet as they explore tornadoes, hurricanes, lightning, blizzards and monsoons. Actor Hal Holbrook narrates the film. The VASC also offers the following IMAX films, showing throughout the summer: ***To the Limit***, through Sept. 3, daily at 1 p.m.; ***Cosmic Voyage***, through Sept. 3, daily at 11 a.m. and 3 p.m.; ***Titanica***, through Sept. 3, 5 p.m., Thursday-Sunday; ***Ring of Fire***, through Sept. 3, shown as a double feature with ***Super Speedway***, 7 p.m., Thursday-Sunday, and 9 p.m., Friday and Saturday; ***Grand Canyon: The Hidden Secrets***, through Sept. 30, daily at 1 p.m. IMAX admission is $5.50 for adults; $4.50 for NASA, military, seniors and children under 12; double feature admission is $8 for adults and $7.50 for NASA, military, seniors and children under 12. For more information, call 727-0900.

PH.D. PARTY: Friends and coworkers of Dr. Ralph D. Buehrle are invited to help him celebrate receiving his Ph.D. degree, Aug. 6, 4:30-5:30 p.m., at the H.J.E. Reid Conference Center. Refreshments will be provided. For more information, call George Whitehurst at ext. 47147.

LAA CARNIVAL IS COMING: The Langley Activities Association's annual summer carnival is Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with activities for the whole family. For more information or to volunteer, call ext. 46369.

CARNIVAL VOLUNTEERS: The LAA Carnival needs volunteers to help with the casino game, "The Dice Throw." Call retiree Sam Sokol at 826-7171.

SIDE OUT: As part of the Langley Activities Association carnival, the NASA Volleyball Club will sponsor a "co-ed fours" volleyball tournament on Aug. 23. $20 per team. To reserve a spot, submit roster forms (available at gym) and checks (payable to LAA) to Dave Rosenbaum at Mail Stop 488 by Aug. 15. For more information, contact Dave Rosenbaum, ext. 41800, d.m.rosenbaum@larc.nasa.gov, or Tom Britton, ext. 46619, t.c.britton@larc.nasa.gov.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, contact jrrjr@icase.edu or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

MUSICAL DUO: The Williamsburg Regional Library presents Paul Reisler and Cecil Hooker of the acclaimed "chamber-folk" acoustic ensemble, Trapezoid, Aug. 31, 8 p.m., at the Williamsburg Library Theatre. Tickets are $10. For reservations or more information, call 229-4198.

Photo by Jeff Caplan

MEMORY MONTAGE -- During Langley's Open House July 19, astronaut candidate and former Langley researcher Charlie Camarda reacts to an older photo of himself on a poster that Jeane Kurtz of NCI Information Systems, Inc., made for him. The poster is a collection of photos of people Camarda worked with throughout more than 20 years of service here. Kurtz was his illustrator for 11 years.

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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

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 16 ❖ August 15, 1997

New ozone instruments to be launched from White Sands

BY NICOLE FOREST

As the space shuttle Discovery streaked across the New Mexico sky in early August, a rocket was scheduled to be launched from the White Sands Missile Range below to carry several instruments for measuring ozone high in the Earth's atmosphere. The measurements will be compared with data derived from two instruments released into orbit from Discovery's payload bay.

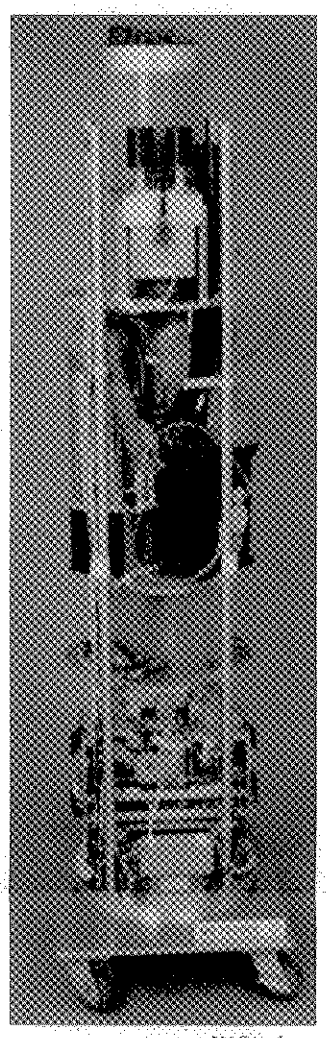
The Mesosphere-Thermosphere Emissions for Ozone Remote Sensing (METEORS) experiment will be carried to an altitude of 72 miles over the New Mexico desert by a Black Brant sounding rocket. The numerous METEORS instruments will use four independent techniques to measure ozone in the Earth's upper atmosphere. Two experiments aboard the space shuttle will observe ozone, temperature and other chemical species at the same time, but from different angles.

"This experiment is unique in that it is the first time, to my knowledge, that four independent techniques of measuring ozone in the mesosphere and lower thermosphere have ever been used together in the same air mass," said Langley research scientist Dr. Marty Mlynczak, principal investigator of the METEORS project. "It gives us an excellent opportunity not only to measure the ozone abundance in this region [of the atmosphere] but to conduct a critical comparison of the techniques themselves."

The METEORS instruments will be carried in the top portion of the Black Brant rocket and will begin measurements at an altitude of approximately 30 miles, after the nose cone is deployed. The METEORS instruments will make measurements between the altitudes of 30 and 60 miles – the Earth's mesosphere and lower thermosphere – both on the way up and on the way down. The entire METEORS flight from launch to parachute-assisted landing will last about six minutes.

"Mesospheric ozone is difficult to measure," Mlynczak said. "There is still a long-standing discrepancy between the amount of ozone measured in the mesosphere and that which we predict from chemicals models. The METEORS measurements, coupled with other chemical measurements from the [shuttle] payloads, will add to our understanding of the ozone chemistry of the mesosphere."

METEORS will measure infrared emissions on molecular oxygen at two different wavelengths and infrared emission from ozone at a third wavelength. Absorption of ultraviolet radiation by ozone will be measured, allowing scientists to determine ozone abundance. These measurements provide both direct and indirect measures of the ozone abundance in the high atmosphere. In addition, two small rockets will be launched, one prior to and one after the METEORS launch, to measure temperatures in the mesosphere and lower thermosphere.



NASA photo

The METEORS experiment was scheduled to launch Aug. 8 from New Mexico's White Sands Missile Range.

"METEORS is a pathfinding mission to an upcoming NASA satellite experiment called TIMED – Thermosphere Ionosphere Mesosphere Energetics and Dynamics," Mlynczak said.

Three of the four techniques being tested by METEORS will be used in less than three years aboard the TIMED satellite, which will enable scientists to begin long-term studies of the Earth's upper atmosphere. NASA Langley scientists will contribute one of the instruments aboard that satellite, Mlynczak said.

NASA Langley is leading the METEORS experiment, coordinating the science team activities, and defining the scientific purpose of the mission, the overall goals, the measurements and the instrumentation. The METEORS science team is composed of several university-affiliated research laboratories, including Utah State and Johns Hopkins Applied Physics Laboratory, plus NASA centers and private companies.

Colloquium Communiqué

Safety to remain universal concern of worldwide airlines into next century

Dutchman Karel Ledeboer, director of operations & infrastructure for the International Air Transport Association (IATA), will deliver the September edition of Langley's colloquium lecture series, Sept. 10, 2 p.m., in the H.J.E. Reid Conference Center. Ledeboer will discuss "The Technological Needs of Airlines in the 21st Century."

The operations committee of the IATA is composed of 30 senior representatives from the engineering, maintenance, and flight operations areas of the association's member airlines.

Karel Ledeboer

The group recently defined the technological needs of the airlines for successful operations in the next century, and divided those needs into these eight areas, all of which include safety concerns: aircraft and engine construction materials; aircraft size; avionics, including future antenna construction and design; maintenance – easing, reducing, eliminating, managing; operating costs; propulsion and fuel, including noise and emissions; security; and training.

Ledeboer will discuss the airlines' views on each of these topics, as well as the three conclusions reached so far – that commercial aviation must reach an even higher level of safety than today; that operating costs must continue to decrease; and that the impact on the environment must be minimized.

FYI

What: Langley Colloquium Lecture "The Technological Needs of Airlines in the 21st Century" Karel Ledeboer
When: Sept. 10, 2 p.m.
Where: H.J.E. Reid Conference Center

Ledeboer, an aeronautical engineer, worked for KLM Royal Dutch Airlines for 33 years, most recently as executive vice president for operations. He joined IATA in 1994.

Sigma Series Lecture

Langley scientist traces Mars evolutionary path

Cold, lifeless planet still a red-hot topic

Senior Langley researcher Joel Levine will discuss "The Early History and Evolution of Mars" in a Sigma Series lecture, Sept. 9, 7:30 p.m., at the Virginia Air & Space Center in Hampton.

Although Mars and Earth formed at the same time, from the same material, in the same general area of the solar system, the evolution of these two planets took divergent paths. Today, Mars appears to be a cold, dry, inhospitable and lifeless planet. But in its earlier history, Mars may have been warmer, wetter and abundant with various forms of life. This view recently gained support with the surprising discovery that meteorites from Mars may contain evidence of early life on the Red Planet.

Two NASA spacecraft are traveling to Mars for the first time since the successful Viking Project of 1976, which was planned and managed at Langley. The Mars Global Surveyor will conduct an orbital survey of the surface of Mars, and the Mars Pathfinder landed on Mars and released a mobile robot for surface exploration. These two missions may provide valuable new information to help unravel the mystery of the strange evolution of planet Mars.

Joel Levine

Levine is a research scientist in the Atmospheric Sciences Division. He has conducted and published research on the origin and evolution of the atmospheres of the planets, atmospheric chemistry, global burning and global change. He has written and hosted several Public Broadcasting System television programs on the planets, including the "Life in the Cosmos" and "Mission Earth-Bound" series.

FYI

What: Sigma Series Lecture "The Early History and Evolution of Mars" Dr. Joel Levine
When: Sept. 9, 7:30 p.m.
Where: Virginia Air & Space Center 600 Settlers Landing Rd. Downtown Hampton
Info: 727-0900

News Briefs

Around the Agency

REVOLUTIONARY NEW AIRCRAFT DEBUTS AT OSHKOSH – (Lewis Research Center, Cleveland, Ohio)The V-JET II, an all-composite, turbofan-powered light aircraft designed for future flight testing of modern turbofan engines, made its debut at the annual Experimental Aircraft Association (EAA) Fly-In and Convention early this month at Oshkosh, Wis. Intended for use in NASA's General Aviation Propulsion program, the aircraft will flight-demonstrate breakthrough, low-cost turbine-engine propulsion systems for light, general aviation aircraft with cruising speeds above 200 knots.

FARTHEST GALAXY IN THE UNIVERSE DISCOVERED – (Goddard Space Flight Center, Greenbelt, Md.) An international team of astronomers has discovered the most distant galaxy found in the universe to date, by combining the uniquely sharp images from NASA's Hubble Space Telescope with the light-collecting power of the W.M. Keck Telescopes – supplemented by a gravitational lens in space. The results show the young galaxy is as far as 13 billion light years from us, based on an estimated age for the universe of approximately 14 billion years.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

Day of Caring offers two ways to participate

Langley will join other community-minded organizations to sponsor the 1997 Community Day of Caring, Sept. 4.

Last year, the Day of Caring mobilized nearly 700 workers from area businesses and federal facilities. Volunteers painted, planted and even built playgrounds for children and houses for families. They offered their skills in plumbing, electrical work, air conditioning, landscaping, carpentry and computer projects. They also did general clean-up, fix-up chores, helped with day camps and stocked food pantries.

To participate this year, civil service employees should contact Nancy Finn at ext. 46528 or at n.m.finn@larc.nasa.gov for a volunteer form. The first 150 Langley employees to register will be granted up to 8 hours of administrative leave.

Contractors who wish to participate should contact their corporate office. Retirees also are invited to participate.

Langley will also participate in the Day of Caring's "School Tools" initiative, co-sponsored by the Office of Public Services and the cafeteria. Center employees are encouraged to purchase school supplies and to drop them in the boxes provided in the cafeteria and in the AeroDyner.

On the Day of Caring, the donated items will be packaged and delivered to area schools for distribution to needy children on the Peninsula.

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "Our goal is a technically strong, fiercely competitive and fully diverse workforce. We recognize that the future quality of our bench strength will determine our future success. In attaining both goals, recruitment and retention of minority scientists is crucial." – Jean Jackson-Swopes, Abbott Laboratories

▲ Aug. 18-23 – Blacks In Government (BIG) National Training Conference, Washington, D.C. (202) 667-3280

▲ Aug. 26 – Women's Equality Day

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Oshkosh roundup

Light plane technologies advance on broad front

NASA NEWS RELEASE

Three years after the government and the U.S. light plane industry made a pact to revitalize general aviation in this country, leaders of the Advanced General Aviation Transport Experiment (AGATE) Alliance report impressive progress. AGATE partners are working to make airplanes as easy to operate as cars.

"These advances were made possible by investments in new technologies for general aviation and by investments in technologies for air traffic modernization and aviation safety, from which general aviation will greatly benefit," said Dr. Robert Whitehead, NASA's associate administrator for aeronautics, at a joint NASA, Federal Aviation Administration (FAA) and U.S. industry news briefing held earlier this month at the Experimental Aircraft Association Annual Fly-In and Convention, Oshkosh, Wis.

NASA Administrator Daniel Goldin also participated in the event, outlining the agency's aeronautics vision for the future and presenting the winners of the third annual NASA/FAA National General Aviation Design Competition.

Design competition first-place winner

The first-place design award went to a student team from three Kansas universities: the University of Kansas, Wichita State University and Kansas State University. The team's design offers a four-passenger kit plane "for the pilot with limited resources."

The design claims payload, range, cruise velocity, take-off and landing field lengths, rate of climb, and handling qualities comparable to a Cessna 172R for about half the cost, or $75,000.

The competition allows university students to participate in a major national effort to rebuild the U.S. general aviation sector.

Pilot training curriculum development team

The FAA has selected a team led by Embry Riddle Aeronautical University to develop a revolutionary training curriculum that could cut the cost of obtaining an instrument rating for non-pilots by as much as 25 percent. The team will also develop learning modules for glass cockpit multifunction displays and single-lever power control systems.

In the next few years, these products will be integrated into

(see AGATE, page 3)

Announcements

Travel contract awarded

American Express Travel Services will replace Omega World Travel here at Langley, effective Sept. 1. American Express will hold two 90-minute orientations, Aug. 19, 10 a.m. and 1 p.m., in the H.J.E. Reid Conference Center, covering the company, its services and programs. For more information, call Gary Lofswold at ext. 42079.

Tech Forum topics set

The next Langley Technical Forum, Aug. 20, 10 a.m.-noon, in the Pearl Young Theater, will cover these topics:

▲ Measurements of Tropospheric Ozone and Other Pollutants from Space Using a Geostationary Platform: A New Capability for a New Millennium – *Doreen O. Neil*

▲ Development of Pulsed Planar Doppler Velocimetry – *Michael W. Smith*

▲ Long-Term Durability of Polymeric Composites for Application to High-Speed Civil Transport – *Thomas S. Gates*

▲ Microgravity Crystal Growth of Alloy Compound Semiconductors – *Archie Fripp*

▲ Preconditioning Methods for Low-Speed Flows – *Veer N. Vatsa, Eli Turkel*

Career workshops set

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars:

▲ "Life After NASA – What Will I Do Next?" Aug. 20, 1-4 p.m.

▲ "Making Yourself Indispensable at Work," Aug. 27, 1-4 p.m.

▲ "Effective Communication Between Engineers and Technicians," Sept. 4, 9 a.m.-noon

▲ "Networking for Career Development," Sept. 16, 1-4 p.m.

▲ "Conflict Management – Aggressive, Assertive or Passive?" Sept. 25, 8:30 a.m.-noon

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

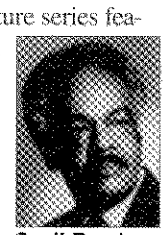
GWU degree programs

The George Washington University's School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences at NASA Langley offers the following degrees: master of science, professional and doctor of science in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, and structures and dynamics.

Fall registration continues through Aug. 22. For course listings and telephone registration, call ext. 41982; e-mail: jiafs@larc.nasa.gov; fax: ext. 45894.

Iowa legislator to speak

The second seminar in the multicultural lecture series features Cecil Reed, an Iowa legislator, businessman, entrepreneur, author and lecturer, Aug. 27, 1:30-2:30 p.m., at the H.J.E. Reid Conference Center. His topic will be "Getting the Best Out of People: Care Enough To Make a Difference."



Cecil Reed

Author of *A Fly in the Buttermilk*, Reed was Iowa's first black Republican state representative and the first black to preside over the Iowa House of Representatives. He was also the first black commissioner in the United States.

His lectures are designed to motivate anyone in government to become more aggressive and dedicated to the task at hand.

Langley's Multicultural Leadership Team sponsors the event, and all employees are invited to attend. Charge time to J.O. A5006.

Bond winners named

Langley's payroll office recently held a drawing for two free $100 U.S. savings bonds at the conclusion of the center's bond campaign. Charles E. Harris won for bond increase, and Benjamin M. Copeland won for new bond allotment.

OEOP goes on line

The Office of Equal Opportunity Programs has a Web site at ***http://oeop.larc.nasa.gov***. The site details the laws and regulations governing its charter, staff assignments, special-emphasis programs/committees, and the EO counseling program for employee concerns.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

Photographer . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Public Inquiry Center stores wealth of information

BY HEATHER NEWBILL

Like an undiscovered treasure chest, NASA Langley's Public Inquiry Center (PIC) holds a wealth of information and resources.

The lone bearer of the treasure map is Jeane Shanks, public inquiry specialist and manager of the PIC, who can aid information seekers in finding sources and materials. More often than not, Shanks succeeds in helping people realize their informational goals.

Langley's "Answer Lady" daily aids students in homework projects and engineers in enhancing presentations. The PIC also distributes NASA information to the general public, specifically within Langley's five-state region – Kentucky, North Carolina, South Carolina, Virginia and West Virginia – as well as throughout the country and all over the world.

Many of the center's inquiries are from school-aged children who want to learn more about aerospace exploration. Information from NASA supplements their imaginations with facts.

The PIC also supports the Educator Resource Center at the Virginia Air & Space Center and seven regional educator resource centers. Educators can use these facilities and the PIC as information sources and as resources for lesson plans designed for students from preschool level through high school.

The Public Inquiry Center is located in the lower level of Building 1153. It stores resources to help employees and other inquirers to prepare and augment presentations, lectures or educational lessons.

In addition to numerous printed materials, the PIC also provides lithographs, posters and videos. On a first-come, first-served basis, Langley employees may borrow airplane and shuttle models, aerospace exhibits, a blue flight suit or even space toys.

Additionally, the PIC maintains various materials on astronomy, earth science, life science and technology. And if the center does not have certain requested information, Shanks will seek it from other sources.

With only two part-time volunteers, Gladys Hardrath and Mary Levin, the PIC works continuously to answer nearly 6,300 requests and to distribute some 330,000 publications annually. With a local Web site ***(http://oea.larc.nasa.gov/Public_Inquiry.html)*** and a national Web page in progress, the PIC will be able to increase substantially the scope of its outreach in the future.

To request information, contact the Public Inquiry Center at ext. 43293, fax to ext. 48810, or e-mail to pic@larc.nasa.gov. Walk-in hours are Monday-Friday, 8:30 a.m.-4 p.m. The mailing address is NASA Langley Research Center, Mail Stop 146, Hampton, Va. 23681-0001.

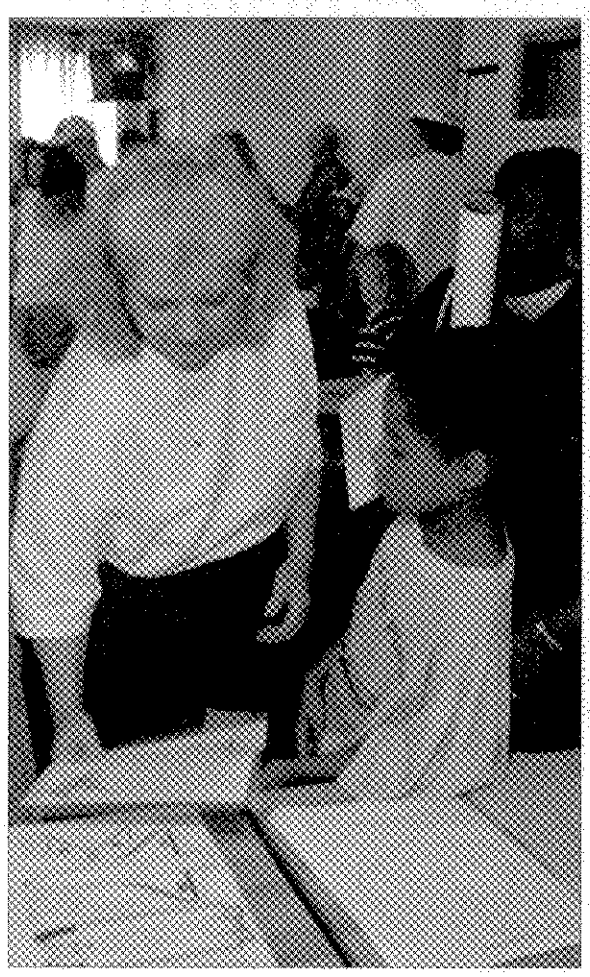


Photo by Jeff Caplan

Jeane Shanks, manager of the Public Inquiry Center, assists inquiring minds – of all ages – during NASA Langley's recent 80th anniversary Open House celebration. Visitors to the center picked up some 17,000 items from the Public Inquiry Center display during the seven-hour Open House event.

PIC Resources

Bookmarks
Exhibits
Fact Sheets
Flight Suit
Handouts
Lesson Plans
Lithographs
Model Kits
Models
Pamphlets
Posters
Slides
Space Toys
Tapes
Videos
Workbooks

Subject Matters

Aeronautics
Apollo
Astronomy
Astrophysics
Careers
Earth Sciences
General Science
Life Sciences
Rockets
Satellites
Space - Hubble
Space Shuttle
Space Station
Technology Transfer

NASA budget for FY 1998 awaits September conference resolution

BY LEE RICH
Congressional Affairs Officer

Both the House of Representatives (HR 2158) and the Senate (S 1034) have passed a $90 billion Veterans Administration, Housing and Urban Development and Independent Agencies (including NASA) Appropriations bill for fiscal year 1998.

A House-Senate conference to resolve the differences between the two bills – including the $148 million difference for NASA – is set for early September when Congress reconvenes following the August recess. Upon adoption of the conference report by both House and Senate, the final bill will go to the president for his signature before Oct. 1, the start of the new fiscal year. The measure has drawn little controversy this year, and signing seems assured.

NASA FY 1998 Appropriations (in millions)

VA-HUD-Independent Agencies Appropriations Bills for Fiscal Year 1998

	FY 1997 Public Law	FY 1998 Request	As passed by the House (HR 2158) 7-16-97	As passed by the Senate (S1034) 7-23-97
Human Space Flight	$5,674.8	$5,326.5	$5,426.5	$5,326.5
Science, Aeronautics and Technology	5,453.1	5,642.0	5,690.0	5,642.0
Mission Support	2,564.3	2,513.2	2,513.2	2,513.2
Inspector General	17.0	18.3	18.3	18.3
Total Budget Authority	**$13,709.2**	**$13,5000.0**	**$13,648.0**	**$13,500.0**

AGATE

(continued from page 2)

training methods for the complete AGATE glass cockpit.

Single-lever power control

Single-lever power control works much like the accelerator pedal in an automobile, by replacing the complex system of control levers and gauges with a single lever and single display.

The first successfully flown electronic single-lever power control for air-cooled engines was on board Aurora Flight Sciences' modified Cessna 02-A. The Manassas, Va., company developed its power controller under NASA's Small Business Innovation Research Program. NASA's Lewis Research Center, Cleveland, Ohio, manages the development of guidelines, standards and certification methods for engine controls and diagnostics.

Advantages of single-lever power control systems include increased engine performance and fuel efficiency and reduced pilot workload.

Occupants survive crash test

A NASA Small Business Innovation Research Program contractor successfully crash-tested a small airplane designed to protect occupants against fatal injuries using airbags and energy-absorbing composite structures.

Terry Engineering, Wichita, Kan. – along with NASA Langley and Cirrus Design Corp., Duluth, Minn. – has crash-tested four airplanes over a two-year period. The tests also successfully demonstrated an improved shoulder harness system and energy-absorbing seats.

The program aimed to apply the techniques to improve survivability in crashes of small composite airplanes, as well as to reduce injury severity in survivable crashes. In the final crash test, all of the crash dummies on board "survived" the crash, a first for general aviation crash tests.

Affordable datalink radio

An AGATE Alliance member company has successfully demonstrated a digital datalink radio using affordable technologies for retrofit as well as future general aviation aircraft.

The high bandwidth software-based digital radio, developed by NavRadio Corp., Denver, Colo., may quickly communicate weather, clearance, flight planning, maintenance and other data. Datalink radios may help to reduce weather-related general aviation accidents, the leading cause of light plane fatalities today.

New propeller innovation

An advanced "quasi-constant speed" propeller, made of space-age composite materials, may be the first major improvement in fixed-pitch propellers for light planes since the 1930s.

As part of its work in the AGATE Integrated Design & Manufacturing Work Package, Global Aircraft, Starkville, Miss., designed and developed a composite quasi-constant speed propeller which is more efficient and quieter than current metalpropellers and is suitable for a typical 150-180 horsepower general aviation engine.

NASA, Boeing demonstrate new composites technology

BY MEGHAN WOODCOCK

NASA and Boeing demonstrated a new composites manufacturing method Aug. 13 that is expected to revolutionize the way aircraft wing structures are fabricated. By replacing the metal wing structures on airplanes with composite materials, the aeronautics industry is hoping for large savings on both weight and production costs. The improved structural efficiency and production savings should directly translate into lower airfares for the public in the near future.

The event took place in Huntington Beach, Calif., at the new Boeing Stitched Composites Development Center. Langley's Doug Dwoyer, director for the Research and Technology Group, and retiree John Davis, former head of the Advanced Composites Technology (ACT) program, presented remarks on the ACT program and the stitching machine.

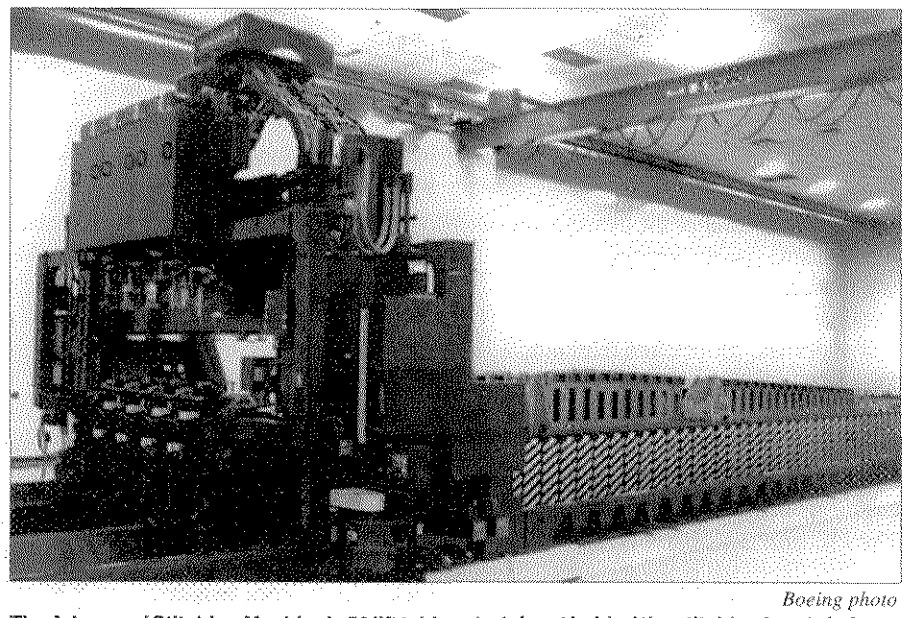
Inside the center, NASA's Advanced Stitching Machine (ASM) demonstrated its function in the new stitched/resin film infusion composites manufacturing process.

Dedication to Langley retiree

Boeing dedicated their composites development center to NASA Langley retiree Marvin B. Dow for his invaluable work on the development of the ASM. He is the first NASA employee honored in the naming of a corporate facility. Dow's son, Dr. Steven W. Dow, presented remarks on behalf of his father.

The stitching machine

The stitching machine, designed and built under the ACT program, sews together pre-cut knitted fabric layers at a rate of 3,200 stitches per minute, forming the shape of the wing. After the fabric pieces are stitched together, the ASM sews on braided stiffener materials to add to the wing's strength. Once stitching is complete, the still-flexible wing is set with resin using the resin film infusion process.



Boeing photo

The Advanced Stitching Machine's 50 lift tables stretch out behind the stitching heads in front.

The cover panels for a 41-by-8-foot wing section are currently being stitched on the ASM and will be used as test articles in Langley's Structures and Materials Laboratory in 1999. These tests will determine if the composite wing meets Federal Aviation Administration standards. The ACT program will be completed in 2001.

Benefits of composite wings

Composite wing structures are expected to cost less and weigh less than aluminum wings while remaining as damage tolerant and carrying the same loads of weight and pressure. Part of the weight and time savings comes from the elimination of many of the 80,000 metal fasteners found on an aluminum wing.

NASA's aeronautics vision

The new composites stitching technology is a prime example of NASA's implementation of revolutionary technology leaps in the agency's new aeronautics vision. The stitching machine was designed and built under the NASA ACT program and has proven itself one of those technology leaps for NASA.

Fellowship awardees

Aerospace technologist to study acoustic emissions

BY NANCY FINN

As a recipient of the Floyd L. Thompson Fellowship Program award, Dr. William H. Prosser, an aerospace technologist in the Nondestructive Evaluation Sciences Branch, will spend the next year studying acoustic emissions (AE) at the University of Denver and at the National Institute for Standards and Technology in Boulder, Colo.

"In seismology, an active fault, or earthquake, generates acoustic, or seismic, waves which travel through the earth," says Prosser. "These waves are detected to determine the location and depth of the earthquake and provide information about the structure of the earth through which they propagate."

AE signals – acoustic waves that are generated by damage mechanisms such as crack growth in a material or structure – travel through material and are detected by surface-mounted sensors. Triangulation techniques are used to determine the location of the damage.

Prosser's research will include investigations into how AE signals can help determine the type and extent of internal damage.

Prosser hopes to develop and use numerical modeling techniques for the production of AE signals in composite materials and in complex geometries. He plans to use experimental research to confirm models and to apply Langley-developed test techniques to simple models as well as to more complex structural ones.

Prosser, 34, holds bachelor of science degrees in math and physics from the College of William and Mary and a doctorate degree in materials science and engineering from Johns Hopkins University, Baltimore, Md.

He earned a NASA Graduate Student Researchers Program Fellowship to attend that university, 1985-1987.

He came to NASA Langley in 1987, while finishing his dissertation on the propagation of acoustic waves in solids.

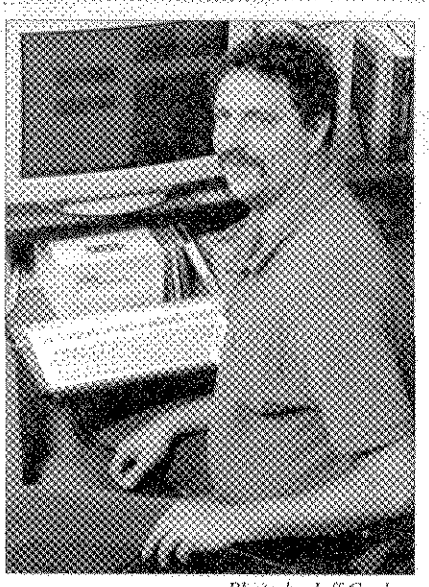


Photo by Jeff Caplan

Floyd L. Thompson Fellowship Program awardee Bill Prosser

Assistant branch head to attend Syracuse program

BY NANCY FINN

Laura O'Connor, assistant head of the Engineering Support and Facility Projects Branch, will represent NASA Langley at the Maxwell Mid-Career Development Program at Syracuse University in Syracuse, N.Y., this fall.

NASA sends one person per session to this 15-week program for experienced, high-potential government managers. The participants take five or six graduate-level courses, two of which are mandatory.

O'Connor, 41, said she feels that this is an excellent opportunity to learn the inner workings of various governmental agencies.

"I hope to bring back to Langley a greater understanding of the global, economic, social and political environment which Langley faces," she said. She also hopes to return with management skills to improve her leadership abilities.

Photo by Jeff Caplan

Laura O'Connor, Maxwell Mid-Career Development Program attendee

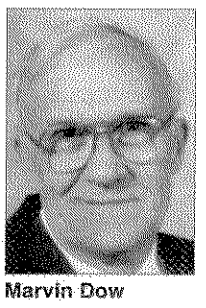
O'Connor came to Langley in 1986 as a research engineer in the 8-Foot High-Temperature Tunnel. She has been a member of the Facilities Systems Engineering Division since 1994. She serves on the management team of the Engineering Support and Facility Projects Branch, which supports the planning, design, construction, activation and troubleshooting of Langley's facilities.

O'Connor, a York County native, holds a bachelor of arts degree in music education from the College of William and Mary and a bachelor of science degree in mechanical engineering from Old Dominion University.

Boeing honors Dow

BY MEGHAN WOODCOCK

Boeing named its new Stitched Composite Development Center after NASA Langley researcher Marvin B. Dow in honor of his contributions to stitched composites research and, specifically, to the Advanced Stitching Machine (ASM). Dow spent the last 25 years of his 40-year NACA/NASA career in pursuit of the application of advanced composite materials on commercial transport aircraft.



Marvin Dow

Dow's composites research began in the 1970s. His work on composites led to the flight testing of graphite/epoxy rudders on the McDonnell Douglas DC-10 commercial transport aircraft.

During the next 10 years as a key technical leader in the NASA AirCraft

(see DOW, page 5)

From the editor

Good RN stories follow these guidelines

The *Researcher News* offers the following tips for submitting stories, photos and other items for publication. Attention to these guidelines will allow your submission to be published more easily and quickly.

▲ First, put yourself in the place of a reader who knows nothing about the subject. Imagine that a 12-year-old child asks you to describe your work. What would you say? Remember that most readers aren't familiar with your subject, so you need to avoid jargon, acronyms and abbreviations. If you must use them, explain what they mean with your first reference.

▲ Put the most important piece of information – the "news" – in the first sentence. Try to grab your readers' attention. The story should be constructed like a pyramid, with the most important facts at the top, other details in the middle, and background information at the base. Include the who, what, where, when and why of the event in the story – preferably in the first couple of sentences.

Put yourself in the place of a reader who knows nothing about the subject... What would you say to describe it to him?

Submit stories/items to the RN editor's e-mail address: m.l.graves@larc.nasa.gov. It is best to hand-carry photos to the *Researcher News* office at 1 West Reid St., Building 1153, Room 112.

▲ Report the event in a timely manner. Advance notice of an event or project is helpful, but we will cover events after the fact only if we get the information within a week. Old news gets even older quickly when run in a biweekly publication.

Since the *Researcher News* has no staff writers, we encourage all civil service and contract employees to submit stories themselves. The editor and managing editor will edit the article and put the finishing touches on it so that it conforms to RN style guidelines.

▲ A good photo can enhance a story. The editor can work with you in suggesting good pictures; our photojournalist may also be available to shoot photos for your story.

The best photos are usually "action" shots – people doing something or working with equipment, but *not* staring at a computer. ***We do not run group shots or shots of people accepting an award or shaking hands or of people posed and staring at the camera.***

▲ Most stories should be no more than two double-spaced pages, with one or two photographs if appropriate.

▲ Submit stories/items to the RN editor's e-mail address: ***m.l.graves@larc.nasa.gov.*** It is best to hand-carry photos to her at 1 West Reid St., Building 1153, Room 112.

Stories that involve Langley and NASA programs, events and people have priority; other material will published as space permits.

The deadline for submissions to the RN is noon on the Monday following the publication date, i.e., Aug. 18 for the Aug. 29 issue.

▲ Always include a contact name and phone number so that we may obtain additional information as needed.

▲ Discuss your story idea with the editor or managing editor before you begin writing. This will help us plan upcoming issues, and we might be able to suggest ways to make the story more interesting.

The deadline for submissions to the RN is noon on the Monday following the publication date, i.e., Aug. 18 for the Aug. 29 issue.

Contact *Researcher News* Editor Mary Graves regarding story ideas and item submissions. Send her an e-mail at the address above, or call ext. 46126.

Contact Managing Editor Keith Henry regarding *Researcher News* policies and procedures. Call him at ext. 46120, or send him an e-mail at h.k.henry@larc.nasa.gov.

Researcher News Publication Schedule

Submission Deadline	Publication Date
Aug. 18	Aug. 29
Sept. 2	Sept. 12
Sept. 15	Sept. 26
Sept. 30	Oct. 10
Oct. 14	Oct. 24
Oct. 27	Nov. 7
Nov. 10	Nov. 21
Nov. 24	Dec. 5
Dec. 8	Dec. 19

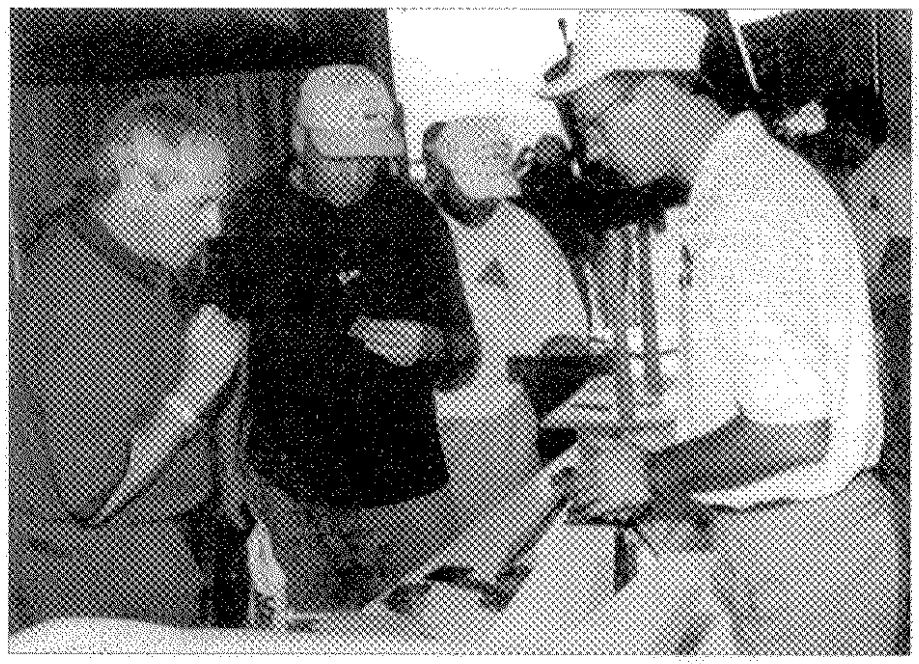


Photo by Donna Bushman

CLOSE-UP VIEW – Langley's Scott Young, right, of the Mechanics of Materials Branch, shows samples of aerospace materials to NASA Administrator Dan Goldin, left, and other visitors at the NASA crafts exhibit at the annual Experimental Aircraft Association Fly-In and Convention in Oshkosh, Wis., July 30-Aug. 5..

DOW

(continued from page 4)

Energy Efficiency Program, he was instrumental in developing composites technology for application to structures on DC-10, B-737 and C-130 aircraft.

In 1989, Dow became the technical manager of the NASA ACT Wing Program. He worked with Boeing to develop the ASM and the stitched/resin film infusion process.

"Not many contracting officers' technical representatives would've gotten as involved with a company," said Benson Dexter, a materials research engineer involved with the program. "Probably not many NASA people would've dedicated this long a time to getting the job done. [Boeing] would not be at the stage they're at now without Marvin Dow."

Dow retired from Langley last year and now serves the center as a distinguished research associate. His latest project is a technical summary and bibliography titled "The Development of Stitched, Braided and Woven Composite Aircraft Structures in the U.S. (1985 to 1997)."

CUT HERE

FOLD HERE

'Researcher News' surveys readers

So that we may better serve the NASA Langley readership, the *Researcher News* asks its readers to complete the following survey about the content and quality of your center's newspaper. Please fill out the following questionnaire, cut off the bottom half of this page, fold it in half with the address label up, staple it and send it to Mary Graves, Mail Stop 146 by **Sept. 15**. We appreciate your participation.

1. How much time do you spend reading a typical issue of the RN?
   - ❑ 30 minutes or less
   - ❑ More than 30 minutes

2. In your opinion, is the reading level of the RN:
   - ❑ too high?
   - ❑ too low?
   - ❑ about right?

3. Would you like to see more technical detail in articles about technical subjects?
   - ❑ Yes ❑ No

   Comments:_____

4. What topic or subject not presently reported in the RN would you like to see covered?

   _____

5. Do you read any particular section first each issue?
   - ❑ Yes ❑ No

   Which section?

   _____

6. Do you prefer to find the same types of items – announcements, classified ads and events, news briefs, people features – in the same place in each issue of the RN?
   - ❑ Yes ❑ No
   - ❑ Doesn't matter

7. Issue-to-issue, do you find the format and design of the RN to be:
   - ❑ easy to read and follow?
   - ❑ difficult to read and follow?

   Comments: _____

AdVentures

WRITERS WANTED: Stringer reporters on center wanted to write general interest stories, personnel profiles for the *Researcher News*. Contact RN editor, Mary Graves, at ext. 46126, e-mail m.l.graves@larc.nasa.gov, or RN managing editor, Keith Henry, at ext. 46120, e-mail h.k.henry@larc.nasa.gov.

FOR RENT: Large house in downtown Hampton, 4 BR, 2.5 baths, 2 full kitchens (great for roommates), 2-car garage, pets OK, must see to appreciate; $800/month. Call 727-9067 and leave a message.

FOR SALE OR RENT: Ranch-style home in Hidenwood, 3 BR, 1 bath, large family room with fireplace, hardwood floors, 3 window air-conditioning units, fenced back yard, large work shed, .39 acre, 1,300 sq. ft., move-in condition. $79,000, or $675/month plus deposit. Call Martin at 595-5997.

FOR SALE: Wedding gown, size 9/10, mermaid style, form-fitted satin, long-sleeve, heart-shaped cut-out back with three pear droplets at the center and a shimmery bodice. Never altered, never worn; cleaned and preserved. Originally $695; will sell for $300 or best offer. Call 599-5929 or 419-6427 (pager).

FOR SALE: Centurion Ironman Master 14-speed bike, 60cm, full Shimano Ultegra, Araya wheels, 28/32 spoke, race ready. Originally $815; will sell for $379. Call 874-3121.

FOR SALE: Smith Corona PWP 3700 word processor, quiet printing system, Grammar Right, 3.5 disk drive, with monitor and printer. $150 or best offer. Call 898-9043 and leave message.

LAA CARNIVAL IS COMING: The Langley Activities Association's annual summer carnival is Aug. 22, 5-10 p.m., and Aug. 23, noon-10 p.m. The picnic grounds and the H.J.E. Reid Conference Center will be open with activities for the whole family. For more information or to volunteer, call ext. 46369.

CARNIVAL VOLUNTEERS: The LAA Carnival needs volunteers to help with the casino game, "The Dice Throw." Call retiree Sam Sokol at 826-7171.

MOTORING AROUND LANGLEY: The Virginia Air & Space Center in Hampton offers guided motor tours of NASA Langley and Langley Air Force Base through Sept. 1, Monday-Saturday, 10:30 a.m. and 1:30 p.m.; Sunday, 1:30 p.m. $4 with VASC admission ticket. For more information, call 727-0900.

JUST LIKE 'TWISTER': The Virginia Air & Space Center presents the 1995 IMAX film ***Stormchasers***, daily at noon and 2 p.m.; Thursdays-Sundays as a double feature with ***Super Speedway*** at 7 p.m.; Friday and Saturday at 7 and 9 p.m. ***Stormchasers*** follows weather experts around the planet as they explore tornadoes, hurricanes, lightning, blizzards and monsoons. Actor Hal Holbrook narrates the film. The VASC also offers the following IMAX films, showing throughout the summer: ***To the Limit***, through Sept. 3, daily at 1 p.m.; ***Cosmic Voyage***, through Sept. 3, daily at 11 a.m. and 3 p.m.; ***Titanica***, through Sept. 3, 5 p.m., Thursday-Sunday; ***Ring of Fire***, through Sept. 3, shown as a double feature with ***Super Speedway***, 7 p.m., Thursday-Sunday, and 9 p.m., Friday and Saturday; ***Grand Canyon: The Hidden Secrets***, through Sept. 30, daily at 1 p.m. IMAX admission is $5.50 for adults; $4.50 for NASA, military, seniors and children under 12; double feature admission is $8 for adults and $7.50 for NASA, military, seniors and children under 12. For more information, call 727-0900.

PASSING PLAY: NASA Flag Football League is looking for people to join existing teams or form additional teams for the upcoming season. The league is a refereed, seven-on-seven competition with minimal contact allowed. Passing plays are the general rule. Games are usually played Saturday mornings at Langley beginning the second or third weekend in September. The league is open to all Langley civil servants, contractors and their spouses. For more information, contact Dan Mazanek at ext. 41739 or at d.d.mazanek@larc.nasa.gov.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, contact jrrjr@icase.edu or call ext. 42197.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

JAZZY JAMMIN': Fort Monroe presents the "Jazz Extravaganza on the Chesapeake," Aug. 30, 5 p.m., at the beach near the post's club. Entertainment will include Ike Cole, Connie Parker and Quartet, Skip Gailes and Quartet, Claud Rivers, and Jaome. Food and beverages will be sold on site. No coolers will be allowed. Tickets are $12 in advance and $15 at the door, and may be purchased at the NASA Langley Exchange Shop, as well as at several other locations. For more information, call 727-3151/4029.

MUSICAL DUO: The Williamsburg Regional Library presents Paul Reisler and Cecil Hooker of the acclaimed "chamber-folk" acoustic ensemble, Trapezoid, Aug. 31, 8 p.m., at the Williamsburg Library Theatre. Tickets are $10. For reservations or more information, call 229-4198.

BIG BANDS, MOVIES AT BUCKROE: Big band music for dancing or just listening, every Sunday, 7-9 p.m., at Buckroe Beach in Hampton. Also outdoor movies every Wednesday, starting at sunset. Bring lawn chairs, blankets. Food vendors on site. For more information, call 826-7171.

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News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 17 ❖ August 29, 1997

Langley leads low-visibility research at Atlanta airport

BY KEITH HENRY

NASA is demonstrating technology on the runways and taxiways of Hartsfield-Atlanta International Airport that promises to keep traffic moving safely and efficiently – day or night, regardless of visibility.

The technology is actually many technologies integrated into one super system. On the ground is a Federal Aviation Administration-developed system of ground surveillance sensors and other equipment. On-board NASA's Boeing 757 research aircraft are the airborne systems and displays.

The Atlanta deployment, led by Langley, represents the first time the Langley-modified 757 has been used as a flying laboratory.

The research program calls for a total of 53 flight tests and demonstrations at Hartsfield-Atlanta to be completed by the end of August. Demonstrations will be to about 100 airline and industry executives and officials of the FAA and other government agencies.

"The idea is to demonstrate the feasibility of safely performing low-visibility operations at capacities that currently are performed in clear weather," said Langley's Steve Young. "We've all experienced what happens to the air traffic system when weather slows traffic at an airport. And the trend is toward more traffic delays. This work has the potential to slow that trend as well as to improve safety."

Young and Denise Jones are co-principal investigators for the program, dubbed Low Visibility Landing and Surface Operations (LVLASO).

The research is part of NASA's Terminal Area Productivity (TAP) program begun in 1994, led by NASA Ames Research Center, Moffett Field, Calif.

For the Atlanta effort, the cockpit display system is an integration of two subsystems – the Roll-out Turn-off (ROTO) guidance subsystem developed at Langley, and the Taxiway Navigation & Situation Awareness (T-NASA) display subsystem developed by Ames.

As the research aircraft approaches the runway, computer-generated graphics outline the correct runway and its precise location on a glass visor mounted between the pilot and the cockpit windshield. Upon contact with the ground, the pilot's aircraft position and that of other aircraft is shown on an electronic moving map of the airport on the instrument panel.

With Global Positioning System satellite information and an airport layout database, the displays are updated in real time.

Ground-based components consist of a surveillance system that provides traffic positions to the 757 via a computer datalink and a controller interface that allows air traffic controllers to transmit instructions to the aircraft by computer in parallel with normal voice communications. The controller is also automatically informed via this computer link if the 757 diviates from its approved path.

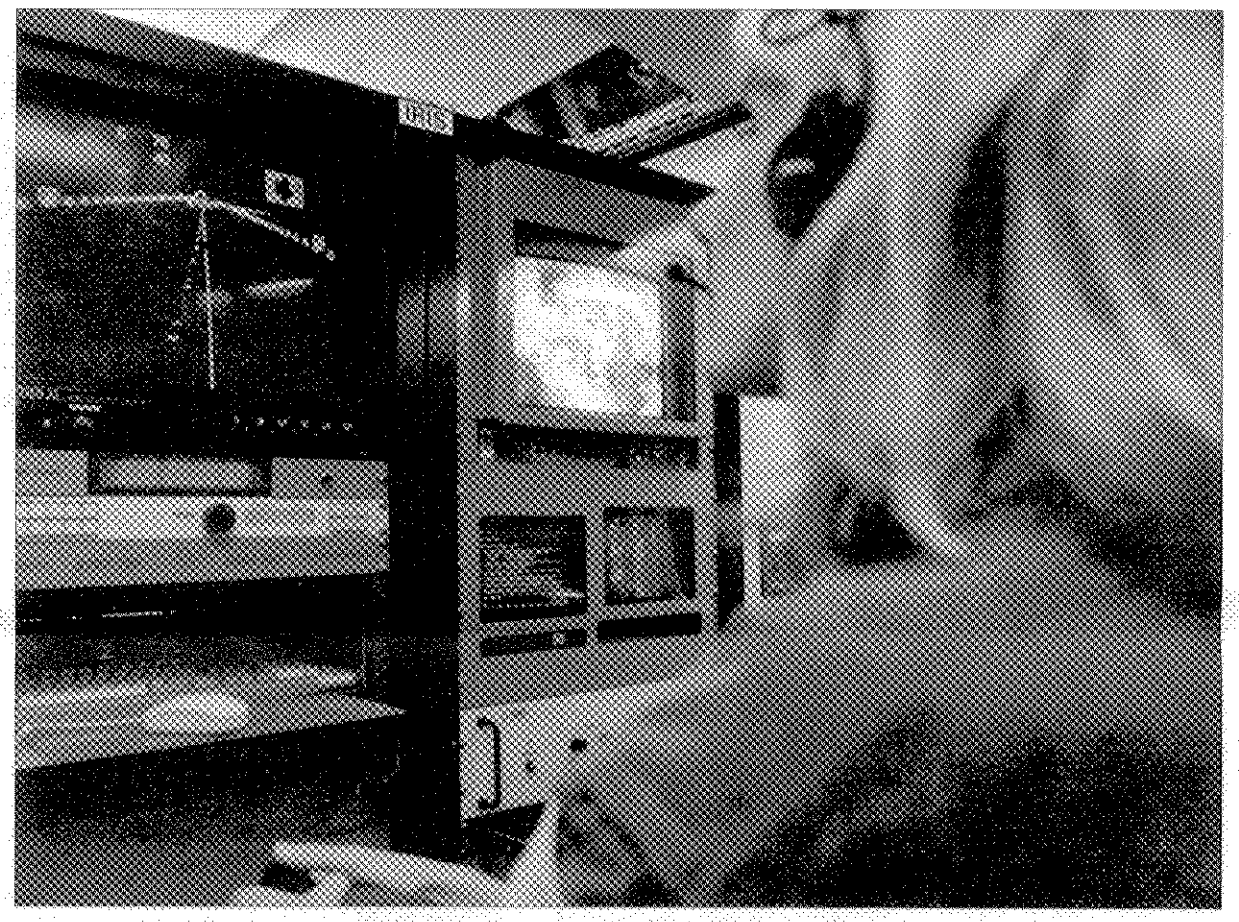


Photo by Jeff Caplan

Sharon Beskenis, of Lockheed Martin, checks out one of the research pallets in the NASA 757 aircraft before deployment to Atlanta.

30-foot antenna comes tumbling down

BY TOM CAMPBELL

During a recent signing ceremony at Langley's Flight Electronics Technology Division, the center officially transferred its deactivated 30-foot dish antenna to the State of Florida to support satellite-oriented research activities of the Florida Space Institute (FSI) in Cape Canaveral.

The antenna, valued at $2.6 million, will be refurbished as part of an FSI effort to develop a multi-user "ground station" capable of supporting payload tracking, data retrieval and command and control operations for earth-orbiting satellites and other space research pay-loads. The ground station will also support launch operations at the Cape Canaveral spaceport.

"Florida has long lacked a dedicated capability to provide on-orbit support to scientific and commercial payloads at the Cape," said Florida Congressman Dave Weldon, vice chairman of the Space and Aeronautics Subcommittee and a long-time supporter of the FSI initiative. "With the right investment in infrastructure and people, the state's academic community can become a world leader in space research, while providing the education and training necessary to maintain our leadership in the launch industry."

Dr. Ron Phillips, director of FSI, and Jerry Grover, project coordinator, plan to fully refurbish Langley's antenna with new support equipment and proposed data links to the University of Central Florida (UCF) in Orlando.

The Cape Canaveral-based ground station would allow researchers from around the state and around the world to remotely access data through the internet from a wide variety of satellites. The system would initially be used for the FSI's "photon" laser communications satellite and for training Florida engineers and technicians. Establishing a similar capability with a new antenna would cost about $3 million.

The FSI project is part of a statewide effort to increase academic involvement in, and support to, Florida's space-related industry. FSI is a partnership of the Spaceport Authority, UCF, the NASA-sponsored Florida Space Grant Consortium, Brevard Community College, Embry-Riddle Aeronautical University and the Florida Institute of Technology. The Boeing Company also supports FSI, which works closely with the Air Force 45th Space Wing and NASA Kennedy Space Center.

The antenna may be shipped from Langley to NASA Kennedy Space Center by the end of September.

Representing Langley in this transaction were Dr. Doug Dwoyer, director of the Research and Technology Group; H. Milton Holt, chief of the Flight Electronics Technology Division; Tom Campbell, Electromagnetics Research Branch; Theresa Elliott, property disposal officer; and Sharon Smith, Office of Chief Counsel.

In addition, Robert Holt and Allen Langford, electronics technicians with the Electromagnetics Research Branch, are supporting the transfer of the antenna to FSI.

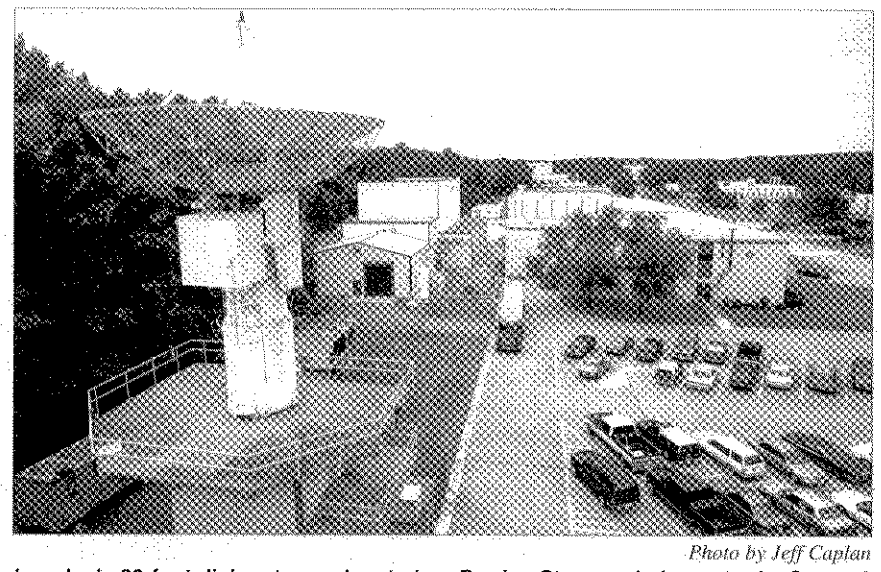


Photo by Jeff Caplan

Langley's 30-foot dish antenna, located on Dryden St., now belongs to the State of Florida to support the Florida Space Institute's satellite-based research in Cape Canaveral. The antenna was deactivated in the late 1970s. The transfer to Florida may occur by the end of September.

News Briefs

Around the Agency

NASA TECHNOLOGY MAY ASSESS RISK OF BONE PROBLEMS – (Ames Research Center, Moffett Field, Calif.) A device developed for the space program to examine how physical activity relates to bone density may someday serve as a way to assess a person's risk of osteoporosis. The device measures and records the interaction between the foot and the ground during daily activity. This "loading" of the body plays a major role in maintaining muscle and bone strength in the lower limbs.

NASA SELECTS REPLACEMENT INSTRUMENT FOR HUBBLE TELESCOPE – NASA has selected a proposed scientific investigation that includes the development of a new spectrograph for the Hubble Space Telescope (HST), Associate Administrator for Space Science Dr. Wesley T. Huntress Jr. said. The estimated cost of the new instrument is about $25 million. NASA will work with Dr. James C. Green, University of Colorado, Boulder, to negotiate a contract for the new instrument, called the Cosmic Origins Spectrograph. The new spectrographic instrument is planned for installation on the HST by shuttle astronauts during the fourth servicing mission scheduled for late in 2002.

NEW COMPUTER TO REVOLUTIONIZE AIRPLANE DESIGN, CONSTRUCTION – (Ames Research Center, Moffett Field, Calif.) A NASA computer network tool promises great savings in time and money for airplane makers and the government by providing faster access to information to help shorten the aircraft design and test process by about 25 percent. Called "Darwin," the network will revolutionize the way airplanes are developed by using wind tunnels linked with computers that send nearly instant test results via a network to geographically separated companies and laboratories.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "Lower productivity and poor performance are likely outcomes when employees feel alienated because their contributions are not valued and they do not see the organization as an affirming place to work." – from "Facts About Diversity," National MultiCultural Institute

▲ Over the next 20 years, the U.S. population will grow by 42 million. Hispanics will account for 47 percent of the growth; blacks, 22 percent; Asians, 18 percent; and whites, 13 percent.

▲ Aug. 29-Sept. 1 – National Association of Asian American Professionals (NAAAP) Convention, Houston, Texas, 1-800-691-7188

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.***

Jones' 'Book Builder' wins Space Act Award

Langley's nominee for NASA's 1997 Software of the Year Award, Kennie Jones of the Scientific Application Branch, received special recognition – the Space Act Award – when the agency's Software Advisory Council announced the winners last month. Jones was acknowledged for his Web site authoring tool known as "Book Builder."

Representing "an excellent contribution to NASA's mission," Jones' entry receives a $6,000 monetary award under the Space Act Awards Program, as recommended by the Inventions and Contributions Board and approved by NASA Administrator Dan Goldin.

Jones

Book Builder is a user-friendly software tool for collaborative documentation. It allows a team of users to easily post multimedia documents to a Web server without knowing HTML or other computer techniques conventionally required for developing and posting documents. It requires only the computer skills required for word processing and e-mail.

Book Builder was originally designed and implemented for the Hybrid Laminar Flow Control wind tunnel test to facilitate collaborative documentation of the test among a geographically dispersed team. Subsequently, it has been used to document more than 40 wind tunnel tests at Langley, NASA's Ames Research Center, Moffett Field, Calif., and McDonnell Douglas.

To facilitate document exchange and provide security, it was implemented for the technical management team of the High-Speed Research (HSR) program at Langley, four other NASA centers and eight industry sites. Its use has resulted in a collective archive of HSR documents on a central server that otherwise would have been scattered among the personal e-mail boxes of team members.

Information about the Book Builder is available at this Web address: ***http://adapt-www.larc.nasa.gov:23456/adapt/docs/book-builder/.***

Announcements

Career center offers training workshops

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars:

▲ "Effective Communication Between Engineers and Technicians," Sept. 4, 9 a.m.-noon

▲ "Networking for Career Development," Sept. 16, 1-4 p.m.

▲ "Conflict Management – Aggressive, Assertive or Passive?" Sept. 25, 8:30 a.m.-noon

▲ "Hone Your Negotiating Skills," Oct. 8, 9 a.m.-noon

▲ "Starting Your Own Business," Oct. 9, 8:30 a.m.-3:30 p.m.; follow-on sessions, Oct. 16, 23, 30, 9 a.m.-noon

▲ "Communicating Effectively with Your Supervisor," Oct. 21, 9 a.m.-noon

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Tech Forum topics set

The next Langley Technical Forum, Sept. 17, 10 a.m.-noon, in the Pearl Young Theater, will cover these topics:

▲ Winter Runway Friction Measurements – *Tom Yager*

▲ Prediction and Validation of the Mars Pathfinder Aerodynamic Data Base – *Peter A. Gnoffo, K. James Weilmuenster, Bob Mitcheltree, Walt Engelund, Bobby Braun*

▲ Development of Millimeter Wave Imaging Sensor for All-Weather Aircraft Landing Operations: A Joint NASA-DARPA Project – *Tom Campbell*

▲ An Aircraft Investigation of Tropospheric Chemistry over the Tropical Pacific Basin – *James Hoell*

▲ Overview of Systems Studies in Support of Scenario-Based Planning – *Philip C. Arcara Jr.*

VASC names new board

New members of the Virginia Air & Space Center's board of directors include:

▲ Harrol A. Brauer III, director of sales and marketing, WVEC-TV

▲ T. Michael Hatfield, vice president for corporate communications, Newport News Shipbuilding

▲ A. Benton Knight II, president, Benton-Knight, Ltd.

▲ George E. Wallace, city manager, City of Hampton

▲ Dara M. Yeh, finance manager, Gateway 2000

▲ Jean M. Yokum, president/chief executive officer, Langley Federal Credit Union.

Humans or robots in space missions?

Dr. Robert Park, chair of the department of physics and astronomy at the University of Maryland at College Park, will discuss the merits of human versus robotic space missions, Oct. 7, 1-2 p.m., at the H.J.E. Reid Conference Center. His visit will be co-sponsored by the American Institute of Aeronautics and Astronautics, the National Security Industrial Association, the Virginia Aerospace Business Roundtable, and the Air Force Association. For more information, check future issues of the *Researcher News*.

Speakers Bureau July activities

Leroy Spearman visited Auburn University's aerospace department to discuss "A New Look at Commercial Transports – the Inboard-Wing Concept." He also spoke to the Southeastern Virginia Ultralight Flyers about air transportation trends.

Jane Hogge addressed Smithfield's Blackwater Baptist Association's day camp about the space shuttle.

Keith Henry spoke to the Rotary Club at Gloucester Presbyterian Church about the Mars '97 mission.

Alan Terry Morris talked to 60 children about space at the Greensboro Neighborhood Nature Museum of the Natural Science Center of Greensboro, N.C.

Lisa Jones spoke to residents of the James River Convalescent Center about crash survivability.

Bob Witkofski addressed the Denbigh Lions Club on "The Role of the Russian Supersonic Transport in the U.S. High-Speed Civil Transport Program."

Retirees send thanks

"Thanks to all my friends that honored me with a retirement party on Aug. 1. I shall cherish the evening forever. The mementos, plaques, photographs and tributes that were prepared are very special to Peggy and me. The gifts are far greater than deserved but are very much appreciated.

"However, the greatest blessing is that I was able to work for 35 years with so many outstanding people and to develop numerous friends. Please stay in touch. Best wishes to all."

– *John G. Davis Jr.*

"I want to thank my many wonderful friends at NASA for all the beautiful, thoughtful cards and notes I've received during my illness."

– *Pat Turgeon*

In memory of Troy A. Wilson

Troy A. Wilson, 69, died July 27 at his home in Suffolk. He served as a wind tunnel technician at NASA Langley for more than 40 years.

In memory of Herbert C. Roehm

Herbert C. Roehm, 85, died Aug. 2. He began his Langley career with NACA in 1930, retiring from NASA in 1970 as assistant chief, fabrications division.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

Photographer . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Students spend summer surveying satellite signals

Photos by Jeff Caplan

SHARP student Ryan Bautista, left, of Virginia Beach, and LARSS student Lorin Laiacona, of Newport News, use the Global Positioning System to pinpoint the exact location of Building 1268-B.

BY LORIN LAIACONA

No, they weren't the Ghostbusters, and they weren't looking for aliens.

Instead, the people seen walking around center wearing bright yellow backpacks this summer were doing Global Positioning System (GPS) surveying.

Under the auspices of William B. "Brad" Ball, six Langley Aerospace Research Summer Scholars (LARSS) and one Summer High School Apprenticeship Research Program (SHARP) student spent ten weeks surveying for the Facilities Program Development Office's Geographic Information Systems team.

The data the students gathered will be used to make a more accurate mapping system and will be integrated with databases containing statistics on each point. These maps can then be used for maintenance, construction, analysis, and emergency response.

Worldwide system

GPS is a worldwide radio-navigation system that uses satellites to determine an exact position anywhere on Earth. Each GPS pack contains a receiver that picks up the signals from at least five satellites. The receiver uses the signals' travel times to determine its exact distance from the satellites.

Pinpoint accuracy

With this information, the receiver then uses a method of trilateration to pinpoint its coordinates. The information is stored in a small, hand-held data collector where it can be immediately viewed or downloaded later.

This is the same method used by GPS equipment commonly found on boats and planes but with far greater accuracy. By pairing with the data collected by a base station, located on top of the hangar, the receiver can achieve accuracy within the centimeter range.

"I like to do GPS when we go out when the conditions are really great," said 19-year-old LARSS student Kristin Dame. "We'll have seven satellites and a PDOP (Position Dilution of Precision) of 1.8, and we'll get every point we attempt. You just move right along. At other times during poor PDOP, we would have to wait in the heat for a few minutes for it to pick up satellite signals."

The Department of Defense is responsible for the development and maintenance of the system, which was created out of a need to determine exact locations around the world rapidly and reliably.

LARSS students Lori Alvardo, right, and Kristin Dame mark the position of Building 1145.

Langley applications

Here at Langley, GPS data points have been obtained for the majority of storm drains, manholes, fire hydrants and the corners of most center buildings. The first-floor elevations of many buildings in danger of flooding have also been gathered using a surveyor's autolevel in conjunction with GPS.

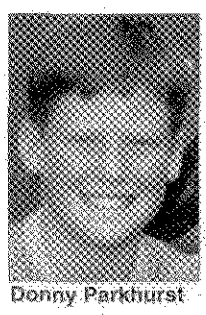
"We are unable to use our GPS equipment inside because the receiver can't get a signal under heavy cover," said 20-year-old LARSS student Rebecca Baker. "It's more time consuming to use the autolevel, and with the additional equipment, another surveyor needs to work on the job."

Kids, paper planes 'aim for the stars'

BY PATSY CAMPBELL

Several hundred kids and parents visited the Federal Women's Program Committee's booth during Langley's Open House last month – not just to learn about women's employment at NASA, but also to participate in a paper airplane design competition, "Go the Distance, Aim for the Stars."

Kelly McDonough



Donny Parkhurst

After designing their airplane, the kids tested their plane outdoors for distance and accuracy, using a board designed by the Model Shop, Fabrication Division. The distance contest attracted so many that participants were divided into four age groups: 3-5, 6-8, 9-12 and 13-15.

Winners and their ages and winning distances include: Lane Maloney, 5, 31 feet; Shannon Thomas, 8, 61 feet; Donny Parkhurst, 11, 67 feet; Kelly McDonough, 13, 54 feet.

Lane Maloney

Shannon Thomas

They all received certificates and packages from the Exchange Gift Shop and the Public Inquiry Center, as well as complimentary tickets to the Virginia Air and Space Center.

Contributors to this event included Sandra Zumbrun, Beverly Thomas-Burse, Alana Takeuchi, Jane Hogge and the designers in Model Shop and Graphics Section.

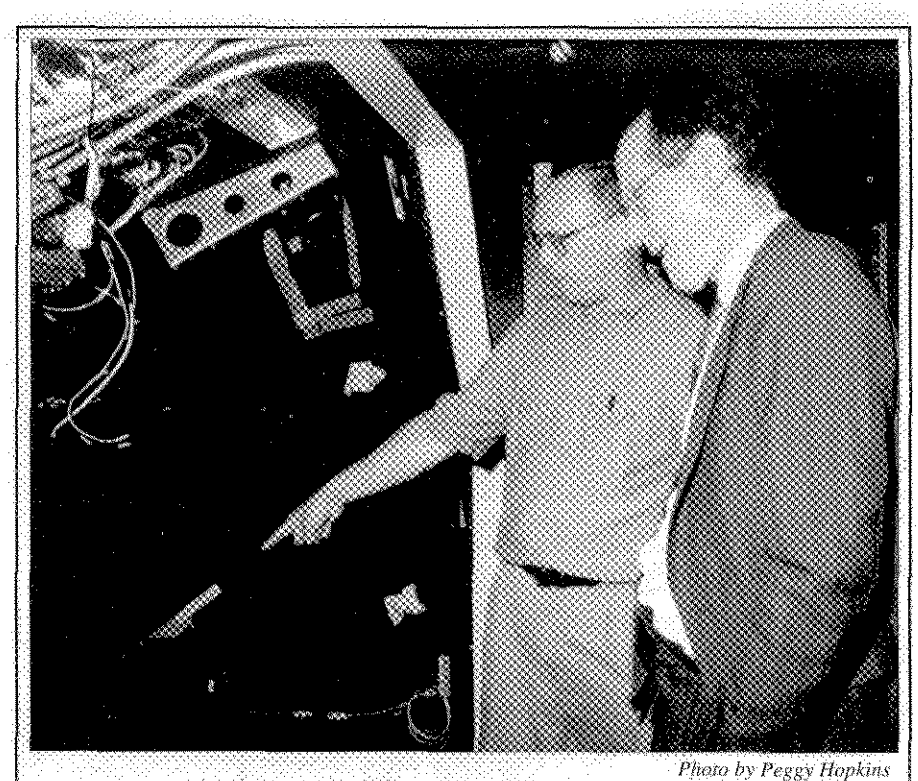


Photo by Peggy Hopkins

Billy Ashworth, left, of the Simulation Systems Branch, explains the Research Flight Deck to Dr. Steven Kelman of the Office of Federal Procurement Policy during Kelman's visit to Langley's Acquisition Division last month.

Federal procurement official visits Langley

Dr. Steven Kelman, administrator for the Office of Federal Procurement Policy (OFPP), visited Langley's Acquisition Division last month. He spoke at an open forum for all division personnel to discuss problems encountered in complying with current procurement regulations and to understand the type of acquisition actions prevalent at a research center.

OFPP, part of the Office of Management and Budget (OMB), was established in 1969 to promote the economy, efficiency and effectiveness of federal procurement. The organization established government-wide policy and procurement systems standards for all executive agencies. It also advises the president and Congress on procurement matters.

Kelman, on leave of absence from his position as the Weatherhead Professor of Public Management at Harvard University's John F. Kennedy School of Government, became the OFPP administrator in 1993. The author of two books, Kelman has played a lead role in the administration's "reinventing government" efforts.

'From Jennies to Jets . . . On Eagle's Wings'

Langley Air Force Base celebrates 80 years of flight

LANGLEY AIR FORCE BASE

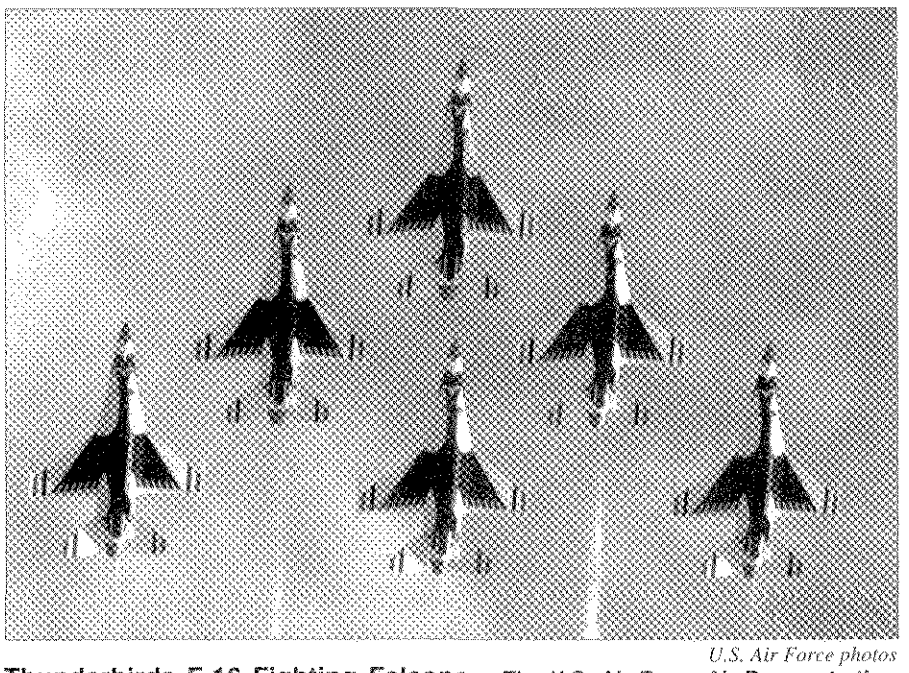
Eighty years ago, Langley's flight line was little more than a patch of muddy marshland, barely providing a landing place for the early aircraft which called it home.

On Sept. 6, the flight line will once again host aircraft from bygone days during Langley's Community Appreciation Day airshow. More than 50 aircraft, ranging from the B-2 Stealth Bomber to the P-38 Lightning, will be on display to celebrate the base's 80th anniversary of flight operations and the 50th anniversary of the U.S. Air Force.

The U.S. Air Force Thunderbirds, F-16 aerial demonstration team, will headline this year's airshow. An F-86 and MiG 15 combat dogfight are also scheduled, along with a multitude of other aerial demonstrations and static displays, including a Civil War reenactment and a F-15C fighter aerial demonstration.

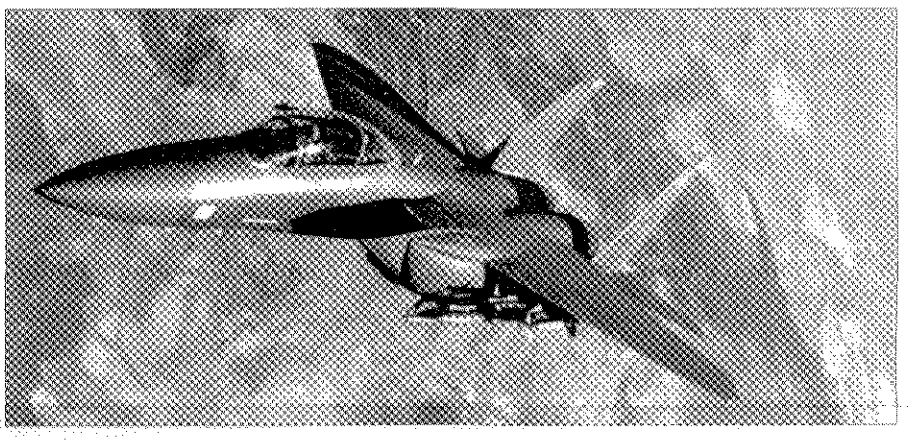
Community Appreciation Day is the Air Force's way of saying "thank you" to the American people and the local community. The event is free and open to the public. Gates open at 9 a.m., and the day will conclude with a free country music concert featuring Mark Wills, whose current top-20 hits include "Jacob's Ladder" and "Places I've Never Been."

For more information, check out the Langley Air Force Base Community Appreciation Day Web site at ***www.langley.af.mil/1fw/pa/cadevnts.html.***

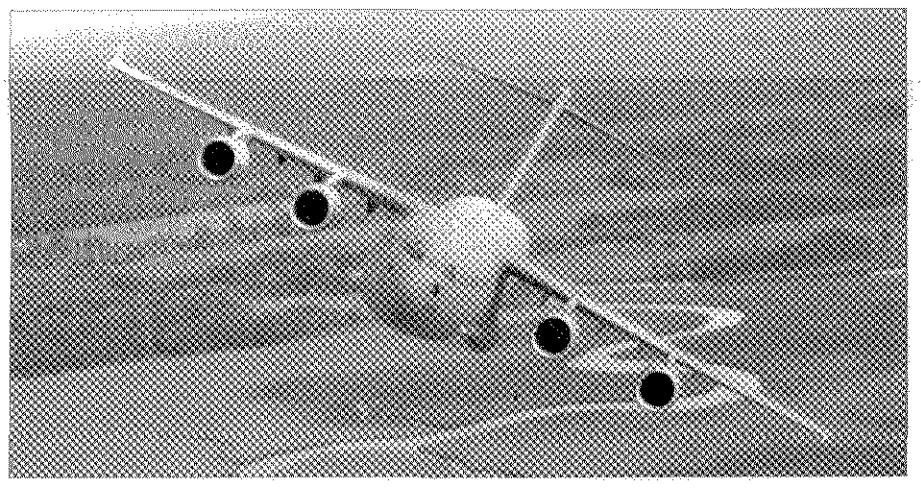


U.S. Air Force photos

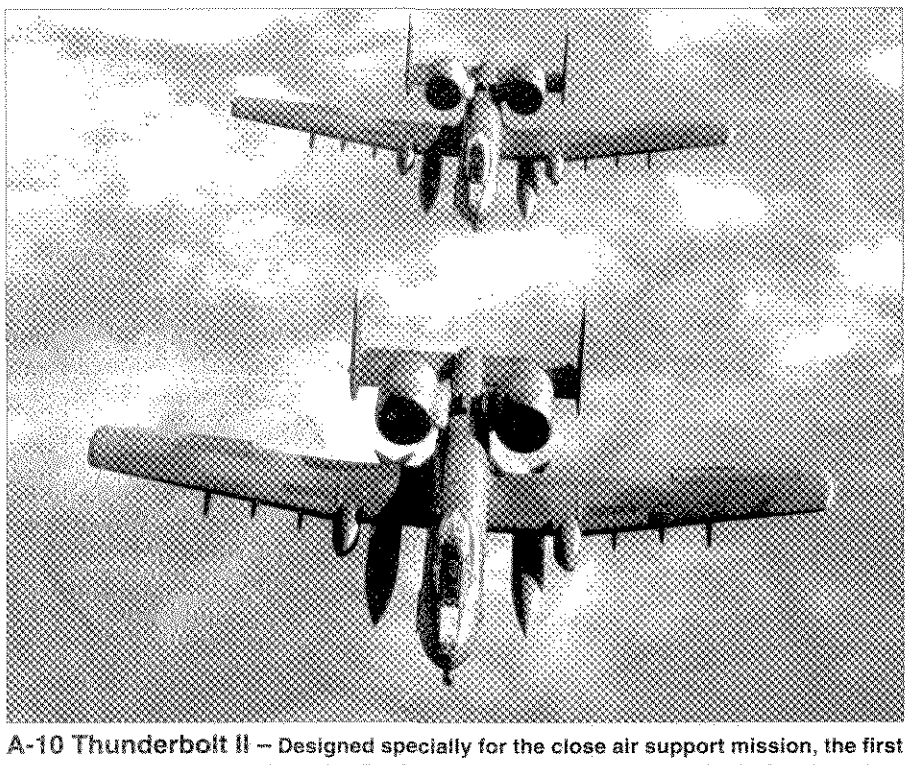
Thunderbirds F-16 Fighting Falcons – The U.S. Air Force Air Demonstration Squadron, the Thunderbirds, performs precision aerial maneuvers, demonstrating the capabilities of Air Force high-performance aircraft to people throughout the world. The Thunderbirds squadron is an Air Combat Command unit composed of eight pilots, four support officers, three civilians and more than 130 enlisted personnel.



F-15 Eagle – The F-15 Eagle is an all-weather, extremely maneuverable, tactical fighter designed to gain and maintain air superiority in aerial combat.



C-17 Globemaster III – The C-17 is the most flexible airlift aircraft to enter the Air Force's inventory, demonstrating the ability to rapidly project and sustain an effective combat force close to a potential battle area. The C-17 made its maiden flight on Sept. 15, 1991. The aircraft is operated by the Air Mobility Command, with initial operations at Charleston Air Force Base, S.C.



A-10 Thunderbolt II – Designed specially for the close air support mission, the first production A-10A was delivered to Davis-Monthan Air Force Base, Ariz., in October 1975. In the Gulf War, A-10s, with a mission capable rate of 95.7 percent, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles.

Community Appreciation Day set for Sept. 6

Langley Air Force Base invites the local community to visit the base for a whole day of activities Sept. 6, featuring aircraft and other military displays, as well as a series of aerial demonstrations, including the Air Force Thunderbirds.

Pentran buses will run from Coliseum Mall to Langley Air Force Base, providing "front door service" to the flight line. The cost is $1 round trip.

Time	Event
9 a.m.	Gates open for general admission
9:30 a.m.	Civil War reenactment
10 a.m.	Misty Blues Parachute Team
	Commander's welcome
	F-15 Eagle Demo
	Sean Tucker and the 1-800-COLLECT Demo
	BT-13 Fly-By
	P-51 Mustang Demo
	B-17 Flying Fortress Demo
	B-25 Demo
	F-14 Tomcat Demo
11:55	Commander's welcome
Noon	A-10 Thunderbolt Demo
	Ian Groom's Su-31 Demo
	F-15 Eagle Demo
	2 X P-51 Mustang Demo
	Heritage Formation: F-15 and P-51
	2 X T-34 Demo
	F-117 Stealth Fly-By
	2 X AT-6 Demo
	F-104 Starfighter Demo
	CF-18 Hornet Demo
	F-86 versus MiG-15 Dogfight
	Misty Blues Parachute Team
2:30 p.m.	P-38 Lightning Demo
	Sean Tucker and the 1-800-COLLECT Demo
3 p.m.	Thunderbirds ceremony starts
5 p.m.	Free concert, featuring country music singer Mark Wills

NASA's distance learning efforts go back to school this fall

DR. SHELLEY CANRIGHT
Precollege Officer

As summer winds down and teachers and students prepare to return to school, more and more Hampton Roads educators are using satellite broadcasts and the computer and internet as teaching tools. And NASA is helping them.

According to a recent national survey from Market Data Retrieval, teachers have indicated that among the best Web sites that support their textbooks and curriculum is NASA's, at ***www.nasa.gov***.

As stated in the NASA Strategic Plan (February 1996), the agency has a strong commitment to education:

"We involve the educational community in our endeavors to inspire America's students, create learning opportunities, and enlighten inquisitive minds."

Langley's internet projects

Langley's Learning Technologies Project (LTP) Office and the Office of Education (OEd) have teamed up to produce internet-based projects such as "Off to a Flying Start," and "KidSat."

"Off to a Flying Start," an LTP effort, is a kindergarten-through-4th-grade online telecommunications project that uses worldwide collaboration and aeronautics to provide learning opportunities to students in math and science. The project will be open for participation this fall, with the length of project participation to be determined by the classroom teacher.

"Off to a Flying Start" consists of three modules: Introduction to Flight, Flying the Falcon Flyer and Experimental Design.

A unique element of this project is the opportunity for students to design and construct their own plane and to compete against other students in a flying contest. "Junior Pilots" collect, graph and share data online, then investigate and describe results. The winning design from each school/class will be published on the project's homepage at ***http://k12unix.larc.nasa.gov/flyingstart/***. For more information, call Jeff Seaton at ext. 46687.

More than 40 middle schools nationwide will participate in the upcoming September shuttle mission (STS-86) through the pilot project, KidSat.

Through the KidSat project, middle school students will conduct Earth science inquiries by commanding a Kodak digital still camera onboard the space shuttle to take photos over specific regions of the world during the course of the mission. The students will validate and analyze returned images according to their predetermined investigations, and they will then share their findings.

NASA field installations play an important role in connecting and assisting the KidSat school sites that reside within each installation's precollege region. The Office of Education, with 13 schools involved from its five-state service region – two in Kentucky, four in North Carolina, four in South Carolina, two in Virginia and one in West Virginia – has established a listserv and has created a special homepage for supporting these distant sites. The office receives support in these efforts from the LTP, the Atmospheric Science Division/Distributed Active Archive Center, Education Committee, Retinex, as well as from individual volunteers throughout the center.

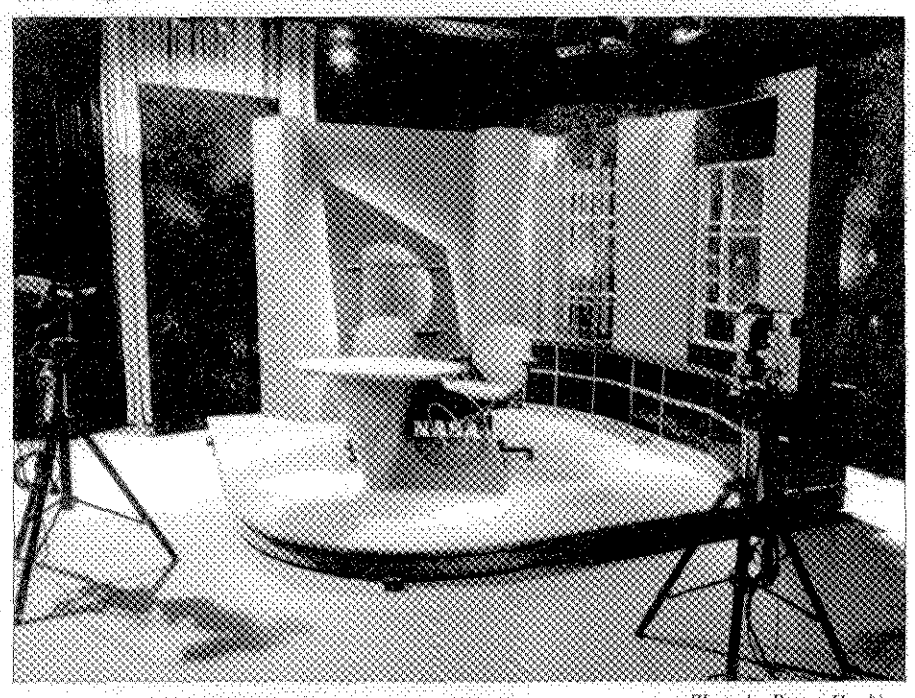


Photo by Peggy Hopkins

This set in Langley's Broadcast Studio will be used for the Office of Education's "CONNECT" and "Journey to Cyberspace" series. The studio extends Langley's outreach to the educational community through a microwave link to WHRO-TV.

The Langley KidSat Homepage will be open to the public in early September and will be accessible through OEd's web site at ***http://edu-www.larc.nasa.gov/edu/OED.html***. For more information about the KidSat project, visit ***http://www.kidsat.ucsd.edu/kidsat,*** or call Shelley Canright at ext. 43313.

Editor's note: This is the first in a two-part series covering the NASA Langley Office of Education's contributions to distance learning using computers and the internet. The next issue of the Researcher News will cover the Satellite Series.

Atmospheric Sciences Division welcomes new chief to Langley

NASA Langley has a new Atmospheric Sciences Division chief – William L. Smith, a former university professor of atmospheric and oceanic sciences and scientist for the National Oceanic and Atmospheric Administration (NOAA).

Smith has returned to the federal government service to join scientists and engineers here in their work to improve satellite systems for observing the physical processes which affect weather and climate.

After receiving a Ph.D. degree from the University of Wisconsin in 1966, Smith had been a satellite remote sensing scientist with the NOAA.

In 1977, he affiliated a small portion of the NOAA group with the University of Wisconsin to form the Cooperative Institute for Meteorological Satellite Studies (CIMSS), he said. This institute enabled university and federal collaboration to develop a specific geostationary weather satellite system. The role of CIMSS naturally increased through the successful collaboration of government and academic personnel on a variety of research, teaching and educational outreach activities.

Smith left NOAA in1984 to join the faculty in the University of Wisconsin's department of atmospheric and oceanic sciences and to become director of CIMSS.

Photo by Jeff Caplan

Atmospheric Sciences Division Chief Bill Smith

"It is in this same spirit of collaboration between government and academia that now brings me to NASA Langley," he said. "I look forward to advancing satellite remote sensing capabilities as a NASA employee and to having more influence on the development of space missions than was possible as a university professor."

As chief of the Atmospheric Sciences Division, Smith will support the many research and development programs already underway at Langley, as well as create new projects to optimize satellite remote sensing.

"I plan to remain active in joint NASA and university research and educational activities," he said.

Ponton wins NASA fellowship

Michael K. Ponton, of Langley's Aeroacoustics Branch, has received one of nine NASA Administrator's Fellowship Program awards agency wide. He will spend two years at Hampton University (HU) beginning Sept. 2, except for several weeks spent at NASA Headquarters next summer.

The program promotes professional development of the science and engineering faculty of Historically Black Colleges and Universities, Hispanic Serving Institutions and Tribal Colleges.

Selected NASA employees work on these campuses for extended periods, allowing the institutions to understand NASA's scientific and technical needs and, thus, to be better prepared to participate in the agency-sponsored research and development programs.

"My goal in accepting this fellowship is to attempt to strengthen the research capabilities of both Hampton University and NASA Langley," said Ponton, "through establishing new working relationships between Langley scientists and the university's faculty members."

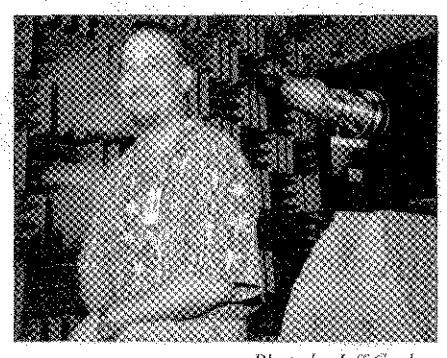


Photo by Jeff Caplan

NASA Fellow Mike Ponton

Ponton, a 10-year Langley veteran who has worked in the Jet Noise Laboratory since 1983, said he hopes to serve as "NASA's technology gatekeeper" for HU and to learn about the school's administrative practices and culture.

Joshi receives NASA scholarship

Sucharit S. Joshi, son of Dr. Suresh M. Joshi of the Flight Dynamics and Control Division, has won the 1997 NASA Scholarship Award.

This award was established as a direct result of a gift by the noted Pulitzer Prize-winning author James A. Michener for dependents of NASA employees who pursue higher education in engineering or science.

Joshi graduated with highest honors from Hampton Roads Academy this spring and was the class valedictorian. His honors include National Cum Laude Society, Mu Alpha Theta Math Honor Society, National Merit commended scholar, National French Honor Society and National Art Honor Society, Jefferson Scholar semifinalist. He was selected for the Governor's French Academy (1995) and for the Governor's School for Mathematics, Science and Technology (1996).

Sucharit Joshi

Joshi is planning to attend Princeton University this fall to pursue a pre-medical degree.

AdVentures

FOR SALE: York County 2-BR Coventry townhome, garage, loft, 2.5 baths, whirlpool bath, fireplace, dining room, small fenced-in yard. 2 years new. 7 minutes from NASA. Coventry has 2 pools, volleyball courts, tennis courts, elementary school, church. Seller will assist in closing costs. Must see. $94,900. Call 865-0764.

FOR SALE: Sturdy, black futon bunk bed with futon mattress and twin size mattress included. $375. Call Gresha Brown at 766-2085.

FOR SALE: Brother 2200 word processor, with spreadsheet and spell check functions, extra disks included. $75. Call 851-1990.

FOR SALE: This End Up-style pine daybed and twin mattress, like new condition. $100. Call 851-1990.

FOR SALE: 1988 Toyota Corolla, 94,000 miles, excellent condition, automatic transmission, power steering, power brakes, air conditioning, stereo. $3,000. Call 766-7840 after 8 p.m.

GET IMAXED: The Virginia Air & Space Center presents these IMAX films Sept. 4-Oct. 1: ***Super Speedway***, daily, 1 p.m.; ***Stormchasers***, daily, 10 a.m., noon, 2 p.m., 3 p.m., 4 p.m.; ***Cosmic Voyage***, daily, 11 a.m., ***Super Speedway*** and ***Stormchasers***, double feature, Thursday-Sunday, 7:30 p.m.

V-BALL TIME: Registration for the Langley Activities Association's fall volleyball season runs through Sept. 5; season starts the week of Sept. 8. Rosters and waiver-of-liability forms are available in the gym. To use the preferred electronic Excel spreadsheet roster form, contact Dave Rosenbaum at ext. 41800, or at d.m.rosenbaum@larc.nasa.gov. Registration fee is $100. Send completed rosters and checks made out to LAA to league representative by 4 p.m., Sept. 5. For more information, contact appropriate league representatives: Tuesday BB – Lou Glaab, l.j.glaab@larc.nasa.gov, ext. 41159, Mail Stop 343; Thursday B – Wes O'Neal, a.w.oneal@larc.nasa.gov, ext. 41132, Mail Stop 343; Tuesday C – Tom Britton, t.c.britton@larc.nasa.gov, ext. 46619, Mail Stop 161; Thursday D – Dave Rosenbaum, d.m.rosenbaum@larc.nasa.gov, ext. 41800, Mail Stop 488; Wednesday Open – Stan Husch, s.h.husch@larc.nasa.gov, ext. 41126, Mail Stop 254.

ALUMNI NEWS: Langley's Alumni Association will resume its meetings Sept. 9 – the second Tuesday of the month – at 11:30 a.m., in the private dining room of the cafeteria. Guest speaker is Bobby Braun on Mars Pathfinder. Pay 1997 dues to Mary Mesic, 2 Towne Square Drive, Newport News, Va., 23607. For more information, call 864-7330.

PASSING PLAY: NASA Flag Football League is looking for people to join existing teams or form additional teams for the upcoming season. The league is a refereed, seven-on-seven competition with minimal contact allowed. Passing plays are the general rule. Games are usually played Saturday mornings at Langley beginning the second or third weekend in September. The league is open to all Langley civil servants, contractors and their spouses. For more information, contact Dan Mazanek at ext. 41739 or at d.d.mazanek@larc.nasa.gov.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

ULTIMATE FRISBEE: Mondays and Thursdays, 5-7 p.m., next to the credit union, co-ed, all levels. For more information, contact jrrjr@icase.edu or call ext. 42197.

'SPARE' TIMES: The Langley Activities Association's tenpin bowling league is now organizing for its winter season. Tenpin bowling is Tuesdays, 6-9 p.m., at Pinboy's of York on Route 17. For more information, call Rodney Russell, ext. 43573, or Alan Frizzell, ext. 45413.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31, 1998, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

VOLUNTEERS NEEDED: For fun, appreciation and self-gratification, help the York Lions Club take the blind fishing on Sept. 17. For more information, call Carol Satterwhite, ext. 44580.

SWING YOUR PARTNER: Square dancing lessons begin Sept. 4 and continue every Thursday, 7:30-9:30 p.m., Palmer Elementary School, at the end of Palmer Lane, off Oyster Point Road in Newport News. Or visit an open house square dance, Sept. 6, 8-10:30 p.m., same place. See modern square dancing, try beginner-level dancing, and enjoy snacks from the hospitality table. For more information, call 825-3308.

VIRGINIA SYMPHONY: NASA and contractor employees can get a $5 discount off tickets to the Virginia Symphony's Beethoven Festival, Sept. 5-7, at the Williamsburg Winery. Tickets are $10 at the Langley Exchange Shop. The event includes a smorgasbord of selections by Beethoven, as well as international wine-tasting and a gala dinner.

MUSICAL MIX: The Barbara Martin Trio will perform a mix of blues, jazz and country/folk at the Williamsburg Library Theatre, Sept. 19, 8 p.m. Tickets are $8; $5 for children under 16. Call 229-4198 for reservations. For more information on this concert and on other library programs, see the Web site at ***http://www.wrl.org.***

School Tools: To help get our future off to a good start this school year, donate supplies to the ***School Tools*** project. Drop off pens, pencils, notebooks, loose-leaf paper, binders, etc., at the center cafeteria and Aero Dyner through Sept. 3; Day of Caring volunteers will distribute the items. For more information, call Sandra Lemons at ext. 43957.

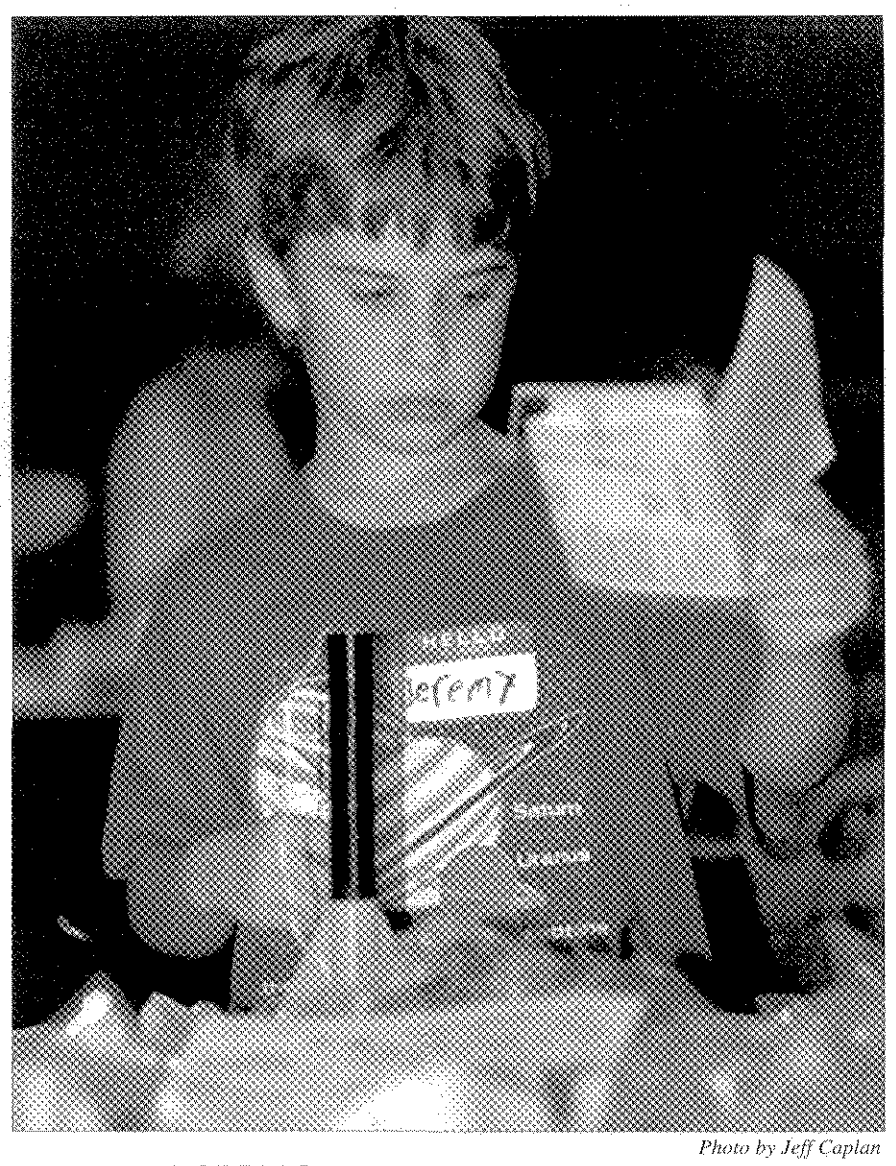


Photo by Jeff Caplan

WHEN ALL ELSE FAILS... Jeremy Hooten, 9, of Hampton, reads the instructions for completing the next step in building an Alpha III rocket during this summer's AeroCamp '97 held at the Virginia Air & Space Center. Some 50 youngsters attended the week-long event for kids in grades 7-12.

Researcher News

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News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 17 ❖ September 12, 1997

Langley tests large segment of RLV intertank

BY ANN C. GAUDREAUX

With a loud snap, NASA Langley deliberately "broke" a 22-foot-by-10-foot part being developed for NASA's next-generation launch vehicles to validate the design, fabrication and analysis tools used in its construction. Langley conducted the tests Aug. 28 on the full-scale technology segment of a composite intertank structure for the Reusable Launch Vehicle (RLV) program.

Dr. Wayne Sawyer of the Thermal Structures Branch said that a full-scale cylindrical section of an intertank RLV shell, including five ring frames, was selected as the test component. The test article is 10 feet long, about 22 feet wide and represents a nearly 90-degree section of an RLV intertank. The shell and ring frames are made from an advanced high-temperature graphite/bismaleimide composite. The test article was designed and fabricated by industry teams in cooperation with NASA.

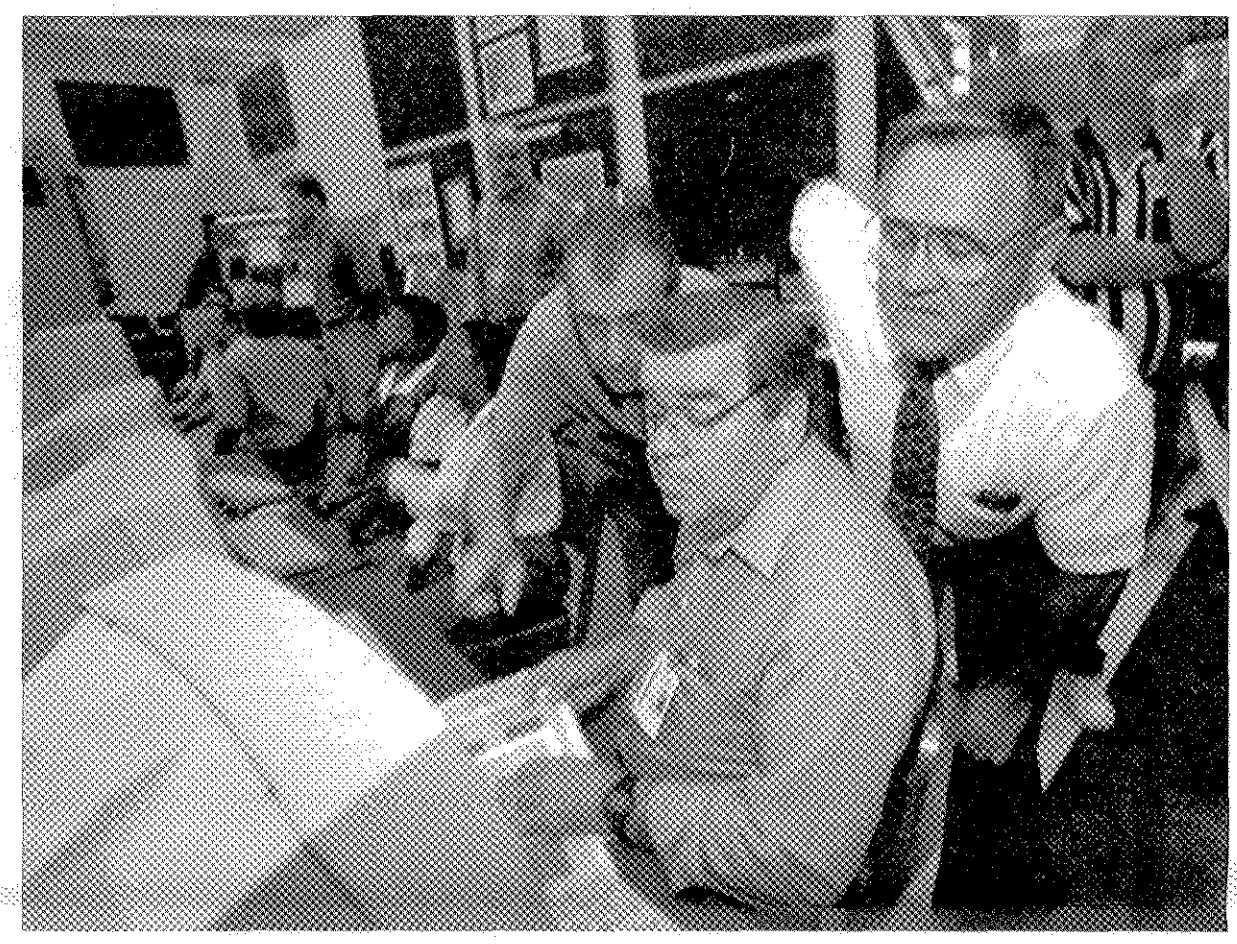


Photo by Jeff Calpan

Industry representatives Vinney Biagiotti, left, and Don Enoe, sitting, check out the performance of the intertank test as NASA senior research engineer Wayne Sawyer looks on.

Test methods, results

The article was tested by subjecting it to uniform compression loads to simulate the vehicle critical loading condition experienced during launch. One end of the test article was attached to the NASA Langley vertical test support structure that serves as a stiff reaction surface. The other end underwent a uniform pressure load applied by 21 hydraulic jacks equally spaced along the circular arc of an aluminum ring frame of the test article.

The ring frame acts as a test fixture to properly introduce the loads into the composite structure. Each load jack is individually controlled to provide equal loads to the test article. The whole structure is supported from the floor by stiff frames attached to the ring frames and the test fixture.

"Although the test component failed at a lower load than expected – at 500,000 pounds rather than at 800,000 pounds – we learned a lot from the test," said Sawyer. "We learned of some shortcomings and improvements needed in the fabrication and of the need to continue to look at the attachment of stiffeners to the skin. This is one of the steps in coming up with a better structural part."

Future of launch systems

For the United States to remain competitive in launching spacecraft, it is necessary to develop a launch system that is lightweight, robust, requires little maintenance or inspection, and has low-cost operations as part of its design features. Future launch systems must also greatly reduce the cost required per pound to put a pound of payload into orbit. The RLV program is developing various ways of achieving that goal.

Studies have shown that composite primary structures are a necessary part of the development required, and composite intertanks are an important part of that development.

Considerable advancements have been made in composite primary structures for the design of an RLV through cooperative agreements between NASA and industry teams. In these agreements, unique technical issues have been addressed for the major structural components of an RLV – intertank, wing and thrust structure.

X-36 tailless aircraft completes 19 flights, with more planned

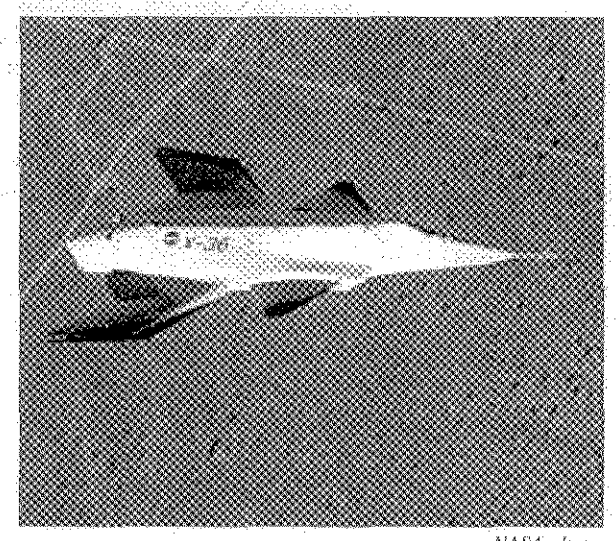
BY ROBIN MCMACKEN
NASA Dryden X-Press Editor

The X-36 tailless agility research aircraft has completed 19 flights as of Aug. 28, with more planned through December. The first phase of the flight-research program was successfully completed earlier this summer.

Phase 1 of the research program verified the remotely-piloted aircraft's control software, ground station and data system. All air data (pitot-static and angle-of-attack) calibrations are complete, including software changes. Parameter Identification, a new software program that looks at individual flight-control surface effectiveness, proved successful during Phase 1.

Another software program successfully used on the X-36 during Phase 1 was the Real-Time Stability Margin program, developed at NASA Ames Research Center at Moffett Field, Calif. This software monitors the aircraft's phase and gain margins for the flight-control system in real-time, meaning the data is sent to the aircraft's ground station immediately as the X-36 is in flight.

Phase 2 of the X-36 flight-research program includes opening up the aircraft's angle-of-attack envelope to 35 degrees, and demonstrating fighter agility that is equal to or greater than current fighter aircraft maneuverability at these elevated angles of attack.



NASA photo

The NASA/McDonnell Douglas X-36 remotely piloted aircraft flies over the Mojave desert near NASA Dryden Flight Research Center in June.

NASA Ames and Boeing (formerly McDonnell Douglas Corp.) developed the technologies required for a tailless fighter beginning in 1989. Ames leads the X-36 program; NASA Dryden Flight Research Center in Edwards, Calif., is hosting the program and providing range support.

In 1993, McDonnell Douglas proposed the remotely piloted aircraft technology demonstration to validate the technologies in a real flight environment. In 1994, McDonnell Douglas began fabrication of the two aircraft in their rapid prototyping facility in St. Louis. The project was jointly funded under a roughly 50/50 cost-sharing arrangement. The combined program cost for the development, fabrication and flight testing of the two prototype aircraft is approximately $20 million.

The X-36 has no vertical or horizontal tails, yet it is expected to be more maneuverable and agile than today's fighters. In addition, the tailless design reduces the weight, drag and radar cross section typically associated with traditional fighter aircraft.

A ceremony for the X-36 Flight Quality Achievement Awards was held recent at Dryden, where Dr. Robert Whitehead, associate administrator for the Office of Aeronautics and Space Transportation Technology, congratulated the team.

News Briefs

Around the Agency

ADVANCED COMPOSITION EXPLORER TO STUDY GALACTIC MATTER – (Goddard Space Flight Center, Greenbelt, Md.) The Earth is constantly being bombarded by a stream of accelerated particles arriving not only from the sun, but also from interstellar and galactic sources. The study of these energetic particles by NASA's Advanced Composition Explorer (ACE) observatory will contribute to the understanding of the formation and evolution of the solar system, as well as the astrophysical processes involved. The space science observatory launched Aug. 25 from Cape Canaveral Air Station, Fla. An ACE Project Web site is located at ***http://www.gsfc.nasa.gov/ace/ace.html.***

SCIENTISTS DISCOVER JET STREAMS FLOWING INSIDE THE SUN – (Goddard Space Flight Center, Greenbelt, Md.) Scientists using the joint European Space Agency (ESA)/ NASA Solar and Heliospheric Observatory (SOHO) spacecraft have discovered "jet streams" or "rivers" of hot, electrically charged gas called plasma flowing beneath the surface of the sun, as well as features similar to trade winds that transport gas beneath the sun's fiery surface. These new findings will help scientists understand the sunspot cycle and associated increases in solar activity that can disrupt the Earth's power and communications.

NASA RESEARCHES ENGINE AIRFLOW CONTROLS – NASA is conducting flight demonstrations of an advanced high-stability engine-control system that may increase significantly future propulsion system performance in military and commercial aircraft turbine engines. Under the High-Stability Engine Control project, NASA's Lewis Research Center, Cleveland, Ohio, and Dryden Flight Research Center, Edwards, Calif., are working together to evaluate a computerized system – called Distortion Tolerant Control – that can sense and respond to high levels of engine inlet air-flow turbulence or distortion, preventing sudden in-flight engine compressor stalls and potential engine failures.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "Between 1986 and 1996, the number of black women ages 16 and over grew from 11 million to 13 million. Their labor force participation rose from 56.9 percent to 60.4 percent – from "Black Women in the Labor Force"

▲ Sept. 15-Oct. 15 – Hispanic Heritage Month

Sept. 23-24 – Advancing Minorities' Interest in Engineering Conference, Florida A&M University, 410-319-3077

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Disabilities Awareness

Langley leads in assistance efforts

BY GERRY PARDUE

No one is immune to accidental injuries or diseases that create temporary or permanent disabilities. The older we get, the more at risk we become. If an accident occurs that results in you or a co-worker requiring assistance, call Disability Program Manager Diane Forrest at ext. 47718 to see what accommodations are available.

Langley's disability program initiated and developed plans that allow assistance for employees suffering from temporary disabilities, as well as for employees with long-term disabilities. The foresight and perseverance of Forrest and her entourage of volunteers have succeeded in making this center premier in the agency with accommodations and accessibility for people with disabilities.

Forrest gives credit for Langley's success to the many volunteers that were willing to take the time to work at something they received no pay or credit for doing. They wanted to make a change that they believed would benefit all Langley employees. To the center's credit, it has.

These energetic volunteers measure doorways, mentor students with disabilities, report needed curb cuts, set up displays and sit for hours talking to visitors about disabilities and the center's technology, sponsor awareness programs, and basically have increased awareness on center and in the community.

Any employee may fall victim to a temporary disability at any time, so all should be aware of what assistance is available. Check it out during **Langley's Disability Awareness Day, Oct. 17, noon-3 p.m., H.J.E. Reid Conference Center.**

Announcements

University women offer presentation

The American Association of University Women, Newport News and Hampton branches, invites the public to the Hampton University Museum for a presentation by the curator, Joan Zeilder, tour and reception, Sept.16, 5-7 p.m. AAUW promotes equity and education for women and girls and values and seeks a diverse membership. For more information, call Nancy Jane Bains at 245-6187.

Tech Forum topics set

The next Langley Technical Forum, Sept. 17, 10 a.m.-noon, in the Pearl Young Theater, will cover these topics:

▲ Winter Runway Friction Measurements – *Thomas J. Yager*

▲ Prediction and Validation of the Mars Pathfinder Aerodynamic Data Base – *Peter A. Gnoffo, K. James Weilmuenster, Bob Mitcheltree, Walt Engelund, Bobby Braun*

▲ Development of Millimeter Wave Imaging Sensor for All-Weather Aircraft Landing Operations: A Joint NASA-DARPA Project – *Thomas G. Campbell*

▲ An Aircraft Investigation of Tropospheric Chemistry over the Tropical Pacific Basin – *James Hoell*

▲ Overview of Systems Studies in Support of Scenario-Based Planning – *Philip C. Arcara Jr.*

Career workshops set

The Career Transition Assistance Program Center, Langley's career center, offers the following training seminars through November:

▲ "Networking for Career Development," Sept. 16, 1-4 p.m.

▲ "Conflict Management – Aggressive, Assertive or Passive?" Sept. 25, 8:30 a.m.-noon

▲ "Hone Your Negotiating Skills," Oct. 8, 9 a.m.-noon

▲ "Starting Your Own Business – The Basics," Oct. 9, 8:30 a.m.-3:30 p.m.

▲ "Starting Your Own Business – Laying a Solid Foundation," Oct. 16, 9 a.m.-noon

▲ "Communicating Effectively with Your Supervisor," Oct. 21, 9 a.m.-noon

▲ "Starting Your Own Business – In the Black, ASAP," Oct. 23, 9 a.m.-noon

▲ "Starting Your Own Business – The Right Side of the Law," Oct. 30, 9 a.m.-noon

▲ "So, You Want To Be A Consultant," Nov. 5, 8:30 a.m.-noon

▲ "Retiring for Fun, Not Profit," Nov. 13, 9 a.m.-noon

▲ "The Net and Career Development," Nov. 18, 9 a.m.-noon.

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Hudson receives ASTM award

C. Michael Hudson, team leader in the Facility Systems Engineering Division, received the American Society for Testing and Materials (ASTM) Fracture Mechanics Metal Award.

The award recognizes Hudson's "lifetime devotion to the field of fracture mechanics, resulting in significant contributions to the implantation and application of fracture mechanics to engineering structures, and lately, for uniting and clarifying terms and definitions for fatigue and fracture mechanics into a single terminology standard."

Hudson began his career at Langley in 1958 as a research engineer, becoming section head in 1974 and team leader in 1994.

Organized in 1898, ASTM is one of the largest voluntary standards development organizations in the world.

Assistive listening device available

If you are having trouble hearing what is being said around the conference table or in the office, call Diane Forrest at ext. 47718 to ask about the assistive listening device called Conference-Mate.

This wireless tabletop microphone can be used in conferences, meetings or offices to pick up nearby conversations.

The Conference-Mate, as well as Langley's other accommodations for people with disabilities, will be on display during Disability Awareness Day, Oct. 17, noon-3 p.m., H.J.E. Reid Conference Center

In memory of Bernice A. Barrack

Bernice Atkins Barrack, 76, died Aug. 7 in her native Hampton. She retired from NASA Langley as a division secretary in 1987.

In memory of Herbert A. Leybold

Dr. Herbert Arthur Leybold, 63, died Aug. 14 at his home in Lake Mary, Fla. A native of New York City, he lived in Hampton for 35 years and worked at NASA Langley as an engineer. He retired in 1984 after 30 years of service.

In memory of Robert F. Macklin

Robert Francis Macklin, 66, of Kitty Hawk, N.C., died Aug. 21, at his residence. A 1960 graduate of the NASA Langley apprenticeship, he retired from Langley in 1985 as a production controller.

In memory of John C. Wilson

John Charles Wilson, 70, died Aug. 30 in Newport News. He had worked for the Army at NASA Langley for 24 years, where he received Langley's Research and Development 100 Award in 1992.

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

New Norfolk State University president visits NASA Langley, promotes partnership

BY JESSICA C. VENABLE
Office of Education

The newly appointed president of Norfolk State University, Dr. Marie McDemmond, visited Langley last month.

During McDemmond's visit, Langley personnel, as well as NSU faculty, briefed her on the cooperative initiatives, grants and educational programs that exist between Langley and NSU.

Cooperative programs

McDemmond's visit began with a meeting with Center Director Dr. Jeremiah Creedon and Deputy Center Director Dr. Lee Beach. Dr. George Miller, associate vice president for research at NSU, gave an overview of the development of the joint Langley-NSU partnership, including competitive research opportunities, the expansion of the master's program in material science and the establishment of the Materials Research Lab.

Dr. Raj Chaudhury, department of physics, introduced the Bringing Education and Science Together (B.E.S.T.) laboratory, which provides science and mathematics curricula enhancements for pre-service and in-service teachers.

In addition, Office of Education Director Dr. Samuel E. Massenberg, Deputy Director Edwin Prior and Dr. Sandra Proctor, special assistant for education, briefed McDemmond on Langley's education programs. Proctor presented NASA's plan towards educational excellence and its education goal, which includes teacher preparation, student support, curriculum support, systemic change, and development and use of educational technology.

Photo by Peggy Hopkins

Dr. Marie McDemmond, president of Norfolk State University, right, talks with NASA Langley Director Jeremiah F. Creedon, during her visit to the center last month.

Dr. Thomas Pinelli, educational television production specialist, presented Langley's Educational Technology and Distance Learning programs, designed to build and enhance the student-teacher relationship by extending learning opportunities beyond the traditional resources. Roger Hathaway, university affairs officer, discussed Langley-NSU relations, stressing faculty enhancement and Langley internship programs, employment opportunities for NSU graduates and Langley-funded research grants.

Continuity of support

McDemmond proposed that, during her tenure, she would encourage the expansion of scientific programs, employment opportunities for NSU students and the continuation of scientific excellence with the help of the Langley-NSU partnership.

The former chief operating officer of Florida Atlantic University and its seven campuses, McDemmond joined the NSU family in July. She also had been vice president for budget and finance at Atlanta University and associate vice chancellor for administration and finance, as well as budget director at the University of Massachusetts. She also had served as assistant vice president for finance at Emory University and as director of finance for the 15 community colleges in Massachusetts.

McDemmond has been selected as an "Outstanding Young Woman of America" and is listed in *Who's Who Among Black Americans*. She has published articles in professional journals on topics ranging from financial management to leadership and is the immediate past president of the Southern Association of College and University Business Officers. She was also the recipient of the Florida Federation of Business and Professional Women's "Glass Ceiling" and "Women of Achievement" awards.

Teacher teams attend summer school at NASA Langley

BY SHELLEY CANRIGHT AND BILL WILLIAMS

This summer, 22 kindergarten through 8th-grade teachers traded in chalkboards, hall passes and dismissal bells for wind tunnel tests, flight simulators and aeronautics-related briefings as they attended a three-week Teacher Enhancement Institute (TEI) at NASA Langley.

Local participation

Among the participants was a local educator team from the Hancock County, W.Va., school system.

The local team consisted of Patricia Cromwell, an 8th-grade teacher from Weir Middle School, and Barbara Dofka, a 5th-grade teacher from Weirton Heights Elementary School.

"When I came to the Institute, I expected to gain content and hands-on activities to help me implement an aeronautics unit in my classroom," said Cromwell.

Problem-based learning

The TEI aimed to teach teachers aeronautics and the broad application of science and technology through a problem-based learning (PBL) strategy. PBL is an instructional method using a real world problem, also known as an ill-structured problem, as the context for an in-depth investigation. Most real-life problems are ill-structured, as are many social, political and scientific problems. When students take ownership of the problem and begin to generate solutions, their thinking improves.

Real-world situations

The teachers were immersed in a problem that challenged them to design a communication strategy for the White House Commission on Aviation Safety and Security, chaired by Vice President Al Gore, to educate and disseminate aviation information to the general public. Specifically, the communication strategy was to focus on aeronautics principles, technology and design associated with U.S. general aviation revitalization and aviation safety programs.

The presented problem addressed NASA's strategic outcome to widely communicate the content, relevancy and excitment of its missions and discoveries to the general population. Further, the PBL scenario addressed the technological challenges being taken up by NASA to revolutionize air travel and the way in which aircraft are designed, built and operated. It also addressed getting people and freight safely and efficiently to anywhere in the world at a reasonable cost.

With a "real-world" problem facing them, the teachers set out to gather information and to better understand the problem using inquiry-based and scientific methods. The learning in this aeronautics scenario was driven by the direction taken by participants, as PBL situations have no preconceived outcomes. The TEI participants established the following communication goal:

"By 2010, at least 85 percent of the U.S. population will be educated in basic principles of aeronautics, air safety, technology and aerodynamic design to be evidenced through the increased ability to effectively and safely use the 'highway in the sky'."

"Students will see a purpose and goal for the hands-on science and math they are learning in school," said Dofka.

Facing future challenges

NASA and educators like to stretch the boundaries and to prove that things that "couldn't be done" yesterday will be done tomorrow. With this mind-set, the TEI participants have picked up the challenge and will design their own aeronautics lesson plan and immerse their 1997-98 school year students in the problem.

That problem is for the students to come up with "a traveling, hands-on, minds-on aeronautics museum exhibit created *for* children *by* children." As a culminating activity, the Virginia Air & Space Center will set up a special display next summer of the childrens' museum exhibits created by the TEI participants and their students. The TEI faculty will visit each classroom during the academic school year to observe the implementation of the units.

In addition to the classroom observations, electronic follow-up sessions via the internet will be conducted during the school year to support the teachers' efforts in developing their PBL units to integrate technology in math and science instruction. Teachers will be connected through a chat line to share ideas, ask questions and generate solutions.

The Teacher Enhancement Institute is funded by the NASA Education Division and is a collaborative effort between NASA Langley's Office of Education and Christopher Newport University. Selected teacher teams were drawn from Langley's five-state precollege service region, which includes Kentucky, North Carolina, South Carolina, Virginia and West Virginia.

'Combined Federal Campaign 1997 seeks to unite those in need with those who can help

This kind of 'campaign contribution' carries no controversy, only kindness

The Combined Federal Campaign (CFC) is an entity created *by* federal employees *for* federal employees. Under one umbrella, it brings into focus the diversity of needs in the local, national and international communities under a single call for help.

This year, campaign contributors are urged to look at their contribution as "More Than a Gift." Rather, the Peninsula theme suggests to the area's more than 39,000 federal workers that their contribution is an investment in the future.

At Langley, this year's CFC committee has further personalized the theme for the 1997 campaign. As the Langley logo indicates, at NASA Langley, the stars are the limit. (See story below.)

"For more than three decades, NASA Langley employees have been charitable leaders on the Peninsula," said Jack Clough, Peninsula CFC program manager. "Langley has the highest participation rate of any major federal group, the highest average gift and the largest number of $500-plus and $1,000-plus givers. Add to this NASA Langley's leadership in continuously providing a CFC loaned executive and the center's immeasurable impact on our Peninsula Day of Caring."

A goal of this year's committee is to increase Langley's high participation to a "stellar" rate. The committee is asking each center organization to name a key worker who will carry the CFC message to their co-workers – the message that a contribution is "more than a gift."

CFC

Virginia Peninsula

"From the Stars to the Heart"

Among the goals of this year's campaign, CFC Chair Joe Heyman wants to emphasize how contributions benefit those who need help. Future issues of the *Researcher News* will highlight some Langley "stars" who are making a difference in our community.

These shining examples will be tapped from the countless center volunteers who have helped agencies supported by CFC dollars. Their generous gifts of time and talent have made a mark on what their organizations can offer those who need help. Watch for their stories.

Photo by Jeff Caplan

Waving the CFC flag are campaign committee members Karen Credeur, Local Federal Coordinating Committee liaison; Debra Hurst, recorder; Richard Bennett, International Association of Machinists representative; Susie Henriksen, financial chair; C. Michael Hudson, CFC loaned executive; Marie Lane, American Federation of Government Employees representative; Mark Shuart, vice chair; Marny Skora, publicity; Joe Heyman, chair.

Center's CFC kickoff set for Sept. 30

NASA Langley Research Center will kick off its annual Combined Federal Campaign on Sept. 30, 9 a.m., in the H.J.E. Reid Conference Center.

Center Director Dr. Jeremiah F. Creedon led the 1996 Peninsula-wide campaign and fully endorses this once-a-year opportunity for Langley to help those who need help – in our local community, across the country and all over the world.

Langley employees have a long tradition of helping in the communities in which they live. Sept. 30 marks the beginning of our annual financial opportunity to expand that tradition.

This year's CFC goal for Langley is $286,000.

Langley graphic artist lends 'more than a gift' to CFC logo design

BY MARNY SKORA

Wade Mickley is a magician – of sorts. His daily challenge is to make concepts visual. Words, a slogan, an abstract idea take on form, color, meaning – a being – under his creative direction. He seems to pull designs out of a hat, to the amazement of his audience.

A look behind the curtain of creativity reveals the tools of his trade. An imposing drawing board dominates his office. Colorful markers, colored pencils, pen and ink are appropriately present.

But Mickley's prime medium is a computer. From that magic box, the artist drew this year's Combined Federal Campaign (CFC) logo.

An NCI illustrator in Langley's Multimedia Service Center, Mickley finds it awkward to describe the process he uses to transform ideas into reality.

"I often go to the dictionary for inspiration," he says. "Something in the definition of a key word may spark a shape or suggest a color."

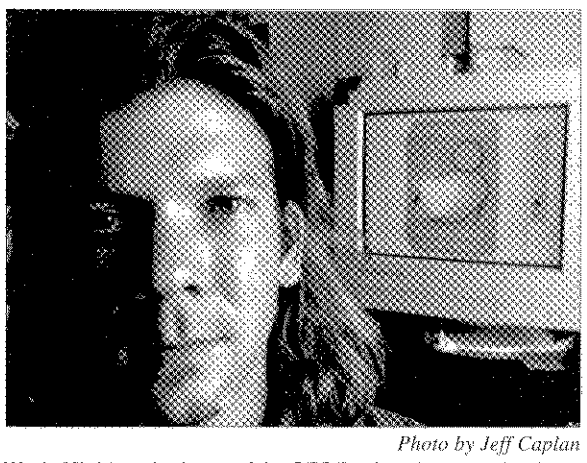


Photo by Jeff Caplan

Wade Mickley, designer of the CFC Peninsula campaign logo

Mickley designed the logo for the Peninsula-wide campaign to illustrate the CFC theme, "More Than a Gift."

"I see a contribution to the annual campaign as not just a donation of money, but as a gift of *self*," says Mickley.

His depiction shows the heart, not safely in place, but flowing from the body and resting at arm's length in an offering of self.

For the Langley campaign logo, he added a shower of stars to represent the center's addition to the Peninsula theme, "From the Stars to the Heart."

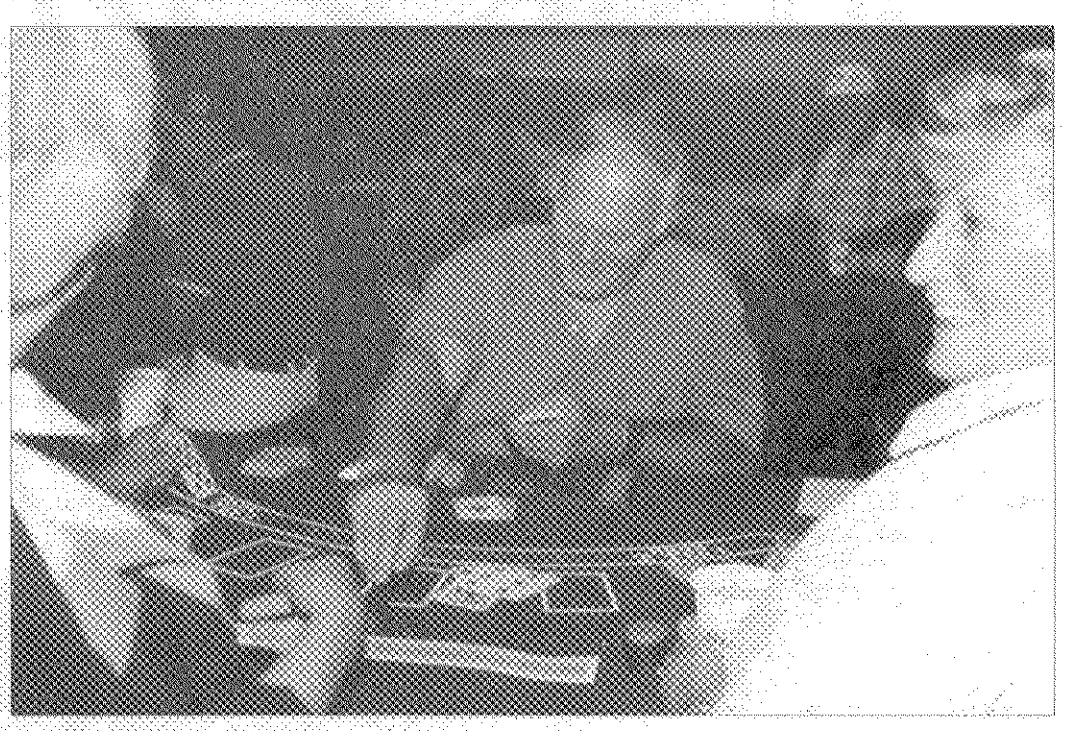
A graduate of Denbigh High School and Virginia Commonwealth University, Mickley has worked at Langley for more than two years, first as an illustrator for the Technology Applications Group. His assignments have included designing visuals for the center director's State of the Center address.

He is currently creating the graphics for Langley's CFC Web site. To see more of Mickley's work, check out the Web site at ***http://graphix2.larc.nasa.gov.***

Langley Activities Association 1997 Carnival

Gaming the day away

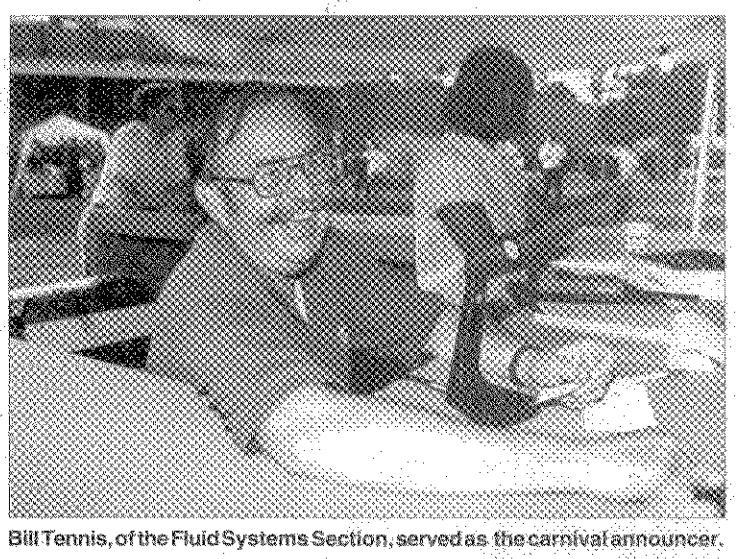
Photos by Peggy Hopkins



Jack Seiner, of the Aeroacoustics Branch, deals blackjack at the LAA Carnival's casino, which attracted nearly 300 people during the two-day event, Aug. 22-23. A total of nearly 1,000 Langley folks and their family and friends attended the carnival, raising about $5,000 for the Langley Activities Association.

Carnival Monarch Tammy Seward, of the Aerodynamic Measurement Branch, accepts her crown and bouquet.

Aaron Lewis, 8, "Little Brother" of Pat Troutman, Spacecraft and Sensors Branch, goes for a spin on the "Orbitron" gyroscope ride.



Bill Tennis, of the Fluid Systems Section, served as the carnival announcer.

Right: A budding young golfer tries his hand at putt-putt as his family cheers him on.

Above: "Mixed Company" entertains the crowd with progressive rock tunes.

Right: Langley family members and friends enjoy some of the many concessions offered at the carnival.

AdVentures

FOR SALE: Entertainment center/wall unit: all oak and hardwood construction; 67 1/2 inches high, 55 1/2 inches wide, 20 inches deep. 32-inch TV space. Superior condition. Originally more than $800; will sell for $325. Call 728-0379.

FOR SALE: Sturdy, black futon bunk bed with futon mattress and twin size mattress included. $375. Call Gresha Brown at 766-2085.

FOR SALE: 1994 Nissan XE truck, king cab, loaded, air conditioning, power brakes, power steering, sun roof, AM-FM cassette stereo, custom wheels, excellent condition. $9,500 or best offer. Call Mike at 804-966-2584, Monday-Thursday, after 6 p.m.

FOR SALE: Montgomery Ward refrigerator, side-by-side, 20 cubic feet, good condition, gold color. $75. Call 247-5144 before 9 p.m.

FOR SALE: Two tires, like new. Kelly Grand Spirit 245/50/R16 performance. $75 each. Call 877-1402.

VOLUNTEER POWER: Air Power Park and Museum, 413 West Mercury Blvd., Hampton, needs volunteers to staff the front desk. The park is open daily; shifts are 8:30 a.m.-12:30 p.m. and 12:30 p.m.-4:30 p.m. Volunteers should have an interest in air and space and in greeting visitors, especially during the park's peak tourist season. For more information, call 727-1163/1086.

RACE PLACES: Winners in the Langley Runners' Club 5-K race were John Hoppe (20:33) and Marlon Mao (38:56). In the 1-mile race, Laura Babcock and Shauna Bolger tied for first place (10:32); Don Cleckner placed third (11:25). Both races were part of the Langley Activities Association's annual carnival, Aug. 23. For information on the Runners' Club, call Richard Shearer at ext. 47036.

STRUCTURES: The Virginia Air & Space Center, Hampton, introduces a new exhibit, *Structures*, beginning Sept. 15 and running through Jan. 11. The display explores the relationship between architecture and engineering and features 12 interactive workstations. By pushing and pulling on various materials, visitors experiment with hands-on devices to discover how tension, compression and shear forces affect an architectural form. Beginning Oct. 4, demonstrations and make-and-take activities will supplement the exhibit. For more information, call 727-0900.

BLOOD DRIVE: The next Blood Drive is Sept. 24, 9 a.m.-3p.m., at the H.J.E. Reid Conference Center. Charge your time to Job Order B-1004.

FALL GOLFING: NASA Langley Golf Association members and friends plan a trip to Myrtle Beach, S.C., for a four-day golfing weekend in early October. For more information, call Tom Yager at ext. 41304.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for Jan. 24-31, to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

'SPARE' TIMES: The Langley Activities Association's tenpin bowling league is now organizing for its winter season. Tenpin bowling is Tuesdays, 6-9 p.m., at Pinboy's of York on Route 17. For more information, call Rodney Russell, ext. 43573, or Alan Frizzell, ext. 45413.

VOLUNTEERS NEEDED: For fun, appreciation and self-gratification, help the York Lions Club take the blind fishing on Sept. 17. For more information, call Carol Satterwhite at ext. 44580.

ALUMNI NEWS: Langley's Alumni Association meets the second Tuesday of the month, at 11:30 a.m., in the private dining room of the cafeteria. Pay 1997 dues to Mary Mesic, 2 Towne Square Drive, Newport News, Va., 23607. For more information, call 864-7330.

VIRGINIA SYMPHONY: The Virginia Symphony presents a Burt Bacharach pops concert, Sept. 20, 8 p.m., at Chrysler Hall, and a Walter Noona "Let's Dance" pops concert, Sept. 28, 2:30 p.m., at the Virginia Beach Pavillion Theatre. Season brochures are available at the Langley Exchange Shop and cafeteria. For tickets or more information, call 623-2310.

VIRGINIA STATE FAIR

Technical and administrative volunteers are needed to staff these NASA aeronautics and space exhibits in the Commonwealth Technology Center at the Virginia State Fair, Sept. 25-Oct. 5, Richmond State Fairgrounds:

▲ Infrared Camera and Nondestructive Evaluation Techniques

▲ Wind Tunnel Mock-Up and Computer Wind Tunnel Simulation

▲ Blended-Wing Body and High-Speed Civil Transport

▲ Pavement Grooving and Other Technology Spinoffs

▲ Atmospheric Sciences Programs and Satellites

▲ Langley's Contributions to Mars Pathfinder

▲ Building Structures in Space

Shifts run 10 a.m.-3 p.m. and 3-8:30 p.m. Transportation and admission tickets will be provided. Supervisory approval is required. For more information, call Nancy Finn at ext. 46528.

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Photo by Jeff Caplan

SCHOOL TOOLS – BAMIS contract employees Susan Givens, left, and Cathleen Norville, right, help Sandy Lemons box donated school supplies for delivery to the Volunteer Center for distribution to needy students. In addition to countless individuals, BAMIS (NCI Information Systems, Inc., and Lockheed Martin Corp.) supported the "School Tools" drive.

National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 19 ❖ September 26, 1997

High-performance material winner of R&D 100 award

Langley's PETI-5 resin cited in worldwide competition

A high-performance composite material with a potential market of several billion dollars has been picked as one of the 100 most technologically significant new products and processes of 1997.

The material, a high-temperature resin called LaRC™ PETI-5, was developed here at Langley.

It was selected by a 75-member panel on behalf of *Research and Development* magazine as part of the magazine's annual R&D 100 Awards competition. Panelists studied new technologies from around the world in making their selection. Following an awards banquet and exhibits program Sept. 25 at Chicago's Museum of Science and Industry, the winning entries were placed on public display.

PETI-5 is short for PhenylEthynyl Terminated Imide and is the fifth in a series. It has been patented by polymer scientists Dr. Brian J. Jensen, Paul M. Hergenrother and Dr. Joseph G. Smith Jr. of Langley's Materials Division. But many other engineers and technicians in the Composites and Polymers Branch were involved in its development into useful product forms such as prepreg and adhesive tape.

"Although only three of us are the inventors of PETI-5, much of the credit for its success belongs to other members of the Branch and our technician support staff," said Jensen.

Technology transfer

"The PETI technology has already been transferred to industry with licensing agreements to four different companies, which is unprecedented in the history of Langley and demonstrates the significant advance in technology which has been accomplished," said Greg Manuel, technology transfer agent with Langley's Technology Applications Group. The four companies are Culver City Composites, Culver City, Calif.; Cytec Engineered Materials, Havre de Grace, Md.; Fiberite, Greenville, Texas; and Imitec, Schenectady, N.Y.

Future contributions to air transports

Since currently available metals are either too heavy or cannot withstand the high temperatures created when flying this fast, composite materials made from graphite fibers and PETI-5 are necessary to both withstand the high temperatures and to make the plane strong enough and light enough to be economically viable.

PETI-5 was recently selected as the composite matrix resin and adhesive by the NASA-industry team developing technology for a future U.S. supersonic civil airliner, expected to be built in the first decade of the next century.

The major goal of the multi-billion dollar technology development program is to develop the technology necessary to build an economically viable supersonic civil transport plane that will fly at 2.4 times the speed of sound, and will carry about 300 passengers at a ticket price only 20 percent more than that for comparable subsonic flights.

This plane would decrease flight times from California to Japan from more than 10 hours to about four hours. Even though the plane would fly at altitudes up to 70,000 feet where the temperatures are lower and the atmosphere is less dense, the air friction created by flying at 2.4 times the speed of sound would heat some of the leading edges of the plane to about 350 degrees Fahrenheit. The plane has a design lifetime of 60,000 hours, or almost seven years, at supersonic cruise speed.

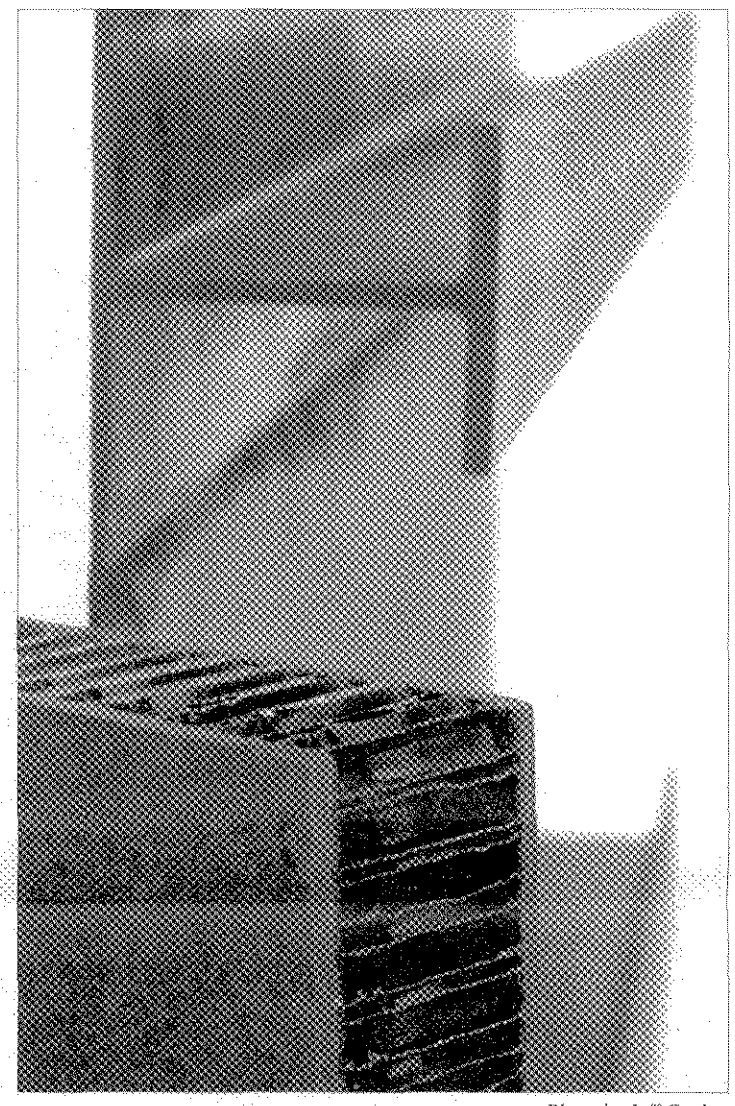


Photo by Jeff Caplan

Shown are composites made from the PETI-5 resin developed by researchers at NASA Langley. The top or horizontal piece is a sample of a stringer panel which is used for a wing or fuselage surface. The bottom piece consists of titanium honeycomb sandwiched between two PETI-5 faces.

The sky is the limit

The market potential of an adhesive or composite matrix resin for a fleet of supersonic civil transports could be several billion dollars. A significant market also exists for nonaerospace applications which require the exceptional combination of properties provided by PETI-5, such as high-performance automobile engine applications.

NASA Langley has earned 30 R&D 100 awards in its 30 years of competition.

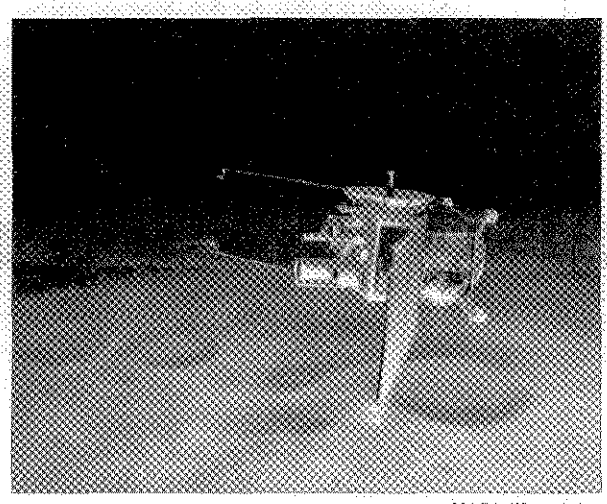
JIAFS student researchers survey Martian atmosphere

BY GERALD KEATING AND CATHERINE E. WATSON

As the Mars Global Surveyor (MGS), which arrived at Mars on Sept. 11, repeatedly dips into the Martian atmosphere to slow itself down, graduate students from the George Washington University Joint Institute for Advancement of Flight Sciences (JIAFS) at NASA Langley will gather the first orbiter accelerometer measurements of the vertical structure of the planet's upper atmosphere.

Five JIAFS graduate students began Sept. 17 to monitor near real-time data coming from one of Surveyor's accelerometers. The accelerometer measures changes in the speed of the Surveyor spacecraft caused by the drag of the Martian atmosphere. The JIAFS students will use these measurements to determine properties of Mars' upper atmosphere and estimate future variations.

"In addition to reducing the risk of aerobraking, our accelerometer experiment should provide a number of firsts in atmospheric science," said Gerald Keating, the principal investigator and team leader of the MGS accelerometer experiment and senior research staff scientist at JIAFS. "This is actually the first orbiter accelerometer to measure any planetary atmosphere.



NASA illustration

The Mars Global Surveyor spacecraft begins aerobraking in the Martian atmosphere. The JIAFS accelerometer experiment team will use measurements made during aerobraking to determine the vertical structure of the Martian atmosphere.

"We should get the first measurements of the polar upper atmosphere of Mars. We should get the first orbiter measurements of systematic variations in the upper atmosphere, including latitudinal and longitudinal variations. We should get the first orbiter measurements of the base of the thermosphere – a region near 100 kilometers that Earth orbiters cannot directly measure because of excessive aerodynamic heating. We may also obtain the first measurements of the responses of the upper atmosphere to Martian global dust storms. In short, this instrument should make the most detailed measurements of the Martian upper atmosphere ever achieved."

"Planetary probes like Pathfinder only have one entry into an atmosphere," said Jeffrey Parker, one of the JIAFS graduate students. "This means there is only one chance to collect data about the atmosphere. The MGS will make hundreds of entries allowing multiple opportunities to collect data."

The accelerometer experiment will make measurements of atmospheric density changes from which the research team will derive various atmospheric variables such as temperature and pressure. The accelerometer measurements will be made in the altitude range of 100-140 kilometers, allowing the team to perform studies of latitudinal, longitudinal and diurnal variations in this region of the Martian atmosphere.

"The ultimate goal of these measurements is to obtain a physically consistent model of the upper

(see SURVEYOR, page 4)

News Briefs

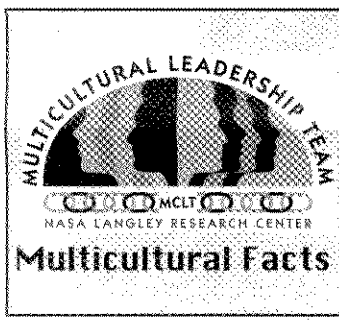
Around the Agency

NASA, DOD, FAA SIGN JOINT AGREEMENT – The NASA Administrator, the Undersecretary of Defense for Acquisition and Technology (Department of Defense) and the Federal Aviation Administration (FAA) Administrator have signed a joint memorandum of agreement (MOA) that provides guidance for federal interaction with commercial launch site operators on spaceports. This joint agreement brings to fruition many months of concerted effort by the members of the Interagency Working Group on Spaceports, which was initiated at the request of the White House Office of Science and Technology Policy. A "spaceport" will be similar to an airport for rockets and will be managed by a launch site operator. Operation of a launch site consists of operations and maintenance of launch property, including at least one launch pad. These operators may be state government agencies, state-chartered or state-sponsored entities, or commercial organizations.

VETERAN SHUTTLE COMMANDER RETIRES – (Johnson Space Center, Houston, Texas) Shuttle astronaut and Russian space station Mir veteran, retired U.S. Air Force Col. John Blaha retires from NASA today to become the assistant vice president of integration engineering for USAA Corporation in San Antonio, Texas. Selected as an astronaut in 1980, Blaha has flown on six shuttle missions during his career, including STS-29 in March 1989 and STS-33 that November. He piloted Discovery during both missions. Blaha also commanded two shuttle missions – STS-43 in 1991 aboard Atlantis and STS-58 on Columbia in 1993. As an extended duration crew member to fly on the Russian space station, he launched to Mir as a member of the STS-79 crew in September 1996 and returned to Earth on Atlantis with the STS-81 crew in Jan. 1997, completing a four-month stay on Mir.

HUBBLE REVEALS HUGE CRATER ON ASTEROID SURFACE – (Goddard Space Flight Center, Greenbelt, Md.) Astronomers have used NASA's Hubble Space Telescope to discover a giant impact crater on the asteroid 4 Vesta. The crater is a link in a chain of events thought responsible for forming a distinctive class of tiny asteroids, as well as some meteorites that have reached the Earth. The giant crater is 285 miles across, which is nearly equal to Vesta's 330-mile diameter. If Earth had a crater of proportional size, it would fill the Pacific Ocean basin. Astronomers had predicted the existence of one or more large craters.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***



▲ "Between 1986 and 1996, labor force participation of Hispanic women ages 16 and above rose from 3.1 to 5.1 million, a 65 percent increase. In the same period, their population growth rose by more than 54 percent. – from "Women of Hispanic Origin in the Labor Force"

▲ Oct. 1-4 – National Action Council for Minorities in Engineering Forum '97 Conference, Seattle, Wash., 212-279-2626, ext. 215

Oct. 8-10 – "Workplace Diversity: New Challenges, New Opportunities" Conference, Washington, D.C., 1-800-283-7476

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Gray named Harvard fellow

BY NANCY FINN

Carl Gray of the Facility System Engineering Division will attend the Harvard Senior Executive Fellows Program (SEF) at Harvard University in Cambridge, Mass., beginning Sept. 29.

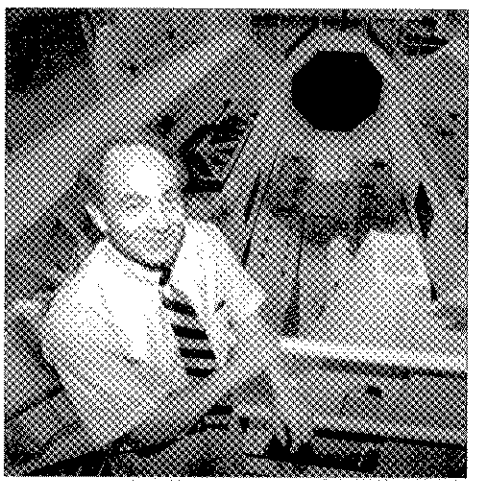


Photo by Jeff Caplan
Harvard Senior Executive Fellows Program attendee Carl Gray

Gray, 47, oversees 115 employees in his division, which supplies ground-based, space- and flight-related research facilities, equipment and hardware for Langley's programs.

SEF participants are primarily upper-level managers who have advanced rapidly into senior positions. The eight-week program allows federal managers to gain insights on public policy and management. They will boost leadership skills, acquire insights into managerial practice and learn to interact across agency lines. It also allows private-sector attendees to gain perspectives on decision-making processes and needs.

"I will be exposed to a cross-section of future leaders of government and industry and from them learn of the political, social, and economic forces which will shape the federal services in the years to come," said Gray.

He hopes to gain an improved understanding of advanced principles of management, he said. He will also be exposed to and will apply the latest tools and technologies available to the ever-changing management process.

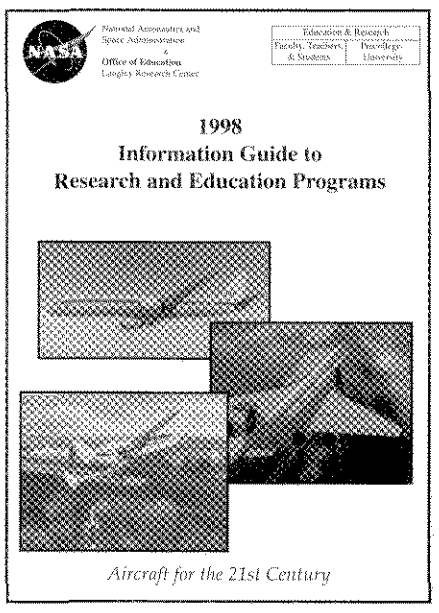
Gray came to NASA Langley in 1969 as an engineering technician. His career here has included stints in the Army's Structures Laboratory, the Structural Dynamics Division and the Systems Engineering Branch. He became head of the Structural Engineering Section in 1989 and then of the Structural Design Branch in 1991. He was named chief of the Facility Systems Engineering Division in 1994.

Announcements

Information Guide now available

The 1998 edition of the *Information Guide to Research and Education Programs*, from Langley's Office of Education, is now available.

The guide provides readers with a comprehensive list of NASA opportunities for students and faculty at all levels of the education community. It contains program descriptions, contact information, Web sites for further reading, and often, the necessary application forms.



Aircraft for the 21st Century

Also included is a summary of Langley opportunities for both students and faculty to participate in center research. In the appendix, readers can find contact information for other NASA facilities, the NASA Educator Resource Centers, and the NASA Regional Educator Resource Centers.

Readers will find many specific internet addresses of various NASA-sponsored Web sites. This year's issue is also available on the Office of Education's on-line publications Web page at ***http://edu-www.larc.nasa.gov/edu/pubs.html.***

For a hard copy of the guide, send an e-mail request with your mail stop to Liz Ward at e.b.ward@larc.nasa.gov, or call Jennifer Moore at ext. 49266.

Voluntary Leave Transfer Program

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

The following Langley employees are approved leave recipients: Lynn E. Brown, Richard P. Hartman, Patricia G. Reagon, Debra P. Shimek, Mary Ann Steuck, Cassandra D. Stevens.

Employees may not donate to their immediate supervisor; employees may not donate more than one-half of the total annual leave accrued during the leave year; employees may not donate more "use or lose" hours than are left in the leave year to work.

To donate annual leave, submit the electronic form, "Request To Donate Annual Leave to Leave Recipient Under the Leave Transfer Program," to Mail Stop 174, Personnel Management Branch, or fax the form to ext. 47899. For more information, call ext. 43194.

Explorer Posts program soliciting applications

The Hampton Roads Section (HRS) of the American Institute of Aeronautics and Astronautics (AIAA) sponsors three Explorer Posts for aeronautics, astronomy and computer science for the Boy Scouts of America. Post meetings are held on center, and all participants must be 16 years of age and U.S. citizens. These posts are open to both boys and girls, including children of Langley employees.

The HRS is currently soliciting applications for the program,which will kick off with a program Oct. 14, 7-9 p.m., at the H.J.E. Reid Conference Center. For an application,contact Geoff Tennille at ext. 45786 (g.m.tennille@larc.nasa.gov). For information about the programs, contact Bob Weston at ext. 42149 (r.p.weston@larc.nasa.gov) about aeronautics; Bob Mack at ext. 45988 (r.j.mack@larc.nasa.gov) about astronomy; and Garry Qualls at ext. 44442 (g.d.qualls@larc.nasa.gov) about computer science.

Retiree sends thanks

"I would like to thank all my friends and coworkers who honored me with a great retirement social on July 29. Joan and I shall cherish the memories forever. The gifts, plaque, photographs, mementos and tributes were very appreciated and much more than I deserved. The most wonderful gift I received is your friendship for the past 36 years while working in one of the greatest adventures of this age. Best wishes to all."

– David B. Rhodes

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor. . . . . Keith Henry

Editor. . . . . Mary Graves
Science and Technology Corp.

Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

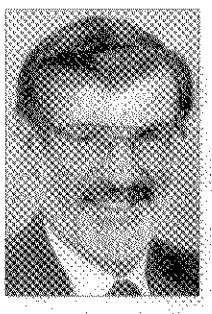
Photographer . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley center director endorses Combined Federal Campaign

"It is once again time to look beyond our gates to the needs of our neighbors – those across the country and throughout the world – who need a helping hand.

"Last year, I was privileged to lead the Peninsula-wide Combined Federal Campaign (CFC). That experience deepened my strong personal commitment to this once-a-year call for help.



"The CFC is an organization founded by federal employees to help those in need. Qualified CFC agencies worldwide are searching for cures to disease, working to protect our environment, helping to feed and clothe victims of disaster, offering hope and help to those who desperately need both.

"Langley's CFC committee, under the leadership of Joe Heyman, has set a center goal of $286,000. That's an increase over last year. It is predicated on the needs of others, and I support it. In fact, I am confident that, with your help, we can make it.

"I invite each of you to consider contributing to the CFC, no matter what the amount. You may designate your gift to your favorite charitable organization or cause. I hope you will view your donation as "more than a gift"; your contribution is truly an investment in the local community, in our country or in our neighbors worldwide.

"This center has a long tradition of leadership on the Peninsula and throughout the agency. As one federal worker to another, I am asking you to help keep that tradition alive. When your key worker approaches you, please consider your contribution carefully. It's more than a gift."

– Dr. Jeremiah F. Creedon

Pilot launches emergency air service

CFC kickoff speaker helps save lives

BY MARNY SKORA

When a mission plane crashed in Columbia, South America, its survivor needed air transport to Washington, D.C., for specialized treatment of a tropical disease that complicated his recovery. Lashing a sawed-off Army stretcher to the floor of a single-engine plane, volunteers created the air ambulance needed to save that survivor's life.

From that incident and other like dramas, Mercy Medical Airlift (MMA) was founded. MMA is a non-profit organization dedicated to serving those in need of air transportation for serious medical treatment.

Its founder, Ed Boyer, will speak at the kickoff of Langley's Combined Federal Campaign, Sept. 30, 9 a.m., in the H.J.E. Reid Conference Center. All employees are invited to attend and to learn how a nationwide league of private pilots is offering a new perspective of the benefits of aeronautics.

A graduate of Rensselaer Polytechnic Institute and a licensed professional engineer, Boyer has been a pilot for 36 years. He earned commercial, instrument, glider and single- and multi-engine ratings. A senior career federal employee, Boyer retired as director of facilities engineering for the Department of Health and Human Services.

FYI

What:	Langley's CFC Kickoff
When:	Sept. 30, 9 a.m.
Where:	H.J.E. Reid Conference Center
Speaker:	Pilot Ed Boyer, founder, Mercy Medical Airlift

The American Federation of Government Employees and International Association of Machinists encourage their Langley members to support this year's CFC.

The American Federation of Government Employees Local 2755 fully supports the efforts of the Combined Federal Campaign at NASA Langley.

Together we can make a difference in the lives of a tremendous number of people. United, through the CFC, we can accomplish what no individual could accomplish in a lifetime of giving. The CFC has proven in the past, and continues to prove today, what a community can do when it pools its resources. A gift to CFC is truly "the gift that keeps on giving."

Benjamin J. Schlichenmayer
President, American Federation of Government Employees, Local 2755

The International Association of Machinists (IAM) Union strongly supports the Combined Federal Campaign and recognizes all of its community assistance programs.

The union has always endorsed the services provided by the CFC. During this era of downsizing and cutbacks, supporting this cause is most critical. Thus, the IAM membership has collectively agreed to 100 percent participation.

Tom L. Vranas
President, International Association of Machinists, Local PM 2829

How to pledge

Electronic pledging marks second year

BY ROBIN K. LAND

Langley civil service employees will again be members of one of the only organizations in the nation making their Combined Federal Campaign (CFC) pledges using an electronic pledge card. Last year, Langley employees demonstrated to CFC organizations around the country that electronic collection of pledges would work without a significant impact to the total amount collected. This year's brochure and pledge form have a new look, thanks to Langley graphic artist, Wade Mickley.

Once again, a contributor entering the Web site can view the brochure in either a graphical or text-only format. Selection of either format type will display the CFC home page. From the home page, the contributor can view more information on how his CFC contribution helps, CFC facts and figures, or a list of CFC charitable agencies. NASA Langley civil service employees can also access the CFC on-line pledge card from the link titled "Contribution Form On Line."

The 1997 brochure has an enhanced search capability. Brochure users can now search for individual pieces of information, such as charity name, affiliation, descriptive information and even overhead percentage.

In addition, the NCI contracting staff has added a shopping-cart feature to the pledge form. This enhanced capability allows contributors to leave the pledge card and "shop" for CFC charities. Contributors can search for and select any agency and place it in their contribution shopping cart. Upon return, the contributor will find his pledge card prepopulated with the charity codes that were contained in his shopping cart. No more writing down agency codes and names.

As always, electronic pledging is at the discretion of the contributor. CFC key people in each organization will have manual pledge cards for any contributor who wants one. Pledging electronically, however, will reduce the amount of time required to pledge by automatically calculating the contributor's total annual pledge amount, validating all entered agency codes, insuring all required information has been completed, and displaying names of agencies contributed to, rather than just code numbers.

More importantly, the electronic version significantly reduces the manpower and cost of processing manual pledge cards, and eliminates the need to keypunch the contribution information into both the Langley payroll system and the Virginia Peninsula CFC pledge system. The development team asks that each contributor consider using the on-line pledge card when possible to help reduce the costs of running Langley's CFC campaign.

The CFC brochure will be available for the Sept. 30 CFC kickoff; the electronic pledge card will be available Oct. 1. Both can be found at this internet address: ***http://cfc-vapen.larc.nasa.gov/CFC***

International efforts

Salvation Army continues flood relief in Czech Republic

BRNO, CZECH REPUBLIC

Blue skies appeared like a benediction over flood-drenched fields, villages and cities in the Czech Republic's north-east quadrant. It was the first hopeful sign in a number of days for tens of thousands of beleaguered citizens. Their optimism may not last, however, as more flooding is expected.

So far, the flooding – called the worst in a century – has left 15 dead, with 30 reported missing. Thousands are homeless. The disaster, which has affected the whole country, has given the Salvation Army its first opportunity to minister through its disaster relief services.

Since the floods hit, the Salvation Army has been on the scene, providing food, water, blankets and clothing to victims. Many of the supplies are the result of Brno corps officer Lt. Premek Kramerius' plea for donations, broadcast on local radio and TV stations.

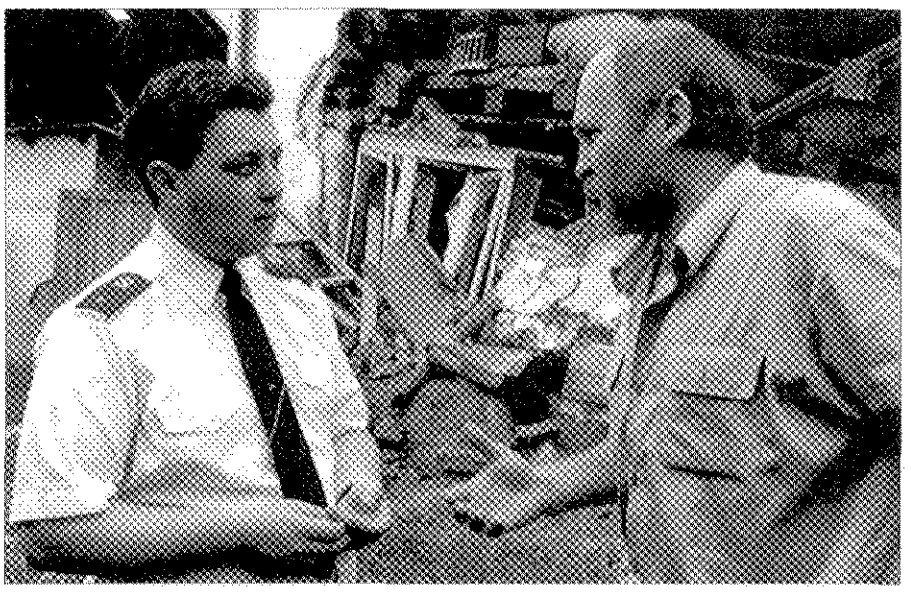


Photo by Ruud Tinga

Salvation Army Lt. Premek Kramerius, left, is the first Czech officer since the Army reopened its work in the country in 1990.

"This is a first for this area," said Capt. Richard Huntley, a Brno hostel director. "People aren't used to solicitations for relief assistance; they aren't used to giving in this way."

The response has been significant, with a steady stream of donations being dropped off at the corps, filling several vans with much-needed goods.

Cols. Bill and Gwen Luttrell, visiting from the USA Western territory, assisted in transporting relief supplies to the town of Olomouc. This was the worst disaster in that city's thousand-year history. Electricity was out, and floodwaters were still rising. The Luttrells and Huntley met the local Red Cross director to determine how the Army and Red Cross might best work together to meet vital needs. They delivered Army supplies to a school and a daycare center, both serving as shelters.

"These people not only need the physical support the Salvation Army can supply," said Gwen Luttrell, "they need the spiritual support that Salvationists can offer as well."

Excerpts reprinted from The War Cry, *the magazine of the Salvation Army, Aug. 23, 1997.*

National organization reaches out locally

Red Cross comes to rescue of Newport News fire victims

Shannon Baker's life was turned inside out just days before Christmas last year when fire overtook the Newport News apartment she shared with her daughters, 11-year-old Brittany and 6-year-old Bianca.

"I never expected to have a fire," Baker said. "I had never known anybody who'd had a fire."

As the smoke settled, she and her children had immediate emergency needs – food, clothing, shelter. The blaze had claimed a week's worth of groceries, all her dining room furniture and other possessions. Everything smelled of smoke. The apartment was uninhabitable.

The Bakers moved in with family. (If she didn't have family, the Red Cross would have put the Bakers up in a local motel.) But Baker knew she and her daughters couldn't stay on indefinitely. She called the Red Cross.

A caseworker worked with her, providing the family with the application fee, security deposit and first month's rent on a new place, Baker says.

When the unexpected happened to the Bakers, help was there in a heartbeat.

"It's been a good year – working, having my own place," Baker says now. "I'd probably just be able to move into my own place now if it hadn't been for the Red Cross. They helped us get back on our feet."

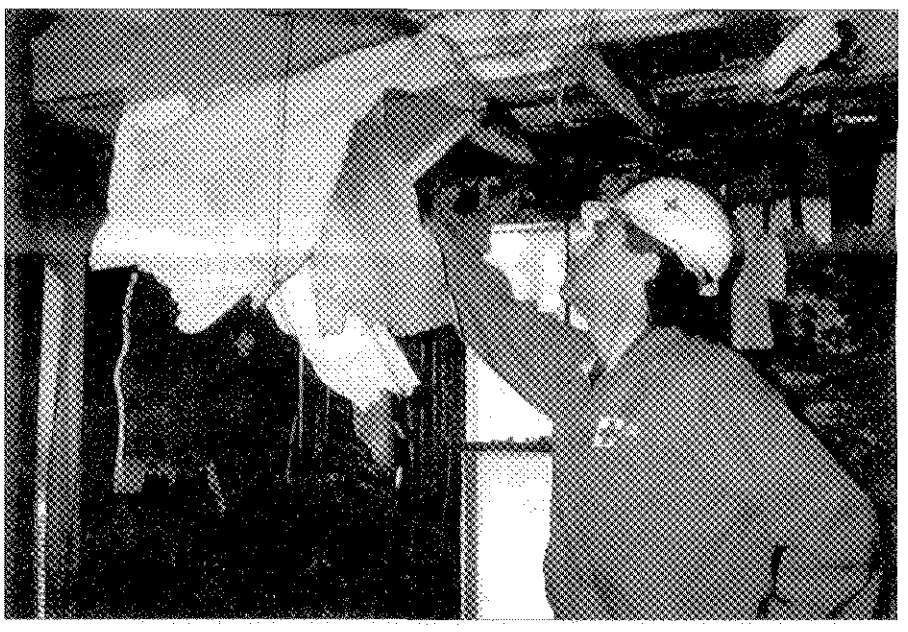


Photo courtesy Red Cross

A Red Cross volunteer inspects the fire damage at Shannon Baker's Newport News apartment.The Red Cross helped Baker and her two young children to get back on their feet after last year's Christmastime fire rendered their apartment uninhabitable.

It's up to you!

Direct your support to what you care about

CFC

a tradition of caring

NATIONAL VOLUNTARY NVHA HEALTH AGENCIES of Virginia

Our Name Is National – Our Service Is Local

The National Voluntary Health Agencies of Virginia is a federation of more than 60 health and human care organizations. Each is dedicated to finding the cause and cure for illness and disease that cripple and kill people throughout Virginia. Our goal is to improve the quality of life for everyone.

The NVHA-VA has been helping Virginians for nearly 40 years. Many of our member organizations have provided their free services to people throughout the Commonwealth even prior to NVHA-VA's origin. Every year, about one person out of three in Virginia receives assistance from NVHA-VA agencies.

SURVEYOR

(continued from page 1)

atmospheres of Mars, Earth and Venus," Keating said.

Also on Sept. 17, the MGS spacecraft began to use the Martian atmosphere to slow down in a process called "aerobraking" – using the friction of the atmosphere flowing past a spacecraft to slow the craft down. The aerobraking, or deceleration, phase of the Surveyor spacecraft will lower it into a nearly circular mapping orbit over the poles of Mars over a period of four months. Once Surveyor is in a circular orbit, it will begin its two-year mission to map the surface of Mars.

"So little is known about the upper atmosphere of Mars that the accelerometer instrument will play a critical role in safely performing the Surveyor aerobraking," Keating explained.

Surveyor mission engineers will use results from the accelerometer data analyzed by the JIAFS students to determine how well the aerobraking is working and to make adjustments to the spacecraft's aerobraking orbit. Because the Surveyor spacecraft will be near its aerodynamic heating limits throughout much of the four-month aerobraking procedure, the accelerometer experiment data are critical.

"All the aerodynamic coefficients used in the aerobraking are generated using computer codes only," said Bob Blanchard, a NASA Langley coinvestigator. "The rarefied atmosphere condition during the MGS aerobraking event presents great difficulties for using the classical 'wind tunnel' techniques for generating the aerodynamics data base."

"In the last few years, [JIAFS students] have also been involved in operations with the Magellan mission to Venus and a shuttle/Mir docking mission," said Bob Tolson, the co-principal investigator and a JIAFS student advisor. "We try to put students into situations that stretch their capabilities, that make them take risks and make real engineering decisions."

The JIAFS students are George Cancro, Jeff Parker, Steve Noll, Russell Shane and Brandon Wilkerson. Didier Rault and Dick Wilmot of NASA Langley also provided aerothermodynamic support.

A day at a time

BY MARNY SKORA

Working along with hundreds of citizens from the Peninsula, 170 Langley civil servants and contractors participated in the sixth annual community Day of Caring.

For this one day a year, Langley employees en masse turn off their computers, leave their air-conditioned offices and face a full day of painting, landscaping, filing, carpentry and a host of other jobs.

"I helped make a difference in my community."

Patsy Campbell, Office of Equal Opportunity Programs

They fan out as far north as the Child Development Resources Center in Croaker, southwest to Maryview Nursing Care Center in Suffolk, as well as to nearby agencies, including Big Brothers/Big Sisters, the American Red Cross and Peninsula Habitat for Humanity.

Again this year, NASA joined *The Daily Press*, Virgina Power, Virginia Natural Gas, Newport News Shipbuilding and other community-minded organizations to sponsor this daylong effort to spotlight the needs of the community. The Volunteer Center matched federal and corporate volunteers with more than 40 projects.

The Peninsula was a better place due to the concerted efforts of nearly 700 volunteers, who also changed a bit by day's end.

Debbie Martinez, Information Systems Support Division, went to Maryview Nursing Care Center. She helped organize a picnic for the residents, played games with them and visited.

"One lady touched me in a special way," said Martinez. "She had suffered a stroke, so she couldn't talk except to answer 'yes' or 'no.' Yet she talked with her eyes. I learned that she loved gardening, music, dancing, being in the fresh air, just like I do. I realized just how much she cherished activities that I take for granted. I learned, too, just how much one can learn by taking time for others, by listening to the unspoken word."

Ruth Amundsen, Engineering Analysis Branch, helped a family with three children being raised by their grandparents since the death of their parents. The youngest child has AIDS.

"They are a cheerful family," said Amundsen. "It was a good feeling to be able to do things for them they were not able to get to themselves."

Linda Goodwin, Financial Management Division, visited patients in the Veterans Hospital.

"I had a day full of eye opening experiences – very worthwhile, though heartbreaking at times," she said.

Faye Boninu, BAMIS contract/NCI, scraped and painted a sunporch that will be used as a playroom in bad weather.

"I felt as though I accomplished something important for children who have AIDS. Plus, the staff at the agency we helped were so appreciative."

"I felt a sense of teamwork and a sense of accomplishment."

Julie Fowler, Office of Public Services

Arthur Ritter, Facilities and Systems Support Division, finished an assignment at the American Cancer Society and then helped build a house for Habitat for Humanity. Volunteers at Child and Family Services, the Langley Child Development Center, Zoe Community Church and other locations worked past quitting time to finish their assignments.

TaShawn Bryant, stay-in-school student, Flight Operations and Support Division, will soon begin training to be a buddy for the CANDII program, a children's AIDS network.

"Thanks to the 1997 Day of Caring, I've found a quality organization to help," she said.

Photo by Peggy Hopkins

Marie Lane, Facilities and Systems Support Division, sorts through mounds of donated clothing at Mission Daystar.

Willard Bauserman, Experimental Testing Technology Division, left, and Robin Kloeppel, Supershipbuilding Newport News volunteer, measure ceiling tiles for installation at Zoe Community Church in Newport News.

Photo by Jeff Caplan

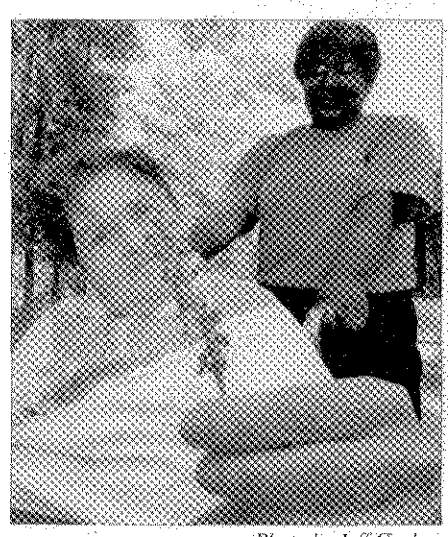


Photo by Jeff Caplan

Jo Legette, Facilities and Systems Support Division, escorts a Maryview resident to the picnic planned for the Day of Caring.

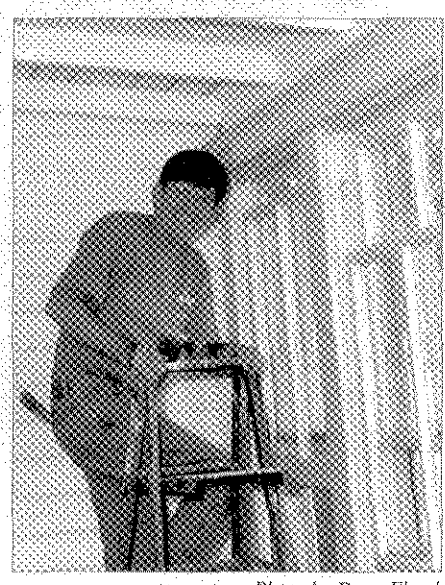


Photo by Dean Floyd

George Allison, Employee Development Branch, finishes scraping water-damaged sections of the ceiling before painting the sunroom at a CANDII site.

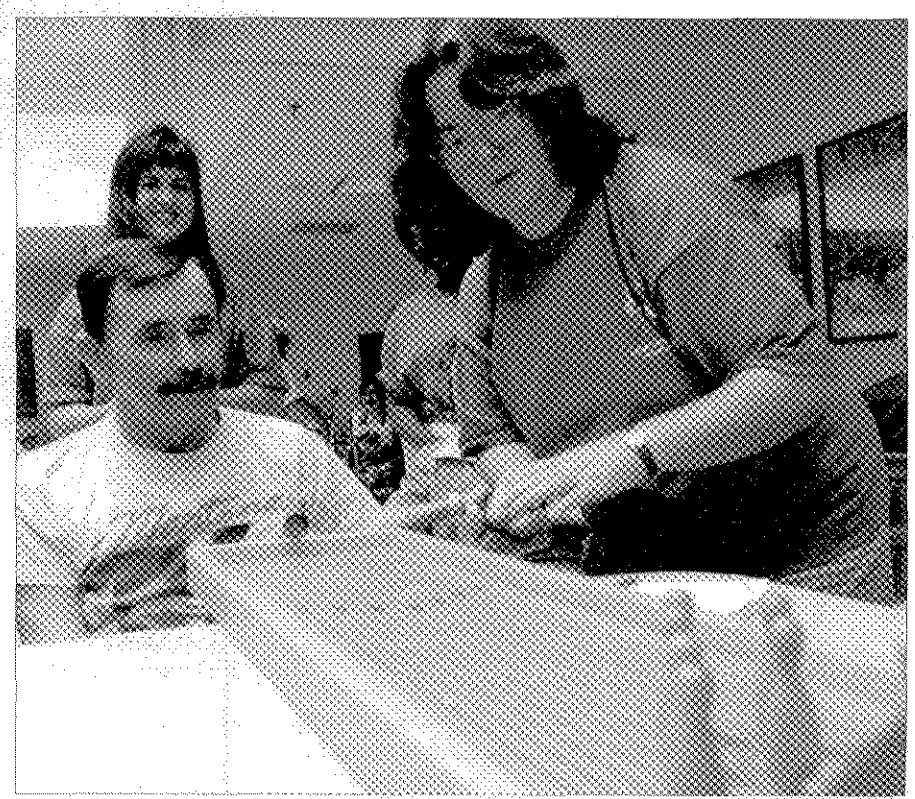


Photo by Jeff Caplan

Sandra Zumbrun, Fabrication Division, right, assists Maryview resident James Masters with a tabletop game of bowling.

AdVentures

FOR SALE: Sterling commemorative 60-coin collection of all the significant space launches. Originally $300; will sell for $50. Call 229-5434.

FOR SALE: This End-Up-style pine daybed, with twin mattress, barely used, like-new condition. $100. Call 851-1990.

REWARD: Offered for return of lost necklace, 18-inch gold herringbone with double clasp, lost somewhere on center, of extreme sentimental value. Call Kim Tatum at 988-0349.

EXCHANGE SHOP NEWS: ***Summer clearance sale***, now in progress, ends Sept. 30. ***Nauticus tickets*** now available; $6 for NASA employees. Tickets for the ***Virginia State Fair***, Sept. 25-Oct. 5, $11. Register to win two tickets to an AMC ***movie*** theatre; drawings held every Friday during October. For more information, call ext. 47918.

POCKET STATS: Limited copies of the 1997 edition of the *NASA Pocket Statistics* have just arrived and are available for distribution. To obtain a copy, contact Jeane Shanks at ext. 43293 or at pic@larc.nasa.gov with your name and mail stop. A few copies of the 1996 edition are still available.

FALL RACING: The NASA Intercenter Competition for the fall will begin on Doolittle Road on the following days: 10-K races, Oct. 6, 16, 23, 5 p.m.; 2-mile races, Oct. 9, 14, 20, 5 p.m.; Halloween 2-mile race, Oct. 30, 4:40 p.m. (cosponsored by the Langley Fitness Center and the Langley Runners' Club). All Langley employees, retirees, on-site contractors and co-ops earn points for Langley by participating in this agency-wide competition. Walkers are welcome. For more information, call Richard Shearer at ext. 47036.

FLYING HIGH: The Virginia Air & Space Center, in collaboration with NASA and the aeronautics industry, opens ***Up, Up and Away! Those Magnificent Flying Machines***, Oct. 7. This is the first of three phases of a new interactive exhibit that explores the science and physics of flight, including lift, drag, gravity and thrust. The last two phases of the exhibit – materials and manufacturing and control and navigation – will open over the next two years. In conjunction with this new exhibit, the VASC will also show the new IMAX film, ***Magic of Flight***. For admission prices and more information, call 727-0900.

AIAA EVENT: The American Institute of Aeronautics and Astronautics, Hampton Roads Section, presents a talk by Dr. Robert D. Braun, "Mars Pathfinder Entry, Descent and Landing," Oct. 8, 6 p.m., H.J.E. Reid Conference Center. Cost for the pizza dinner is $5 for members and guests; $4 for student members; $6 for non-members. For reservations, contact Lynda Foernsler, ext. 48146, l.j.foernsler@larc.nasa.gov, or Paresh Parikh, ext. 42244, p.c.parikh@larc.nasa.gov, by noon, Oct. 3.

ALUMNI NEWS: The next meeting of Langley's Alumni Association will be held Oct. 14, 11:30 a.m., in the private dining room of the cafeteria. Guest speaker William L. Smith, chief, Atmospheric Sciences Division, will discuss Langley's atmospheric sciences projects. Send dues (check payable to Langley Alumni Association) to Mary Mesic, 2 Towne Square Drive, Newport News, Va., 23607.

OYSTER ROAST: The American Institute of Aeronautics and Astronautics hosts its annual Oyster Roast, Oct. 15, 4:30-8 p.m., NASA Langley Activities Center Picnic Grounds. Cost is $7.50 for members and family; $4.50 for student members; $10 for nonmembers; $3 for children under age 10; free for children under age 3. For reservations, call Lynda Foernsler, ext. 48146, or Paresh Parikh, ext. 42244, by Oct. 10.

HISTORY OF GIVING: Alumni Association treasurer Bert Rockey is compiling a list of the organization's contributions to the community and to local charities, for historical purposes. To add to this list, call Bert at 898-4382.

SINGING COWBOYS RIDE INTO TOWN: The nationally known cowboy singing group, Riders in the Sky, will bring their unique blend of three-part harmony, western-swing musicianship and wacky comedy to the Williamsburg Library Theatre, Oct. 12, 3 p.m. and 8 p.m. Tickets are $16 and $8 for those under 14. Call 229-4198 for reservations. For more information, see the internet address at ***http://www.wrl.org.***

PENINSULA SKI CLUB: Ten ski trips are planned for sites in the western and eastern U.S. and Europe. For more information, call Bill Hunter at 874-0913.

TECHNOLOGY SHARING: Scientists and engineers will exchange technical knowledge, advances, theory and experiment results for the 21st century at the **Rotorcraft Acoustics and Aerodynamics Meeting**, Oct. 28-30, at the Ft. Magruder Inn, Williamsburg. Papers will include: analytical, computation, experimental contributions; rotor wake structure and blade loads; results from wind tunnel, ground and full-scale flight test measurements; development and evaluation of active/passive interior and external noise reduction concepts; development of and compliance with national and international noise regulations. For more information, call Jerry Irvine at 878-3272.

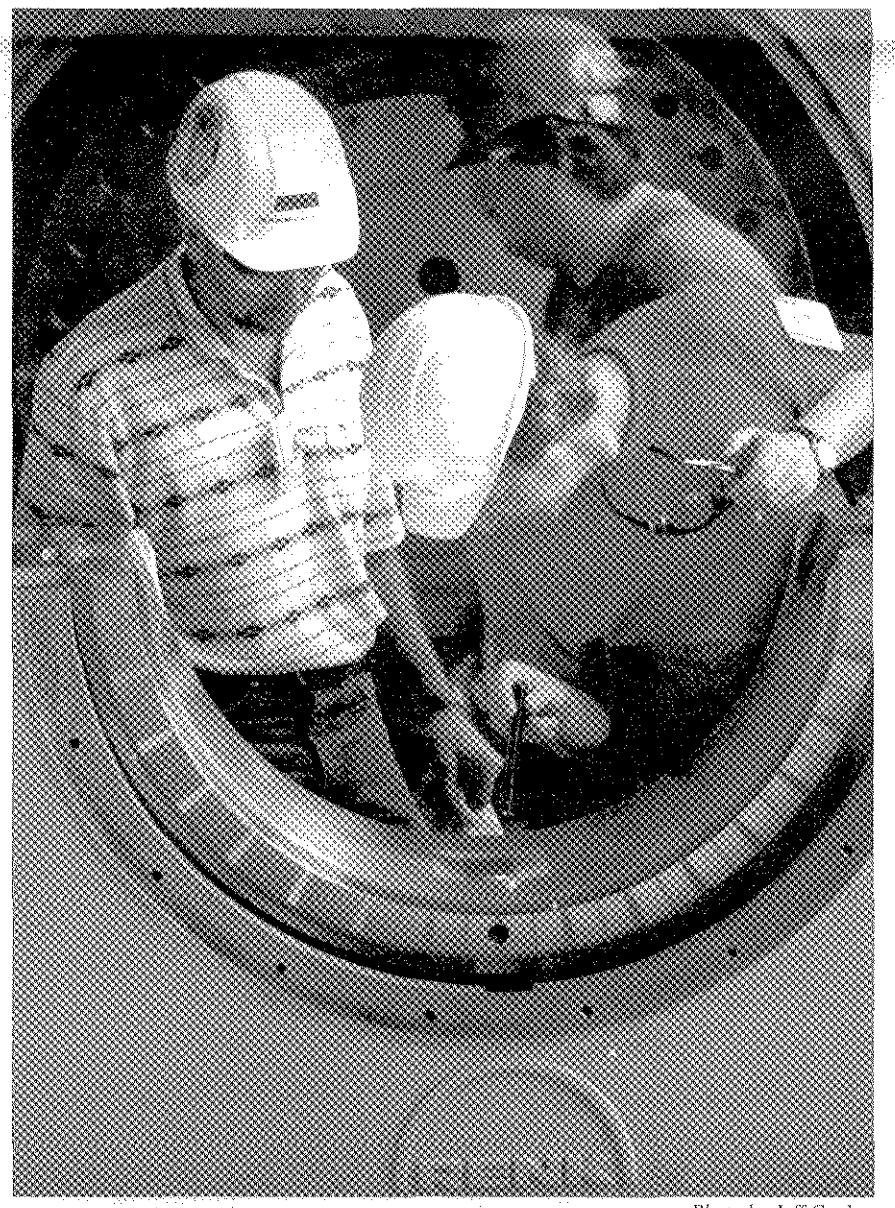


Photo by Jeff Caplan

CHECK AND DOUBLE CHECK – Richard Burleigh, left, a resident engineer with Raytheon, and Peter Wermuth, a technical assistant with Asea Brown Boveri, check the bearing seat for a new fan drive system being installed in the National Transonic Facility. At 135,000 horsepower, the new drive is the largest adjustable speed drive system in the world and is part of a $42 million upgrade to the NTF. Other major components of the project include a new liquid nitrogen storage tank, a replacement wind tunnel control system, a nitrogen vent-stack modification and design of a sidewall model access system.

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Researcher News

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NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 20 ❖ October 10, 1997

NASA researchers eagerly await return of Mir experiment

NASA photo

Astronaut Linda M. Godwin, left, trains with the Mir Environmental Effects Payload (MEEP) in a NASA Langley clean room. Godwin and astronaut Michael R. Clifford attached the four MEEP experiments to handrails on the shuttle docking module of the Russian space station Mir during the STS-76 mission in March 1996.

Langley payload to return results from four experiments

BY CATHERINE E. WATSON

The experiment they designed has quietly gathered data for 18 months, and researchers at NASA Langley had been eagerly awaiting the launch of the space shuttle Atlantis on Sept. 25. Seven days after docking with Mir, two Atlantis astronauts retrieved Langley's Mir Environmental Effects Payload (MEEP) from the Russian space station and were scheduled to return it to Earth.

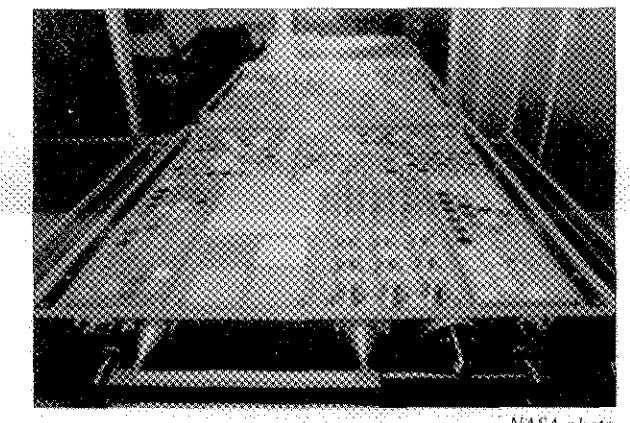
MEEP, an International Space Station Phase 1 Risk Mitigation Experiment, will provide an assessment of baseline and candidate Space Station materials in the intended operational environment. MEEP also fulfills the need for a greater understanding of the occurrence and effects of man-made and natural debris through capture and impact studies.

"The science investigators are very excited about the retrieval and are anxious to begin the analysis of the MEEP experiment," said Greg Stover, a Langley researcher and the MEEP project manager. "The 18 months of exposure on Mir has provided the type of environment to help determine the effects activities around an operational station can have on materials, and to help give a greater understanding of the type and frequency of orbital debris that impacts a station."

MEEP was attached to the outside of the Russian space station in March 1996 to study the long-term effects of the space environment on selected and proposed International Space Station materials, and to study the effects of impacts from space debris. MEEP, made up of four separate experiments, was designed to determine the frequency and effects of both human-made and natural space debris that strike the station, and to determine the reactions of materials in the space environment.

Because the International Space Station will be placed in approximately the same Earth orbit as Mir, flying MEEP aboard Mir gave researchers an opportunity for long-term testing of materials for the new station in a comparable orbital position.

Once back on Earth, the four MEEP experiments will be studied to determine what kind of debris hit the space station, and how contaminants collected on some of the different surfaces affect the long term performance of some materials. After the data from all four MEEP experiments is analyzed, the data will be placed into an electronic archive that will be accessible via the Internet.



NASA photo

The MEEP comprises four experiments contained in this briefcase-like apparatus.

Colloquium Communiqué

Supercomputing speeds toward 21st century

Gary P. Smaby, chief executive officer and principal analyst at Smaby Group, Inc., an international strategic advisory company, will present the October Langley colloquium lecture – "Evolving at Warp Speed: Supercomputing – 2001 and Beyond" – Oct. 14, 2 p.m., in the H.J.E. Reid Auditorium.

He will repeat the talk as part of the Sigma Series lectures the same evening, 7:30 p.m., at the Virginia Air & Space Center in Hampton.

Smaby

Smaby began tracking the fledgling supercomputing industry in 1982. From his vantage point as a widely respected Wall Street analyst for the investment banking firm that brought Cray Research into the stock market, Smaby built an international reputation as an oft-quoted observer on trends in the high-performance computing (HPC) landscape.

He will present an historical and often lighthearted perspective on the forces that shaped the evolution of supercomputing during its heyday, highlighting the factors that led to the tumultuous restructuring that has characterized the market in the post-Cold War era. He will trace major industry events and offer some prognostications about the future direction and impact of HPC into the new millennium.

Smaby advises senior executives at many of the world's largest corporations – and most promising start-ups – on strategies for launching and building successful new technology ventures. He also serves as interim chief executive officer for ThemeMedia, Inc., a Redmond, Wash.-based information visualization software start-up formed as a joint venture between Smaby Group and Battelle Memorial Institute.

Colloquium & Sigma Lectures

What: "Evolving at Warp Speed: Supercomputing – 2001 and Beyond" Colloquium and Sigma Series lectures by Gary P. Smaby

When: Oct. 14 – 2 p.m. Colloquium; 7:30 p.m. Sigma Series

Where: Colloquium – H.J.E. Reid Conference Center; Sigma Series – Virginia Air & Space Center, Hampton

Info: 757-0000

Smaby began his career in the information technology industry in 1974 as an entrepreneur when he founded Realcom Corp., an advanced graphics imaging firm. Over the next eight years, he launched and built several successful new ventures.

In 1982, shortly after divesting Realcom, Smaby joined a Minneapolis-based investment banking firm as vice-president and senior analyst to set up an emerging technology group.

During his Wall Street career, Smaby's coverage encompassed high-performance workstations and supercomputers, as well as networking and digital media. He formed Smaby Group in 1989.

Sound barrier busted half a century ago

Six hundred and sixty mph at 30,000 feet above sea level – the speed of sound. Fifty years ago – Oct. 14, 1947 – United States Air Force Capt. Charles "Chuck" Yeager broke the sound barrier at 700 mph flying the X-1, the first in a series of "X" planes that continues today.

The first "official" contract to begin the X-plane program, a joint venture between the National Advisory Committee on Aeronautics and the Air Force, was signed in 1943, and the research program began in earnest after eight conceptual years. Fifty-seven X-plane programs have been initiated throughout the years; 49 of those have seen at least one aircraft completely built and tested or undergoing testing.

Research is the one word that most accurately describes the X-plane program. Aircraft have made up the bulk of the program, which also included missiles, rockets and an alternative parachute-landing vehicle.

The "X-1" plane was the first in a series of rocket-powered research aircraft. Subsequent work included the X-11, known as the Atlas rocket; the X-15, which broke altitude and speed records; the X-25, an alternative to soft parachute landings; and the X-31A, the first international X-designated program.

The X-plane program is still going strong today with reusable vehicles X-33, -34 and -38, as well as the X-36, a fighter vehicle.

See related photos on pages 4-5.

News Briefs

Around the Agency

TELESCOPES WITH NEAR-INFRARED 'EYES' BEGIN ALL-SKY SURVEY– (Jet Propulsion Laboratory, Pasadena, Calif.) The first of a pair of new telescopes, funded primarily by NASA, has begun an ambitious three-and-a-half year near-infrared survey of the entire celestial sky, peering through the curtain of interstellar dust in the Milky Way galaxy.The Two-Micron All-Sky Survey (2MASS), based at the University of Massachusetts, Amherst, Mass., features two 1.3-meter telescopes, one at a Smithsonian Astrophysical Observatory site atop Mount Hopkins, near Tucson, Ariz., and the other at a National Optical Astronomy Observatories site in Cerro Tololo, Chile. Additional information and images are available at the 2MASS Web site at ***http://www.ipac.caltech.edu/2mass/***.

DEVICE TO MEASURE EFFECTS OF SPACE ENVIRONMENT ON MIR – (Marshall Space Flight Center, Huntsville, Ala.) A new NASA device to monitor the structural health of the future International Space Station will soon be on its way to the Russian space station Mir for testing. The Space Portable Spectroreflectometer, a device for measuring the effects of the space environment on spacecraft materials, was scheduled to fly aboard the space shuttle Endeavour on the STS-86 mission last month. The device is designed to test spacecraft materials such as those being used to construct the International Space Station. NASA and its international partners are scheduled to begin on-orbit assembly of the Space Station in June 1998.

FIRST IMAGES FROM SENSOR TO AID CLIMATE, BIOLOGICAL STUDIES – (Goddard Space Flight Center, Greenbelt, Md.) Exciting ocean-color images from the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) – the first readily available ocean-color data in more than 10 years – should play a major role in studying the ongoing El Nino and in other global warming research. The SeaWiFS data also is giving scientists their first continuous look at the global biosphere – the combination of living organisms and their environment. Ocean color is largely determined by the concentration of microscopic marine plants called phytoplankton. Accurately measuring phyto-plankton concentration is important to climate change research and to local economic concerns such as commercial fishing. Images from SeaWiFS are available at this internet address: ***http://seawifs.gsfc.nasa.gov/SEAWIFS.html***.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "Persons with physical and mental impairments comprise the single largest 'minority,' with approximately 45 million individuals." – from "Facts About Diversity," National MultiCultural Institute

▲ October is Disabilities Awareness Month. Support your local disabilities awareness programs.

▲ Oct. 23-26 – National Multicultural Institute Conference, Washington, D.C., 202-483-0700

Oct. 25 – The Million Woman March, Philadelphia, Pa. 215-476-3683

▲ See the MCLT homepage at ***http://mishss20.larc.nasa.gov/MCLT/homepage mclt.html***. To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Disabilities Awareness

Langley's road to accessability

BY GERRY PARDUE

Disabilities Awareness Program Manager Diane Forrest and the concerned volunteers at Langley began the pursuit of total commitment of accessabilities and accommodations in 1990. After an extensive ADA (American Disability Act, 1990) training program, the work began in earnest.

As a result, the Internal Operations Group director assigned the project of modifying facilities to the Facilities Program Development Office (FPDO). Phase I modifications are the direct result of the positive attitude, teamwork and support of employees, senior management, Facilities Systems Engineering Division and FPDO.

The teamwork and determination have resulted in entrance door modifications – easy-to-open doors with automatic openers – to Buildings 1153, 1194, 1195A, 1195B, 1195C, 1202, 1229 and 1244; restroom upgrades and/or new restrooms – clearing obstacles and enlarging stalls to accommodate wheelchairs – to Buildings 1194, 1194A, 1195A, 1195B, 1195C, 1202, 1202A, 1208, 1213, 1222B, 1228, 1229 and 1244; elevator additions to Buildings 1244C and 1192; an enclosed wheelchair lift to Building 1194A; and ramp additions to Buildings 1202A, 1213 and 1244.

A map indicating the location of accessible buildings is being designed for publication as a visitor handout.

Langley observes Disability Awareness Day

Langley's Disability Awareness Day observance is set for Oct. 17, noon-3 p.m., at the H.J.E. Reid Conference Center. The event features an exhibit of accommodations, an equipment display by local vendors; Langley's newest accommodation for those who may have trouble hearing conversations, "Conference-Mate"; training demonstrations of Canine Companions for Independent Living; the "Chairman of the Court" wheelchair tennis players on the tennis courts; Langley's wheelchair that can roll upstairs, "Vacu-trax."

In addition, the Lion's Club will collect old eyeglasses and hearing aids, and Langley's clinic will offer free blood pressure and diabetes testing. For more information, call ext. 46986.

Announcements

Explorer Posts program soliciting applications

The Hampton Roads Section (HRS) of the American Institute of Aeronautics and Astronautics (AIAA) sponsors three Explorer Posts for aeronautics, astronomy and computer science for the Boy Scouts of America. Post meetings are held on center, and all participants must be 16 years of age and U.S. citizens. Posts are open to both boys and girls, including children of Langley employees.

The HRS is soliciting applications for the program, which will kick off with a program Oct. 14, 7-9 p.m., at the H.J.E. Reid Conference Center. For an application, contact Geoff Tennille at ext. 45786 or e-mail address g.m.tennille@larc.nasa.gov. For information about the programs, contact Bob Weston at ext. 42149 (r.p.weston@larc.nasa.gov) about aeronautics; Bob Mack at ext. 45988 (r.j.mack@larc.nasa.gov) about astronomy; and Garry Qualls at ext. 44442 (g.d.qualls@larc.nasa.gov) about computer science.

Equal Opportunity recognizes efforts

The following NASA employees recently received a 1997 Equal Opportunity Award:

▲ Dr. Karen R. Credeur, deputy head of the Office of External Affairs and head of the Office of Public Services, "for outstanding leadership in assuring cultural diversity as a Langley manager, community leader and public representative of the Langley Research Center";

▲ John H. Crosby III, head of the Materials Support Section, "for providing a positive work environment which fosters the goals of equal opportunity";

▲ Wallace C. Sawyer, Director of the High-Speed Research Program Office, "in recognition of a demonstrated commitment to developing and advancing the careers of all Langley employees, regardless of race, sex or ethnicity."

Training video available

The Financial Management Reporting for Contractors training video along with its companion workbook is now available for viewing in the Learning Center. The video gives contractors and civil service personnel a general understanding of NASA Form 533 cost reporting, to enhance the timeliness, completeness, accuracy and usefulness of the data reported.

The Johnson Space Center Financial Management Division and Taft Broadcasting developed the video.

For more information, call Lisa Oliver at ext. 47973 or Gail Temple at ext. 42122, Financial Management Division, Office of the Chief Financial Officer.

Voluntary Leave Transfer Program

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

The following Langley employees are approved leave recipients: Lynn E. Brown, Richard P. Hartman, Susan Quisumbing Jernigan, Patricia G. Reagon, Donna G. Roper, Debra P. Shimek, Mary Ann Steuck, Cassandra D. Stevens.

Employees may not donate to their immediate supervisor; employees may not donate more than one-half of the total annual leave accrued during the leave year; employees may not donate more "use or lose" hours than are left in the leave year to work.

To donate annual leave, submit the electronic form, "Request To Donate Annual Leave to Leave Recipient Under the Leave Transfer Program," to Mail Stop 174, Personnel Management Branch, or fax the form to ext. 47899. For more information, call ext. 43194.

Employee offers thanks

"During my recent heart surgery and recovery, I received many cards, calls, prayers and support from my friends and fellow workers at NASA Langley. Your concern and support of me during this critical time in my life had a great effect on my well-being and complete recovery.

"God gave me another chance at life, and I want to offer my thanks to all of you. I will never forget it."

– Bill Phaup

Retiree offers thanks

"The good wishes expressed and the remembrances and gifts given to me upon my retirement were much appreciated and will be cherished for years to come.

"The friendships that developed during my 28 years at NASA will not soon be forgotten. I feel very blessed to have had the opportunity to work with so many fine people.

"Thanks for everything. Best wishes, and please keep in touch."

– Anne I. Holland

Researcher News

The *Researcher News* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news@larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

Photographer..... Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley helps to clean the air

BY BARBARA BODENSTEIN

For use in the center's on-site automobile fleet, NASA Langley recently purchased six alternative-fueled vehicles, which run on compressed natural gas, or CNG.

Alternative-fueled vehicles simultaneously reduce urban air pollution and dependence on imported petroleum. Run on fuels other than gasoline which usually are not petroleum-based, CNG vehicles produce dramatically lower carbon monoxide and volatile organic compound air emissions.

Emissions are also some 50-75 percent less reactive than those from gasoline vehicles. Since urban smog, or ground level ozone – a primary pollutant – occurs after a complex chemical reaction, less reactive emissions result in lower pollution concentrations.

The Energy Policy Act of 1992 and the Clean Air Act Amendments of 1990 require federal facilities to include increasing percentages of alternative-fueled vehicles in their new vehicle purchases. Additionally, Executive Order 12844 mandates federal agencies to promote the use of alternative-fueled vehicles to significantly reduce toxic and hazardous air pollutants.

Langley's motor vehicle fleet consists of approximately 250 vehicles, including sedans, station wagons, light duty trucks and vans. In late 1995, the Logistics Management Office and the Office of Environmental Engineering purchased four light-duty trucks and two sedans that use either CNG or conventional unleaded gasoline.

Langley's CNG vehicles now are fueled at the Virginia Natural Gas corporate location in Oyster Point, Newport News, but a station will soon be available at Langley Air Force Base.

"I enjoy driving the truck, and it performs well," says Janet Edmondson, of the Office of Safety and Facility Assurance. "I recognize that there's a small amount of extra effort needed to fuel the vehicle, but I feel good about what it is doing for the environment."

Virginia Natural Gas has also provided operator training to ease the transition to the alternative-fueled vehicles.

Further research on and development of this new technology will improve the reliability and performance of the CNG vehicles, as well as reduce both their capital and operating costs. Although a fill-up costs about the same for each fuel, a vehicle burning CNG can only travel one-quarter of the distance of a gasoline-filled auto. This disparity should diminish as the technology improves.

Langley is also investigating the possibility of extending its use of alternative-fueled vehicles by converting some of the existing fleet vehicles to dual fuel-burning capability.

Charlie Harris of the Property and Transport Branch and Janet Edmondson contributed to this report.

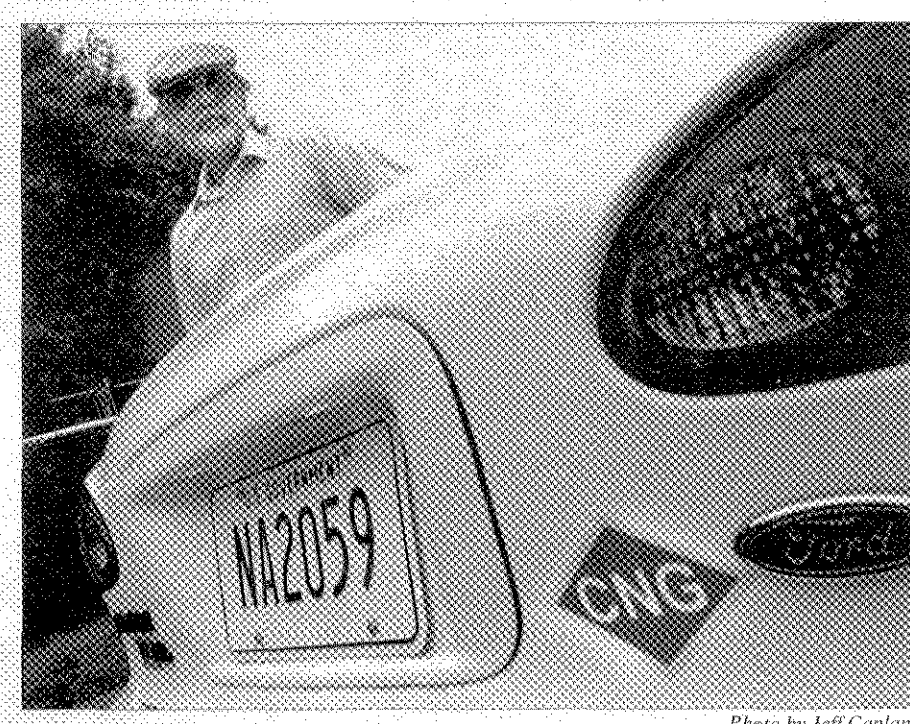


Photo by Jeff Caplan

Bob Brown, Office of Environmental Engineering, checks out one of six alternative gas vehicles that run on compressed natural gas. The blue "CNG" diamond symbol on the right rear bumper distinguishes the new vehicles.

Langley technician sees past disability

BY NANCY FINN

Accidents can leave anyone disabled at any age, as Langley's Larry Cooper can tell you. He lost his right eye in a sledding accident in Yorktown in 1973, at age 22.

Now a technician in the Nondestructive Evaluation Section, Cooper does not let his disability get in the way of his work, and he has worked on most of the major projects at the center. He probed the cause of the Challenger disaster and participated in the HL-20 Human Factors study. He also worked on heat-treated metal used on some aircraft during Operation Desert Storm.

Cooper says he believes that he never would have been hired if Randy Manning, of the Acquisition Support Branch, had not overlooked his disability.

In coping with the loss of his right eye, Cooper tries to position himself with his coworkers on his left, for their safety. Before he tests anything, he insures that there are no obstacles in the walkway. He takes safety seriously and says that, with a disability, one must be prepared. His section has even installed warning lights in his shop to help him remain safe.

Cooper does not consider himself to be disabled. He drives a car, plays basketball with his sons and golfs. But his lack of vision makes some mishaps inevitable. Due to a lack of depth perception, he often walks into walls and people.

Cooper also chooses not to build barriers around himself – not to isolate himself or to give up doing even simple activities.

"[A disabled person] might have to change the way of looking at or doing something, but there is a way to do it," he says. "You have to work hard."

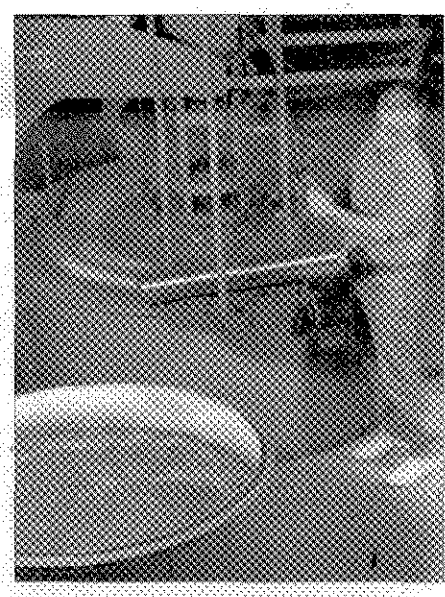


Photo by Jeff Caplan

Larry Cooper moves a piece of aluminum around his shop in Building 1267A, preparing it for heat treatment. He has overcome a vision disability and also works with students with disabilities on center.

Cooper spends a lot of his free time helping others. He participates in Langley's Engineers Week, Day of Caring and the LARSS program. He is also a member of the center's Satellite Committee for People with Disabilities and has designed several posters for them.

He has worked with the Office of Education on the "Power to the Stars" program, which matches college students who have disabilities with a NASA employee mentor who also has a disability. The mentors teach the students that being disabled need not limit their abilities.

Cooper was named the Outstanding Volunteer of the Year in 1990. In 1992, NASA Headquarters nominated him for a Presidential Point of Light.

In addition, he has been a volunteer firefighter for the past 24 years. He is also a part of a group that teaches wheelchair tennis.

Applin to attend management program

BY NANCY FINN

Junilla Applin, of the Aeronautical Systems Engineering Branch, will attend the Program for Developing Managers at Simmons College in Boston, Mass., this month.

Mid-level managers attending this four-week course will learn the different aspects of business disciplines while increasing their leadership potential. The program covers basic quantitative skills for interpreting and using financial data and fosters team-building and problem-solving. This twice-yearly program allows middle managers or technical specialists with at least five years' experience to gain a broader vision of the business environment.

This program is a great opportunity to interact with other women who are leaders in business, says Applin. As a result of her participation, she hopes to understand the development of modern management issues and solutions.

"I will benefit from a better understanding of modern management principles and improved analytical skills, which I will use to develop better plans for my organization," she says.

Photo by Jeff Caplan

Junilla Applin will attend a management program in Boston.

An Old Dominion University graduate, Applin began her career at NASA in 1989 as a pyrotechnic engineer. She serves as project manager for the Gas Permeable Polymer Materials (GPPM) project and the Evaluation of Space Environment and the Effects on Materials (ESEM) project. GPPM flew on board STS-57, 63 and 77; ESEM, on board STS-85. Applin is also the deputy project manager for the F/A-18E/F Drop Model program.

Langley undergoes personnel changes

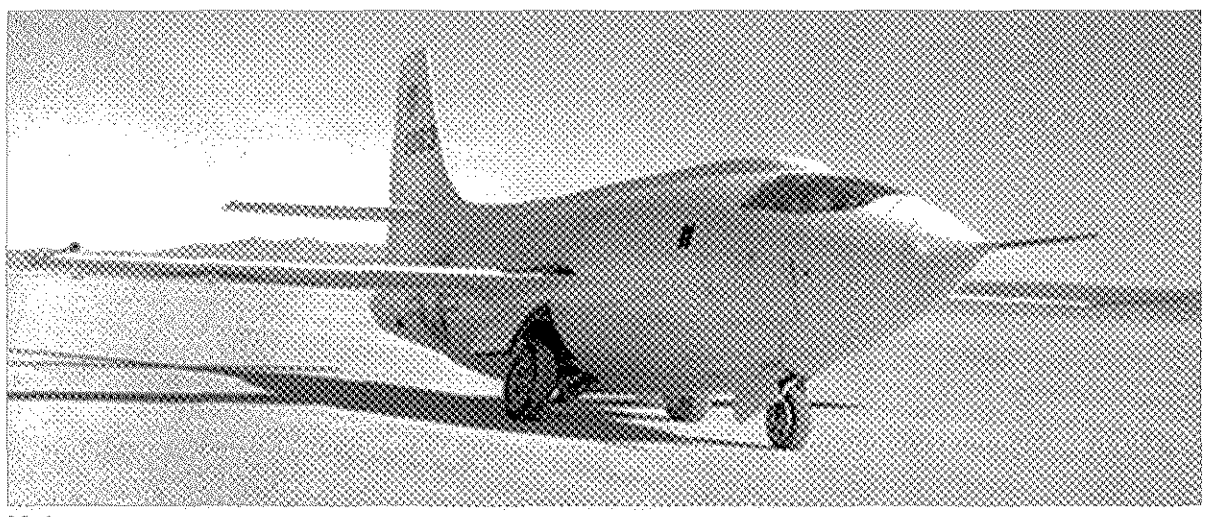
Roy V. Harris Jr. has resigned his position as the NASA facility group director for Wind Tunnels, Aero/Aerothermodynamic Facilities and Aeropropulsion Facilities. He will continue in his position as the Langley assistant director for Research and Engineering until January 1998 when he plans to retire.

Blair B. Gloss succeeds Harris as the facility group director for Wind Tunnels, Aero/Aerothermodynamic Facilities and Aeropropulsion Facilities.

Effective Oct. 12, Dr. Woodrow Whitlow becomes the chief of the Structures Division, Research and Technology Group (RTG). He is the deputy director of the Airframe Systems Program Office.

Also effective Oct. 12, Irving Abel has been named the manager of Langley's Advanced Concepts Program within the Airframe Systems Program Office. This new position oversees all advanced concepts research within the center. Abel is chief of the Structures Division, RTG.

Evolution of Excellence:

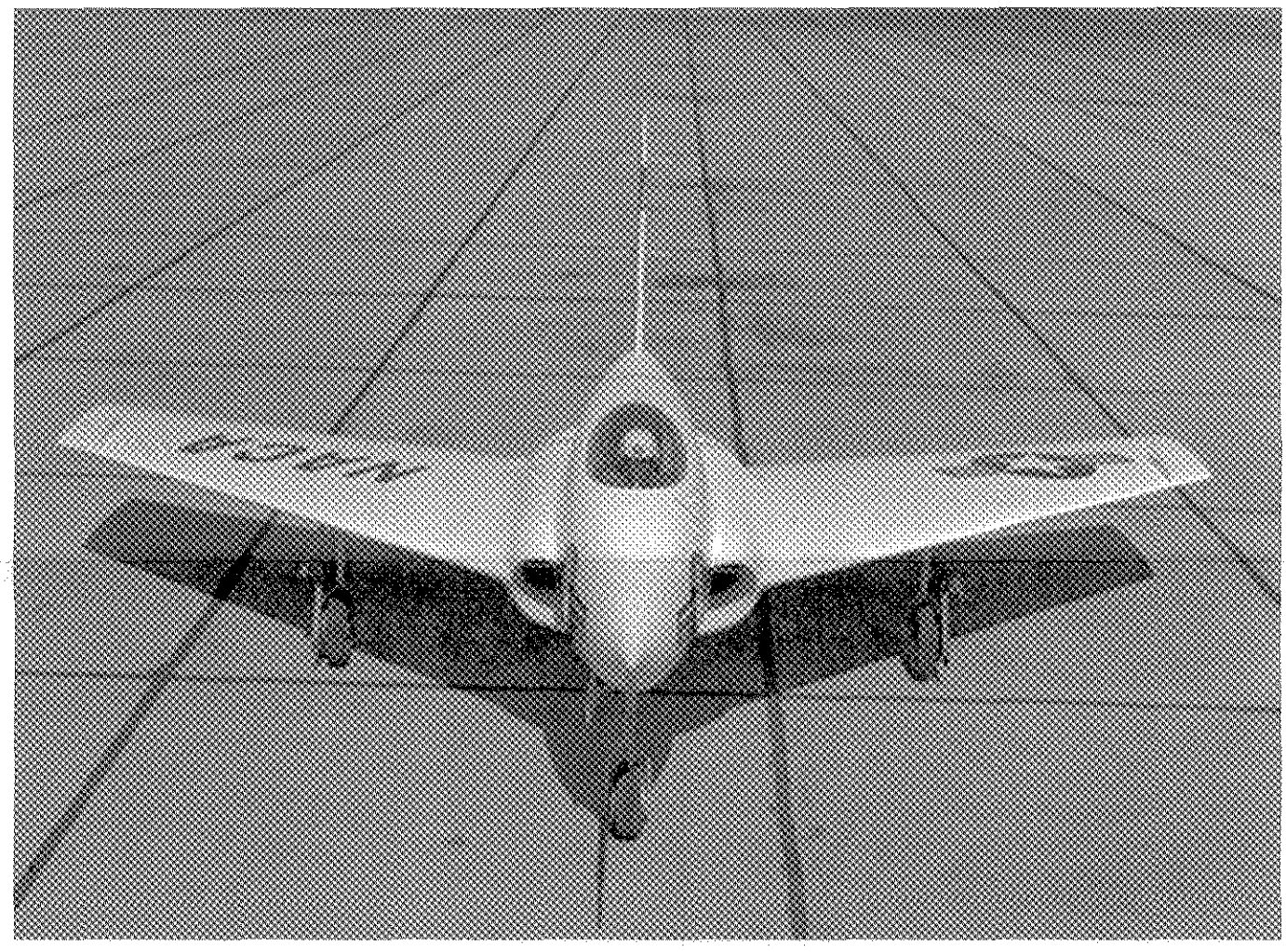


X-1 — This was the first plane to bear the "X" designation, originally "XS" for "eXperimental Supersonic," applied to a family of experimental aircraft not intended for production beyond a limited number built solely for flight research. The bullet-shaped, rocket-powered X-1, flown 1946-58, became the first airplane to break the sound barrier, Oct. 14, 1947.

NASA photos

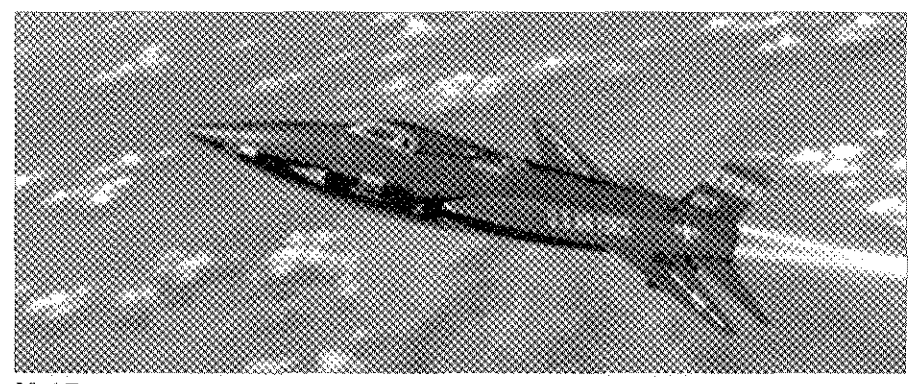
X-1E — The X-1E was an advanced model of the original X-1 plane. It helped to provide the National Advisory Committee on Aeronautics with aerodynamic information for use in correlating wind-tunnel data with actual flight data and for designing later high-performance aircraft.

X-4 — In a joint program with the Air Force and Northrop, The National Advisory Committee on Aeronautics conducted most of the flights in this semi-tailless aircraft. Powered by two turbojet engines and featuring swept wings, the X-4 helped demonstrate that tail surfaces are important for proper control effectiveness. It flew 1948-1953.



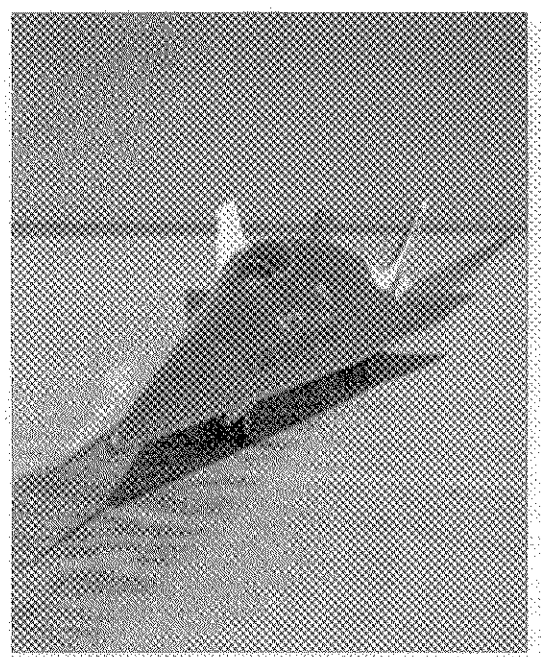
X-11 — The original X-11 was a single-stage ballistic rocket. Flight testing provided design data concerning guidance, stabilization, thermodynamic, structural and aerodynamic features for future missiles. Today's version of the X-11, shown here, is also known as the Atlas. It is used to support the Defense Satellite Communications System III program and commercial customers.

X-3 — This slender, jet-powered aircraft tested such new materials as titanium and collected data on stability and control, pressure distribution, and flight loads. Flown 1952-1955, the X-3 failed to achieve the high speeds for which it was designed but contributed to the aircraft tire technology.

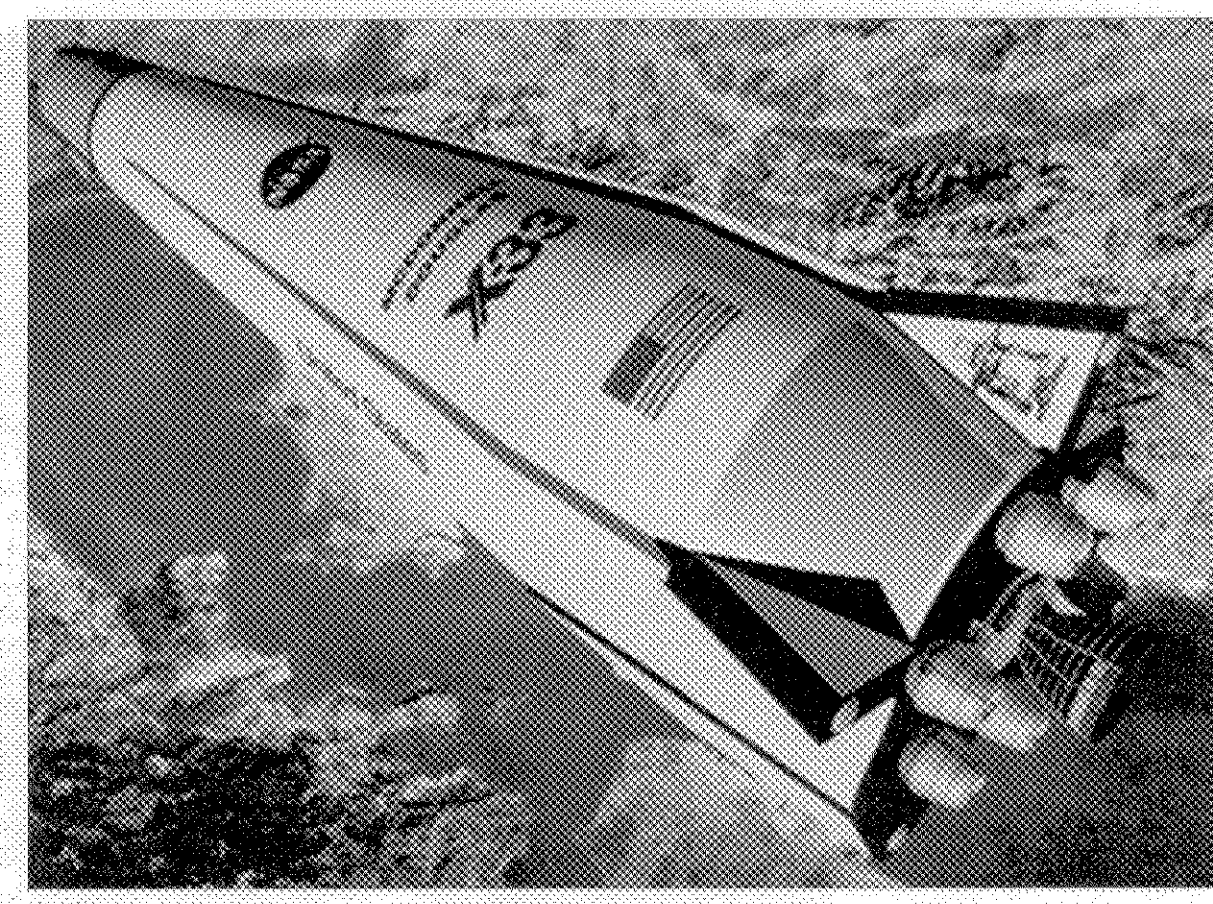


X-15 — Flown 1959-1968, the X-15 set speed records in the Mach 4-6 range and set an altitude record of 67 miles in 1963. It also provided much data relevant to spaceflight as well as to aeronautics, such as reaction controls for flight above the atmosphere and reentry piloting.

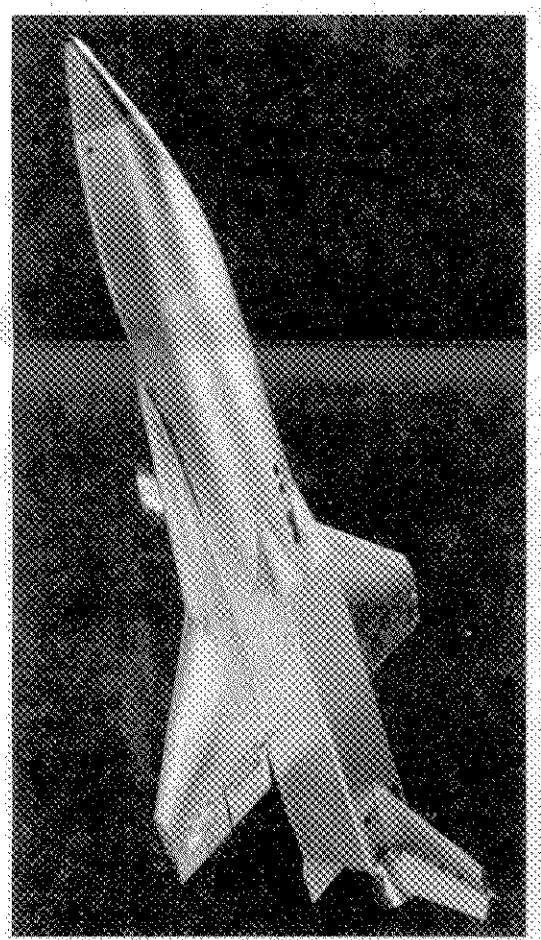
X-Planes Through the Years



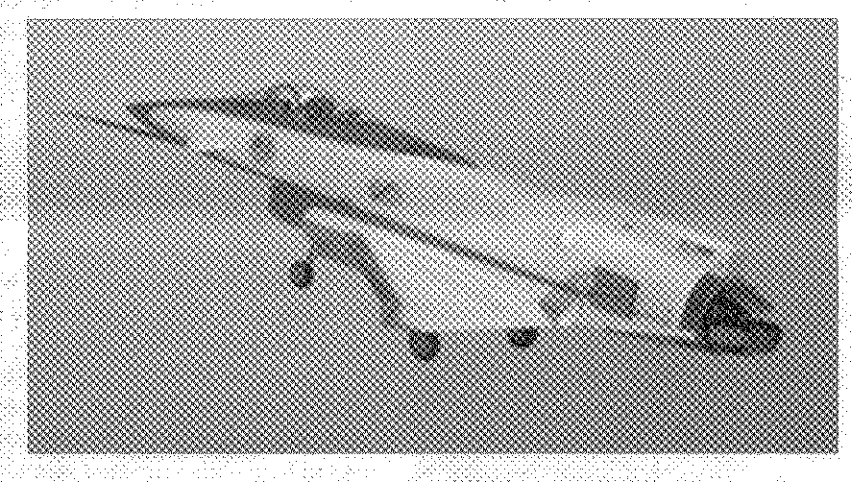
X-24 — The X-24, flown 1963-1975, was part of a series of lifting bodies in a joint program between the AirForce and NASA. The program demonstrated the ability of pilots to maneuver and safely land a wingless vehicle designed to fly back to Earth from space and be landed like an aircraft at a predetermined site – a precursor of today's shuttle program.



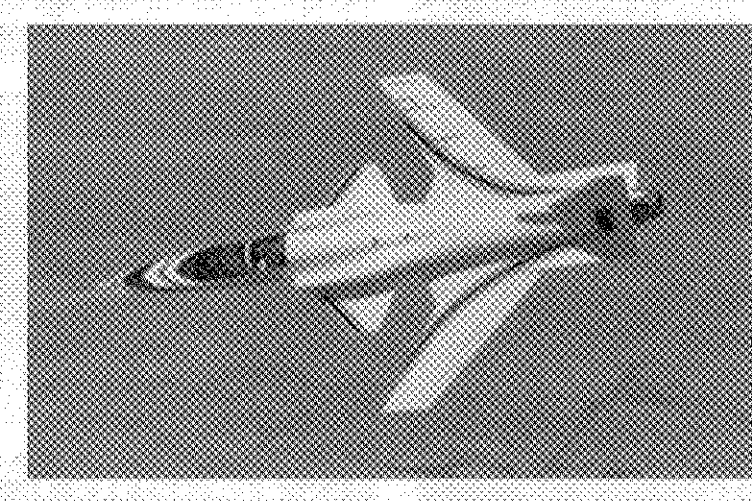
X-33 — Lockheed Martin will design, build and fly the X-33 Advanced Technology Demonstrator test vehicle in 1999. The half-scale vehicle will feature a lifting-body shape, a new "aerospike" rocket engine and a rugged metallic thermal protection system. The X-33 will be an unpiloted vehicle, launched vertically like a rocket but landing horizontally like an airplane. It will capable of reaching an altitude of 50 miles and speeds of more than Mach 15.



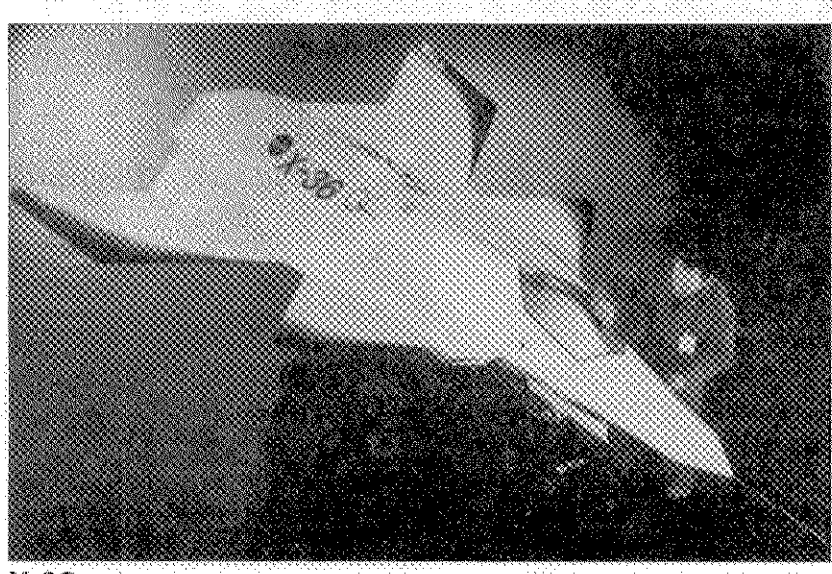
X-34 — The X-34, developed in 1996 and yet to be flown, is a small, reusable technology demonstrator for a launch vehicle. The single-engine rocket is intended to fly at Mach 8, reaching an altitude of 250,000 feet.



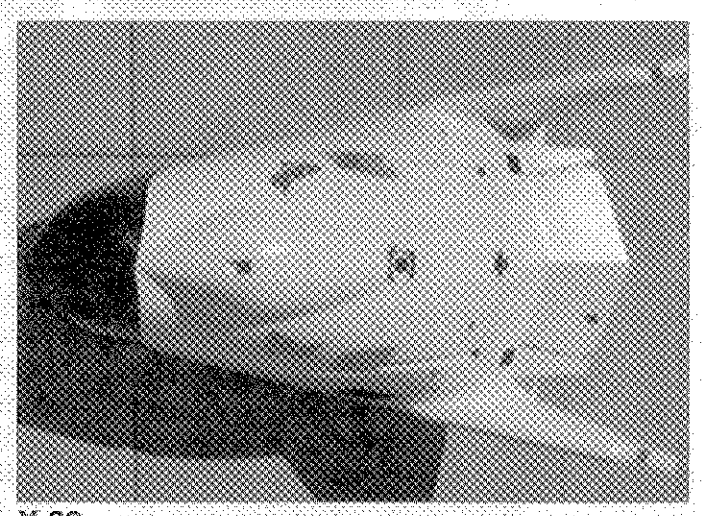
X-31 — This Enhanced Fighter Maneuverability demonstrator, flown 1990-1995, showed the value of using thrust vectoring coupled with advanced flight control systems to provide high maneuverability and controlled flight at high angles of attack.



X-29 — This single-engine, jet-powered aircraft, flown 1984-1992, investigated the use of advanced composite materials, among other technologies. On Dec. 13, 1985, the X-29 became the first forward-swept-wing airplane in the world to exceed Mach 1 in level flight.



X-36 — The X-36 is a remotely piloted, advanced research vehicle developed by NASA and McDonnell Douglas in 1996 to demonstrate the feasibility of future tailless fighters achieving agility levels superior to today's best fighter aircraft.



X-38 — The X-38 technology demonstrator is a prototype for a spacecraft designed to return crewmembers from the International Space Station in an emergency. Using a lifting-body concept, the X-38 would glide from orbit without power and use a steerable parachute for its final descent to landing.

'Stars' hold universal wonder of giving to those in need

BY JOE HEYMAN
CFC CHAIR

I went for a long walk at night recently and looked up at the stars. I thought about all the other people who might be doing the same thing – looking up at the stars – at the same time. For an instant, that group of people shared the same resource – the awesome beauty of the universe and all its wonders.

Perhaps some of them, I mused, are more knowledgeable than I, some younger, some in the closing phases of life. I suspect one thing we have in common – while looking skyward – is a sense of wonder and a sense of the unknown. All can share in the wonder together, yet not know each other.

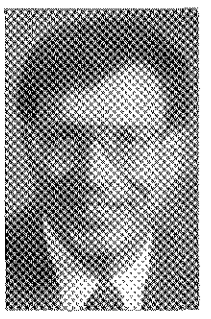
On one hand, a child tries to understand how to heal the pain caused by the death of a family dog. A senior faces a medical procedure for cancer. A family fights financial ruin after a devastating fire.

On the other hand, so many of us have good health, economic stability and peace of mind, and are able to care for the people we love.

If only we could help those less fortunate than we are by just collectively looking to the stars. If only it were that easy.

I've found a way to spread the comforting arms of the community to help those in need: The Combined Federal Campaign (CFC) helps us help others.

This year's Langley CFC theme is *More Than a Gift: From the Stars to the Heart.* It fits Langley people well.



Gift means *a notable capacity or talent*, and *something voluntarily transferred by one person to another without compensation.*

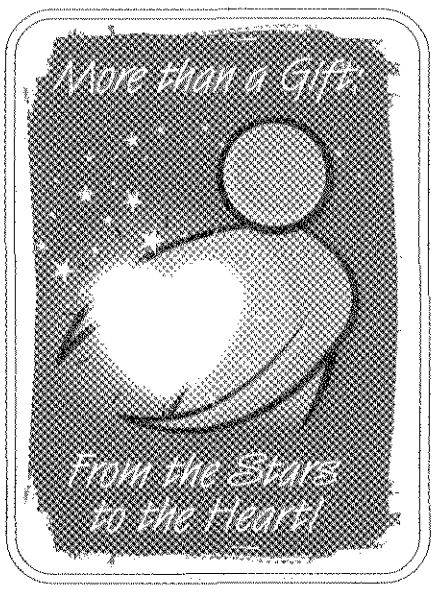
Most of us at Langley have a "notable capacity" in that we have good jobs and a high standard of living. We have the "talent" to know that any one of us may, at some time, need help. We also have big hearts. Langley employees have a proud history of sharing with the community to help those in need.

When we give to the CFC, we create an instrument capable of probing the stars. The CFC identifies those who need assistance and those best qualified to offer help. Organizations listed in the CFC brochure are outstanding caregivers. They need and deserve our support.

Your CFC contribution goes directly to the organization or organizations you designate. You choose, whether it is a shelter for pets to help the child fill the void inside, or a group able to comfort the sick or assist those who have seen tragedy. These organizations will exist only if we reach into our heart. I firmly believe each of us is a star when we reach for the CFC.

This year, once again, we are able to use the electronic pledge process coupled to the electronic brochure. Each of us is invited to search out our favorite charity, to examine its purpose and to assess its efficiency. We can place those we choose in an electronic shopping cart and allocate our donation as we wish. Of course, we can also use the paper pledge process along with the paper brochure. Our key person will assist in whichever technique we select.

I'm convinced that each of our employees is the most important person in the CFC process. You are the person who can give. You are the one who can relate



to that star in the sky asking for help.

The single most important aspect of the CFC is that, if all share in the giving, the community has a bright star, a milky way, to light the night sky. It is, indeed, "More Than a Gift." I believe it is an honor and a privilege to be able to help.

Finally, I maintain that help from Langley employees is, indeed, "From the Stars to the Heart." I urge you to give as generously as you can.

Volunteer assignment becomes commitment

BY MARNY SKORA

Meet Emilee, a survivor . . .

Emilee, born three months early, weighed only 1 pound, 9 ounces. Like most premature babies, she had to spend her first few months in the hospital. Unlike many preemies, when Emilee was discharged, her family was referred to Child Development Resources (CDR) in Williamsburg.

During the first years of her life, a CDR service coordinator visited her home weekly, helping Emilee's family learn how prematurity would affect her health and development. The child also received full developmental assessments every six months and attended weekly developmental play groups at CDR.

Faced with a challenge at birth, Emilee is now one of the lucky ones. Her parents say Emilee came into the world a real fighter. With help and support from CDR, she has grown into a delightful toddler who loves to play and laugh. She is truly a joy to her family.

Meet Chase, volunteer extraordinaire . . .

Richard Chase, electronics engineer in the Assessment Technology Branch, was assigned to Child Development Resources for the community Day of Caring in 1994. He has volunteered each succeeding year and has consistently been requested at CDR.

"Chase," as Director Marsha McLean calls him, "has become a true friend to CDR – to the staff and to the children."

During his tenure as volunteer, he has helped construct a sandbox and outdoor play center; a covering for the sandbox that provides a shaded play area necessary for accreditation; and a platform that became a "window on the world" for

Photo by Steve Richards, U.S. Coast Guard
Richard Chase works on a project at Child Development Resources in Williamsburg.

Emilee and others. This year, under his direction, NASA volunteers repaired toys, built two storage units and four pegboard room dividers, saving the center more than $1,300.

Pat McCants, a then-staff member of the CDR, had no idea what talent was coming her way in 1995. Chase and Gene Monroe teamed up to redesign the covering over the 11- by 17-foot sandbox rather than install the tarp that was provided. They convinced a local lumber yard to donate the materials. By the end of the day, the NASA team had provided a permanent structure that still shades Emilee and her friends.

The next year, Chase and Mac Price designed a loft to replace the single step stool that allowed children to reach the windows.

"No more fighting to see outside," said McLean. "Now Emilee and her classmates can check the weather and exercise their large muscles in the climbing process."

McLean won't waste a moment of the extraordinary talent she has found.

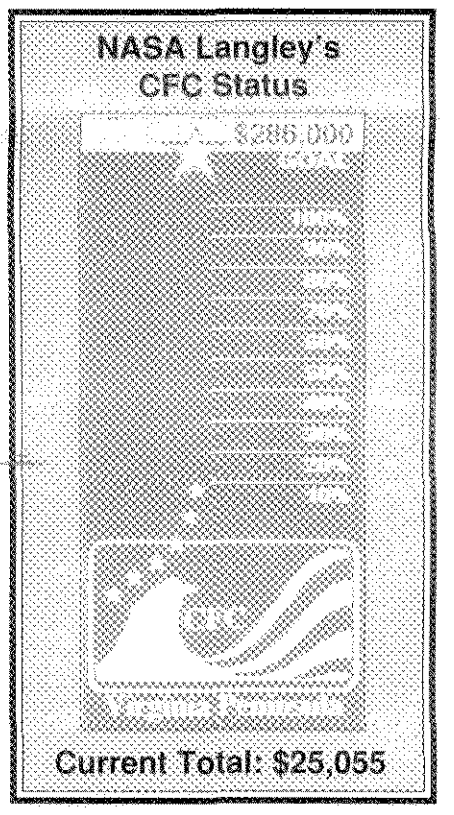
"I've learned to plan ahead," she said. "We already know exactly what we want to do next year – build a playhouse for the children."

Chase has agreed to meet with her as early as March to begin to design the structure, to provide a list of materials and to help obtain donated supplies.

Why does Chase return to CDR each year?

"It's always interesting and certainly a challenge," he said. "But the staff makes it fun and rewarding."

The Williamsburg agency is a national model for services to children with disabilities or delays in development. Chase has never met Emilee, yet he has made a difference in her life. In fact, he has yet to realize how valuable he is to this organization that opens windows of opportunity for special children and their families.

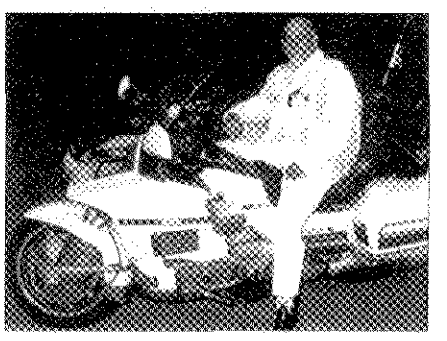


COMMUNITY

WALK OF LIFE –

The American Heart Association's American Heart Walk, Oct. 25, at Sandy Bottom Nature Park in Hampton, will raise money to support the association's research and community education programs. Their goal is to have some 1,000 walkers participate, helping to raise $30,000.

Registration is 9-10 a.m., and the walk begins at 10:15. Registration packets are available at the Langley Fitness Center. For more information, call 873-8703.



GET YOUR MOTOR RUNNIN' –
Langley employees Don Smith, above, of the Composites Section, Rick Hopson, of the Microelectronics and Sensor Development Section, and Valinita Johnson, of the Resources Control Section, will participate in the fifth annual March of Dimes Ride for Healthier Babies, Oct. 19, at Newport News Park. More than 1,000 motorcyclists are expected to ride the 40-mile course. For more information, call 1-800-732-7097.

Art enlivens theater, enhances facility

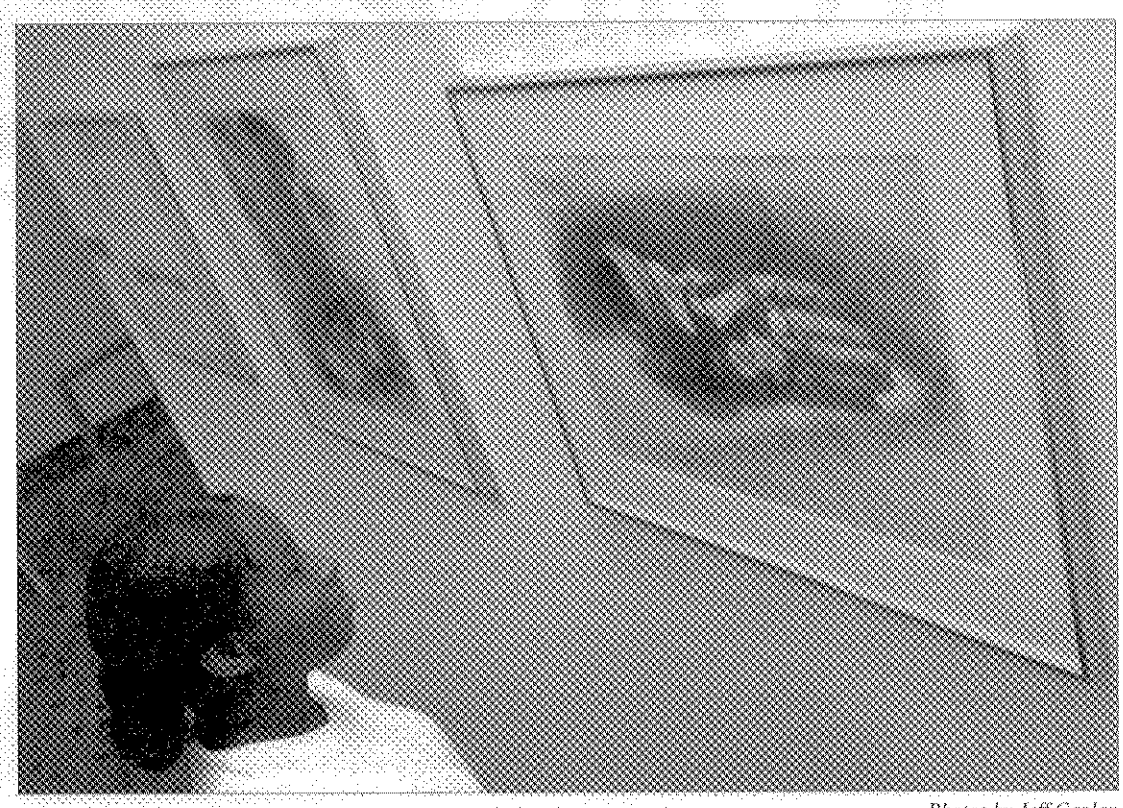
BY PAM VERNIEL

Original artwork adorns the walls of Langley's Pearl I. Young Theater, part of an ongoing effort to improve and enhance the conference facility.

The art is part of the NASA Art Program, in existence since the early 1960s. The idea of using art to help document NASA's work originated with James E. Webb, NASA administrator from 1961 to 1968. Webb believed that "important events can be interpreted by artists to give a unique insight into significant aspects of our history-making advance into space."

Nearly 800 pieces comprise the NASA collection, and more than 2,000 pieces are housed at the National Air and Space Museum, Washington, D.C. Artists represented in the collection include Norman Rockwell, Jaime Wyeth, Robert Rauschenberg, Andy Warhol and Robert McCall. Artwork from the NASA collection is loaned to museums, libraries and NASA centers.

Artists commissioned by NASA receive a small honorarium to complete an art assignment. The works depict a wide range of subjects, from space shuttle launches to aeronautics research, the Hubble Space Telescope and even virtual reality. The NASA Art Program is managed by the Office of Public Affairs, NASA Headquarters, Washington, D.C.

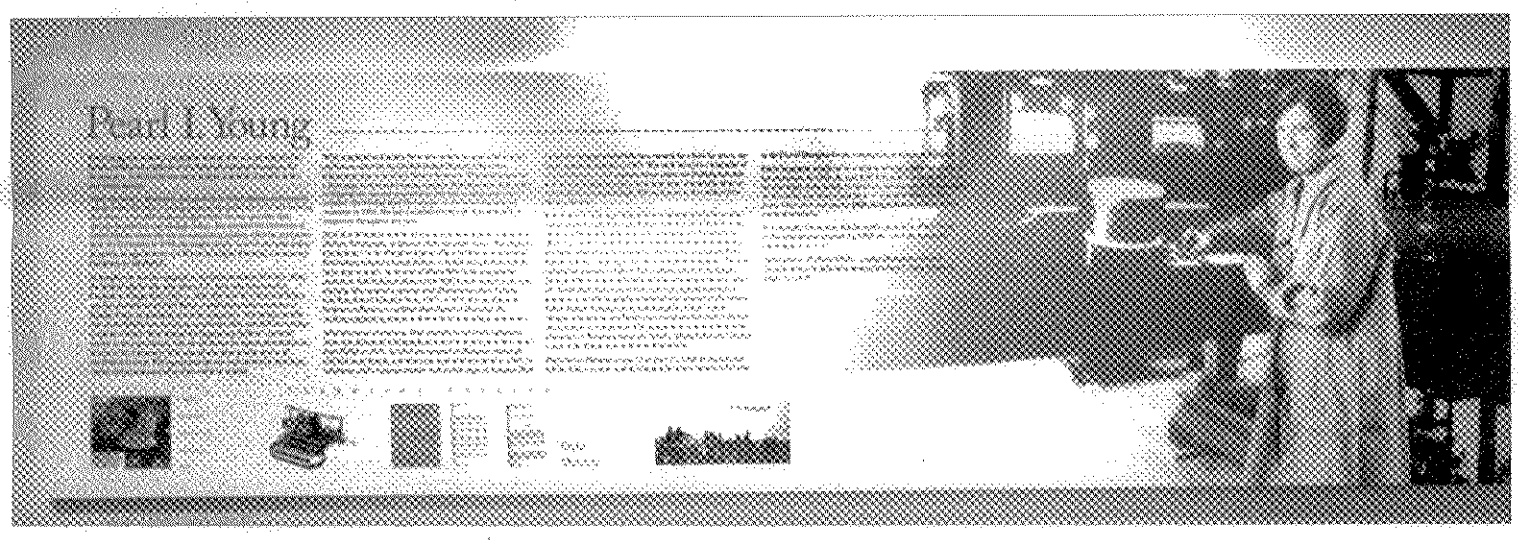


Photos by Jeff Caplan

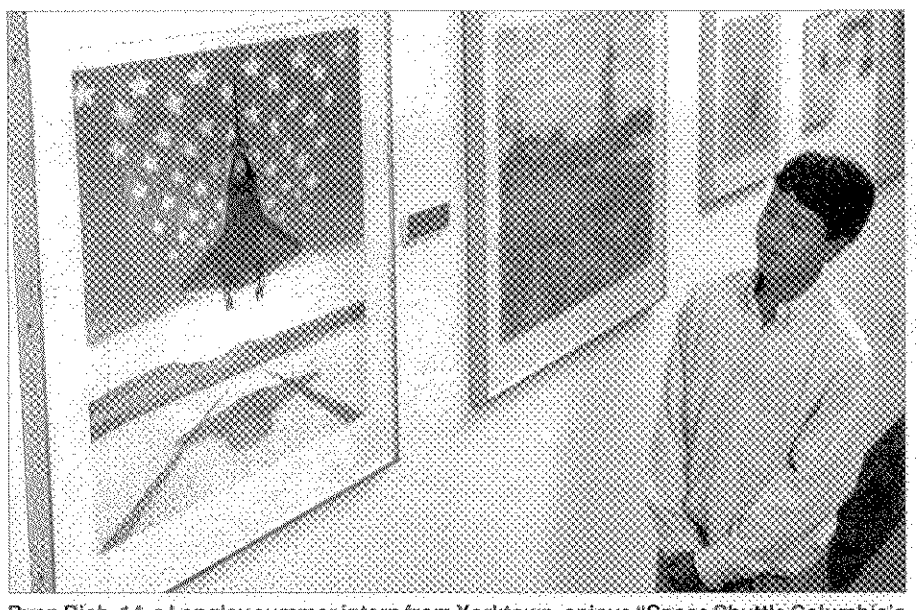
Nicole Brown, of Langley's "small cafeteria," in the same building as the theater, checks out "Vacancy," a painting by Chet Jezierski, at the theater during a break.

Pearl Young mural

In addition to the original paintings hanging there, the theater also boasts a mural in its lobby which displays a photo of Pearl Young and the text of a speech given by Hewitt Phillips, a Langley distinguished research associate and personal friend of Young, during the dedication of the facility in 1995. Young served Langley as a physicist and technical editor from 1922 to 1943.



This mural, depicting Pearl Young and a transcript of Hewitt Phillips' remarks at the theater's dedication ceremony, was designed by Anna Ruzecki, NCI Information Systems, Information Systems & Services Division.



Ryan Rich, 14, a Langley summer intern from Yorktown, enjoys "Space Shuttle Columbia's First Landing," by Robert McCall.

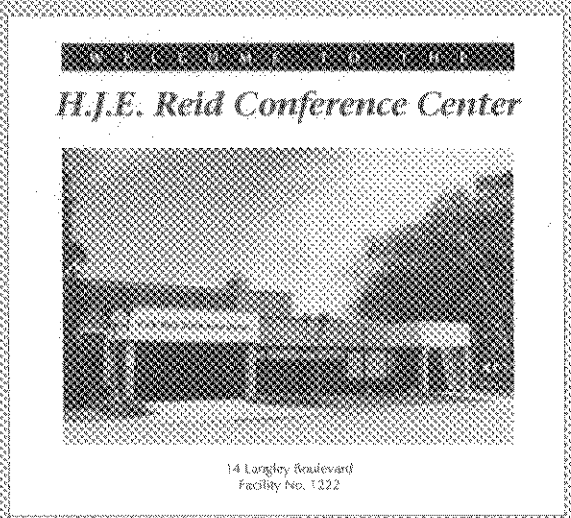
Conference facility brochures now on line

See URL www.larc.nasa.gov/lantern/categories/scheduling_reserving/larc-conference-rooms.html

Brochures describing Langley's four major conference facilities – the Pearl Young Theater, H.J.E. Reid Conference Center, Executive Conference Center, and Room 200 of the 7 x 10 Facility – now are available on the World Wide Web, in addition to hard copy.

The brochures provide information on location, floor plan and services. In addition, Langley employees who have access to the Now-Up-to-Date Macintosh software may access a calendar of availability for the four facilities.

For hard copies of the brochures, call the Conference Manager at ext. 46362.



This brochure, one of four now available on line for information about Langley's conference facilities, describes the floor plan and services offered at the center's H.J.E. Reid Conference Center, Langley Blvd.

On the internet, look for the brochures on the Langley home page under *Lantern*, "Scheduling and Reserving," "Conference Rooms."

AdVentures

FOR SALE: Cannondale Bugger bicycle trailer, full canopy and zipper enclosure. New hitch. $50. Call 874-3121.

FOR SALE: Renovated 2-BR rancher in historic Wythe. 1 bath, large living room, spacious kitchen, hardwood floors throughout, enclosed front patio, privacy fence, large detached garage/workshop, front-yard water view, one block from the Chesapeake Bay, in established neighborhood with lots of trees. $69,900. Call 247-5144.

ALUMNI NEWS: *Item 1* – The next meeting of Langley's Alumni Association will be held Oct. 14, 11:30 a.m., in the private dining room of the cafeteria. Guest speaker William L. Smith, chief, Atmospheric Sciences Division, will discuss Langley's atmospheric sciences projects. Send dues (check payable to Langley Alumni Association) to Mary Mesic, 2 Towne Square Drive, Newport News, Va., 23607. *Item 2* – The University of Maryland, Eastern Shore, requests contributions to the Abraham Spinak Endowed Scholarship Fund for students enrolled in Airway Science Program. Tax-deductible contributions may be made payable to the University of Maryland Foundation and sent to Office of Development, University of Maryland, Eastern Shore, Princess Anne, Md. 21853.

OYSTER ROAST: The American Institute of Aeronautics and Astronautics hosts its annual Oyster Roast, Oct. 15, 4:30-8 p.m., NASA Langley Activities Center Picnic Grounds. Cost is $7.50 for members and family; $4.50 for student members; $10 for nonmembers; $3 for children under age 10; free for children under age 3. For reservations, call Lynda Foernsler, ext. 48146, or Paresh Parikh, ext. 42244, by Oct. 10.

CAREER BOOSTERS: Langley's career center offers the following training seminars through December: ***Starting Your Own Business – Laying a Solid Foundation***, Oct. 16, 9 a.m.-noon; ***Communicating Effectively with Your Supervisor***, Oct. 21, 9 a.m.-noon; ***Starting Your Own Business – In the Black, ASAP***, Oct. 23, 9 a.m.-noon; ***Starting Your Own Business – The Right Side of the Law***, Oct. 30, 9 a.m.-noon; ***So You Want To Be A Consultant***, Nov. 5, 8:30 a.m.-noon; ***Retiring for Fun, Not Profit***, Nov. 13, 9 a.m.-noon; ***The Net and Career Development***, Nov. 18, 9 a.m.-noon; ***Making Yourself Indispensable at Work***, Dec. 4, 9 a.m.-noon; ***Stress Management***, Dec. 10, 1-4 p.m. These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

BUSH ON BOOKS: Dr. Lance Bush, of Langley's Technology Applications Group, will lead a book discussion group, Oct. 16, 7 p.m., at Barnes & Noble, Jefferson Ave., Newport News. Bush will focus on science and technology's impact and future implications on society. Recommended reading includes *Cosmos*, Carl Sagan; *The Day the Universe Changed*, James Lee Burke; *Silent Spring*, Rachel Carson; *Science & the Founding Fathers*, Bernard Cohen. For more information, call 249-2488.

SWEET FAREWELL: A retirement social for Jeff I. Cleveland will be held Oct. 24, 7:30 p.m., in the H.J.E. Reid Conference Center. Desserts and coffee will be served. Reservations are $7 per person, $11 per couple and $2 for gift-only donations. Respond to Amanda Levy, Mail Stop 125B, by Oct. 16.

HALLOWEEN AT THE VASC: The Virginia Air & Space Center hosts its sixth annual Sci-Fi Halloween Bash, Oct. 25, 5-8 p.m. Activities include trick-or-treating, a haunted house, a costume contest for children and adults and a scavenger hunt. Admission is $3 for the general public, $2 for members. For more information, call 727-0900.

HISTORY OF GIVING: Alumni Association treasurer Bert Rockey is compiling a list of the organization's contributions to the community and to local charities, for historical purposes. To add to this list, call Bert at 898-4382.

SAIC SEEKS INTERNS: SAIC-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in any of the following fields: earth sciences, physics, engineering, mathematics, scientific computer programming. Successful candidates must be U.S. citizens or must be eligible for employment with a U.S. government contractor. For applications or more information, contact Summer Intern Program, SAIC, at 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

PENINSULA SKI CLUB: Ten ski trips are planned for sites in Virginia, in the western and eastern U.S. and in Europe. For more information, call Bill Hunter at 874-0913

NEW-AGE POETRY: America's greatest contemporary poets and their works will be featured in a free six-part discussion series, "American Poetry into the 21st Century," beginning Oct. 19, 2 p.m., and continuing each Sunday through Nov. 30 (except Oct. 26), at the James City County Library, 7770 Croaker Road, Norge. The series is part of a national project to stimulate appreciation for contemporary American poetry. To register, call 229-4198. For more information, see the internet address at ***http://www.wrl.org***.

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Photo by Jeff Caplan

FAREWELL FLIGHT – NASA Langley's 737, nicknamed "Fat Albert" because of its stubby shape, executes the first of two flyovers above the center Sept. 19 before heading west to its new home in Seattle. The research plane, the first 737 Boeing produced, was retired and loaned to the Seattle Museum of Flight after serving the center for 20 years.

National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

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Breaking the sound barrier – 50 years later

Former Langley pilot shares X-1 flight memories

BY KEITH HENRY
AND DEBBIE DOUGLAS

"No NACA pilot will ever be permitted to fly an airplane powered by a damned firecracker," said Mel Gough, Langley's chief research pilot, privately, in 1945. But the second and the sixth men to break the "sound barrier" in the rocket-powered X-1 were Langley pilots.

Langley pilot Herbert Hoover was the second person to fly faster than sound in an X-1; Langley pilot Bob Champine was the sixth.

But the pilot the public remembers is Chuck Yeager. They've forgotten that the era's top aeronautics trophy was shared by Yeager, Larry Bell of Bell Aircraft Corp. and Langley's John Stack. And they certainly don't remember the amazing group of NACA pilots who worked on the project right from the start.

This month marks the 50th anniversary of the first supersonic flight. To help underscore Langley's contributions to that feat, Bob Champine shared some of his memories from that time with the *Researcher News*.

"Hoover once said that it wasn't necessary for Chuck Yeager to be first [to break the sound barrier] because the guys in the NACA would have done it anyway," said Champine.

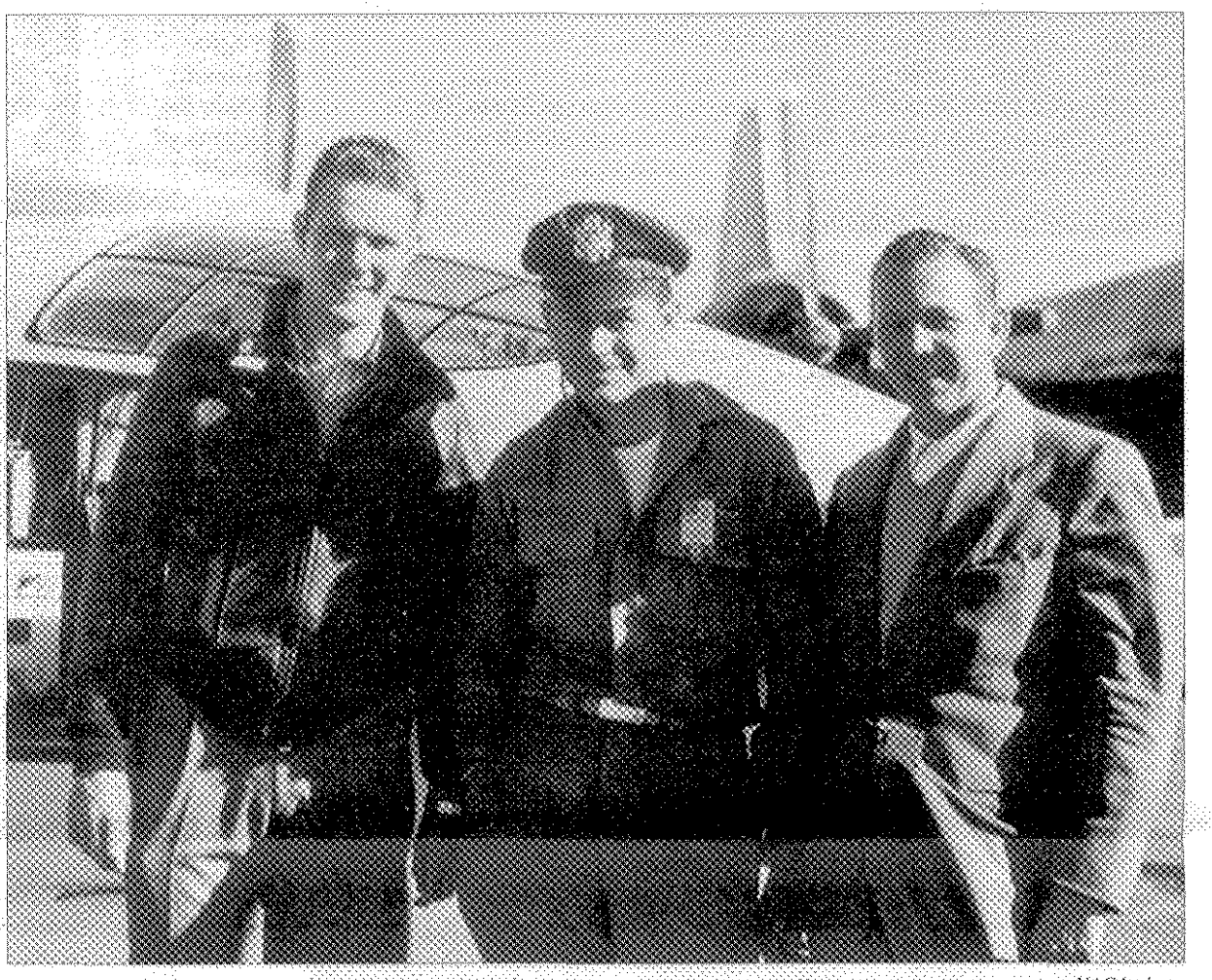
Champine, retired from NASA in 1979 and living with wife Gloria, also a NASA retiree, in Newport News, was quick to head off a boasting war by adding, "But the military pilots were expert pilots, and Chuck Yeager was one of the best."

Any serious student of aeronautics history knows that the honors bestowed upon Yeager for the past 50 years for that one flight could just as easily have gone to Langley's Hoover (or Lewis Research Center's Howard Lilly) if that sort of thing had been important to NACA pilots. It wasn't.

According to Jim Hansen in *Engineer in Charge*, Hoover, unlike Yeager, was the typical NACA engineer – methodical, more interested in what could be learned by flying that "firecracker" than in being the first to push it beyond Mach 1. The NACA didn't want a flash-in-the-pan; they wanted to make supersonic flight a practical reality.

This was a different objective from that of the Air Force. While the Cold War hadn't officially begun, relations with the former Soviet Union were extremely tense. It was vital to the military to demonstrate America's technological superiority – to be

(see MEMORIES, page 3)



NACA photo

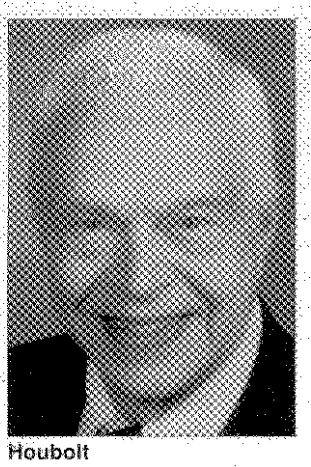
Bob Champine, left, Chuck Yeager and Herbert Hoover stand before an X-1 at what is now Edwards Air Force Base, Calif. The propeller-powered aircraft in the background is the B-29 used to carry the X-1 aloft before drop tests.

Colloquium Communiqué

How airplanes take shape depends on many factors

Distinguished aeronautical engineer Dr. John C. Houbolt will deliver the November Langley Colloquium lecture, "How Design and Operational Factors Influence the Nature and Shape of Resulting Airplane Configurations," Nov. 4, 2 p.m., at the H.J.E. Reid Conference Center.

He will also deliver a related Sigma Series lecture, "Why Airplanes Look Like They Do," that same evening, 7:30 p.m., at the Virginia Air & Space Center in Hampton.



Houbolt

A host of design and operational factors – some conflicting – directly influence the way an airplane configuration is born. Houbolt will show how a plane's final shape is highly dependent on its intended use. He will offer some basic, uncomplicated theoretical formulae to show key parameters in the design process, as well as factors involved in improving airplane efficiency.

Houbolt, who is also a private pilot with multi-engine rating, has a personal interest in airplane design. He began his career at NASA Langley in 1942. He served as the associate chief of the Dynamic Loads Division from 1949 to 1961, and as chief of the Theoretical Mechanics Division from 1961 to 1963. He was senior vice president and senior consultant at Aeronautical Research Associates of Princeton, Inc., from 1963 to 1975. From 1976 until his retirement in 1985, he served as Langley's chief aeronautical engineer.

Colloquium & Sigma Lectures

Colloquium Lecture:
"How Design and Operational Factors Influence the Nature and Shape of Resulting Airplane Configurations," Dr. John C. Houbolt, Nov. 4, 2 p.m., H.J.E. Reid Conference Center

Sigma Lecture:
"Why Airplanes Look Like They Do," Dr. John C. Houbolt, Nov. 4, 7:30 p.m., Virginia Air & Space Center, Downtown Hampton
Info: 727-0900

Houbolt received the 1963 NASA Exceptional Scientific Achievement Award and the 1983 Space Act Award for the conception and development of the Lunar Orbit Rendezvous for manned lunar landings. Houbolt was Peninsula Engineer of the Year in 1989.

State of the Center Address

NASA Langley Center Director Jeremiah F. Creedon will deliver the 1997 State of the Center address, Nov. 13 and 14, at the H.J.E. Reid Conference Center, 14 Langley Blvd.

Five sessions are scheduled so that as many employees, retirees and contractors as possible may attend. An early morning session is planned for those who work third shift. The rest of the sessions are based alphabetically on last names, but anyone may attend any session.

Nov. 13 – 1:30-2:30 p.m. (A-E)
3-4 p.m. (F-K)

Nov. 14 – 5-6 a.m. (third shift)
8:30-9:30 a.m. (L-R)
10-11 a.m. (S-Z)

News Briefs

Around the Agency

HUBBLE SEES LONE NEUTRON STAR – (Goddard Space Flight Center, Greenbelt, Md.) Astronomers using NASA's Hubble Space Telescope have taken their first direct look, in visible light, at a lone neutron star. This offers a unique opportunity to pinpoint its size and to narrow theories about the composition and structure of this class of gravitationally collapsed, burned-out stars. By determining the properties of an isolated neutron star, astrophysicists can better understand the transitions matter undergoes when subjected to the pressures and temperature found in the gravitational field of a neutron star.

TEAM BEGINS TEST OF ADVANCED LIFE SUPPORT SYSTEM – (Johnson Space Center, Houston, Texas) The next phase of testing of regenerative life support systems has begun at NASA's Johnson Space Center, Houston, Texas. A crew of four is being maintained in an air-tight chamber environment for 90 days, testing life support systems for future space exploration missions.. Phase III of the Lunar-Mars Life Support Test Project began last month. The crew will investigate the use of biological, mechanical and chemical means to recycle their air and water and to provide some of their food. For more information about the test, visit the Phase III web site at ***http://pet.jsc.nasa.gov.***

SPACE RESEARCH PROVIDES EARTHSHAKING REVELATIONS – (Marshall Space Flight Center, Huntsville, Ala.) Research aboard the space shuttle is helping to provide a way to protect structures from the major vibrations of severe earthquakes and high winds. Dr. Mark S. Whorton, an aerospace engineer at NASA's Marshall Space Flight Center, Huntsville, Ala., has been working for several years on resolving vibration problems in a microgravity environment that can affect sensitive science experiments conducted aboard the shuttle in orbit. The research is part of a National Science Foundation effort to understand dynamic loads placed on structures by earthquakes.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ Today's top minority graduates want open and honest answers to the following: "What's it like to work for your company?" "Do minorities get promotions?" "What's the real minority representation (don't give me funny numbers)?" Competitive companies need to be open and honest about minority representation in order to attract the best talent.

▲ November is Native American Heritage Month. Support your local Native American celebration programs.

▲ Nov. 6-8 – National Technical Association Annual Conference, Philadelphia, Pa. 215-549-8743.

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV.

Announcements

Getting two copies?

If you are presently getting multiple copies of the *Researcher News* mailed to you through the postal system, call 864-6120 with your name and all other information from your mailing label so we can update our mailing lists.

Handbooks, directives now only on the Web

Effective Nov.1, hard-copy distribution of Langley directives and handbooks will be discontinued. With the exception of the Safety Manual, all Langley Handbooks (LHBs) and Langley Procedures and Guidelines (LAPGs) are now available through the NASA Online Directives Information System (NODIS).

The successful implementation of NODIS at Langley results in a new, inexpensive method of distributing policy and guidance throughout the center. This accomplishment was spearheaded by the Logistics Management Office.

The Web address for NODIS is ***http://misbss20.larc.nasa.gov/LDMS/ldmshome.html.***

To view or print LHBs or LAPGs by computer, Adobe Acrobat Reader software is needed. This free software can be downloaded from the above Web site. Once a bookmark is set, NODIS offers faster access to directives than the current hard-copy versions. The Safety Manual, consisting of 19 handbooks, is under revision and will be included in NODIS when completed. Notices of new directives and revisions will be announced via e-mail to the appropriate personnel.

For more information, call Marjorie Turner, Logistics Management Office, ext. 43436.

'World of Wings' video now available

The official video review of the 1997 Experimental Aircraft Association (EAA) Fly-In Convention is now available on home video.

World of Wings is a complete review of EAA Oshkosh '97, the world's largest sport aviation event. The 60-minute video features the people and airplanes of the world's premier sport aviation event. This year's convention attracted more than 840,000 visitors and 11,500 airplanes.

This year's production includes air-to-air footage used in this fall's EAA Oshkosh prime-time special on ESPN, plus exclusive EAA footage of homebuilts, vintage airplanes, warbirds, ultralights and more. This video also includes segments on the 50th anniversary of the U.S. Air Force, the 50th year of supersonic flight and other significant aviation developments presented during the event.

To order *EAA Oshkosh '97: World of Wings*, call 1-800-843-3612. The cost is $19.95, plus $5 for shipping and handling. PAL format is available for international customers.

NASA history on Web

NASA history is now on the World Wide Web. Topics covered include aeronautics, personnel, astronautics, history at the NASA centers, timeline, pocket statistics and human spaceflight programs – including Mercury, Gemini, Apollo, Skylab, Apollo-Soyuz and the space shuttle.

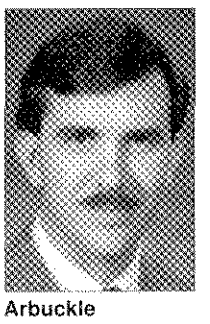
To access all this information and more, see the NASA History Home Page at ***http://www.hq.nasa.gov/office/pao/History/history.html.***

In memory of Wade E. Cason Jr.

Wade Edwin Cason Jr., 74, died Sept. 29. The Greenville, S.C., native retired from NASA in 1979 as an electronics technician after 35 years of service.

Personnel changes affect senior executive positions

NASA Langley Center Director Jeremiah F. Creedon has announced the following changes to senior executive assignments at the center:


Arbuckle

P. Douglas Arbuckle is appointed as associate director, replacing Dr. Kristin A. Hessenius. Arbuckle is a graduate of the NASA Senior Executive Service Candidate Development Program.

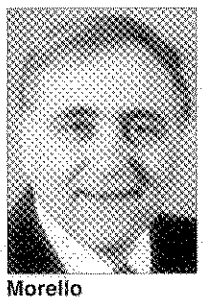
Hessenius will serve as special assistant to the director until her resignation is effective in early November.

Hessenius

Samuel A. Morello is selected as director of the Advanced Subsonic Transportation Program Office.

Luat T. Nguyen is selected as chief, Flight Dynamics and Control Division, Research and Technology Group.

Dr. Mark J. Shuart is selected as chief, Materials Division, Research and Technology Group.


Morello

Shuart

Nguyen

Policies govern leave scheduling

The current leave year ends Jan. 3. Supervisors and employees hold joint responsibility to plan and to schedule annual leave throughout the leave year. Supervisors must approve annual leave if work load permits. However, if the leave must be denied, the supervisor and the employee should work together to reschedule the leave to the satisfaction of the employee and still meet mission requirements.

Approval of an exigency of the public business must be obtained prior to cancellation or denial of leave if the leave is subject to forfeiture. "Use or lose" annual leave may be restored only when the leave is forfeited due to an exigency of the public business – not for the convenience of the employee. For such leave to be considered for restoration, it must be scheduled and approved before the beginning of the third pay period prior to the end of the leave year, or no later than Nov. 22. A properly executed Standard Form 71, Application for Leave, satisfies this requirement.

A key element in the leave restoration process is line management's determination that a sufficiently critical problem or situation exists to declare an exigency. Such exigencies should be rare events having significant program cost or schedule impact or involving safety considerations. Approval of an exigency of the public business must be obtained prior to canceling or denying leave in the "use-or-lose" category.

For individual employees who are requesting an exigency that is not affiliated with a project or team, the request for exigency must be processed through organization channels to group level and must include the following:

(see LEAVE, page 5)

Researcher News

The *Researcher News* is an official publication of Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees and has a circulation of approximately 8,100. It is distributed to all Langley civil service employees, contractors, retirees and on-site university personnel, with limited distrubution to NASA Headquarters, other NASA centers and, by special request, to other non-NASA individuals and organizations. Questions related to the content and distribution of the *Researcher News* should be addressed to Keith Henry, Mail Stop 115, (757) 864-6120. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news @larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

Photographer..... Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

NASA fares well in FY '98 numbers

BY LEE RICH
Congressional Affairs Officer

The Fiscal Year 1998 Veterans Affairs, Housing and Urban Development, and Independent Agencies Appropriations Bill, HR 2158, which includes NASA, has been signed into law by President Bill Clinton. The final mark for NASA is $13.648 billion, $148 million more than the Administration's request. The breakdown is as follows (in millions):

Human Space Flight	$5506.5
Science, Aeronautics and Technology	$5690.0
Mission Support	$2433.2
Inspector General	$18.3
TOTAL	**$13,648.0**

The FY '98 budget request for Langley Research Center is $648 million. The Langley allocation for FY '97 was $637 million.

The conference report which accompanies HR 2158 is accessible on the internet at ***http://www.hq.nasa.gov/office/legaff***. The NASA portion of the bill, is found on pages 129-134 of the report.

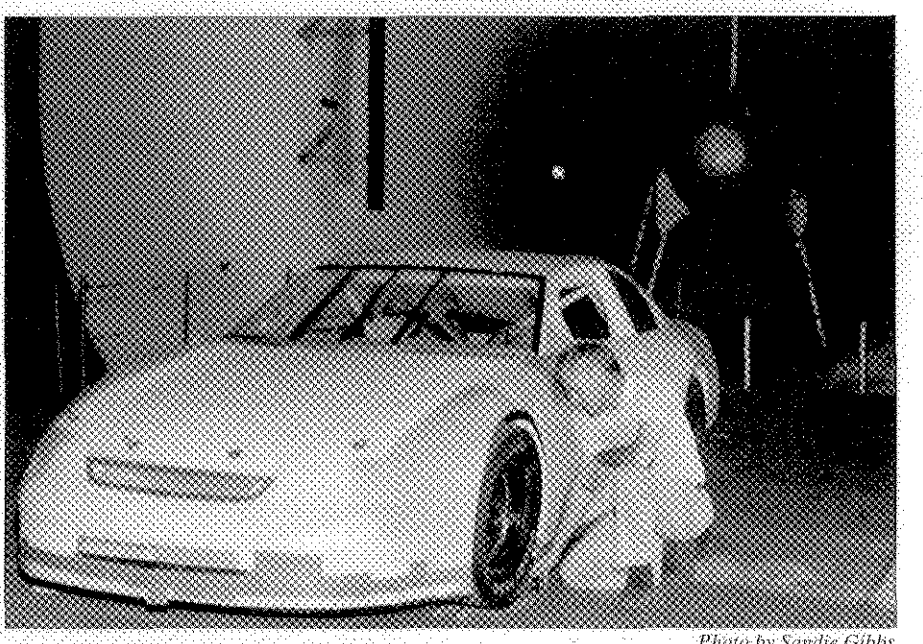


Photo by Sandie Gibbs

TUNNEL TRAFFIC – Former NASA employee Earl Conkling checks out a race car in the Langley Full-Scale Tunnel. Old Dominion University is using the facility, which Langley closed in 1995, to perform drag tests on the car for a NASCAR team. Conkling is a technician for the ODU Research Foundation. Last summer, ODU, its research foundation and Langley signed a 10-year, renewable agreement that allows ODU to manage and operate the tunnel as an educational center and as an independent, non-NASA aerodynamic research facility. ODU will use the facility for commercial research, including architectural and structural wind loading and car and truck aerodynamics. ODU's College of Engineering operates the facility, in collaboration with the foundation, managed by Dr. Jim Cross, former dean of engineering.

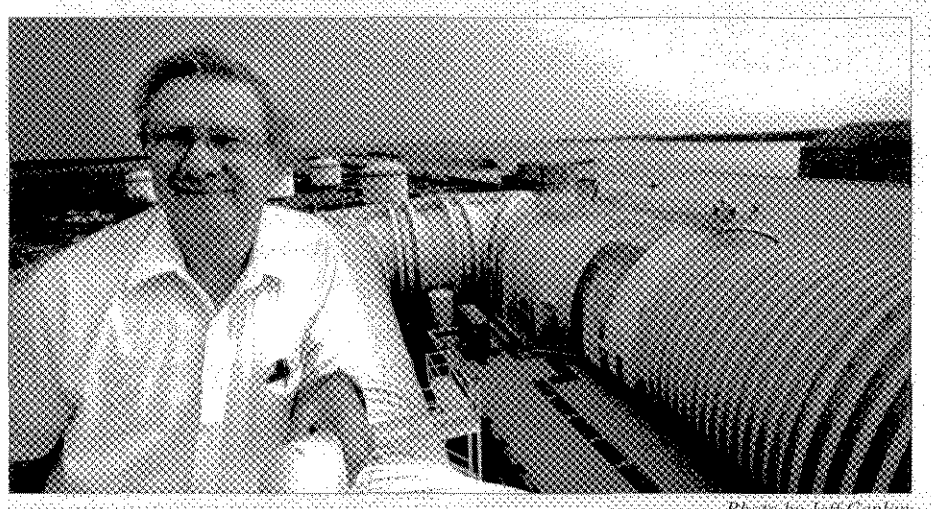


Photo by Jeff Caplin

TUNNEL IN TRANSITION – Bryce Kipley, facility manager of the Transonic Dynamics Tunnel, observes the back leg of the TDT that contains the wind tunnel drive systems. Kipley is overseeing the conversion of the tunnel from R12 gas to R134 gas.

Networking key to career development

Marty A. Brown, senior counselor with Langley's Career Center, presents a seminar entitled "Networking for Career Development," Nov. 18, 5 p.m., at the H.J.E. Reid Conference Center

The presentation will:

▲ Illustrate the impact a strong network can have on career development

▲ Discuss how to tap into the wide range of local and national networking opportunities available

▲ Explore means of identifying and connecting with people to establish and maintain a meaningful network.

Reservations are not required. For more information, call Marilyn Ogburn at ext. 41175, or send her an e-mail at m.e.ogburn@larc.nasa.gov.

The American Institute for Aeronautics and Astronautics, Hampton Roads Section, Career Enhancement Committee, sponsors the event.

MEMORIES

(continued from page 1)

first, to fly highest and fastest. For veteran military war pilots, bravery and aggressiveness mattered most.

For the record, Hoover first flew the X-1 two months after Yeager's record-breaking flight of Oct. 14, 1947, then took his time before becoming the second person to fly supersonically on March 10, 1948.

Typically modest, Champine spent more time talking about his former boss in the Langley flight office than about himself and his experiences.

"Hoover gave me very clear, concise orders and directions," recalled Champine, "and I liked that. He trained me, back here at Langley, on how to fly the X-1 – and I had never even seen it. He did it through conversations and his files that he brought back to Langley.

"The most helpful advice he gave me about flying the X-1 was not to think about bailing out if there was trouble. He said, 'Just recover the airplane, bring it back to the lakebed and land it.' And, of course, he was right because I would have immediately struck the wing.

" I got from him a feeling of confidence that no matter what happened, I could bring that thing back."

As for Champine's first reaction to his own sound-barrier-breaking X-1 flights, "It was a piece of cake."

"I guess I was pretty lucky. That's what most people would say – you lived through it, you must have been lucky. But my real perspective, after all these years, is that I must have been a pretty smart guy," he continued, laughing. "Apparently I must have done it right, even in the situations that might have been kind of hairy."

Tragically, Hoover, whom Champine so much admired for his piloting, intelligence and leadership, died in an aircraft accident in 1952 during a research flight unrelated to the sound barrier.

***

Note: Langley and Langley people played a much bigger role in breaking the "sound barrier" than most realize, even here at Langley.

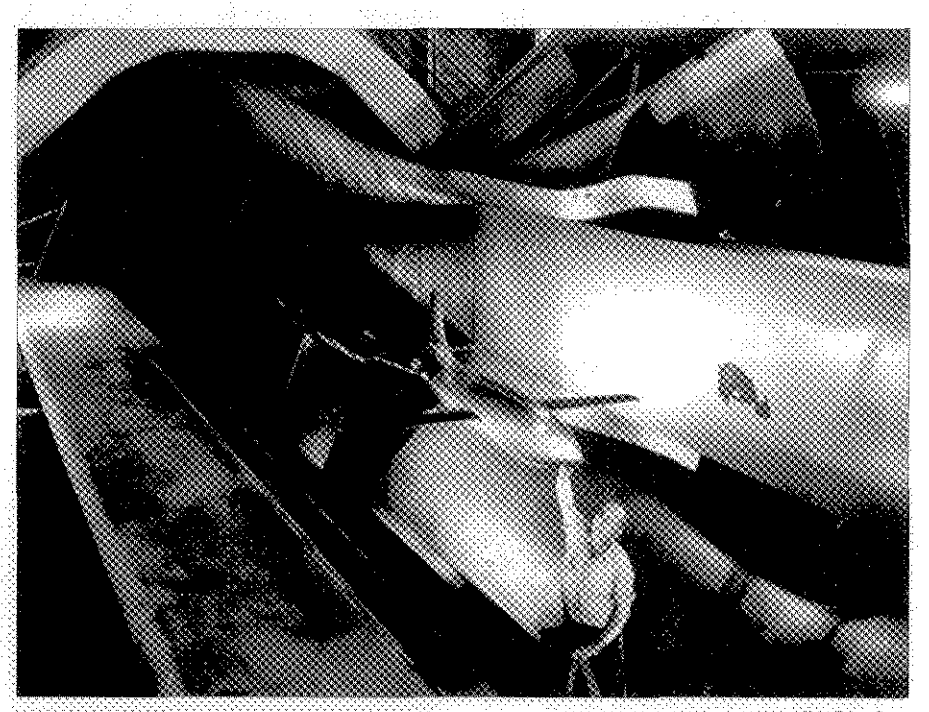
Several years before Yeager's historic flight, Langley was adding to this country's knowledge about supersonic flight in a number of ways, including firing supersonic rocket models from the shores of Wallops Island, Va.

Langley's John Stack was instrumental in interesting the Army Air Corps in funding the Bell X-1 program and the Navy in funding the parallel non-rocket Douglas Aircraft D-558-1 program. Stack and others at Langley then heavily influenced the design and mission of each, even though he and his team strongly preferred the D-558 program.

Langley wind tunnels provided confidence-building data before and during the flight programs. This and other wind tunnel research at the time led to the construction of the agency's premier collection of transonic, supersonic and hypersonic tunnels.

At Muroc dry lake (now Edwards Air Force Base, Calif.), a team of Langley engineers, instrument specialists and technical observers supervised the instrumentation of the more research-oriented second X-1 aircraft. The same team gathered and analyzed "all possible data" during the period of its powered test flights. A group of three women "computers in skirts" was also assigned to the X-1 project at Muroc, crunching the numbers that documented the breaking of the sound barrier.

And, of course, our pilots flew the X-1 and D-558-1 and 2 aircraft, supported by Langley mechanics and other ground personnel.



NASA photo

Langley played a key role in transonic studies during the X-1 era. Here, a Langley engineer inspects the installation of an X-1 model in Langley's 16-Foot High-Speed Tunnel after award-winning modifications to the tunnel allowed accurate measures of airflow at and near the speed of sound.

X-1 Web site

The NASA History Office has developed a Web site on the history of the X-1 in observance of the 50th anniversary of the first supersonic flight. It includes documentation, photos and links to other sites. The address is ***http://hqirms5.hq.nasa.gov/irms/sasl/***

NASA Langley volunteer razes roof for others

BY MARNY SKORA

Habitat for Humanity is in the business of building good homes – and good neighbors.

An international, non-profit organization, Habitat's goal is to eliminate poverty housing. That's a substantial undertaking – but they are well on their way. This summer, the 56,000th Habitat house was completed. In fact, *Professional Builder* magazine named Habitat for Humanity the 16th largest home builder worldwide.

"Habitat is one of today's best investments by people who want to help others. Habitat's key to success is not provided by charity, but by capital to worthy families shackled by poverty."

Jimmy Carter, Former president of the United States and Habitat volunteer

This ecumenical group got a big shot in the arm when former President Jimmy Carter picked up a hammer and adopted the cause. More recently, Oprah Winfrey has challenged her audience to help her build more than 200 Habitat houses all over the country.

Perhaps not as well known as President Carter or Oprah, NASA Langley's star of the local Habitat chapter is equally committed to the framework of building no interest homes for low income families. Russell De Young, a senior research scientist in the Chemistry and Dynamics Branch, was one of the founders of Peninsula Habitat for Humanity.

In 1985, De Young and his family traveled to Habitat's national headquarters in Americus, Ga., along with two other families. Upon their return, the local chapter was born and, in 1986, construction started in Newport News. De Young and the others formed the nucleus of a community effort which produced the first Habitat home in Virginia.

Since that time, the Peninsula organization has built 35 more homes, giving clean, affordable housing to 36 families and nearly 100 children. De Young spends two to three weekends a month doing everything from supervising volunteers to razing the roof of another Habitat home.

"We serve good families who are living well below the poverty level," said De Young. "They are not able to get a conventional mortgage but have demonstrated need and fiscal responsibility. The Habitat approach is a *partnership* between deserving families and the community. Prospective homeowners work side-by-side with volunteers to build their home."

De Young explains that the Peninsula community is very supportive of Habitat. Communities have donated land, suppliers often donate materials and thousands of volunteers regularly donate time and talent. Cash donations cover whatever else is needed.

Sound easy? Well, it's not quite that simple. A great deal of coordination exists behind the scenes to interest local businesses, civic and church organizations and federal groups in participating.

For instance, De Young is working with a group of Mennonite churches to build a Habitat house.

"We are planning a ground breaking on Christmas eve," he said. "What an appropriate way to celebrate the holiday!"

Starr Mayer, executive director of the Peninsula Habitat for Humanity, has the greatest respect for her former board president.

"Russ De Young personifies in every way what Habitat stands for," said Mayer. "He does it all. He was instrumental in the formation of the chapter; he sustains community interest; he involves churches and corporate sponsors – and he wields a mean hammer."

Photo by Dean Floyd

Russell De Young helps raze the roof on the 36th Peninsula Habitat for Humanity home. De Young supervised a crew of volunteers on the Day of Caring that gave a great start to the latest Habitat endeavor.

The average cost of a three bedroom house is $35,000. This house becomes not only a home to a deserving family but also an asset to the community, valued at more than $60,000.

Habitat holds the mortgage on the homes they build. Because payments made by homeowners are used to construct homes for others in need, each home is like an endowment. It is a gift of permanent capital that generates funds for the next home to be built.

Langley still leads in CFC efforts

Last month, many employees at Langley Research Center participated in the community Day of Caring. This annual activity is a terrific demonstration of community support and sharing of ourselves for the benefit of others. In fact, such demonstrations have become part of the proud tradition that comprises the culture at our center.

Leadership is another component of the proud tradition at Langley. The Combined Federal Campaign is and has been an outstanding example of that leadership. Our efforts in the past have set an example for others to follow and have made a tremendous difference to the local communities. The Peninsula Combined Federal Campaign both recognizes and relies on NASA's example and leadership as elements to its success.

We are called on again this year to lead the way. Our center's goal of $286,000 is aggressive and challenges our resolve. I am confident that, with support from each of us, we can reach this goal. I'm hoping Langley can count on you to help continue the tradition. If you haven't already done so, I urge you to consider contributing to the Langley Combined Federal Campaign today.

Photo by Jeff Caplan

Mark Shuart displays the Langley banner at the Peninsula CFC kickoff last month.

– Mark J. Shuart, CFC Vice Chair

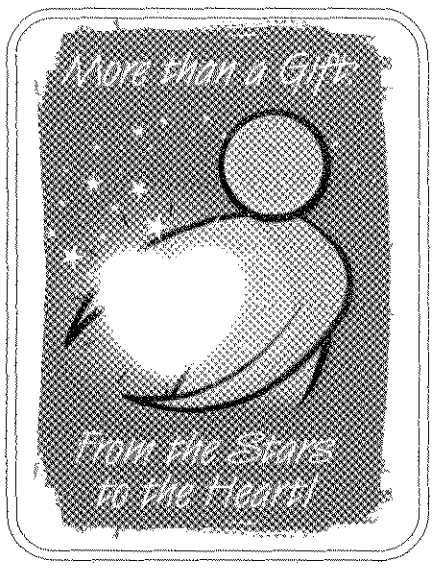
CFC's impact may require second thought

Think for a moment – Has the Combined Federal Campaign ever benefitted me? Casual reflection may result in a quick "no." But think a little more. You may see that you have indirectly received many benefits from the CFC.

Perhaps you have a parent whose life was saved by blood transfusion, or an in-law who was freed from the tyranny of epileptic seizures by CFC-funded research, or a good friend who was saved through the miracle of bypass surgery. I have, and I am very grateful that the needed CFC-funded agencies were in place when needed.

Hudson

When a crisis occurs, there's no time to form and staff an agency, build the needed facilities, develop the needed equipment and complete the essential research. These vital resources must be in place when the crisis occurs.



Your contribution to the Combined Federal Campaign is a major factor in the readiness of these resources. I urge you to think for a moment, celebrate the gifts you have and share your gifts with others less fortunate than yourself.

– C. Michael Hudson, CFC Loaned Executive

Did you know?

▲ Your CFC contribution can only be distributed to those agencies that you designate. None of it can be distributed to other agencies.

▲ If you do not designate the receiving agencies, your CFC contribution will be distributed only to those agencies that have been designated by other donors.

▲ Only 8 to 9 percent of your contribution goes to overhead for the Combined Federal Campaign. The remaining 91 to 92 percent goes directly to the agencies you designate.

▲ The proposed cost-of-living increase goes into effect on the same date that the CFC payroll deduction begins. Thus, you will probably experience only a reduced increase in pay next year – not an actual decrease in pay as a result of your contribution.

NASA exhibits amaze Va. State Fair-goers

Legos, Mars Pathfinder exhibit steal the show

Just a pile of Legos®, some gloves and some squeeze grips that athletes use to strengthen their hands – hardly "space age" or "high-tech" stuff. Yet thousands of kids and their parents were fascinated by the principles of engineering design these ordinary things demonstrated at the "Building Structures in Space" part of NASA's annual exhibit at the Virginia State Fair, Sept. 25-Oct. 5.

Of the estimated half a million people who flooded the State Fair-grounds at Strawberry Hill in Richmond, more than 300,000 visited the NASA exhibit in the Commonwealth Technology Building, including some 18,000 school children.

Once a mainly agricultural event, the fair now has grown even beyond the midway rides, funnel cakes and craft exhibits. Today, all aspects of commerce in the Commonwealth get fair play, and aerospace technology is on display along with the latest agricultural developments.

NASA Langley took the opportunity to acquaint Virginians with the center's role in some of the most visible NASA programs – like Mars Pathfinder – as well as with its own identity – who we are and what we do.

Visitors picked up free literature, saw demonstrations and learned about NASA and Langley from volunteers at the Public Inquiry Center's information booth and at exhibits on structures, infrared camera, blended-wing body, Mars, atmospheric sciences, pavement grooving and wind tunnel simulation.

The infrared camera exhibit brought a steady stream of fair-goers who wanted to see how "hot" they were as the camera captured a video image of their body temperatures.

"A lot of the kids were up on the whole Pathfinder mission," said Jack Drost, of the Information Systems and Services Division, "and it was great to be able to encourage them to study and to tell them that they could be an astronaut or an engineer if they wanted to be."

"All the kids wanted the 3-D glasses," said Linda Goodwin, of the Cost and Commercial Accounting Branch, who also worked the Mars exhibit. The glasses offered a unique perspective of a picture of the Red Planet, and were popular with "kids" of all ages.

"When [visitors] looked at the Mars photo, they were even more intrigued," said Goodwin. "They came in swarms all day, asking all kinds of questions, astonished to find out that the rover Sojourner was actually the size of the model we had on display."

Archie Fripp, of the Sensors Research Branch, found the same reaction during his shift at the Mars exhibit.

"One man kept asking me 'Is that all the bigger it is?' What started as a question evolved into an exclamation – 'That's all the bigger it is!' He was so impressed that I saw him a couple of hours later, back at the display, educating his wife – 'That's the actual size. Isn't that something!'"

Not to be outshone by all the new technology, the old 3-D gimmick played well to just about everyone.

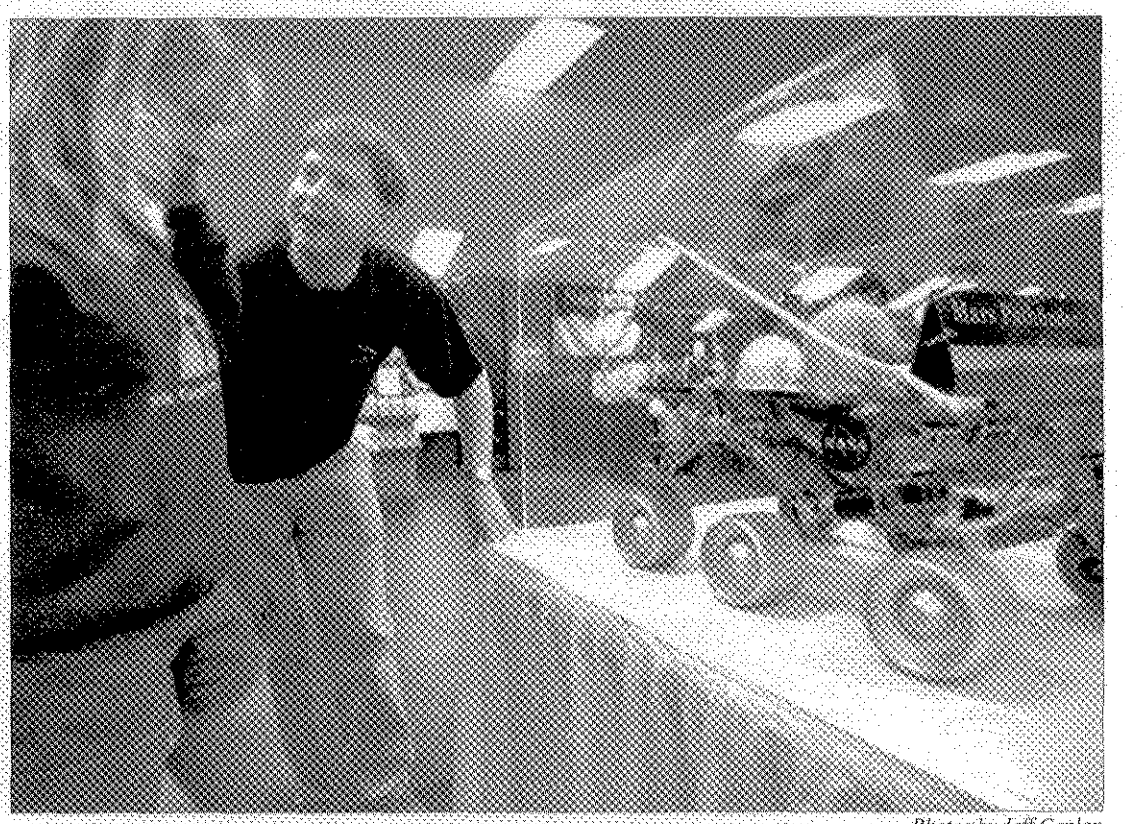
"Folks who remember the old 3-D movies were amused that NASA would be using that 'technology' from the past," said Ann Gaudreaux, of the Office of Public Affairs. "Young people who had never seen 3-D were really thrilled. Even the toughest-looking teen-agers let out a 'Cool!' after I roped them into the booth to check out the photo."

Pete Covell, of the Research and Technology Group, became an expert paper-airplane builder, flier and retriever as he worked the blended-wing body and high-speed civil transport exhibits. But one paper plane got away from him.

"After one successful flight of the paper AGATE model, another visitor distracted me from retrieving the airplane," he said. "A couple of minutes later, a young boy came walking toward me with the plane in his hand. I held out my hand and said 'thank you' as he handed it to me, with a disappointed look in his eyes."

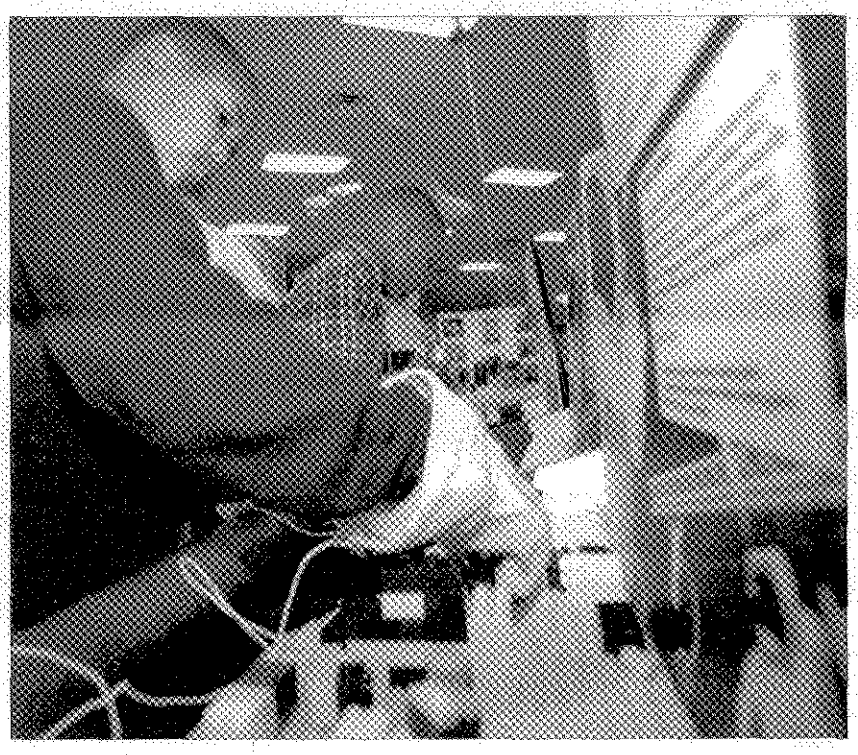
Then Covell learned that another volunteer had told the boy he could keep the model.

"So, wanting to save face for NASA and AGATE, I asked the boy if he would like me to build him a model of his own," said Covell. "In the 10 minutes it took to build and test fly the model, we had a nice discussion about NASA and airplanes. Hopefully, he left as a happy NASA 'stakeholder.'"



Photos by Jeff Caplan

Dawn Cox, 18, and Trey Booker, 25, both of Richmond, are amazed at the size of the Mars Pathfinder rover, the Sojourner, on their visit to the Virginia State Fair, Sept. 26, in Richmond. The NASA display attracted more than 300,000 visitors , with displays ranging from the Mars mission to wind tunnel models to infrared cameras.



Quinton Miles, left, 11, and his brother, Deron, 9, both of Richmond, try their hand at NASA's structures, or "Lego," display at the State Fair. The two found it challenging to build with Legos while wearing gloves.

LEAVE

(continued from page 2)

1. A complete description of the exigency.

2. The reason why the employee cannot use scheduled annual leave, and why the leave cannot be rescheduled prior to the end of the leave year.

3. The proposed beginning and ending dates of the exigency.

4. A completed Standard Form 71 for the employee affected by the exigency dated before Nov. 23.

Employees who are members of a project or team should check with their line management to ensure that their project or team has been submitted as a group by their group director. The procedure for project(s)/team(s) follows:

1. Employees associated with a project/team execute Standard Form 71 requesting leave use of use-or-lose annual leave.

2. Group Directors respond to request from the Office of Human Resources (OHR) to identify project(s)/team(s) for consideration of an exigency.

3. Office of Director line-item vetoes or approves requests for project/team exigencies.

4. OHR notifies appropriate offices of approved project(s)/team(s).

5. Supervisors deny use of use-or-lose annual leave for the employees associated with the approved project(s)/team(s).

6. Forward *copies* of properly executed SF 71s to OHR by Jan. 30.

Note to employees affiliated with an approved project/team: A properly executed SF 71 must contain the following additional information:

a. Name of project/team with which employee is associated.

b. Number of hours *actually* lost, as well as number of hours scheduled.

c. Employee's and supervisor's signatures are dated *before* Nov. 23.

"Use-or-lose" annual leave may be denied or canceled only if the Office of the Director determines that an exigency of the public business of major importance exists. *Exigency requests should be routed through appropriate organizational channels to the OHR, Mail Stop 120.*

"Use-or-lose" annual leave which cannot be used by the end of the leave year may be donated to approved leave recipients in the Voluntary Leave Transfer Program, which permits federal employees to donate annual leave to other federal employees who are experiencing personal or family medical emergencies.

AdVentures

FOR SALE: Renovated 2-BR, 1-bath rancher in historic Wythe; large living room, spacious kitchen; hardwood floors throughout, enclosed front patio; privacy fence; large detached garage/workshop; water view from front yard; one block from Chesapeake Bay in established neighborhood with lots of trees. $69,900. Call 247-5144.

FOR SALE: 3-BR rancher near Main St. in Newport News. 1-1/2 baths, wall-to-wall carpet, central air/heat, energy efficient, attached garage; eat-in kitchen, new roof, large fenced back yard, near elementary school, good location, on cul-de-sac, 20 minutes to NASA/Langley Air Force Base. $77,500. Call 838-0726.

FOR SALE: Doghouse, 2-by-4 framing with insulation and asphalt shingles; large, sturdy, owner-built with $150 of materials; will sell for $65. Call 247-5144 before 9 p.m.

FOR SALE: Cannondale Bugger bicycle trailer, full canopy and zipper enclosure. New hitch. $50. Call 874-3121.

FOR SALE: Two lots at Peninsula Memorial Park. $1,400. Call 365-9015.

FOR SALE: This-End-Up-style pine daybed, with twin mattress, barely used, like-new condition. $100. Call 851-1990.

FOR SALE: Couch, $100; futon, $250; computer desk, $100; kitchen table and chairs, $75. Call 596-2144 evenings.

ROOMMATE WANTED: Hampton Woods townhouse, 1,700 sq. ft., two years old, fully furnished. Your room has walk-in closet and private bath. No pets, no smoking. Less than 10 minutes from Langley. $400/month includes utilities. Call 827-0077.

HALLOWEEN BASH:

The Virginia Air & Space Center hosts its sixth annual Sci-Fi Halloween Bash, Oct. 25, 5-8 p.m. Activities include trick-or-treating, a haunted house, a costume contest for children and adults and a scavenger hunt. Admission is $3 for the general public, $2 for members. For more information, call 727-0900.

LOOKING SKYWARD:

The Skywatchers Astronomy Club will host a free evening of telescopic viewing of the heavens, Nov. 7, 8 p.m.- midnight, at the club's observatory, Building 1231A, 10A Lindbergh Way. A variety of telescopes will be set up for this event, and no reservations are required. Everyone older than age 16 must show a civil service, military or government contractor (with after-hours authorization) photo identification at the main NASA gate. For more information, call Marilyn Ogburn at ext. 41175.

SAIC SEEKS INTERNS:

SAIC-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in any of the following fields: earth sciences, physics, engineering, mathematics, scientific computer programming. Successful candidates must be U.S. citizens or must be eligible for employment with a U.S. government contractor. For applications or more information, contact Summer Intern Program, SAIC, at 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

NASA SKI WEEK VII:

The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31 to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

VIRGINIA SYMPHONY:

The Virginia Symphony presents "Trick or Uh-Oh!" – a children's concert – Nov. 1, at Norfolk's Chrysler Hall. A Masterworks concert will also be held Nov. 1-2. For other events, call 623-2310. Season brochures are available at the NASA Exchange Shop or in the cafeteria.

LITERARY LUNCHEON:

Seventh annual Writers' and Readers' Luncheon and Book Sale, Nov. 15, noon, in Christopher Newport University's student center, Newport News. Cost is $15. Guest speaker will be Felicia Mason, award-winning novelist and *Daily Press* reader editor/ columnist. Sponsored by Newport News Branch of American Association of University Women. For reservations, send check payable to AAUW Newport News Branch to Writers' Luncheon, 200 Harwood Drive, Yorktown, Va., 23692. For more information, call 898-3556.

Virginia Air & Space Center offers new exhibit on flight

The Virginia Air & Space Center has opened the first of three phases of a new interactive exhibit exploring the science and physics of flight – ***Up, Up and Away! Those Magnificent Flying Machines.*** Hand-on activities illustrate how the four basic principles of flight – lift, drag, gravity and thrust – must be balanced to achieve flight.

The last two phases of the exhibit will open over the next two years. The second phase will focus on materials and manufacturing. Visitors will see what an airplane looks like on the inside, explore the differences between weight and strength and explore the future of aircraft design.

The final phase will focus on control and navigation. Visitors will learn about advanced cockpit designs and the Global Positioning System method of navigation, train to be an air traffic controller and fly a model aircraft. This exhibit is the result of a partnership with NASA Langley and the funding of Langley Federal Credit Union.

In conjunction with the exhibit, the VASC will also show the new IMAX film ***Magic of Flight***, featuring the Blue Angels of the U.S. Navy.

For more information and ticket prices, call 727-0900.

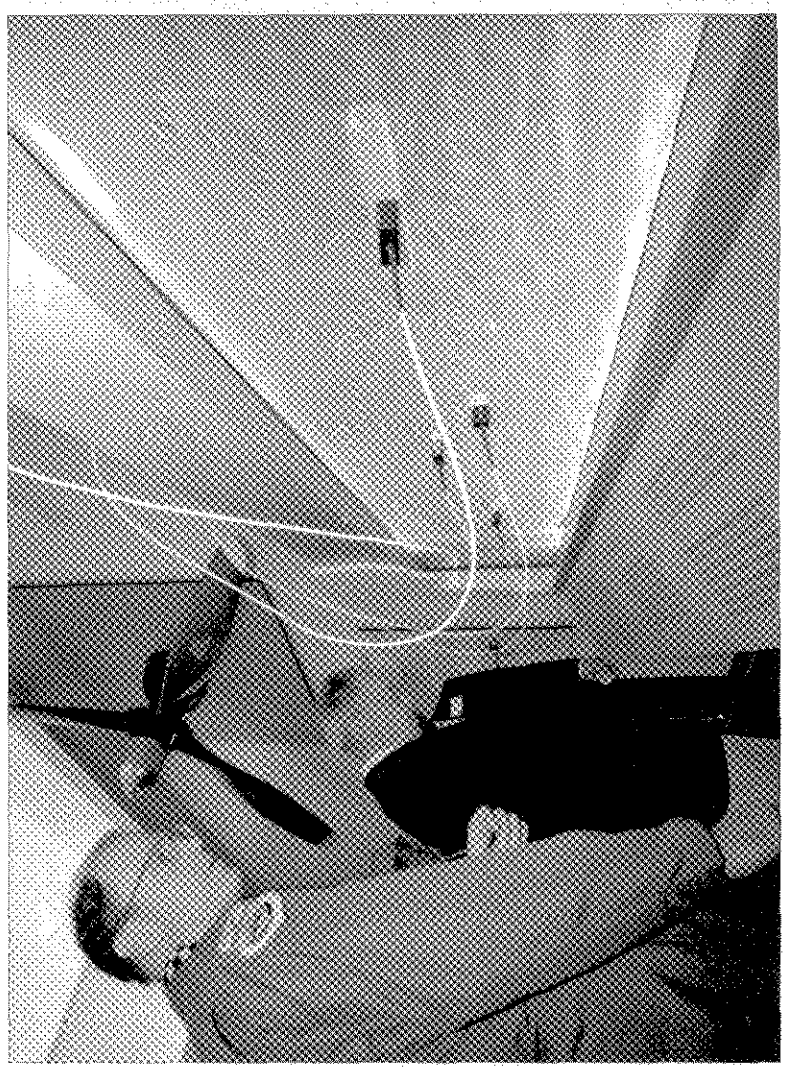
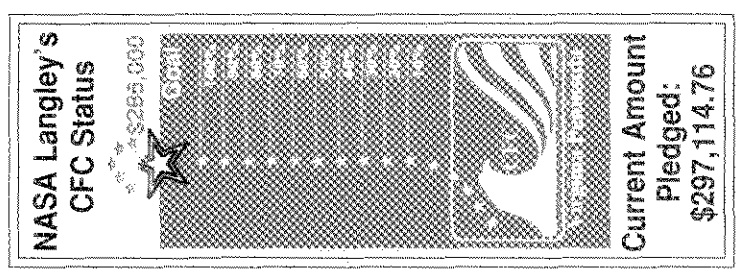


Photo by Jeff Caplan

WIND OVER WINGS – Visitors to the Virginia Air & Space Center's new exhibit, "Up, Up and Away! Those Magnificent Flying Machines," got to learn first hand how wind flows over a wing's surface. This display allows visitors to use different wing patterns to observe the flow of water over the surface simulating the air flow.



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Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 22 ❖ November 7, 1997

Bushnell to deliver Wright Brothers Lecture in London

Center senior scientist first Langley awardee in 32 years

BY MARY GRAVES

London's renowned and respected Royal Aeronautical Society has awarded NASA Langley Senior Scientist Dennis Bushnell its 1998 Wilbur and Orville Wright Lectureship, "the greatest distinction the Society can confer." The first Langley recipient since John Stack in 1966, Bushnell will travel to London to deliver the lecture in December 1998 at the organization's annual formal awards banquet.

This lectureship award, in its 84th year, is considered to be "one of the world's premier aeronautical awards," and selections are based on "lifetime contributions to the aeronautical world."

"This award is a wonderful coup for the center – a further recognition of the quality of Langley's research and work," said Bushnell. "It's a chance, along with the 1998 American Institute of Aeronautics and Astronautics' Dryden Lecture, which I will deliver next year here in the United States, to further the cause of aeronautical advanced concepts in terms of vehicles, systems and utilization, as well as technology."

Both lectures, he said, will be similar in content, focusing on "frontiers of the 'responsibly imaginable' in civilian aeronautics." He presented a similar talk here as a Langley colloquium lecture last year.

Bushnell has been collecting – via focused workshops – modifying working and advocating advanced vehicle concepts since the late 1980s, in both national and international venues. He has participated in AIAA/Society of Automotive Engineers meetings, NASA and university seminars and workshops, overseas conferences, the Experimental Aircraft Association Fly-In and Convention in Oshkosh, Wis., the National Air & Space Museum convocation, company and government laboratory presentations and panels – all of which have prepared him for these two lectures.

The Wright lectureship, which alternates yearly between a British and an American presenter, is the society's most prestigious award. Bushnell will address an audience of several hundred "captains of industry" and their spouses.

When RAeS Director Ron Kennett called him to offer him the award, Bushnell, who is a fellow of the society but did not know of the award previously, said he considered the offer for "about three microseconds" before he agreed to accept.

"This was literally a phone call out of the blue, just before Labor Day" recalled Bushnell. "He [Kennett] told me that he had asked around to everyone he knows who knows Americans, 'Who could give the best talk?' And they all said that I could."

Bushnell believes that – in addition to the recommendations of his peers – his selection is an indication that the RAeS sought a lecturer who would offer a perspective of the future of aeronautics.

"I believe they wanted something farther term, with some substance, with some depth," he said.

The London lecture will probably be the last time Bushnell gives this type of talk, which he has given several times over the past couple of years, he said.

"The lecture evolves as new ideas evolve and as more work is done on the various topics and as it becomes more and more real," Bushnell said. "But its essential feature, as I said in my acceptance letter to the RAeS, is that we have convinced ourselves that we are a 'plateau' industry. I am having some success

(see BUSHNELL, page 3)

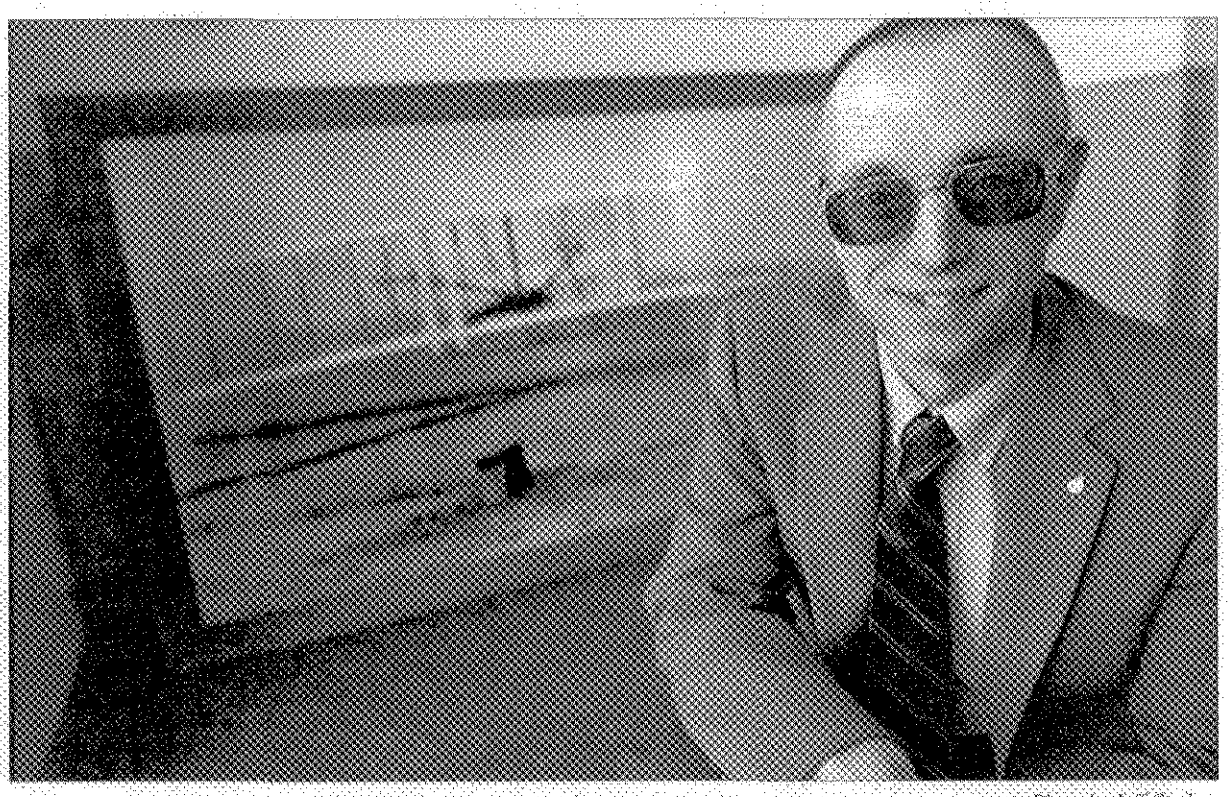


Photo by Jeff Caplan

Dennis Bushnell, who will deliver the RoyalAeronautical Society's Wilbur and Orville Wright Lecture in London next year, sits in front of a Wright Brothers photograph in the lobby of Langley's hangar building.

"...Aeronautics is far from operating near the limits of what can be accomplished either physically or economically...The conventional wisdom...that aeronautics is a 'plateau'/'mature' industry is emphatically not correct. There is such a wealth of alternative concepts, each of them offering truly revolutionary possibilities, that the adaptation of even one or a limited number could lead to a 'Renaissance' in aeronautics."

Dennis Bushnell,
NASA Langley Senior Scientist,
1998 AIAA Dryden Lecture

Founder of NASA College Scholarship Fund dies

Pulitzer Prize-winning author James A. Michener died at his home in Austin, Texas, Oct. 16, at the age of 90. Michener was the author of 48 books. His first novel, *Tales of the South Pacific*, won him the Pulitzer Prize in 1948. Other works included 1985's *Texas*, 1982's *Space* and many others.

Michener and his wife, Mari, contributed more than $110,000 to establish the NASA College Scholarship Fund, Inc., in 1982, and subsequently contributed $25,000 to the fund in 1991, a result, he had said, of his high regard for the people of NASA and for the importance of education. He specifically requested that the scholarships be awarded to the children of NASA employees who were pursuing science or engineering degrees.

Although he had made significant contributions to the arts, Michener and his wife felt strongly that students of the sciences should be supported in their endeavors.

Michener

"This may be the most important spinoff we have – repopulating the science and engineering community of the country," said scholarship fund board member Harold Stall in 1991.

Michener strongly supported the space program and appeared before Congress to support continuation of the international space station program.

To date, 73 NASA scholarships have been awarded. Thirty-five of these recipients have graduated, and many of these have gone on to obtain masters and doctorate degrees.

Ames Research Center scholarship recipient Debora Compton still appreciates the assistance she received through the fund, she said. She is an assistant professor at Boston College and has had seven papers published.

Brandon Brown, a scholarship recipient from Johnson Space Center, is a science communications intern at the University of California at Santa Cruz and is a consultant for the Educational Testing Service.

Many NASA employees have contributed to the fund directly or through the Combined Federal Campaign. Other major contributors include the Freedom Forum, which honors the Hubble Space Telescope crew members and Shannon Lucid's stay aboard the Russian space station Mir, and the Johnson Space Center chapter of the NASA Alumni League.

News Briefs

Around the Agency

LAUNCH OF LUNAR PROSPECTOR RESCHEDULED – (Ames Research Center, Moffett Field, Calif.) The launch of the Lunar Prospector mission to explore the moon has been rescheduled for Jan. 5. The schedule adjustment will allow completion of the rigorous testing, review and preparation of the new Lockheed Martin Athena II launch vehicle (formerly known as the LMLV-2). The previous launch date was Nov. 23. Lunar Prospector will orbit approxmately 63 miles above the moon's surface during a one-year mission

NEXT DISCOVERY PROGRAM MISSIONS SELECTED – A mission to gather samples of the wind flowing from the sun and a mission to fly by three near-Earth comets have been selected as the next flights in NASA's Discovery Program of lower-cost, highly focused scientific spacecraft. The Genesis mission is designed to collect samples of the charged particles in the solar wind and return them to Earth laboratories for detailed analysis and is due for launch in January 2001. The Comet Nucleus Tour will take images and comparative spectral maps of at least three comet nuclei and analyze the dust flowing from them and is scheduled for launch in July 2002.

NASA, ARGENTINA SIGN AGREEMENTS FOR FUTURE COOPERATION – NASA Administrator Daniel S. Goldin and Dr. Conrado Franco Varotto, executive director of the Argentina National Commission on Space Activities (CONAE), signed memoranda of understanding last month on the Satelite de Aplicaciones Cientificas (SAC)-C and (SAC)-A in Buenos Aires, Argentina. Goldin was in Buenos Aires accompanying President Bill Clinton. SAC-C will conduct correlated observations of the Earth of interest to Argentina and the United States, and also will contribute directly to the NASA Mission to Planet Earth Program.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "Do you want a handshake or an embrace? Before you even consider recruitment and retention, you must look at the human investment you intend to make. This will be a long-term relationship with people from different contexts and cultures. If you're not willing to make that investment, there's no relationship there." – Norbert Hill, American Indian Science & Engineering Society

▲ According to the U.S. Department of Labor, 60 percent of U.S. women have paying jobs. – CNN Headline News

▲ Nov. 20-23 – American Indian Science & Engineering Society Conference, Houston, Texas, 303-939-0023

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

Career Center offers seminars

Langley's Career Center, offers the following training seminars through January:

▲ "Retiring for Fun, Not Profit," Nov. 13, 9 a.m.-noon
▲ "The Net and Career Development," Nov. 18, 9 a.m.-noon.
▲ "Making Yourself Indispensable at Work," Dec. 4, 9 a.m.-noon
▲ "Stress Management," Dec. 10, 1-4 p.m.
▲ "Resume Reality," Jan. 7, 9 a.m.-noon
▲ "Interview Basics," Jan. 13, 1-4 p.m.
▲ "Conflict Management – Aggressive, Assertive or Passive?" Jan. 22, 8:30 a.m.-noon
▲ "First 30 Days on the New Job," Jan. 28, 9 a.m.-noon

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Native-American month observed

BY KELLY JOHNSON

As we approach the new millenium, it is important to remember that our differences contribute to the rich cultural heritage of this great country. In celebration of National Native-American Month, NASA wishes to support, promote and encourage the Native Americans that make up our workforce.

The number of Native Americans in the NASA workforce has increased steadily during the 1990s, rising from 113 in 1990 to 170 in 1996. At 1.0 percent (25) of the center's workforce, Langley is ranked third among NASA centers for the largest number of Native Americans. Within NASA, Native Americans are represented in all job categories and at all grade levels. Some of the tribes represented here include the Creek, Eastern Band Cherokee, Navajo, Lumbee, Lenape (Delaware), Osage, Seminole, Chickasaw and Pamunkey.

NASA salutes these individuals who help make up the spectrum of people in our workforce and who empower NASA to meet its future goals and objectives.

Announcements

Benefits premiums to rise

According to the Office of Personnel Management, health insurance premiums for federal employees and retirees will increase an average of 8.5 percent next year. This increase reverses approximately four years of stable or declining rates for the more than 9 million workers covered by FEHB, the nation's largest employer-sponsored health plan. On average, employees will see a biweekly, out-of-pocket increase of $3.32 for individual health care coverage, and an increase of $8.64 for family coverage.

The FEHB open season will run Nov. 10-Dec. 8. Elections made during this period will be effective Jan. 4. Each employee currently enrolled in the FEHBP will receive a copy of his plan's 1998 brochure prior to the open season. To determine the amount of increase (if any) and any benefit changes for the upcoming year, review the brochure carefully. To obtain a plan comparison chart and individual plan brochure, visiting the Personnel Management Branch, Building 1195C, Room 150, or call ext. 42602.

In addition, an informal health fair has been scheduled for Nov. 24, 1-4 p.m., in the H.J.E. Reid Conference Center. Plan representatives will be there to discuss benefits.

To request plan brochures, call Pat Howard, ext. 42602; for more information, call Linda Park, ext. 42605.

Food drive gears up

The Langley "Supervisors Club" sponsors a food drive collection table for the Peninsula Food Bank in the cafeteria, Nov. 10-21 and Dec. 8-19. For more information, call Peggy Harmon, ext. 45473; Howard Puckett, ext.46067; or Bill Tennis, 850-1515. Langley alumni are welcome to participate.

Career networking seminar offered

Marty Brown, senior counselor at Langley's Career Center, offers a Networking for Career Development seminar, Nov. 18, 5 p.m., in the Langley Room of the H.J.E. Reid Conference Center. Reservations are not required; everyone with access to the center may attend.

The presentation will:

▲ Illustrate the impact a strong network can have on your career development

▲ Discuss how to tap into the wide range of local and national networking opportunities available

▲ Explore means of identifying and connecting with people to establish and maintain a meaningful network.

Seminar participants may bring their resumes to leave with Brown for his critique.

Brown has more than a decade of experience in the job market. He is also an adjunct professor at four local academic institutions, where he teaches business courses and effective communications. He has designed and facilitated communication and stress management seminars, and is a small business owner of ConsultWise, Inc.

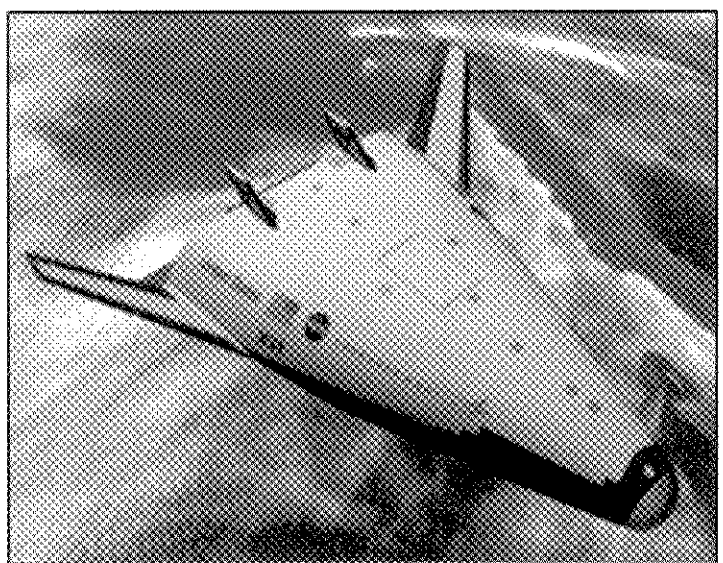
This event is sponsored by the American Institute of Aeronautics and Astronautics, Hampton Roads Section, Career Enhancement Committee. For more information, call Marilyn Ogburn at ext. 41175, e-mail m.e.ogburn@larc.nasa.gov.

Word training offered

The Employee Development Branch is offering two classes in Word 6.0-Introduction, Dec. 3, 9 a.m.-4 p.m, and Jan. 28, 9 a.m.-4 p.m. Both classes will be held in Building 1229, Room 120.

For a course description, see URL ***http://ohr.larc.nasa.gov/edb/word1.html.***

(see ANNOUNCEMENTS, page 3)



NASA photo

X-33 ADVANCED TECHNOLOGY DEMONSTRATOR – The X-33 flight test vehicle, being designed and built by Lockheed Martin, will demonstrate advanced technologies that can dramatically increase reliability and lower the cost of putting a pound of payload into space. A depiction of an earlier proposed version of the X-33 reusable launch vehicle was erroneously included in the Oct. 10 issue of the *Researcher News*, in a photo spread on X-planes.

Researcher News

The *Researcher News* is an official publication of Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees and has a circulation of approximately 8,100. It is distributed to all Langley civil service employees, contractors, retirees and on-site university personnel, with limited distrubution to NASA Headquarters, other NASA centers and, by special request, to other non-NASA individuals and organizations. Questions related to the content and distribution of the *Researcher News* should be addressed to Keith Henry, Mail Stop 115, (757) 864-6120. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news @larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

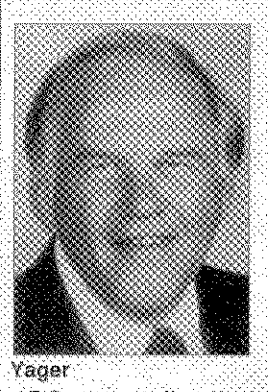
Assistant Editor. . . . . Jeane Shanks
Science and Technology Corp.

Photographer . . . . . Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Yager receives Shelburne Award

Thomas J. Yager, senior research engineer for NASA Langley, has received the 1997 Tilton E. Shelburne Memorial Award from the American Society for Testing and Materials standards-writing Committee E-17 on Vehicle/Pavement Systems. The award is presented to a current or past member of E-17 for outstanding work in the fields in which the committee is active: the stimulation of research, dissemination of knowledge and development of principles, techniques and standards for pavement management technologies.


Yager

Yager began his career at Langley as an intern in 1963 and served as aerospace technologist and research engineer before attaining his current position in 1990.

His career concentration has been in aircraft ground handling performance, landing gear design, tire/pavement friction studies and ground friction measuring vehicle tests. He has also been involved in conducting landing gear/pavement evaluation tests at Langley's Aircraft Landing Dynamics Facility and in providing support for space shuttle landing operations and aircraft accident investigations when loss of traction is a contributing cause.

Committee E-17 is one of 131 ASTM technical standards-writing committees. Organized in 1898, ASTM is one of the largest voluntary standards development systems in the world.

Larson honored for spaceport work

William E. Larson, formerly of Langley's Instrument Research Division, was among 48 Kennedy Space Center Employees recently honored for their work at the nation's spaceport. He received the NASA Space Flight Awareness Program Honoree Award, the program's highest form of recognition.

Larson, a Newport News native and Old Dominion University graduate, has been an electronics engineer at KSC since 1989. He is being recognized for his contribution to the replacement of a space shuttle launch pad data system. The new Ground Measurements System will significantly reduce the cost of measurements made during shuttle launches.

Larson

ANNOUNCEMENTS

(continued from page 2)

To register, send an Application for On-Site Training (NASA Langley Form 24) to DeAnna Lawrence at Mail Stop 137 or fax to ext. 48543 by Nov. 19. For more information, contact Rose Mustain at e.r.mustain@larc.nasa.gov.

Langley , Riverside to offer mammography

Mammography services will be available at Langley via Riverside Mobile Mammography, beginning Dec. 5. Numerous dates and appointments are available through Feb. 27.

This service is available to active civil service employees, retirees, contractors and their family members. Insurance will not pay for a mammogram if 365 days have not passed since your last mammogram.

The American Cancer Society guidelines follow:

▲ A baseline mammogram should be performed once between ages 35-40.

▲ A mammogram should be performed every one to two years from ages 40-50.

▲ A yearly mammogram is recommended for women age 50 and over.

For more information and to schedule an appointment, call the Riverside Diagnostic Center at 594-2773.

Public service award applications available

Applications are now available for the 1998 Public Employees Roundtable Public Service Excellence Awards, which pay tribute to government programs whose achievements exhibit the highest standard of dedication, excellence and accomplishment.

Programs should demonstrate outstanding improvement over previous performance or outstanding achievement in comparison to existing programs with the same mandate.

Selection criteria include measurable productivity or service delivery improvement; accomplishments that improve quality of life; programs or projects that have increased cost effectiveness of governmental services.

For nomination materials, call 202-401-4344, or see the Web site at ***http://www.patriot.net/users/permail.***

Retirees offer thanks

"Thanks to all at Langley for your help, support and cooperation for 32 years of the best career one could hope for. We are lucky to have taken part in an historic era of exploration. Barb and I appreciate the Oct. 3 dinner, gifts and good company. Our friends in the Langley and contractor community are well remembered."

– Kermit Jensen, Lockheed Martin

"As I look forward to the future, I look back with fond memories of the gracious folks with whom I have worked at Langley. Thank you all for the interesting 34 years and the 'Sweet Farewell' celebration. Best wishes to all of you."

– Jeff Cleveland

BUSHNELL

(continued from page 1)

convincing the U.S. portion of the industry that a renaissance in aeronautics is feasible and perhaps inevitable, from both a technological and business perspective."

Bushnell, a 34-year Langley veteran, has served as research scientist, section head, branch head, associate division chief and chief scientist. He has conducted personal research in flow modelling and control across the speed range, advanced configuration aeronautics, aeronautical facilities and hypersonic airbreathing propulsion. He is the author of more than 200 publications and major presentations, as well as of some 120 invited lectures and seminars.

Royal Aeronautical Society carries long, proud tradition

Well known and well respected throughout the worldwide aerospace industry, the Royal Aeronautical Society was formed in London in 1866 by the 8th Duke of Argyll and a group of "aerial navigation enthusiasts." Although centered in the United Kingdom, the RAeS has members in nearly 100 countries around the globe.

The group calls itself "the one multidisciplinary professional institution dedicated to the global aerospace community." Its membership includes not only engineers and pilots, but also doctors, air traffic controllers, journalists, legal specialists – anyone who is a professional within aerospace.

The Society strives to remain an aerospace leader and "provider of foresight." It has published much of the pioneering work in many aspects of aeronautical study, including early work on wind tunnels and lightweight structures. Throughout its history and its present, lists of prominent Society members read as a who's who of aerospace. Strong traditions and a distinguished history form the foundation of the RAeS, which "works hard to ensure that yesterday's achievements are the forerunners of many more to come."

Wilbur and Orville Wright Lecture turns 84

Originally named after only Wilbur Wright, the Wright Memorial Lecture was founded by the Royal Aeronautical Society's council in 1912 and was first delivered in 1913. The annual talk was renamed in 1965 to include Orville Wright, making this year's presentation the 84th lecture in the series and the 31st bearing both Wright brothers' names.

The lecture has become one of the most important in aviation and has been given by distinguished speakers from both Great Britain and the U.S.

Notable Wilbur and Orville Wright Lectures

1961 ***Research in Space Flight Technology***
Dr. Abraham Silverstein, Director, Lewis Research Center

1966 ***The Prospect of Hypersonic Flight***
John Stack, Engineer, Langley Research Center

1968 ***The Role of Competition in Aeronautics***
George Schairer, President, The Boeing Company

1970 ***To the Moon and Beyond***
Dr. Robert Gilruth, Director, Johnson Space Center

1976 ***Energy and Aerospace***
Dr. Robert Seamans, NASA Associate Administrator

1984 ***The Impact of Space on the World Community***
James Beggs, NASA Administrator

1986 ***Vertical Take-off and Landing Aircraft***
Dr. Hans Mark, NASA Deputy Administrator; Director, Ames Research Center; Secretary, United States Air Force

1988 ***The Skunk Works Management Style – It's No Secret***
Benjamin Rich, President, Skunk Works, Lockheed Advanced Aeronautics Corp.

1990 ***The View through the Looking Glass – At Ourselves: The Importance of Incident Reporting for Aviation Safety***
Dr. Charles Billings, Ames Research Center

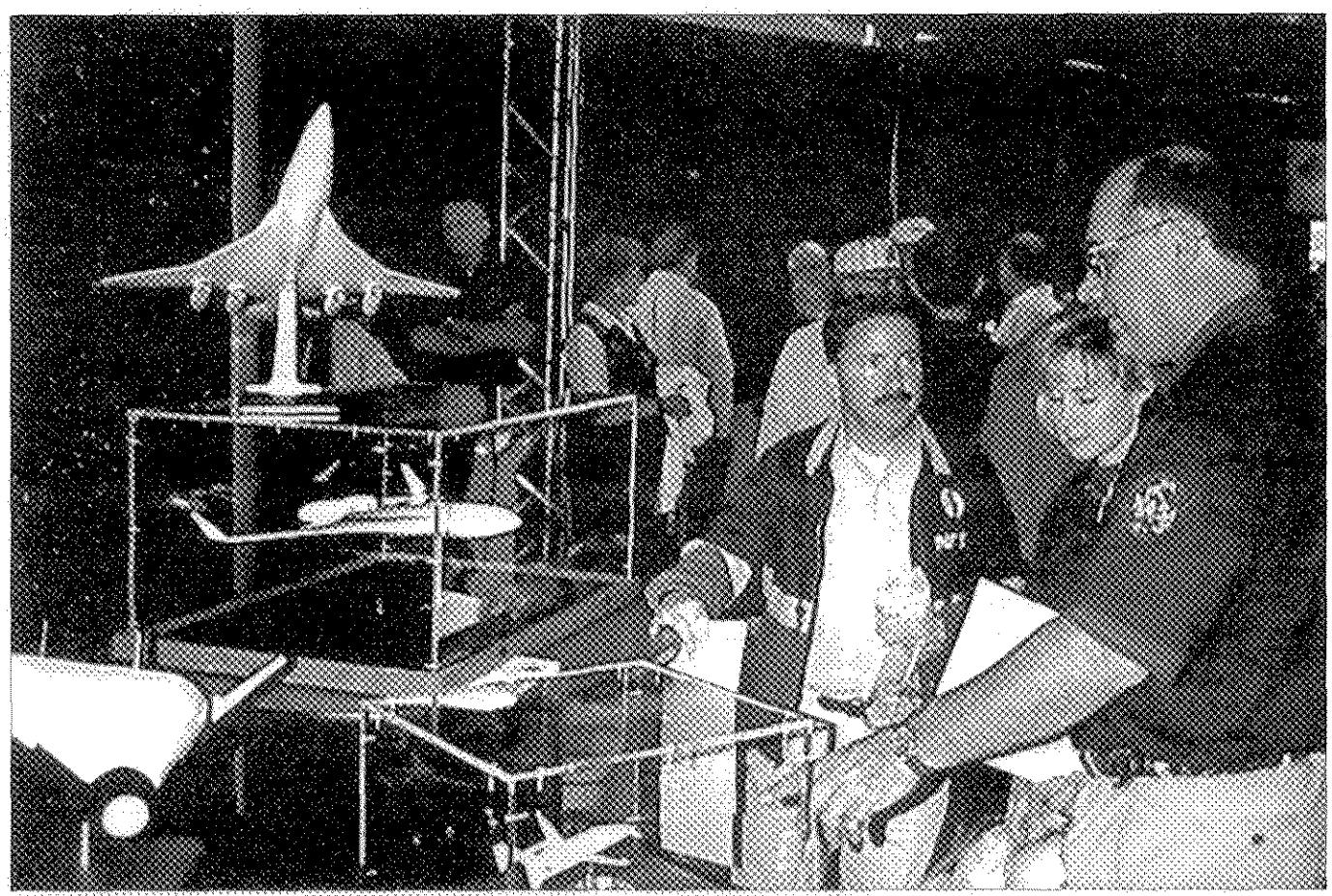
1992 ***Working Together: The 777 Story***
Philip Condit, President, The Boeing Company

1998 ***Frontiers of the "Responsibly Imaginable" in (Civilian) Aeronautics***
Dennis Bushnell, Senior Scientist, Langley Research Center

NASA exhibits score another hit at North Carolina State Fair

BY JEANE SHANKS

Sticky fingers, animals, contests, yo-yos, stage shows, farm equipment, food of all descriptions, computer technology – and most of all – curiosity, complemented the NASA Langley exhibits at the North Carolina State Fair in Raleigh, N.C., Oct. 17-26.



Photos by Olin Jarrett

Volunteer Nick Koltun, of the Virginia Air & Space Center, discusses the models used in NASA's Three Pillars for Success exhibit.

Mars exhibit still 'red' hot

The Langley Mars exploration exhibit was the subject of six days of intense media coverage that helped the exhibit quickly become one of the fair's most popular – rain or shine.

Typical comments overheard included "Awesome!" "Wow!" "Cool!" "Neat!" as Langley employees showed the crowds modern technology and dance lessons (the "NASA Shuffle") while looking through the 3-D glasses at the Mars surface.

Once the initial reaction wore off, the most frequently asked questions referred to the Mars rover, Sojourner: "That's the actual size?" and "How much did it cost?"

Area educators had assigned the Mars exhibit as homework for 5th-grade classes and as part of a scavenger hunt for 4th-grade classes.

Aero exhibit piqued interests

Not to be outdone by its sister exhibit, an aeronautics display featured four models and a computer slide show which focused on Langley's role in NASA's "Three Pillars for Success" theme.

The super jumbo jet, or blended-wing-body, concept drew considerable attention, as people consistently and incredulously asked, "It holds how many people?"

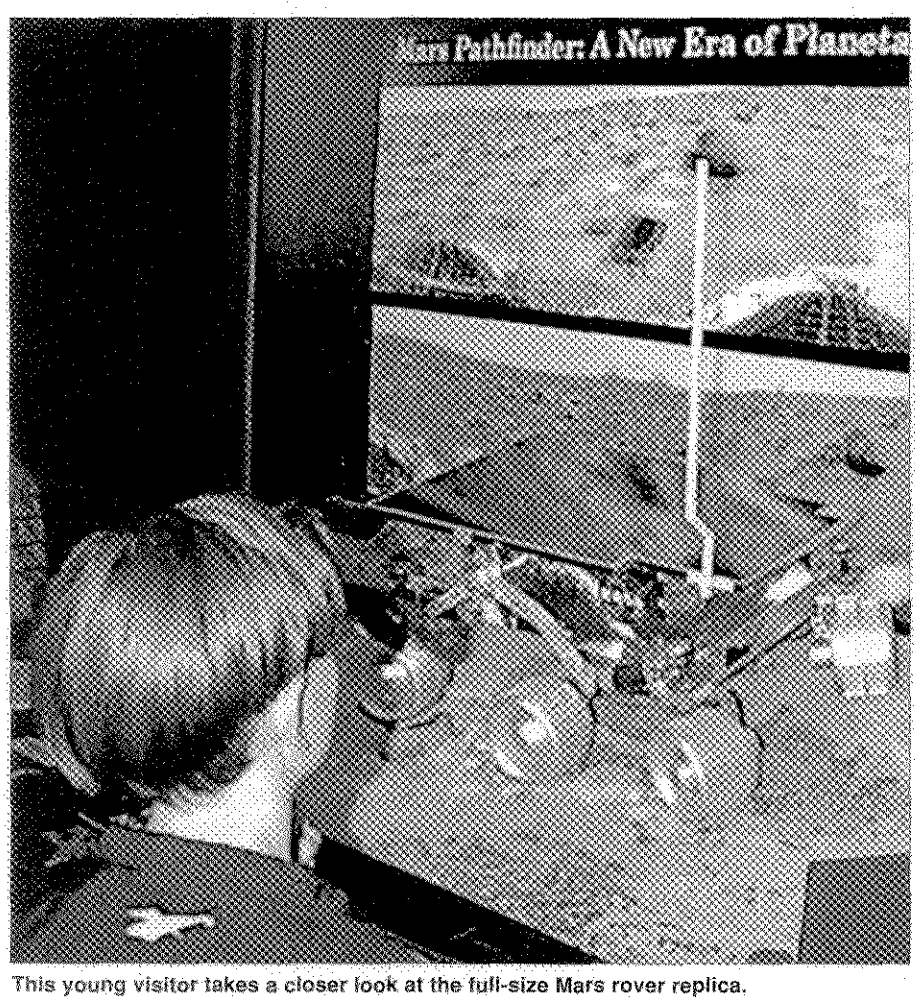
The sleek High-Speed Civil Transport model was just as impressive to fair-goers. Eyes opened wide upon learning that the HSCT could cut travel time across the Pacific Ocean by more than half. The AGATE aircraft and the Reusable Launch Vehicle models rounded out the aeronautics display. The idea that the RLV would replace the space shuttle fleet and use its own power to take off and land was surprising to the majority of visitors.

The crowd of more than 160,000 visitors to the Langley exhibits in the fair's Cyberspace Building went away well satisfied with NASA's role in the future.

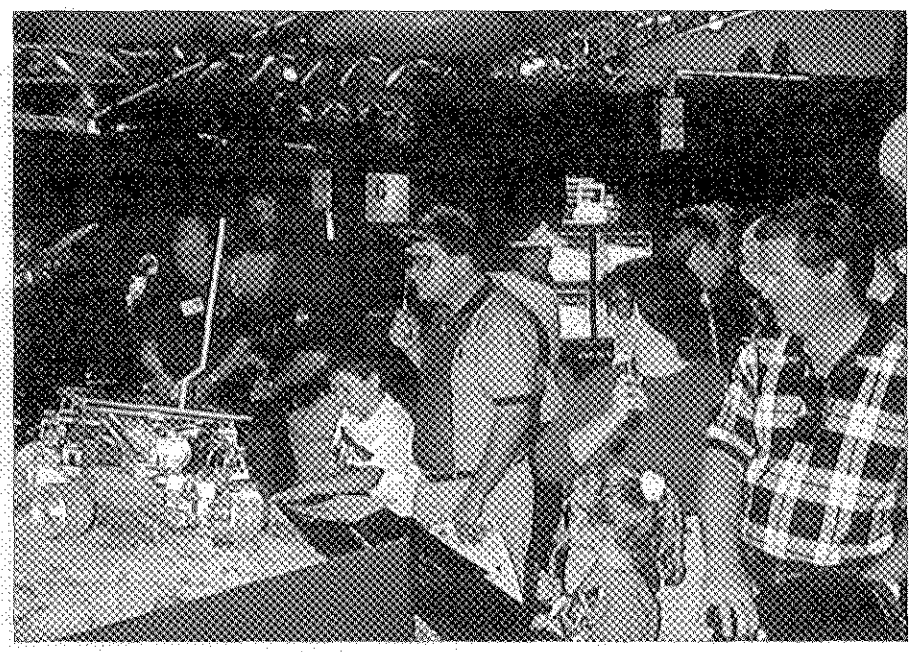
Volunteers tell NASA story

A small contingent of NASA Langley researchers, retirees and staff generously gave of their time and expertise to share the NASA story with North Carolina fair-goers.

Those who traveled to Raleigh included: Victor Carreno, Assessment Technology Branch; Vicki Connors, Atmospheric Studies Branch; Karen Credeur, Office of Public Services; Lana Hicks, Cast Metals and Facility Support Section/Models and Materials Technology Branch; Milton Holt, Flight Electronics Technology Division; Olin Jarrett, Office of Public Services; Nick Koltun, Office of Education; NASA Langley retirees Bob Miserentino and Robert O'Neal; Gary Price, Office of External Affairs; Jim Price, Engineering Design Branch; Ed Prior, Office of Education; Jeane Shanks, Office of Public Services; Harry Verstynen, Flight Operations and Support Division; and Dan Vicroy, Vehicle Dynamics Branch. Jarrett coordinated and managed this very successful event.



This young visitor takes a closer look at the full-size Mars rover replica.



Visitors to the North Carolina State Fair enjoy NASA Langley's Mars exhibit, complete with a 3-D picture landscape of Mars.

Disabilities Awareness Day at Langley

The Dancing Wheels got down to business and showed the crowd a few dance moves as part of their demonstration at Langley's Disabilities Awareness Day, Oct. 17, at the H.J.E. Reid Conference Center. Event participants also were treated to vendor exhibits and a K9 demonstration. "Wheels" includes, from bottom left, clockwise: Nora Davidson, Donald Fennell, Peggy Overbey (of Langley's Data Analysis and Imaging Branch), Nick Cheruka and Anne Reed. The Dancing Wheels came together around 1988 and dance mostly to country music.

Photo by Jeff Caplan

Langley, NASA join crusade for women's health

New technological developments which grew out of spinoffs from the U.S. space and aeronautics program will usher in a new era in detection and treatment of women's health problems, ranging from breast cancer to osteoporosis to reproductive health.

Langley's atmospheric studies yield 'twice-used' technology

Technology long used by atmospheric scientists at Langley to monitor changes in the Earth's atmosphere is now being used to take digital mammograms. A CCD, a compact silicon chip commonly found in cameras, camcorders and scanners, can replace x-ray-sensitive film used for mammography by converting x-rays into light, then into electronic signals which are then changed into images and stored in a computer.

The mammography unit developed using CCDs, computers and scanning techniques accommodates different tissue density, especially significant for photographing the more dense breast tissue of younger women.

The Langley approach has many advantages over current mammography techniques. It is fast, easy to use, safe and allows for full breast coverage.

In addition, the computer used in this system helps even more after the images are taken. It can scan each part of every mammogram image and report any suspicious areas, and electronic images can be transmitted to other experts for further study.

Properly exposed film mammograms reveal fine detail in the breast; in fact, some have even detected tumors as small as 0.2 mm, about the thickness of a piece of thread. Digital mammography aims to identify those as small as 0.1 mm.

This is an example of "technology twice used," where the techniques used to monitor the atmosphere and help protect the Earth's ozone layer is also put to use to help save the lives of countless women.

NASA, HHS join together to benefit women's health

NASA has signed an agreement with the Department of Health and Human Services enlisting NASA technologies to fight breast cancer and other women's illnesses. The agreement establishes a cooperative framework between Ames Research Center and the Office on Women's Health to identify, develop and transfer NASA technologies to benefit women's health. Major areas of concern are cancer, reproductive health, pregnancy, osteoporosis and education.

The technologies include the new robotic "Smart Surgical Probe"; technology to allow three-dimensional "planning" for breast reconstruction, as is currently done for facial reconstruction surgery; and a device to predict an individual's specific risk of contracting osteoporosis.

NASA-wide efforts

At a recent Congressional Caucus on Women's Issues, NASA Astronaut Mary Ellen Weber, Ph.D., participated in a discussion on "Space Technology Contributions to Breast Cancer Research." She explained how NASA efforts to grow human cells and tissue in space help researchers understand cancer and the response of the human immune system.

In addition, Dr. Carolyn Krebs of NASA's Goddard Space Flight Center, Greenbelt, Md, provided information on the way technology allowing the Hubble Space Telescope to map distant stars is being used in doctors' offices today to easily detect tiny spots in breast tissue, using a needle for biopsy rather than surgery.

Photos by Jeff Caplan

WORLDWIDE WEATHER WATCHERS – *Left:* Lin Chambers, of the Radiation Sciences Branch, communicates through a video camera over the World Wide Web with students from a French elementary school as part of the Students' Cloud Observations Online Program, in the last phase of its first year. The program allows kids from 30 schools around the world to ask NASA scientists questions about weather and climate. The Langley Distributed Activities Archive Center also helps with the program. Looking on is Stephanie Weckmann, a senior research associate with Virginia Polytechnic Institute and State University, and David Young, of the Radiation Sciences Branch.
Above: Students see this screen when talking on line to NASA scientists.

AdVentures

FOR SALE: Baseball, basketball and football cards, including Michael Jordan rookie, Ken Griffey Jr. and many more. Call 896-0070.

FOR SALE: Complete king-size waterbed set, waveless mattress, two dressers, nightstand, mirror. Paid $2,000; will sell for $900 or best offer. Call 868-0054.

FOR SALE: 3-BR rancher near Main St. in Newport News, 1-1/2 baths, wall-to-wall carpet, central air/heat, energy efficient, attached garage, eat-in kitchen, new roof, large fenced back yard, near elementary school, good location, on cul-de-sac, 20 minutes to NASA/Langley Air Force Base. $77,500. Call 838-0726.

FOR SALE: Renovated 2-BR, 1-bath rancher in historic Wythe, large living room, spacious kitchen, hardwood floors throughout, enclosed front patio, privacy fence, large detached garage/workshop, water view from front yard, one block from Chesapeake Bay in established neighborhood with lots of trees. $69,900. Call 247-5144.

FOR RENT: 4-BR home on River Road, in Hilton Village, 3 baths, all amenities, $900/month. Call 599-0578 after 6 p.m.

TURKEY TIME: The Langley Activities Association's annual Turkey Shoot will be Nov. 7, 9 a.m.- 3 p.m., at the H.J.E. Reid Conference Center grounds. Cost per round is $1, and the winner takes home a turkey; cost per ham round is $2, and the winner takes home a ham. For specific rules and regulations, call ext. 46369.

SHOPPING NEWS: "Reading's Fun/Books Are Fun" will be at the NASA Langley Exchange Shop, Nov. 17-21, offering books and gift items, including items from the Anne Geddes collection, as well as holiday gift items. Also, check out the shopwide pre-holiday sale. To receive the Exchange Shop newsletter, call ext. 41585, or send an e-mail to r.s.welty@larc.nasa.gov. For more information, call ext. 41585.

TENNIS PARTY: The NASA Langley Tennis Club will hold its end-of-the-year awards party at the McCormack-Nagelsen Tennis Center, Williamsburg, Nov. 22, 6:30-11:30 p.m. Following the awards presentation, doubles play on six courts begins at 7:30 p.m. Pizza, drinks and tennis balls will be provided; members/guests are asked to bring a snack and/or dessert to share. Cost for members is $10, for guests, $12, and for non-players, $4. For more information, call Marco Egoavil, ext. 47247, or Tom Yager, ext. 41304.

BLOOD DRIVE: The annual NASA Day-Before-Thanksgiving Blood Drive is set for Nov. 26, 9 a.m.-3 p.m., at the H.J.E. Reid Conference Center. To donate blood, a person must be in good health and weigh at least 110 pounds. Donors will be automatically entered in a drawing for one of seven turkeys or turkey certificates to be given away following the drive.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31 to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

SAIC SEEKS INTERNS: SAIC-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in any of the following fields: earth sciences, physics, engineering, mathematics, scientific computer programming. Successful candidates must be U.S. citizens or must be eligible for employment with a U.S. government contractor. For applications or more information, contact Summer Intern Program, SAIC, at 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

SOFTWARE ENGINEERING: Software Engineering Laboratory presents a NASA-sponsored software workshop, Dec. 3-4, at Goddard Space Flight Center, Greenbelt, Md., to discuss software and processes. For more information, call Mark Cashion at 301-286-6347.

LITERARY LUNCHEON: Seventh annual Writers' and Readers' Luncheon and Book Sale, Nov. 15, noon, in Christopher Newport University's student center, Newport News. Cost is $15. Guest speaker will be Felicia Mason, award-winning novelist and *Daily Press* reader editor/columnist. Sponsored by Newport News Branch of American Association of University Women. For reservations, send check payable to AAUW Newport News Branch to Writers' Luncheon, 200 Harwood Drive, Yorktown, Va., 23692. For more information, call 898-3556.

VIRGINIA CHORAL SOCIETY: "An Evening of Gilbert and Sullivan," presented in three performances, Nov. 7-9, will feature selections from *The Mikado*, *The Pirates of Penzance*, *H.M.S. Pinafore*, *Trial by Jury*, and *The Gondoliers*. The performance Nov. 7 is at 8 p.m., at Ogden Hall on the campus of Hampton University; Nov. 8, 8 p.m., at James Blair Middle School in Williamsburg; Nov. 9, 3 p.m., at First Friends Church in Portsmouth. Tickets are $8 for adults and $6 for students and seniors, and will be on sale at the door. For more information, call 851-9114.

WILLIAMSBURG LIBRARY PROGRAM: Vocalist Laurel Masse´, founder of the Grammy-award-winning Manhattan Transfer vocal group, comes to the Williamsburg Library, Nov. 13, 8 p.m., for an evening of a capella song and ancient story. To reserve tickets, which are $10, call 229-4198. For more information, see the Williamsburg Regional Library's Web site at ***http://www.wrl.org***.

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Researcher News

National Aeronautics and
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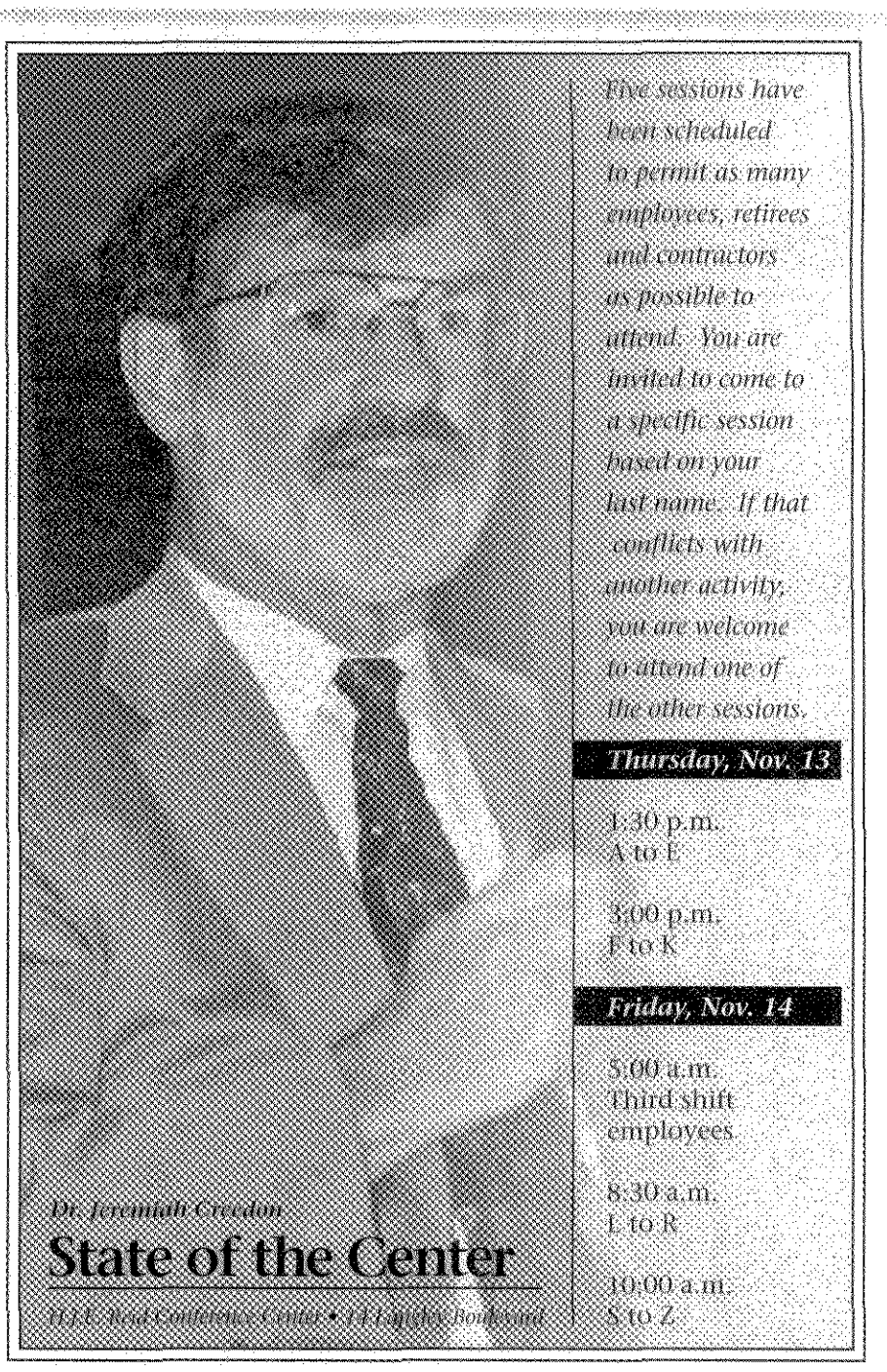


National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

News Researcher

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 23 ❖ November 21, 1997

Langley's crystal growth experiment launches into space on board STS-87

Microgravity payload series continues, following last year's STS-75 mission on Columbia

BY ARCHIE FRIPP

As part of the United States Microgravity Payload series (USMP-3 and USMP-4), the space shuttle Columbia, STS-75, carried a Langley crystal growth experiment into space on Feb. 22, 1996, and will transport two more such experiments on board STS-87, scheduled to launch Nov. 19.

These experiments use the Advanced Automated Directional Solidification Furnace (AADSF) to grow semiconductor crystals in conditions unavailable anywhere on Earth. The multizone AADSF could process one sample per shuttle mission during the USMP-3 flight. Hardware improvements made since the last flight now allow the AADSF to process three samples per flight. Three of these past four experiments are from Langley.

Langley team seeks answers

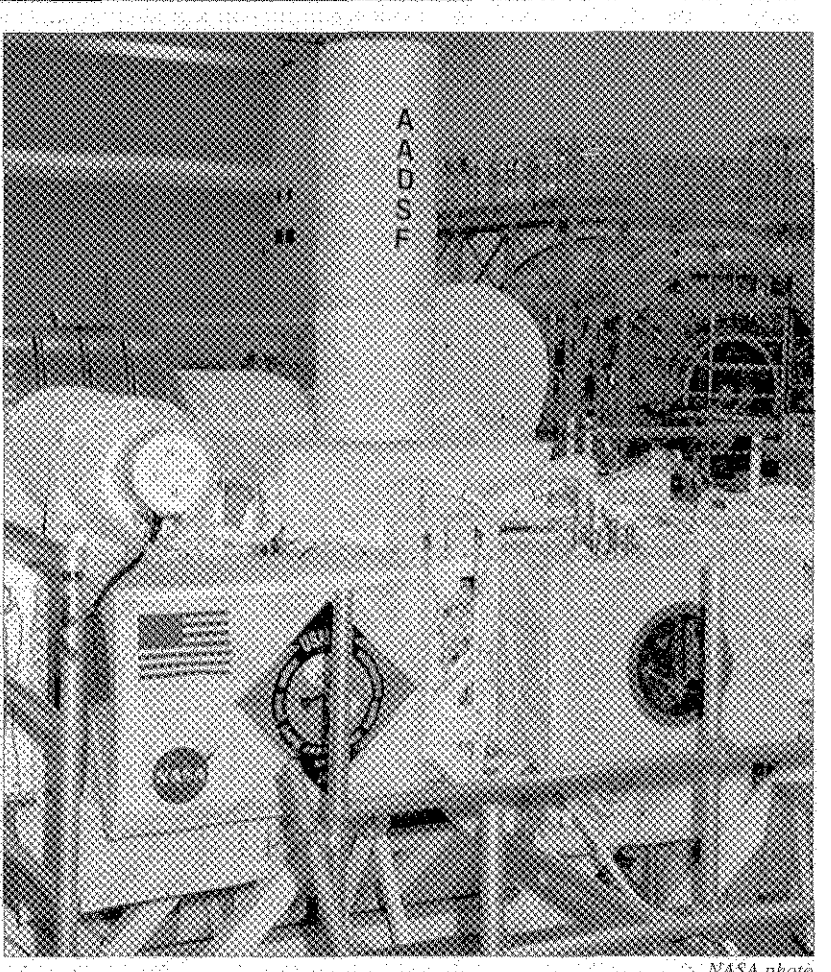
The Langley research team is investigating the effects of the microgravity environment on the growth of lead tin telluride (PbSnTe), a compound semiconductor material. The electronic properties of this material are determined by the distribution of the chemical components within the grown crystal.

Uniform compositions, which are vital for most applications, are only possible if there is no convective mixing in the molten liquid during growth. The Earth's gravitational force produces so much convection that crystals grown on the Earth's surface have no compositionally uniform areas. This gravity-driven convective mixing is greatly reduced in orbit because the net acceleration at the shuttle's center of mass is less than one millionth of the pull felt on the Earth's surface.

Crystalizing process

Lead tin telluride crystal growth is accomplished by first melting the compounds at a temperature of 1,150 degrees

(see MICROGRAVITY, page 4)



NASA photo

The Advance Automated Directional Solidification Furnace towers over the other experiments on the fourth United States Microgravity payload flight on STS-87, scheduled to launch Nov. 19.

Colloquium Communiqué

Structural integrity: Simple, complex structures alike must pass test

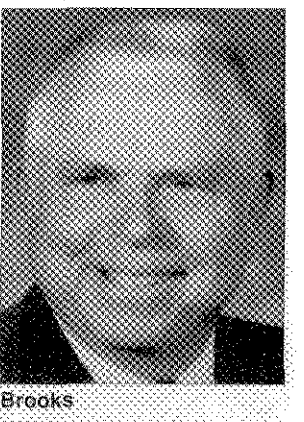
NASA Langley retiree Dr. George W. Brooks will deliver a Sigma Series Lecture entitled "Structures: Spider Webs to Space Stations," Dec. 2, 7:30 p.m., at the Virginia Air & Space Center, Hampton.

Brooks will examine the evolutionary development of manmade structures. Whether a structure is as simple as a coat hanger or as complex as a space station, the contemporary demand is structural efficiency, i.e., will the structure perform the intended function, in the intended environment, at a reasonable weight and cost? Does it have the intended practical and/or aesthetic value?

See related story, page 5.

Brooks will explain fundamental concepts such as load, stress, strain, inertia, bending and torsion, while looking at the design process where the designer selects bars, beams, tubes, plates and shells to assemble structures to do the job.

Brooks will review classical structural masterpieces in contrast with contemporary structures in civil, auto, mechanical, aerospace and marine engineering and will discuss the role of advanced composite materials. Noting the importance of environmental compatibility and access for maintenance in the design process, he will also cite the roles that models have played in the creation of today's structural marvels.



Brooks

Brooks retired in 1974 from NASA Langley, where he was the director for structures. During his career, he authored more than 40 technical reports on the dynamics of helicopters and rocket propellants, rotor blade flutter and lunar and planetary landing simulators. He also served on several NACA/NASA committees and was a frequent consultant to other government agencies on vibration and dynamics problems.

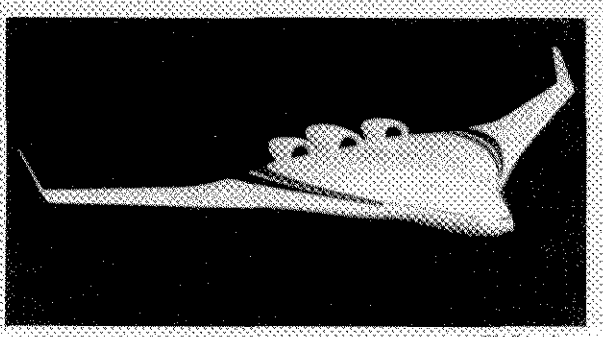
Following his retirement from NASA, the World War II veteran and Princeton University graduate worked in private industry for Engineering Incorporated for nine years as the director for research and development. For the past 15 years, Brooks has spent most of his time as a volunteer for various community organizations, including the York/Poquoson Department of Social Services, the American Red Cross, the NASA Langley Alumni Association, the Virginia Air & Space Center and the United Way.

Blended-wing-body aircraft may fly into future

Dr. Robert H. Liebeck, of The Boeing Company, Long Beach, Calif., will deliver a Langley colloquium lecture, Dec. 9, 2 p.m., at the H.J.E. Reid Conference Center, on "The Evolution of the Blended-Wing-Body Subsonic Transport." The lecture is open to all NASA employees and contractors; civil service personnel should charge their time to B1010.

NASA, industry and academia are working together on new solutions to tomorrow's aviation challenges, which include the predicted tripling of passenger air travel from 1995 to 2015 and pressures on the aircraft industry to produce lower ticket prices while remaining economically viable. Future aircraft will also be required to meet increasingly stringent noise, emissions and safety requirements. Revolutionary technologies and aircraft concepts – such as the blended-wing-body – may enable future aircraft to meet these challenges.

Liebeck has been instrumental in the recent application of "flying wing" technology to subsonic passenger aircraft. A member of the National Academy of Engineering and a fellow the American Institute of Aeronautics and Astronautics and the Institute for the Advancement of Engineering, he has authored or co-authored more than 50 technical publications.



NASA photo

The blended-wing-body "flying wing" would carry 800 passengers more than 7,000 miles in a double-deck compartment that blends into the wing. That's almost twice the capacity of a Boeing 747-400.

For more information, visit the colloquium Web site at ***http://oldtown.larc.nasa.gov/Lectures/lectures.html.***

Colloquium & Sigma Lectures

Colloquium Lecture:
The Evolution of the Blended-Wing-Body Subsonic Transport
Dr. Robert H. Liebeck, Dec. 9, 2 p.m.
H.J.E. Reid Conference Center

Sigma Lecture:
Structures: Spider Webs to Space Stations
Dr. George W. Brooks, Dec. 2, 7:30 p.m.
Virginia Air & Space Center, Downtown Hampton
Info: 727-0900

News Briefs

Around the Agency

BLACK HOLES DISTORT SPACE, TIME – (Goddard Space Flight Center, Greenbelt, Md.) Astronomers using NASA's Rossi X-ray Timing Explorer (RXTE) spacecraft have reported seeing a black hole that is literally dragging space and time around itself as it rotates. This bizarre effect, called "frame dragging," is the first evidence to support a prediction made in 1918 using Einstein's theory of relativity. Collaborators in the research include Dr. Wan Chen of NASA's Goddard Space Flight Center, Greenbelt, Md., and Dr. Shuang N. Zhang of NASA's Marshall Space Flight Center, Huntsville, Ala.

GALILEO FINDS VOLCANIC DEPOSIT ON IO – (Jet Propulsion Laboratory, Pasadena, Calif.) Observations taken by NASA's Galileo spacecraft five months apart reveal a new dark spot the size of Arizona on Jupiter's moon Io, indicating that dramatic volcanic activity occurred during that time. The visible change took place during time between Galileo's seventh and tenth orbits of Jupiter and is seen as a dark spot about 249 miles in diameter. Dark features at the center of the deposits may be new lava flows. These changes appear in images taken by the Solid State Imaging system aboard Galileo. Images of Io and other data received from Galileo are posted on the World Wide Web at ***http://www.jpl.nasa.gov/galileo.***

SOHO HELPS SOLVE SOLAR MYSTERY – (Goddard Space Flight Center, Greenbelt, Md.) A likely solution to one of the major mysteries of the sun has emerged from recent observations with the European Space Agency/NASA Solar and Heliospheric Observatory (SOHO) mission. The new findings seem to account for a substantial part of the energy needed to cause the very high temperature of the corona, the outermost layer of the sun's atmosphere. Since the corona's temperature was first measured 55 years ago, scientists have lacked a satisfactory explanation for why it is three million degrees while the visible surface of the sun is only 11,000 degrees Fahrenheit. Information about the SOHO spacecraft and its observations may be found on the Web at ***http://sohowww.nascom.nasa.gov/.***

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER
Multicultural Facts

▲ "Part-time employment is not unusual in modern industrial countries. As a percentage of total employment, part-timers make up 15 to 20 percent of the workforce in the U.S. Germany and France, likewise, 20 to 25 percent of employment is part time in Britain, Japan and Canada. –*The Daily Press*, Sept. 13, 1997.

▲ Dec. 8-12 – Effective Management of Cultural Diversity Seminar, Kochman Communications Consultants, Chicago, Ill., 800-723-7640.

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV.

Holiday outreach programs gear up for giving at Langley

NASA Langley once again sponsors its two yearly holiday goodwill projects in conjunction with the Salvation Army – "Angel Trees" and "Cookie Power."

'Angel Tree' program

Last year, Langley's Acquisition Division challenged other Langley organizations and all personnel to "earn their wings," and it's fast becoming a Langley tradition.

Again this year, we have an opportunity to "adopt" kids who are part of the Salvation Army's "Angel Tree" program. Angel Trees are set up in local department stores, malls and churches.

Set up in the cafeteria, Langley's Angel Tree will be decorated with angel-shaped tags which carry age and size information for needy children whose holiday wish may not be otherwise granted.

Last year, more than 6,000 Peninsula children received gifts through the Angel Tree program. Because the Salvation Army guarantees a toy for every child, the emphasis is on warm clothing – jeans, sweatshirts, hats, mittens, boots.

Consider pulling a tag from the Langley Angel Tree to ensure a needy child is warm this holiday season.

Here's how you can help:

▲ Choose an angel tag from the tree in the cafeteria

▲ Pick up a clear plastic bag from under the tree

▲ Purchase a gift of new clothing; do not remove price tags

▲ Put your unwrapped purchase in the clear bag and affix the angel tag

▲ Place your gift under the Langley Angel Tree by Dec. 15, when gifts will be delivered to the Salvation Army.

For more information on the Angel Tree program, call Sandra Lemons at ext. 43957.

'Cookie Power' program

To help sweeten someone's holiday, bake an extra batch of cookies or your favorite holiday treat for someone less fortunate.

(see HOLIDAY, page 3)

Announcements

General Aviation Program deputy manager named

Henry W. Jarrett III has been named deputy manager for the General Aviation Program Office in the Advanced Subsonic Technology Program Office, replacing Michael H. Durham, who is now the technical assistant in the NASA Aviation Safety Program Office.

Jarrett formerly woked in Langley's Office of Space and Atmospheric Sciences Program Group.

NTA recognizes Lee

Robert B. Lee III of the Radiation Sciences Branch has been selected as the 1997 Research Scientist of the Year by the National Technical Association (NTA), for his "distinguished contributions, scholarship, leadership and service" in his career field. The award was presented at the NTA 69th annual conference banquet, Nov. 8, in Philadelphia.

Lee was also invited to join NTA's Panel of Eminent Scientists to participate in panel discussions at the Pennsylvania Convention Center lecture hall to provide an expected 500 or more students the opportunity to receive career planning information and techniques for succeeding in the work world from technical experts and positive role models, to see and hear distinguished scientists who will ignite their desire and enthusiasm to continue their schooling and to pursue higher education.

The NTA is a nonprofit minority professional organization dedicated to the preparation of minority youth to meet the challenges of modern technology.

Professor to discuss linear search problem

Anatole Beck, Ph.D., professor of mathematics at the University of Wisconsin, will deliver a lecture on "The Linear Search Problem," Nov. 25, 2 p.m., in Building 1192C, Room 124.

Linear search, or search in the line, can be defined as "searching for a particular point on the real line, placed at random with respect to a known or unknown probability distribution," i.e., looking for an object or place on a road. This simple-sounding problem is surprisingly difficult to analyze mathematically.

A variation of this problem is "rendezvous search in a line," in which two searchers are looking for each other. For any variation of this problem, the "Mommy will find you" strategy, where one player remains stationary while the other searches, is never the best approach to the problem.

Beck, a former chair of mathematics at the London School of Economics, has conducted work in the theory of probability in Banach spaces, topological dynamics, and most recently, the rendezvous search problem.

For more information, call Dan Giesy, ext. 44006.

Career seminars offered

Langley's Career Center offers the following training seminars through January:

▲ "Retiring for Fun, Not Profit," Dec. 2, 9 a.m.-noon.

▲ "Making Yourself Indispensable at Work," Dec. 4, 9 a.m.-noon

▲ "Stress Management," Dec. 10, 1-4 p.m.

▲ "Resume Reality," Jan. 7, 9 a.m.-noon

▲ "Interview Basics," Jan. 13, 1-4 p.m.

▲ "Conflict Management – Aggressive, Assertive or Passive?" Jan. 22, 8:30 a.m.-noon

▲ "First 30 Days on the New Job," Jan. 28, 9 a.m.-noon

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

George Washington U. spring registration

The George Washington University School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences at NASA Langley offers the following degrees: master of science; professional and doctor of science degrees in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, and structures and dynamics.

Registration period for the spring semester is Dec. 8-19 and Jan. 5-9. For complete course listings and telephone registration procedures, call ext. 41982; e-mail, jiafs@larc.nasa.gov; fax, ext. 45894.

Speaker's Bureau October activities

Robert Kreiger spoke to a time recording devices group in Newport News on "Real Time Data Recording in the 21st Century."

Kelly Hayhurst addressed the Institute of Electrical and Electronics Engineering student chapter at Old Dominion University on software reliability.

Jane Hogge talked to elementary school students at Colrain Central School, Colrain, Mass., about the Mars Pathfinder and Global Surveyor.

Bobby Braun addressed the Williamsburg Kiwanis Club about Mars Pathfinder.

(see ANNOUNCEMENTS, page 3)

Researcher News

The *Researcher News* is an official publication of Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees and has a circulation of approximately 8,100. It is distributed to all Langley civil service employees, contractors, retirees and on-site university personnel, with limited distrubution to NASA Headquarters, other NASA centers and, by special request, to other non-NASA individuals and organizations. Questions related to the content and distribution of the *Researcher News* should be addressed to Keith Henry, Mail Stop 115, (757) 864-6120. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news @larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

Photographer..... Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

CFC chairman thanks Langley for participation, exceeding goal

"The entire Combined Federal Campaign Committee and I want to thank everyone at Langley for helping the center to make and exceed our CFC goals. This is a wonderful statement about our priorities and commitment to those in need.

"As we develop the technology and science that drives the future of aerospace, we are setting aside a part of ourselves for our community. That really brings the message home – 'More than a Gift: From the Stars to the Heart.'"

– Joe Heyman
1997 CFC Chairman

Photo by Jeff Caplan

Langley CFC Chair Joe Heyman marks the end of a successful campaign with "thanks."

Langley's Chemical Reuse Facility reduces waste, saves money for center

BY BARBARA BODENSTEIN

Save money on chemical hazardous material purchases by using the Chemical Reuse Facility in the Pollution Prevention Building, Building 1181. NASA Langley has established this facility to foster exchange and reuse of hazardous chemical materials in an environmentally safe manner. The Reuse Facility is a clearinghouse where excess chemical materials are stored and reissued.

The Reuse Facility will reduce the center's raw material purchase costs and waste disposal costs. Excess chemical materials and materials with expired shelf-lives are currently a substantial source of waste generation at Langley.

NASA personnel or on-site contractors may turn in or acquire materials from the Reuse Facility through the center's on-line Chemical Materials Tracking System at ***http://osemant1.larc.nasa.gov/cmts/reuse/.***

Center personnel can review a list of items available or search the Reuse Inventory through the center's internal Web pages. Users issued chemicals out of the Reuse Facility will not be charged for the chemicals.

To encourage use of this facility, transportation will be provided. Dave Steigerwald will pick up or drop off chemicals at your facility. For more information, call him at ext. 48058, or e-mail him at d.j.steigerwald@larc.nasa.gov.

HOLIDAY

(continued from page 2)

The Langley cafeteria and the Langley Community Service Program are again sponsoring 'Cookie Power.' Last year, more than 100 dozen cookies, brownies, fudge and other treats were collected for the Salvation Army's mobile feeding van.

"Our van feeds 150-200 homeless people each weekday," said Darlene Hawk of the Salvation Army. "Everyone was delighted with last year's holiday treats. They were an added bit of cheer these people don't usually receive."

Here's how you can help:

▲ Pick up a plastic container at the cafeteria display

▲ Fill it when you do your holiday baking

▲ Freeze and bring the filled container to the cafeteria for storage

▲ Return all containers to the cafeteria by Dec. 15, when the treats will be delivered to the Salvation Army.

ANNOUNCEMENTS

(continued from page 2)

Lin Chambers spoke to students at several Michigan schools about the CERES S'COOL project, observing clouds, clouds and radiation and physics in space: Murphy Elementary School, Haslett; Marble Elementary School, East Lansing; Galewood Elementary School and Charlotte High School, Charlotte; Potterville Junior/Senior High School, Potterville; and De Witt High School, De Witt.

Christine Darden visited Langley Elementary School to discuss careers at NASA.

Dan Vicroy discussed NASA's aeronautical research and the Aviation Safety Program with students in the Aerospace Technology Department at Indiana State University and at Terre Haute North Vigo High School, Terre Haute, In.

Dr. Stanley Woodard spoke to Old Dominion University mechanical engineering graduate students about "The Upper Atmosphere Research Satellite In-Flight Dynamics."

Coworkers send thanks

"We'd like to thank our friends and coworkers for their cards, phone calls, prayers and support during the past 20 months. While we would have loved to have had Mom around forever, we know that she suffers no more, and we know that we have so many friends who will help us through the trials we face. We've been so blessed by the many friendships that we have here at Langley."

– Connie A. Smith and Yvonne M. Dellapenta

"In June 1996, I was diagnosed with advanced primary liver cancer. Only one-half of 1 percent of cancer patients in the U.S. suffer from this disease. My chance of survival was bleak.

"Although the medical procedure to alleviate the problem was quite radical, the 11-hour surgery in July 1996, followed by weeks of radiation and chemotherapy, proved to be unbelievably successful. By Christmas 1996, I was diagnosed "cancer free." After only four months, a new tumor appeared.

"I am now having chemicals pumped into my body 24 hours a day/seven days a week, with two weeks of 'freedom' allowed after every 10 weeks of chemotherapy. I continue to come to work at least four hours a day whenever possible.

"I have learned so many valuable lessons from this experience. The intense support of my family, church and friends is a joy to experience, and stopping each day to enjoy even the smallest of miracles brings the reminder of how fortunate I am to have such wonderful people and joyous beauty in my life.

"My special thanks are extended to all of you who have contributed to the Voluntary Leave Transfer Program in my name. My need for your leave contributions continues. Without your support, the daily pain I experience would deepen as my concern for dealing with life's realities mounts. Your support is a blessing, and I am truly thankful."

– Pat Reagon

Photos by Becky Kringsold

¡BAILE! ¡BAILE! Panamanian folkloric dancers "Ofelia Watley and Company," above, and Flamenco dancers "Nancy y Sus Majas," right, perform in the H.J.E. Reid Conference Center during Langley's Hispanic Heritage Month program early last month. The center's observance of Hispanic Heritage Month, Sept. 15-Oct. 15, also included an earlier panel discussion in which local community members representing six Hispanic countries shared information about their culture, values and history.

Survey results

Readers rate 'Researcher News'

BY MARY GRAVES

Sixty-eight people responded to the Researcher News Reader Survey conducted in September. The survey queried readers on seven items: time spent reading the *Researcher News*; its perceived reading level; its coverage of technical detail within technical articles; topics desired to be covered; first-read sections; placement of regular items; and reader-friendliness of format and design.

Here are the results:

1. How much time do you spend reading a typical issue of the RN?

The RN seems overwhelmingly to be a quick read, with 62 readers (91 percent) spending 30 minutes or less with each issue. Six readers (8 percent) find more time to read the RN.

2. Is the reading level of the RN too high, too low, or about right?

Most readers (86 percent) think the RN is written at an appropriate reading level, while 2 people find the level too high, and seven people find it too low.

3. Would you like to see more technical detail in articles about technical subjects?

More than half of readers responding (64 percent) do not want to see more technical detail included in technical articles, while 26 percent do want it.

Comments in favor of more details include:

▲ Instead of writing it for a 12-year-old, write it for an 18-year-old!

▲ On occasion, more would be helpful/interesting.

▲ More on what's being done at Langley.

▲ Some names of participating organizations, including supporting.

▲ Possibly—but not too much more needed.

▲ But not written in highly technical jargon; I would like to know more about resources we can use as we develop the concept of doing more with less.

Comments against more detail include:

▲ I think the present level is OK. We know where to get details.

▲ If I want details, I can go to the source.

▲ Not technical; am administrative; therefore feel there is enough technical.

▲ I'm not a rocket scientist.

▲ Good balance now.

▲ Already get too much technical information.

▲ Reference a URL for more technical information.

▲ Articles should introduce, not detail. I can contact the source.

▲ Don't change anything. I like the *Researcher* just the way it is.

▲ I'm a writer, not a techie.

4. What topic or subject not presently reported in the RN would you like to see covered?

Comments included:

▲ Would like to see more human interest stories with pictures.

▲ Would like to see letters to the editor with response from senior staff as appropriate. This might provide a chance to be heard, especially since we no longer have town hall meetings.

▲ More *research* details.

▲ Changes in secretarial support, i.e., the Research and Technology Group's CAST experiment.

▲ Langley Web activities.

▲ More pictures of people in daily jobs.

▲ Regular messages from the director – what is happening – where is Langley going – how are we doing. I would also like to see articles contain information about how Langley is working with other NASA centers on certain projects to develop our understanding of how we have distinct roles that come together to be better than the sum of parts.

▲ Sports/activities.

▲ Safety and security.

▲ Letters to editors (opinions).

▲ Multicultural facts.

▲ NASA Langley projects, shops, engineering, etc.

▲ Workforce and people-related articles.

▲ Good "range" of coverage now offered.

▲ Technician workforce articles – awards – special accomplishments.

▲ Highlights/summary of senior staff meetings.

▲ Various pictures and events of NACA and NASA earlier times.

▲ More Langley history.

▲ Mix OK.

▲ On-base wildlife, astronomy column, cartoon related to science.

▲ Interesting Langley contributions and technologies.

▲ Suggestion and comments column.

▲ More retiree information.

▲ Langley Activities Association athletics.

▲ How what we do affects the local economy, national growth in research and development objectives.

5. Do you read any particular section first each issue?

Most readers (73 percent) do not read any one section of the RN first. However, of the 15 respondents who do have a priority section, more than half (53 percent) read AdVentures first.

6. Do you prefer to find the same types of items – announcements, classified ads and events, news briefs, people features – in the same place in each issue of the RN?

Sixty-four percent of respondents like to see the same items in the same places each issue, while 35 percent say it doesn't matter.

7. Do you find the format and design of the RN to be easy or difficult to read and follow?

Just about everybody who responded – 95 percent – thinks the RN is easy to read and follow.

Comments include:

▲ Good insight into what other areas of Langley are working on – lets the left hand know what the right hand is doing. Good facility coordination facilitator.

▲ Please train photographers in the types of photos you'll accept so we won't waste time with undesired, unpublished photos.

▲ Good job. Keep up the good work!

▲ Article separations are hard to follow.

▲ Get rid of the ads and more photos of what's produced at Langley.

▲ Good source of NASA information.

▲ You should put RN on the Web for Langley employees and hard copy only for people off site.

▲ Well edited. Good visual appeal. Nice work!

▲ The paper really looks good!

▲ RN should be "employee focused" – not management/HQ information – don't repeat information available elsewhere (LaRC This Week, for example).

▲ Keep up the good work!

▲ Web-based archive would be nice.

▲ I'm very impressed. It is information I can't easily get.

▲ I am happy, so just keep it coming.

▲ Please, maintain a paper copy – *do not* become electronic.

▲ Would like a column like "whatever happened to...." Use people from past who have left, like Sid Pauls, Ed Cortright, Bill Williams.

▲ Although layout has changed over the years – *Researcher News* looks very good!

MICROGRAVITY

(continued from page 1)

Celsius, or 2,100 degrees Fahrenheit. Then the molten material is directionally cooled very slowly to a temperature less than the melting point to seed and then grow the crystal.

The Langley team, with the invaluable aid of the fabrication shops, developed a unique growth vial that allows them to grow three separate crystals with one sample container. Using this design, the team grew three crystals on the USMP-3 mission and is growing six more crystals this month for USMP-4. Each crystal will take from a few hours to nearly a day to grow, depending on how it is processed.

Application of lessons learned

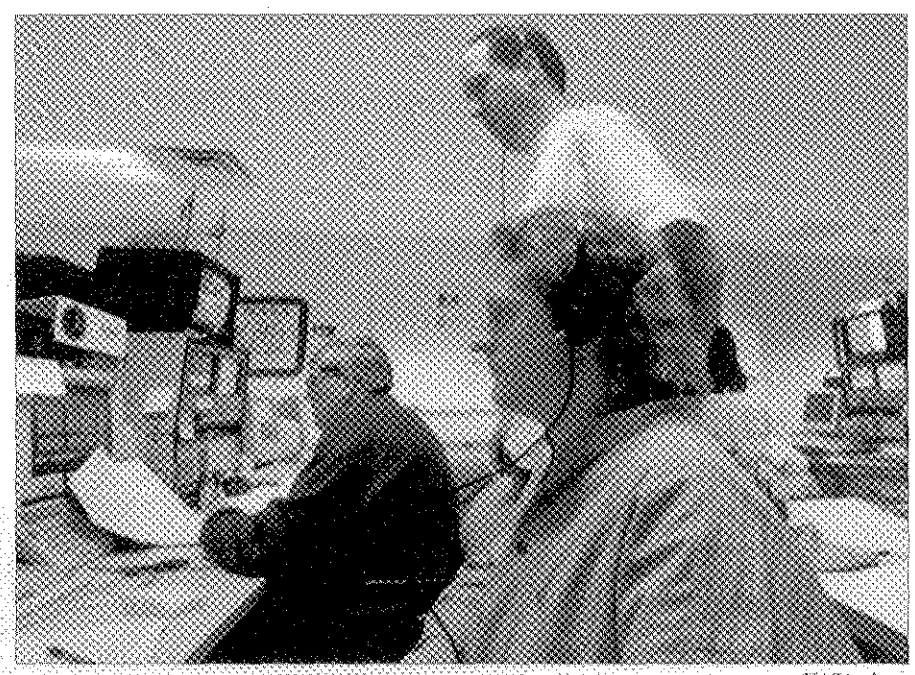
During the USMP-3 experiment last year, Columbia was commanded into a different flight attitude for each of the three crystals during growth, which effectively changed the growth direction in accordance with the microgravity environment of the shuttle. These changes were similar to turning the furnace upside down and sideways from the growth direction normally used on Earth.

In the USMP-4 flight, all of the crystals will be grown in the attitude which produced the best results from the previous flight. This time, the experimental parameters will be crystal growth rate, temperature gradient, internal pressure and type of initial crystal seeding.

Teamwork continues

The Langley team, which includes Principal Investigator Archie Fripp, Bill Debnam and Glenn Woodell, all of the Sensors Research Branch; Bill Rosch, of the National Research Council; Ned Baker, of Lockheed Engineering & Sciences Co.; and Ranga Narayanan of the University of Florida, will control the experiment and eat Thanksgiving turkey in the Payload Operations Control Center at the Marshall Space Flight Center, Alabama. Another member of the team, Dick Simchick, also of Lockheed Engineering & Sciences Co., will serve as a liaison from Langley.

For more information and a running account of the latest results during the shuttle flight, see the home page for the NASA/LaRC Microgravity Sciences, Compound Semiconductor Crystal Growth, at internet address ***http://dragon.larc.nasa.gov/woodell/homepage.html.***



NASA photo

Bill Rosch, standing, of the National Research Council, looks over the console as Bill Debnam, left, of the Sensors Research Branch, records the latest telemetered data, and Glenn Woodell, right, also of the Sensors Research Branch, communicates with the payload director on the USMP-3 mission in February 1996.

Life after NASA

Retirement? What retirement?

NASA Langley 'retiree' George Brooks remains busier than ever, 23 years after leaving the center

BY JEANE SHANKS

Life after retirement from NASA Langley is not the proverbial rocking chair for Dr. George W. Brooks, 74, who retired as director of structures in 1974, after 25 years' service.

"I climbed the ladder, didn't fall off and skipped only one rung," he said of his career during a recent visit to the center.

Head start into aeronautics

Brooks earned bachelor's, master's and doctorate degrees from Princeton University, where he delivered newspapers to Albert Einstein as a part-time delivery person and worked with Alexander Nickolsky, an early developer of the helicopter, when that aircraft was first getting off the ground.

Brooks began his career at Langley in 1949, focusing on aeronautical dynamics. His first job was to build a helicopter model for testing purposes; his expertise and accomplishments in helicopter dynamics quickly became recognized nationwide.

He began researching the dynamics of the space vehicle systems program in 1958, and he conceived and implemented the Langley's Structural Dynamics Laboratory, Building 1293.

New opportunities to help

At the end of his NASA career, the then-51-year-old Brooks saw new opportunities before him.

"If I had been older [at the end of 25 years], I would not have retired," he said. "But there were so many places where I could help people do things. I had a good career and wanted to try some other things."

The first year after retirement, Brooks purchased and converted an old house to accommodate a floral business for his wife. He started a second career the following year as the director for research and product development for a private firm. He retired a second time after nine years, and his third career began in earnest – that of a "professional" volunteer.

His days of scouting programs and work with the Parent-Teacher Association mushroomed. He served as a board member and chair for the York-Poquoson Department of Social Services and on the council for the York-Poquoson Extension Service. He remains very active in the Combined Federal Campaign efforts for the United Way of the Virginia Peninsula.

One of his hobbies is "to fix anything that doesn't work" – evidenced not only in the conversion of the floral house but also in acquiring and physically rebuilding the present York-Poquoson Red Cross Chapter House.

"The work included roofing, wiring, plumbing, carpentry, plastering – whatever had to be done," he said. He was a Red Cross board member and first-aid instructor for many years and still serves the organization as a volunteer.

Key to staying young

"Volunteer work keeps me young," said Brooks. "I have a hard time goofing off and relaxing – I always have something going. When I relax, they will have to find me a box. It makes for a fun life."

Fun includes his wife Beryl, four children, seven grandchildren, golf, fishing, bowling, gardening, string music and continued participation in the NACA/NASA Langley Alumni Association, for which he has served in all the officer roles, as well as staying actively involved as a member.

Alumni activities

As an alumni member, he participates in state fairs and open houses and initiated three "goodie" package programs to overseas military personnel. He recently received a glowing thank-you letter, he said, from the wife of a lieutenant who had just returned from Bosnia and had received one of the "Project Remember" goodie boxes.

"Those are nice things to do," he said. "They have an impact – a lot more than we think."

"There are three things we retirees need to do for the Langley Alumni Association," he said.

"Do something for self. Have the need to keep up contact; do not want to become isolated and dry up in a world that needs you.

"Do something for the community. I think all of us owe something back to the community, and that's important.

"We are all from Langley, and if we can help Langley, I think we should. I think that is the kind of thing you owe if you have been fortunate," he added.

VASC roles

In addition to all his activities as a NASA Langley alumnus, Brooks has worked with the Virginia Air & Space Center (VASC) since 1991. He serves as an ambassador for the Peninsula Galaxy of Gifts Program and hosts the NASA/College of William and Mary Sigma Lecture Series held at the VASC.

In a reversal of roles, he will deliver a Sigma Series Lecture at the museum – "Structures: Spider Webs to Space Stations" – Dec. 2. (See related story, page 1.)

Does Brooks feel that he is "leaving his mark" on the world?

"Yes," he jokes. "And someone will probably take their foot and rub it out. It's an interesting time and has been an interesting life."

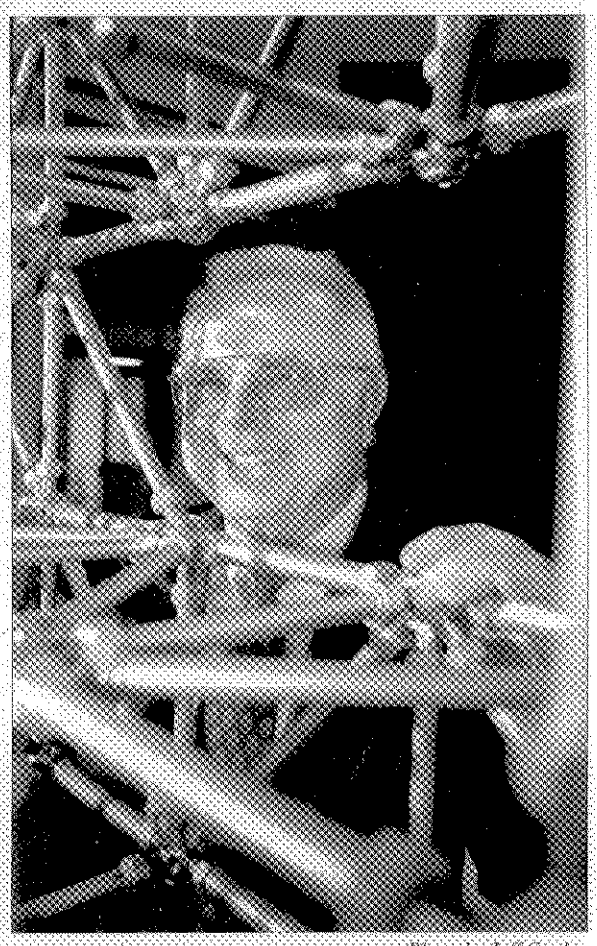


Photo by Jeff Caplan

Brooks, pictured here with a Langley model of the space station, will discuss how structures work in his Sigma Series lecture Dec. 2 at the Virginia Air & Space Center, and he invites the public to visit the museum's structures exhibit before his 7:30 p.m. presentation. "I will try to get the people on the street to understand a little bit of what NASA does, what the impact is and what they can look forward to in the future," he said. "I will use layman's terms, and I won't use a single equation."

Langley participates in 'Rethinking Government' symposium

BY MEGHAN WOODCOCK

NASA Langley recently provided exhibits for the "Rethinking Government" symposium in Raleigh, N.C., on Nov. 4.

North Carolina Gov. James B. Hunt spoke at the event, sponsored by IBM and North Carolina Citizens for Business and Industry. In his address to the 175 local business leaders and state and federal lawmakers who attended, Hunt issued a challenge to come together "to be the best that they can be" in improving government.

For the symposium, Langley set up a Mars Sojourner rover replica on a simulated Martian landscape to demonstrate NASA's effort at "rethinking government." Visitors to the symposium learned that the development budget of each of the missions under the Discovery Program is limited to $150 million, as compared to the billions of some former missions.

Recently NASA published a document streamlining its goals "to sustain future U.S. leadership in civil aeronautics and space." The *Three Pillars of Success* plan provides new mission statements governing Access to Space, Revolutionary Technology Leaps and Global Civil Aviation.

Langley set up models at the symposium depicting some of the future aircraft and spacecraft addressed in this document. Models of the X-33, the High-Speed Civil Transport and advanced General Aviation aircraft were displayed.

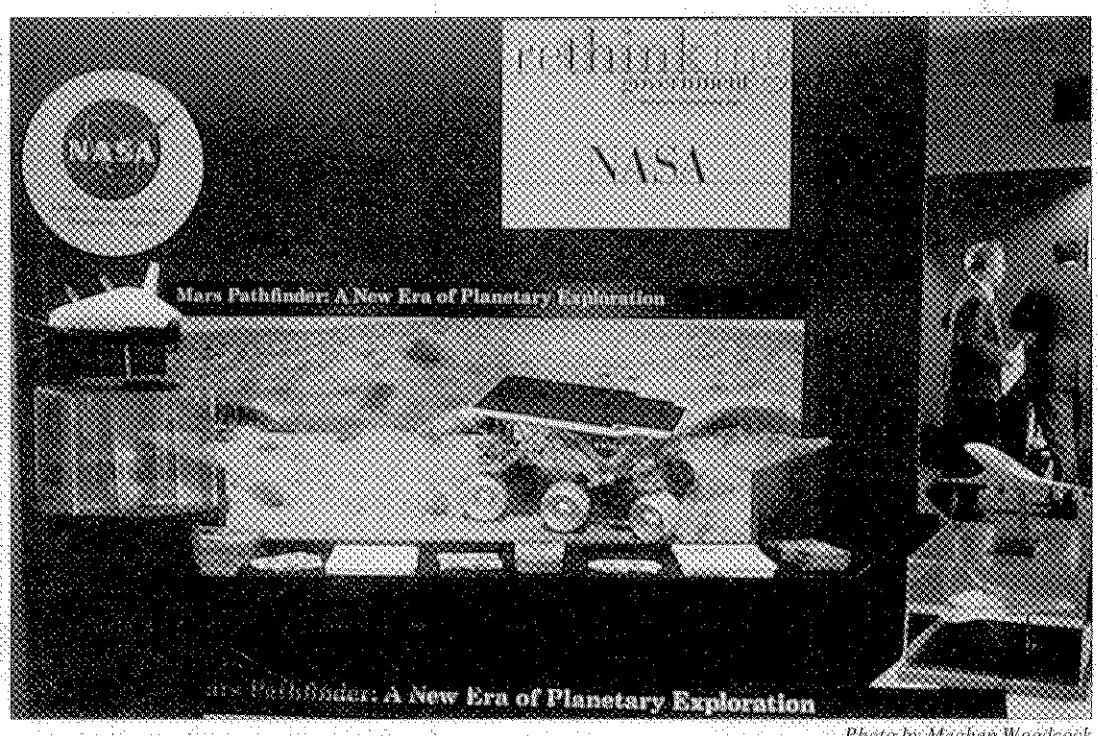


Photo by Meghan Woodcock

Langley's exhibit included a full-size replica of the Mars rover and models of future airplanes and spacecraft.

AdVentures

FOR SALE: 3-BR rancher near Main St. in Newport News, 1-1/2 baths, wall-to-wall carpet, central air/heat, energy efficient, attached garage, eat-in kitchen, new roof, large fenced back yard, near elementary school, good location, on cul-de-sac, 20 minutes to NASA/Langley Air Force Base. $77,500. Call 838-0726.

FOR SALE: Sleep sofa, 3 years old, good condition, neutral colors. $190 or best offer. Call 221-7122.

FOR SALE: Mobilite hospital bed in very good condition with egg-crate mattress. $400. Call Marvin Owens at 420-5789.

BLOOD DRIVE: The annual NASA Day-Before-Thanksgiving Blood Drive is set for Nov. 26, 9 a.m.-3 p.m., at the H.J.E. Reid Conference Center. To donate blood, a person must be in good health and weigh at least 110 pounds. Donors will be automatically entered in a drawing for one of seven turkeys or turkey certificates to be given away following the drive.

TITANIC RISES AGAIN: The 90-minute IMAX film *Titanica* returns to the Virginia Air & Space Center for a limited engagement, Nov. 27-Jan. 14, Thursdays-Sundays. For reservations or more information, call 727-0900, ext. 746.

LAA BOARD SEEKS TO FILL POSITIONS: The Langley Activities Association (LAA) is accepting nominations for the positions of vice president and chairperson of buildings and grounds. These positions are elected to serve two years on the executive board. The LAA board meets formally twice a month and meets informally or in committees weekly to conduct business and operations of the LAA and its organizations. Nomination forms and position descriptions are available at the LAA office in the H.J.E. Reid Conference Center. Nominations must be returned to the LAA office no later than Nov. 28. Voting ballots will be sent to all personnel on Dec. 1 and are due to the exchange by close of business, Dec. 12. Election results will be announced Dec. 19.

HO! HO! HO! The Langley Activities Association's annual children's holiday party will be Dec. 6, 1-3 p.m., in the H.J.E. Reid Conference Center. The event will feature "The Mother Goose Christmas Show," by Rainbow Productions, as well as Santa Claus. Open to children of all NASA employees and contractors. Free, but required, tickets are available at the LAA office, Nov. 21-Dec. 3. For more information, call ext. 46369.

ALUMNI NEWS: The **next meeting** of the Langley Alumni Association is Dec. 9, 11:30 a.m., in the private dining room of the Langley cafeteria. Speaker Patrick Saylor, of Colonial Williamsburg, will discuss the historic area's plans for the holiday season. For more information, call ext. 47330. The annual **dinner/dance/meeting** is set for Jan. 17, 6:30 p.m., at the H.J.E. Reid Conference Center. Cost is $13.50 per person. To make a reservation, send a check by Jan. 10 to the NASA Langley Alumni Association, Mail Stop 184, Langley Research Center, Hampton, Va. 23681-0001. For more information, call ext. 47330.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31 to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

SAIC SEEKS INTERNS: Science Applications International Corporation (SAIC)-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in the following fields: earth sciences, physics, engineering, mathematics, scientific computer programming. Successful candidates must be U.S. citizens or must be eligible for employment with a U.S. government contractor. For applications or more information, contact Summer Intern Program, SAIC, 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

VIRGINIA SYMPHONY: The symphony presents a "Mozart and More" concert, Nov. 22, at Hampton Roads Academy, and Bach Brandenburg Concertos, Dec. 5-6, at Norfolk's Chrysler Hall. For other events, call the Symphony Ticket Office at 623-2310. Symphony season brochures are available at the Langley Exchange Shop or in the cafeteria.

'TIS THE SEASON: Yorktown celebrates Christmas with a townwide Holiday Open House, Dec. 6, 10 a.m.-7 p.m. Tickets are $10 and include all homes on the tour and trolley transportation. For more information, call Sandra Jones at 898-7947.

Author Crouch to deliver Wright Bros. Memorial Lecture

Dr. Tom Crouch, chairman, Division of Aeronautics, National Air and Space Museum, and author of *The Bishop's Boys: A Life of Wilbur and Orville Wright*, will deliver the annual Wright Brothers Memorial Lecture on Dec. 17, 1-2 p.m., in the H.J.E. Reid Conference Center.

Joining Langley in sponsoring this event are the American Institute of Aeronautics and Astronautics, Hampton Roads Section; the Air Force Association; the National Defense Industrial Association; the Virginia Aerospace Business Roundtable and the Langley Colloquia Committee. Crouch will also present a Sigma Series lecture the same evening, 7:30 p.m., at the Virginia Air & Space Center. The Sigma Series lecture will be free and open to the public.

NGWS Researcher

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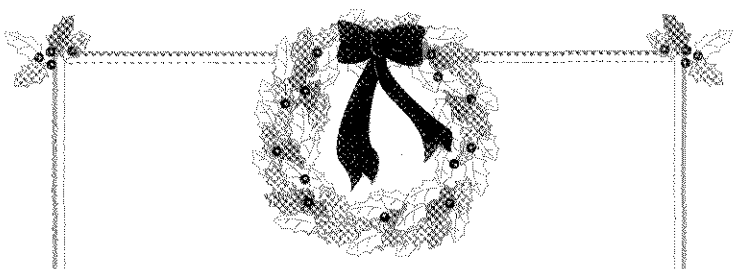


In celebration of the holiday season,
the Director of Langley Research Center,
Dr. Jeremiah F. Creedon,
cordially invites all
NASA civil service employees,
retirees and contractors
to attend a reception at
the H.J.E. Reid Conference Center
Friday, December 19, 1997
from one to three o'clock

Sponsored by the
Langley Activities Association and the
Langley Federal Credit Union

National Aeronautics and Space Administration
Langley Research Center

80 years of excellence
NASA Langley Research Center 1917-1997

Researcher News

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 24 ❖ December 5, 1997

Scientists to use space platform to study clouds

BY CATHERINE WATSON

Pictures from space often show the Earth covered by clouds. In fact, more than 50 percent of the Earth is covered by clouds at any one time. NASA Langley's latest satellite instrument, the Clouds and the Earth's Radiant Energy System (CERES), will use the vantage point of space to provide global data on the Earth's energy balance and how it is changed by clouds.

"The temperature of the Earth is controlled by the global balance between the amount of sunlight absorbed by the Earth, a heat gain, and the amount of energy radiated back to space at thermal infrared wavelengths, a heat loss. Clouds are the largest factor changing this flow of radiation into and out of the Earth," said Dr. Bruce Wielicki, head of the CERES project.

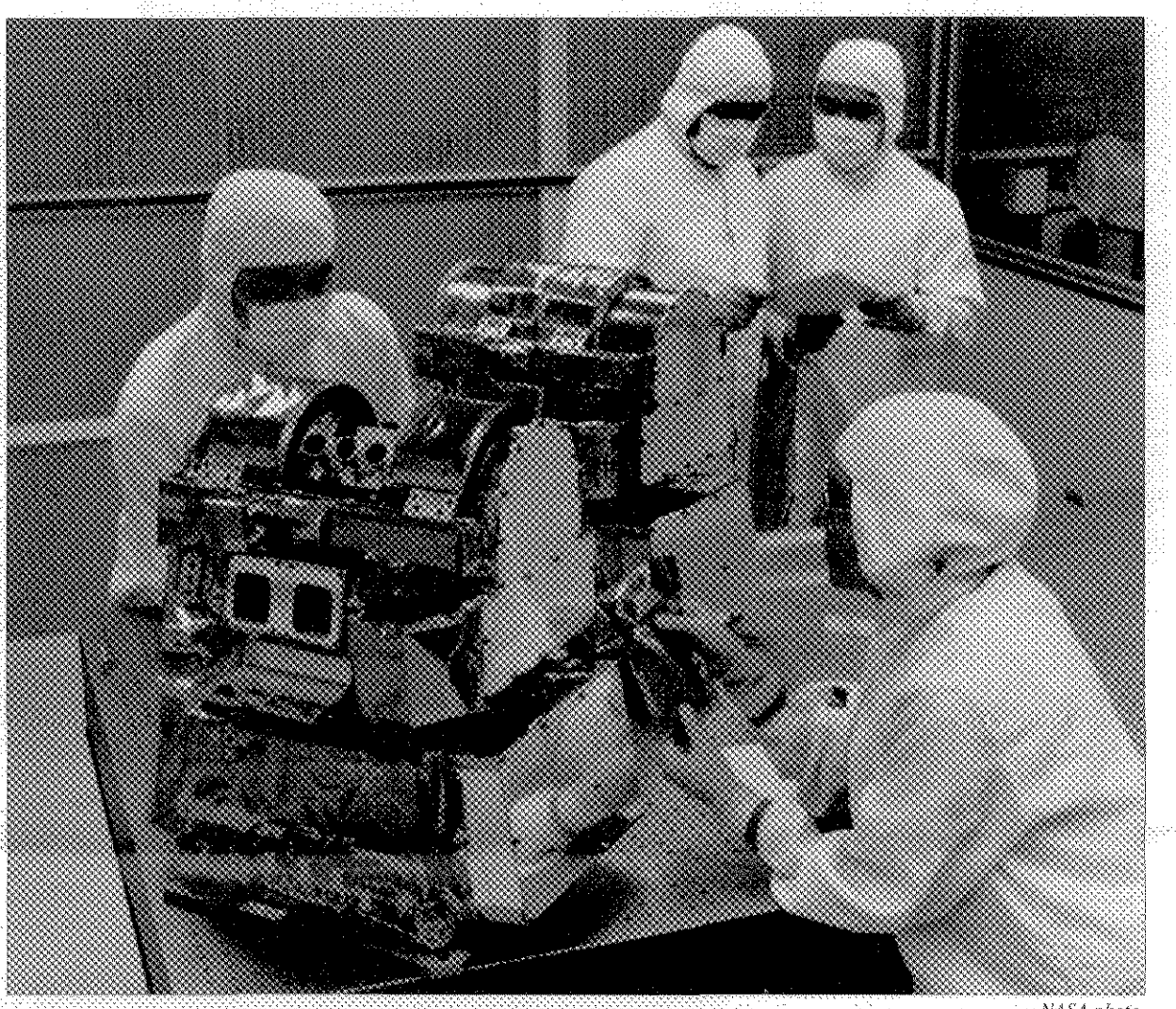
Thin, high clouds can trap heat emitted by the Earth, producing warming. Low, thick clouds can reflect the sun's energy back into space, causing cooling. Scientists need to know how different types of clouds trap or reflect energy, and how much and how often they do it, in order to understand what effects clouds may have on our planet's climate.

"Uncertainties about the way clouds change the energy available to heat and cool the Earth is the largest uncertainty in predicting the magnitude of future climate change caused by increasing greenhouse gases," Wielicki said.

"Clouds change greatly from the equator to polar regions, from day to night, and from land to ocean. Fortunately, satellites allow scientists to observe the complete range of cloud types on the Earth, as well as to measure their behavior and role in the climate system," he continued. "A good example of this type of measurement is to observe the changes in clouds and energy flows which occur during El Niño. The fortuitous timing of the [CERES] launch will allow measurements to be taken both during and after the current major El Niño event."

"[CERES] also will improve the accuracy of solar insolation data used for determining the sites of solar power plants, solar cookers in refuge camps and solar refrigerators. This will happen roughly three to four years after launch," Wielicki said.

CERES, part of NASA's Mission to Planet Earth program, was scheduled for launch in late November aboard the Tropical Rainfall Measuring Mission observatory.



NASA photo

TRW Space & Electronics Group delivered to NASA these two CERES instruments that will help scientists better understand the effects of clouds on the Earth's radiant energy balance and the resulting impact on the Earth's climate.

Wright Brothers Memorial Lecture

Wright Bros. brought 'right stuff' to realize fantasy of human flight

Dr. Tom D. Crouch, chairman of the Division of Aeronautics at the National Air and Space Museum, will deliver the 1997 Wright Brothers Memorial Lecture, Dec. 17, 1 p.m., in the H.J.E. Reid Conference Center.

Crouch

The lecture is entitled "Why Wilbur and Orville?" and will also be presented as a Sigma Series Lecture that same evening, at 7:30 p.m., at the Virginia Air & Space Center (VASC) in downtown Hampton.

On the 94th anniversary of the first flight of the Wright Flyer, Crouch will discuss the unique combination of talents and qualities that enabled Wilbur and Orville Wright to become the first to successfully complete the quest for human flight. Crouch will examine this historic flight from personal, professional and engineering perspectives to reveal how the Wrights made history on Dec. 17, 1903.

An employee of the Smithsonian Institution since 1974, Crouch has served both the National Air and Space Museum and the National Museum of American History in curatorial and administrative posts. He holds a Ph.D. degree in history from Ohio

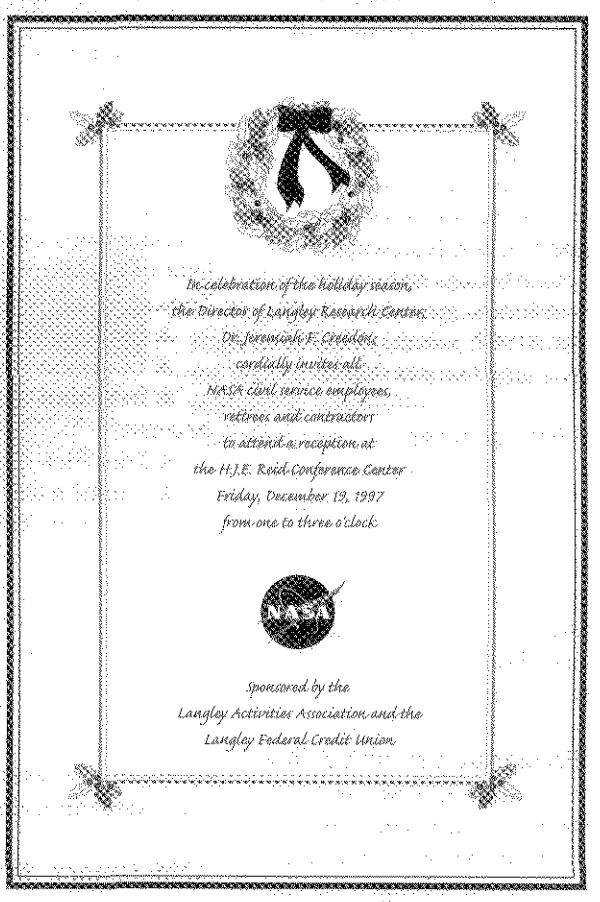
(see CROUCH, page 4)

Wright Bros. Memorial & Sigma Lectures

Wright Bros. Memorial Lecture
"Why Wilbur and Orville?"
Dr. Tom D. Crouch, Dec. 17, 1 p.m.
H.J.E. Reid Conference Center
After the lecture, Crouch will sign copies of his book, *The Bishop's Boys: A Life of Wilbur and Orville Wright*, available at the NASA Exchange Shop.

Sigma Lecture
"Why Wilbur and Orville?"
Dr. Tom D. Crouch, Dec. 17, 7:30 p.m.
Virginia Air & Space Center
Downtown Hampton
Info: 727-0900
Crouch will sign copies of his book, *The Bishop's Boys: A Life of Wilbur and Orville Wright*, available at the VASC Gift Shop, at 6:30 p.m., preceding the lecture.

Center director's holiday reception



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News Briefs

Around the Agency

LASER TO TEST WIND-MEASUREMENT – (Marshall Space Flight Center, Huntsville, Ala.) NASA will fly an infrared laser in the cargo bay of the space shuttle to see if a space-based sensor can accurately measure global winds within Earth's atmosphere from just above the surface to a height of about 10 miles. Successful measurements in this key region of the atmosphere could lead to improved weather forecasting and better understanding of climate-related events such as El Niño. Based on technology tested aboard research aircraft, the Space-Readiness Coherent Lidar Experiment (Sparcle), which includes work by Langley researchers, is due to launch in 2001. It will detect the frequency shift of an eye-safe laser pulse as it reflects off wind-blown dust and aerosol particles. The resulting measurements should provide details about the speed, direction and vertical profile of tropospheric winds.

GLOBAL LAND PRECIPITATION UP – (Goddard Space Flight Center, Greenbelt, Md.) Global land precipitation has increased during the 20th century, according the November issue of the *Journal of Climate*. The findings are based on a recalibrated compilation and analysis of data from 1900-1988 and confirm previous speculation that land precipitation is increasing. NASA scientists learned of the increase from a new data set constructed at Goddard Institute for Space Studies, New York City. For more information, see ***http://www.giss.nasa.gov/data/adai/***

U.S./UKRAINIAN STUDENTS COLLABORATE – High school students from the United States and Ukraine and astronauts aboard space shuttle Columbia will perform plant science experiments during NASA's STS-87 mission, which launched Nov. 19. While the students construct simulated flight hardware and study plant growth, pollination and fertilization of the Brassica rapa plant in their classrooms, the same plant investigation will take place in the microgravity environment aboard the shuttle. The educational activities, a significant component of the Collaborative Ukrainian Experiment payload, are known as Teachers and Students Investigating Plants in Space. For more information, see internet address ***http://fastplants.cals.wisc.edu/cue/cue.htm***

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.l

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ "To succeed internationally, we need to understand the cultures of the world; and we have all the cultures of the world represented right here – a tremendous competitive advantage." – Ernest Thompson, Proctor and Gamble

▲ A 1993 study of Standard and Poor 500 companies showed that firms that succeeded in shattering their own glass ceilings racked up stock market returns nearly two and a half times better than otherwise-comparable companies. – Fact-Finding Report of the Federal Glass Ceiling Commission, 1995

▲ See the MCLT home page at ***http://misbss20.larc.nasa.gov/MCLT/homepage_mclt.html***. To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV

STS-87 spacewalk secures straying Spartan satellite

Two STS-87 crewmembers aboard space shuttle Columbia performed a spacewalk Nov. 24 to capture a wayward satellite and to evaluate equipment and procedures that will be used with future International Space Station operations.

Winston Scott and Takao Doi positioned themselves on a support structure in Columbia's payload bay as Cmdr. Kevin Kregel piloted the shuttle towards the Spartan solar satellite. Scott and Doi captured the satellite by hand about two hours after they began their spacewalk. They then lowered Spartan down onto its support structure, and the free-flyer unit was latched in place.

The two astronauts then set up and tested a crane device which will be used to move large Orbital Replacement Units during the assembly and maintenance of the International Space Station. After the crane was positioned in its holder on the port side of the payload bay, Doi conducted evaluation tests of the crane operating characteristics, while Scott removed a large battery unit and its carrier device. The 500-pound battery/carrier unit was then placed on the end of the crane to evaluate the unit's ability to move with a large mass attached to it. Doi and Scott then stowed the battery unit and the crane device, closed the external hatch and repressurized the airlock, ending a 7-hour, 43-minute spacewalk.

Career Center offers winter sessions

Langley's Career Center offers the following training seminars through January:

▲ "Stress Management," Dec. 10, 1-4 p.m.

▲ "Resume Reality," Jan. 7, 9 a.m.-noon

▲ "Interview Basics," Jan. 13, 1-4 p.m.

▲ "Conflict Management – Aggressive, Assertive or Passive?" Jan. 22, 8:30 a.m.-noon

▲ "First 30 Days on the New Job," Jan. 28, 9 a.m.-noon

These seminars are authorized NASA and Langley training events. Participation is open to all NASA federal civil service personnel and their spouses. Advance registration is required. For more information or to register, call ext. 45000 or fax to ext. 45040.

Announcements

George Washington U. spring registration

The George Washington University School of Engineering and Applied Science's Joint Institute for Advancement of Flight Sciences at NASA Langley offers the following degrees: master of science; professional and doctor of science degrees in aeroacoustics, aeronautics, astronautics, fluid mechanics and thermal sciences, and structures and dynamics.

Registration period for the spring semester is Dec. 8-19 and Jan. 5-9. For complete course listings and telephone registration procedures, call ext. 41982; e-mail, jiafs@larc.nasa.gov; fax, ext. 45894.

FEW to meet

The Langley Chapter of the Federally Employed Women will hold its monthly meeting on Dec. 9, 6 p.m., at the Brass Rail Restaurant, next to the post office at Langley Air Force Base. For more information, call Jackie Smith at ext. 43003.

Brown-bag it with AIAA

William E. Eastburn, financial consultant with Financial Network Investment Corporation in Langley Federal Credit Union's NASA Branch, will conduct a brown-bag lunch seminar on the Taxpayer Relief Act of 1997, Dec. 10, 11:30 a.m., in the private dining room of the NASA Langley cafeteria. The event is sponsored by the Hampton Roads Section of the American Institute of Aeronautics and Astronautics.

Eastburn will discuss the main points of the act's six principal provisions, which provide various tax deductions, new tax credits, new IRA stipulations, savings incentives and adjusted phaseout limits for single- and joint-income taxpayers. Topics include:

▲ Child tax credit

▲ Education incentives

▲ Individual Retirement Accounts

▲ Education IRAs

▲ Capital gains taxes

▲ Estate and gift taxes.

Eastburn will also discuss strategies that apply to a 401K plan or a Thrift Savings Plan. Each participant will receive a workbook that summarizes major tax strategies. For more information, contact Lynda Foernsler at ext. 48146 or e-mail at l.j.foernsler@larc.nasa.gov.

'Old-Timers' to meet

The annual Old-Timers Doughnut and Coffee Party will be held Dec. 20, 10 a.m.-1 p.m., in the Langley hangar (Building 1244). For more information, call ext. 43875.

Fund established to support Edge family

Marion Edge, the wife of Rocky Edge, Langley's labor relations specialist in the Office of Human Resources, is seriously ill with cancer. She is receiving experimental treatments at the M.D. Anderson Cancer Center in Houston.

To help defray expenses and express support for Marion, Rocky and their son Michael, center employees are participating in a fund drive started by Marion's coworkers. Consider a donation of $5 or more to support this fund. Tickets to acknowledge donations are available from any of the fund committee members. Call Don Petrine, ext. 42575; Gael Hawkins, ext. 42527; Anna Jackson, ext. 42573; Jay Taylor, ext. 42705; Mary Erwin, ext. 42561; Ben Schlichenmayer, ext. 44578; Tom Vranas, ext. 45487; George Allison, ext. 42594.

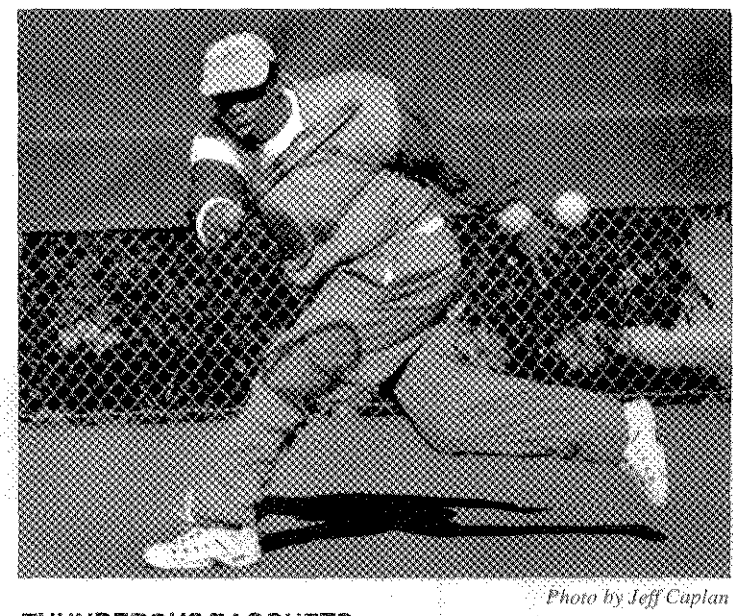


Photo by Jeff Caplan

THUNDEROUS RACQUETS – Burnell McKissick, of the champion NASA Team Thunder, practices during lunch at Langley's tennis courts. The team is once again on top of the Senior (over 50) Men's Doubles Tennis League. They were the only undefeated team this year in matches against six other teams – Hilton, Fort Monroe, Riverside, Briarfield, NASA Lightning and Village Green. The championship team includes McKissick, Tom Yager, George Lawrence, Charles Bryant, Don Petrine, Len Credeur, Maynard Sandford, Bob Smith, John Wilson and Dennis Bartlett.

Researcher News

The *Researcher News* is an official publication of Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees and has a circulation of approximately 8,100. It is distributed to all Langley civil service employees, contractors, retirees and on-site university personnel, with limited distrubution to NASA Headquarters, other NASA centers and, by special request, to other non-NASA individuals and organizations. Questions related to the content and distribution of the *Researcher News* should be addressed to Keith Henry, Mail Stop 115, (757) 864-6120. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news @larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

Managing Editor..... Keith Henry

Editor..... Mary Graves
Science and Technology Corp.

Assistant Editor..... Jeane Shanks
Science and Technology Corp.

Photographer..... Jeff Caplan
Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

State of the Center Address

Langley director talks candidly about state of center

BY MARNY SKORA

In his annual State of the Center presentation Nov. 14, Langley's Center Director Jeremiah F. Creedon assured employees that Langley is in good shape.

"In our dynamic environment," he said, "there are new challenges every day. We must anticipate and address those challenges, continue to improve our efficiency and effectiveness and maintain our impressive record of accomplishment."

Creedon framed his comments in terms of Langley's Strategic and Quality Framework.

"I stand behind the SQF," he said. "If we want to succeed as an organization, we have to have three things:

▲ Our stakeholders' decisions must reflect that Langley returns good value on their investments.

▲ Our customers must value our partnership, use our products and understand our role.

▲ Langley must continue to be an organization that learns, adapts and improves to benefit employees, customers and stakeholders.

An aerospace leader

Creedon noted with pride that national decision-makers support our mission and programs.

"We hold a leadership position in aeronautics," he said. "We play a key role in space transportation technology. We are leaders in NASA's atmospheric science programs. We are also developing innovative technologies for spacecraft and remote sensing instruments. And we are the NASA leader in aerospace technology applications."

The director noted that Langley's technical programs are meeting customer commitments. Clearly, the most visible accomplishment of the past year was Langley's role in the entry, descent and landing of the Mars Pathfinder. Creedon cited the one billion hits on the mission's World Wide Web site as evidence of the public's interest in NASA's success.

Also in the space arena, Langley's Clouds and Earth's Radiant Energy System satellite instrument has been integrated on the Tropical Rainfall Measuring Mission observatory and would be launched in late November from Japan, culminating efforts on several fronts.

In addition, he noted that Langley's solid-state laser technology breakthrough is enabling global measurements of tropospheric winds and was a winner in NASA's New Millennium program competition.

Langley's airframe systems base program is studying the blended-wing-body advanced transport concept with a view toward producing an advanced configuration for the future. This is in line with NASA's goal to dramatically reduce the cost of travel. Further, achieving 8 percent improved lift, Langley's aircraft morphing technology developed a vortex-on-demand capability, without dependence on moveable parts such as flaps or hinges.

The center's Advanced Subsonic Technology program received some much-deserved recognition when Boeing's new Stitched Composites Development Center in Long Beach, Calif., was named for Langley researcher Marvin B. Dow. This facility revolutionizes the way aircraft wings are being built and is making the use of composites affordable.

Creedon also applauded the first deployment of NASA's 757 aircraft to the busy Atlanta airport. The mission demonstrated Langley's Low-Visibility Landing and Surface Operations (LVLASO) cockpit heads-up display as pivotal in reducing or eliminating runway incursions.

Creedon added a note of thanks to those who operate Langley's wind tunnels. He acknowledged the extra effort made to keep the 14- by 22-Foot Wind Tunnel operating seven days a week, 24 hours a day for the past year, while also maintaining operation of all Langley tunnels.

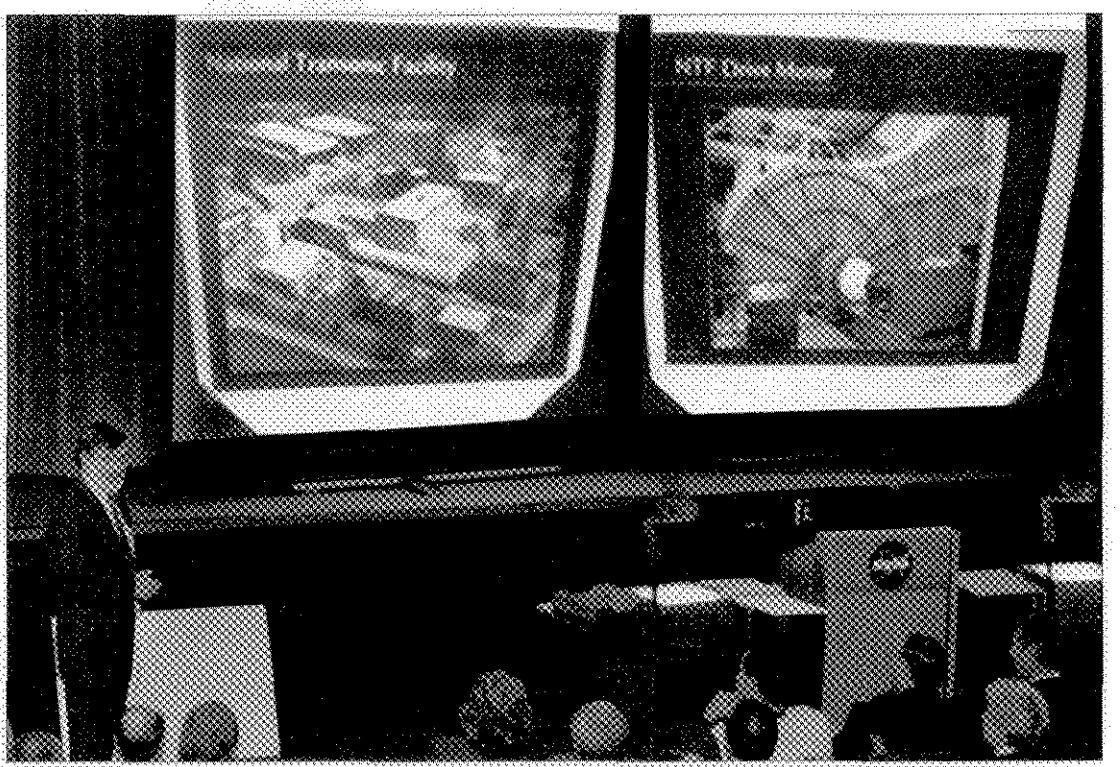
"This is just one more example of how the center stepped up to the challenge and met important customer demands," Creedon said.

Langley's Space Transportation effort was highlighted in two areas. The Hyper-X research vehicle will be tested in the 8-Foot High-Temperature Tunnel. Creedon also noted that the wind tunnel test model is the actual flight model that will be tested next year.

Secondly, aerodynamic performance of the X-33 was tested in eight Langley facilities, contributing to the closure of the outer mold lines and establishing boundary-layer transition criteria.

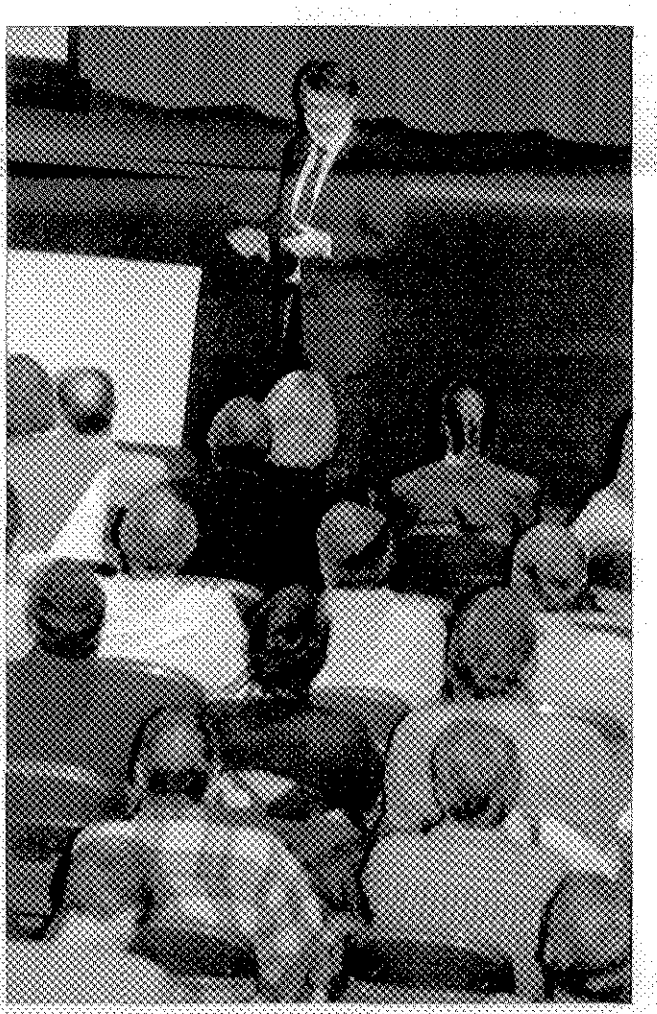
In the High-Speed Research program, materials and structural concepts were selected for subcomponent programs. Following an intense competition, Langley's PETI-5 was chosen as the composite matrix resin and adhesive. This material also received an R&D 100 award due to its exceptional combination of mechanical properties, thermal stability and processability.

Finally, Creedon praised the Technology Applications Group for their leadership in commercializing Langley-developed innovations. Langley negotiated nearly 60 percent of the licenses assigned by all of NASA. In addition, Langley received more than 70 percent of all NASA royalties in fiscal year 1997.



Photos by Jeff Caplan

Center Director Jeremiah F. Creedon discusses upgrades to Langley facilities at the annual State of the Center address to employees. Here he announces the installation of the world's largest horizontal synchronous motor in the National Transonic Facility.



Fine-tuning the organization

On the organizational side, Langley made great strides in efficiently delivering quality products and services. The center formed and staffed several new offices and improved internal processes. The director pointed to Langley's wind tunnel re-engineering effort as a prime example of the NASA administrator's "faster, better, cheaper" dictum. Not only has cost per polar been reduced and polar per user occupancy hour increased, but, in addition, customer satisfaction is up significantly.

Facility upgrades included the installation of the National Transonic Facility drive motor, replacement of the operating medium in the Transonic Dynamics Tunnel, and bringing the Combined Loads Test Facility on line as the premier structures testing facility in the country, perhaps in the world.

In addition to retiring the 737 research aircraft and outfitting the 757 as its successor, the motion base for the Cockpit Motion Facility is on line, ensuring Langley's cutting-edge research capability from simulation to flight.

Finally, Creedon highlighted the High-Incidence Radiation Facility as the high-intensity radiated fields lab for studying susceptibility of avionics to electromagnetic interference.

The director singled out the expertise and dedication of the Langley people as the center's most important resource in all its efforts, notably reaffirming the role of the technician workforce in Langley's accomplishments.

"Our strategy is to keep Langley's core competencies intact," said Creedon. "In the face of additional government downsizing or consolidation of federal labs, I believe our total package offering will continue to be considered vital to the country by our stakeholders."

(see STATE OF CENTER, page 4)

Retiring to the Sunshine State

The 30-foot dish antenna next to Building 1299 was disassembled Nov. 21 and transferred to the University of Central Florida, where it will support the satellite-oriented research activities of the Florida Space Institute (FSI) in Cape Canaveral. Workers labored for a full week to dismantle the dish and load it onto a tractor-trailer for the drive to Florida. The antenna, valued at $2.6 million, will be refurbished as the FSI develops a multi-user "groundstation" capable of supporting space research payloads.

NASA, General Services join forces to outsource desktop computing

NASA NEWS RELEASE

NASA and the General Services Administration (GSA) have agreed to work together to procure desktop computing and networking services in a way that should save taxpayers millions of dollars in the coming years.

NASA Administrator Daniel S. Goldin and GSA Administrator Dave Barram announced the formation of the partnership after extensive discussions and working group sessions within the agencies. Under the terms of the partnership, the agencies will work closely together to implement GSA's Seat Management Program and NASA's Outsourcing Desktop Initiative (ODIN). GSA and NASA acquisition teams will share information, resources and key personnel, and NASA will include provisions in its ODIN contracts that will give GSA exclusive authority to issue and administer government-wide orders against ODIN contracts.

ODIN will require vendors to deliver specific end-to-end desktop, server and local area communications services, which will be offered under ODIN through a single fixed price per seat, which includes computing, networking, maintenance, training and all associated costs. The ODIN service requirements are based on a comprehensive analysis across NASA of end-user and organizational needs and of commercial practices.

Under Seat Management, the government will acquire integrated services and the required components to include general purpose desktop computers, servers and associated peripherals; high-performance computational systems and associated peripherals; local area and wide area network capabilities; commercial software; help-desk services; maintenance; design and installation; and training. GSA's objectives are to acquire quality desktop computing services as a utility in an integrated fashion through a single source and to achieve cost savings based on the private sector's ability to obtain and manage assets.

GSA's Office of Information Technology Integration (ITI) will proceed with its government-wide Seat Management contracts, and NASA will continue to work toward award of its ODIN contracts.

GSA has issued its Request for Proposals (RFP) for Seat, and NASA expects to issue an RFP for ODIN in the next several weeks, with the contract award and selection for both planned for next spring.

STATE OF CENTER

(continued from page 3)

Looking to the future

In assessing Langley's prospects for the future, Creedon noted that the center will work within a budget that is flat or may decline and with a reduced civil service workforce and performance-based contracts. Thus, he emphasized the need for Langley to maintain this strategy:

▲ To continue to align with the NASA Strategic Plan

▲ To maintain our core competencies

▲ To concentrate on satisfying our stakeholders and our customers, and to continue to improve our organization

▲ To identify and vigorously seek and execute meaningful programs in our mission area

▲ To do what we say we will do

▲ To ensure that all our processes deliver quality products and services.

Adherence to this approach presents attractive prospects for Langley's current product lines – aeronautics, space transportation, atmospheric science, space technology and technology applications.

Creedon pointed to the center's enviable position in aeronautics as evidence of the success of this strategy. The selection of Langley to lead the Aviation Safety program is evidence of our stakeholders' confidence in the center.

Looking well beyond the immediate horizon, senior management teams are even now engaged in several futuristic studies. Teams are tasked to predict long-term federal enterprise support, assess future research topics, study Langley's position within the agency, analyze the center's management framework and future workforce strategies, as well as project future nonaerospace research.

What is needed now

In direct opposition to these long-term strategies, Creedon spoke about upcoming initiatives that are seeming to converge – outsourcing desktop computers, instituting a process-based management system, instituting new financial management processes and going to full-cost accounting. He called upon Doug Arbuckle, the newly appointed associate director, to align and lead the successful implementation of these initiatives.

At the same time, the director announced aggressive communication goals as one of the solutions to a number of internal challenges. Among these goals are the re-institution of town meetings under a new format, monthly two-hour "availability" sessions with the director and top management visits to center divisions.

To keep Langley healthy, Creedon enumerated several ways center employees can help ensure success. The need for *teamwork* led the list of desired attitudes and behaviors.

"Within the team context, *lead*," Creedon advised. "Devote energies to the *important* things, work *efficiently*, do what we do with *excellence*, *finish* what we start, have and project a *positive attitude*."

On a more personal note, Director Creedon asked three things from each employee – leadership, quality and flexibility. Every organization needs people at every level who see what needs to be done, are willing to do it and bring others along.

"Above all," Creedon emphasized, "commit to what the organization needs and do it well."

EAA Fly-In Convention '98 set

EAA Aviation Center, Oshkosh, Wis.

Plans are underway for one of the world's largest and most significant aviation events – the 46th annual Experimental Aircraft Association (EAA) Fly-In Convention scheduled July 29-Aug. 4, 1998, at Wittman Regional Airport in Oshkosh, Wis.

"EAA OSHKOSH has evolved into an event that covers all aspects of the world of flight," said Convention Chairman Tom Poberezny.

More than 500 educational forums, seminars and workshops will be offered throughout the week-long event. More than 700 exhibitors will have the latest aviation innovations on display. Many government agencies, including NASA, the Federal Aviation Administration and U.S. and Canadian Customs, will display aircraft and conduct forums covering all aspects of general and sport aviation.

A schedule of evening programs is being coordinated for the convention's "Theater in the Woods." Daily air shows showcase the talents of the world's top aerobatic performers. Showplanes, including antiques, classics, homebuilts, warbirds, ultralights and rotorcraft will be located along the 8,000-foot flightline.

In 1998, several noteworthy convention changes will be in place.

(see FLY-IN page 5)

CROUCH

(continued from page 1)

State University and is the author or editor of books and articles for popular magazines and scholarly journals, mostly regarding aspects of the history of flight technology.

His books include: *The Bishop's Boys: A Life of Wilbur and Orville Wright*; *Eagle Aloft: Two Centuries of the Balloon in America*; *Bleriot XI: The Story of a Classic Airplane*; *A Dream of Wings: Americans and the Airplane, 1875-1905*; *The National Aeronautics and Space Administration*; *Apollo: Ten Years Since Tranquillity Base*; *Charles Lindbergh: An American Life*; and *The Giant Leap: Ohio Aerospace Events and Personalities, 1815-1969*.

Crouch has won a number of major writing awards, including the history book prizes offered by both the American Institute of Aeronautics and Astronautics (AIAA) and the Aviation/Space Writers Association. He received a 1989 Christopher Award, a literary prize recognizing "significant artistic achievement in support of the highest values of the human spirit," for *The Bishop's Boys: A Life of Wilbur and Orville Wright*.

NASA Langley, along with the AIAA Hampton Roads Section, the Air Force Association, the National Defense Industrial Association and the Virginia Aerospace Business Round Table, sponsors the lecture.

The Sigma Series Lecture is sponsored by Langley's Colloquia Committee, the VASC and the Daily Press, Inc.

Following the Sigma talk, the VASC will present a special screening of the IMAX film *Magic of Flight*. Tickets will be available at regular IMAX prices. For more information, call 727-0900.

Life after Langley

NASA retiree takes avionics expertise on the road

BY NANCY FINN

After more than three decades as an aviation engineer and space researcher at NASA, Cary Spitzer just couldn't leave the world of aeronautics behind.

Since his retirement from Langley in 1994, he has spent a large part of his newfound "free time" devoted to consulting and lecturing as an expert in avionics, which he describes as "the application of electronics to aircraft."

This specialty deals mainly with the communication, navigation and surveillance systems of an aircraft. It includes pilot-controlled tower communications and navigation, as well as passenger comforts such as telephones and seat-contained televisions.

Spitzer uses his experiences from his NASA career in his lectures and consulting work all over the world. As part of his role as an avionics expert, he attends various conferences to discuss new technology in the field. He has spoken at meetings in Amsterdam, Rome, Montreal, Singapore and Moscow.

He has also written two books, both titled *Digital Avionics Systems* – one published by Prentice Hall in 1987, and one published by McGraw Hill Textbooks in 1993.

"Avionics will take on even more important roles in the future," said Spitzer. "[We should] expect to see pervasive use of satellite-based communication, navigation and surveillance capabilities."

Spitzer, 60, retired as manager of the Advanced Transportation Operating Systems (ATOPS) Program Plans and Contract office, after 31 years at NASA Langley.

He started as an engineer in the Wind Tunnel Instrument Division in 1962, studying instrument designs and uses. In 1969, he became involved in the Viking Project, studying the physical and magnetic properties of Mars, work which laid the foundation for the current Mars Pathfinder mission, he said.

He was also the deputy director of science analysis and mission planning for the flight team, as well as the deputy program manager for Langley operations. When the Viking office moved to the Jet Propulsion Laboratory in Pasadena, Calif., in 1978, Spitzer began working in aviation. He spent the next seven years laying the groundwork for avionics research in the Avionics Planning Directorate. Spitzer then transferred to the ATOPS program, which studied various aircraft systems.

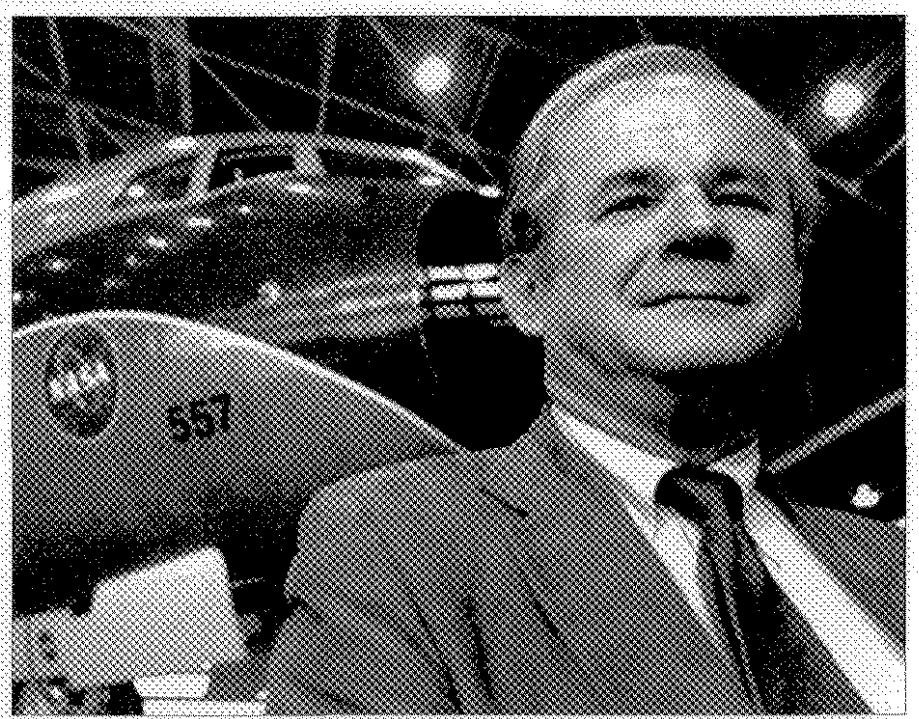


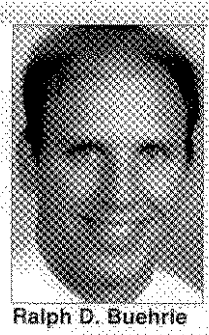
Photo by Jeff Caplan

NASA Langley retiree Cary Spitzer stands in front of NASA's 757 inside the hangar building.

Employees earn graduate degrees with center's study program

Twelve Langley staff members have earned advanced degrees through the center's Graduate Study Program.

The program, established in the 1940s, provides Langley engineers, scientists and administrators an opportunity to improve their proficiency in aeronautical and space research and earn advanced degrees while at Langley. Approximately 1,534 employees have earned masters or doctorate degrees through the program.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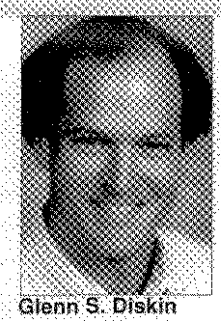
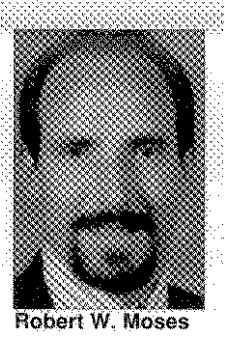

Glenn S. Diskin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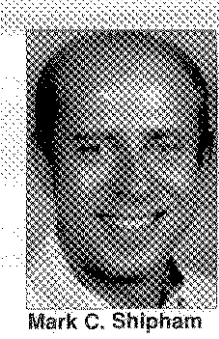
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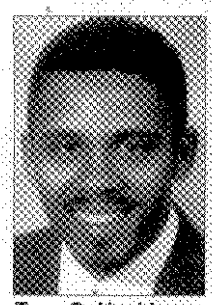
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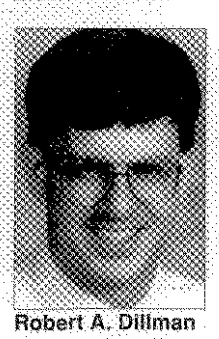
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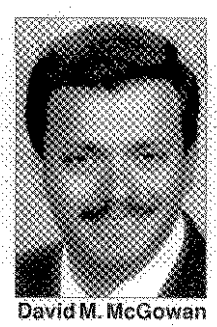
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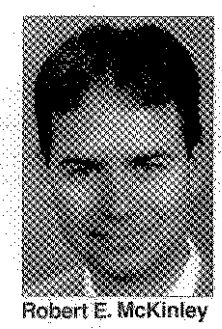
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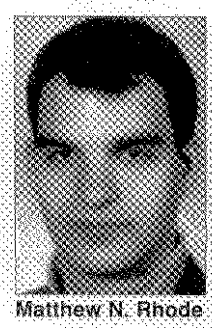
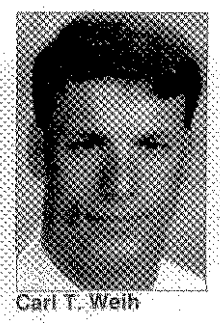

Matthew N. Rhode

Pamela J. Verniel

Timothy P. Warner


Carl T. Weih

Doctors of philosphy

Ralph D. Buehrle, Fluid Mechanics and Acoustics Division, earned a Ph.D. degree in mechanical engineering from the University of Cincinnati, and **Glenn S. Diskin**, Aero- and Gas-Dynamics Division, earned a Ph.D. degree in mechanical and aerospace engineering from Princeton University.

Robert W. Moses, Structures Division, earned a Ph.D. degree in aeronautics and astronautics from Stanford University, and **Mark C. Shipham**, Atmospheric Sciences Division, earned a Ph.D. degree in earth sciences from the University of New Hampshire.

Master's degree awardees

Troy O. Haskins, Programs and Resources Division, earned a Master of Business Administration degree from the College of William and Mary; **Robert A. Dillman**, Aerospace Mechanical Systems Division, earned a Master of Material Science degree from the University of Virginia; **David M. McGowan**, Structures Division, earned a Master of Science degree in engineering mechanics from Old Dominion University.

Robert E. McKinley Jr., Aeronautics Systems Analysis Division, earned a Master of Materials Science degree from the University of Virginia; **Matthew N. Rhode**, Aero- and Gas-Dynamics Division, earned a Master of Science degree in mechanical engineering from George Washington University; **Pamela J. Verniel**, Office of External Affairs, earned a Master of Science degree in human resources management from Troy State University.

Timothy P. Warner, Program Integration Office, earned a Master of Business Administration degree from Old Dominion University, and **Carl T. Weih**, Acquisition Division, earned a Master of Business Administration degree from the College of William and Mary.

The Employee Development Branch, Office of Human Resources, recognizes that the accomplishments of these individuals not only bring additional expertise to Langley, but also enhance the individuals' professional growth and career development.

For information on the center's Graduate Study Program, call George D. Allison, ext. 42594.

FLY-IN

(continued from page 4)

The popular Flymarket area has moved to an expanded location. A new Federal Plaza near the flight line will offer convention participants a better opportunity to meet officials from several American and Canadian government agencies to discuss aviation issues. Outdoor Aircraft Display areas will be expanded near the new Exhibit Hangars.

The Grand Champion aircraft awards, including the "Lindy" trophies, will take place the evening of Aug. 3.

"There is no other recognition coveted more by aircraft designers, builders and restorers than a 'Lindy' Grand Champion award from Oshkosh," Poberezny explained. "The award represents the highest standards in aircraft design, construction, restoration and maintenance."

In 1997, more than 840,000 people and 11,500 airplanes – including 2,648 showplanes – attended the event.

For more information regarding the event, write to the EAA Aviation Center, PO Box 3086, Oshkosh, Wis., 54903-3086, or call 920-426-4800. More information is also available through the event's World Wide Web site at ***http://www.fly-in.org***.

AdVentures

FOR RENT: 4-BR house in Hilton Village, on River Road. 3 baths, all amenities, $900/month. Call 599-0578 after 6 p.m.

FOR SALE: Renovated 2-BR, 1-bath rancher in historic Wythe; large living room, spacious kitchen, hardwood floors throughout, enclosed front patio, privacy fence, large detached garage/workshop, water view from front yard, one block from Chesapeake Bay in established neighborhood with lots of trees. $69,900. Call 247-5144.

FOR SALE: 3-BR rancher near Main St. in Newport News, 1-1/2 baths, wall-to-wall carpet, central air/heat, energy efficient, attached garage, eat-in kitchen, new roof, large fenced back yard, near elementary school, good location, on cul-de-sac, 20 minutes to NASA/Langley Air Force Base. $77,500. Call 838-0726.

BLENDED-WING-BODY: Dr. Robert H. Liebeck, of The Boeing Company, Long Beach, Calif., will deliver a Langley colloquium lecture, Dec. 9, 2 p.m., at the H.J.E. Reid Conference Center, on "The Evolution of the Blended-Wing-Body Subsonic Transport." The lecture is open to all NASA employees and contractors; civil service personnel should charge their time to IO B1010. For more information, visit the colloquium Web site at ***http://oldtown.larc.nasa.gov/Lectures/lectures.html.***

ALUMNI NEWS: The **next meeting** of the Langley Alumni Association is Dec. 9, 11:30 a.m., in the private dining room of the Langley cafeteria. Speaker Patrick Saylor, of Colonial Williamsburg, will discuss the historic area's plans for the holiday season. For more information, call ext. 47330. The annual **dinner/dance/meeting** is set for Jan. 17, 6:30 p.m., at the H.J.E. Reid Conference Center. Cost is $13.50 per person. To make a reservation, send a check by Jan. 10 to the NASA Langley Alumni Association, Mail Stop 184, Langley Research Center, Hampton, Va. 23681-0001. For more information, call ext. 47330.

DANCIN' THE NIGHT AWAY: The Langley Activities Association (LAA) will hold its **Holiday Dance**, Dec. 19, 4-9 p.m., immediately following the director's social, in the H.J.E. Reid Conference Center, featuring favorites in holiday music and dance tunes by Top Scale Music Entertainment. Plenty of holiday treats. LAA also presents a **Country-Western New Year's Eve**, Dec. 31, 7 p.m. until 1998, entertainment by Ramblin Country; tickets are $12.50 in advance from the LAA office. For more information, call ext. 46369.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31 to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

SAIC SEEKS INTERNS: Science Applications International Corporation (SAIC)-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in earth sciences, physics, engineering, mathematics, scientific computer programming. For applications or more information, contact Summer Intern Program, SAIC, 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

RACE RESULTS: In the fall segment of the semiannual NASA Intercenter Running Competition, 18 Langley employees and contractors took part in the 10-K race and 27 in the 2-mile race. Top Langley runners in the 10-K included: women – Valerie Plyler, 38:48; Dianne DeTurris, 56:35; men – John Hoppe, 41:11; David Witte, 43:21; Wayne Marshall, 43:30. In the 2-mile race, top runners included: women – Dianne DeTurris, 16:20; Bernice Becher, 25:12; Pat Parker, 26:59; men – David Witte, 12:08; Robert Mitcheltree, 12:11; John Hoppe, 12:12.

PAVING THE WAY: "Pavers," the interlocking bricks that create the main courtyard at the Virginia Air & Space Center, are available at the discounted holiday price of $50. Engravable brass plates are embedded on the face of each paver to convey whatever message you want thousands of visitors each year to see. Pavers make great gifts, memorials or commemorations of birthdays, weddings, anniversaries, graduations, retirements. The courtyard has a private section for NASA pavers. For more information, or to order by phone, call Sharon Gates at 727-0900, ext. 718.

TITANIC RISES AGAIN: The 90-minute IMAX film ***Titanica*** returns to the Virginia Air & Space Center for a limited time, now through Jan. 14, Thursdays-Sundays. Other IMAX films playing at the VASC include: ***Stormchasers*** and ***Cosmic Voyage***, through Jan. 14; and ***Magic of Flight***, through June 30. Admission for IMAX films is $5.50 for adults and $4.50 for NASA, military, seniors and children under 12; evening double-feature tickets are $8 for adults and $7.50 for NASA, military, seniors and children under 12. For reservations or more information, call 727-0900, ext. 746.

SCIENCE CAMPS: The Virginia Air & Space Center offers the following Holiday Science Camps throughout December for kids ages 7-12. All camps are held 10 a.m.-3 p.m. For more information, call 727-0900, ext. 780.

▲ ***Structures: Build It, Break It, Keep It*** – Dec. 6, $25
▲ ***Flying High: An Aviation Adventure*** – Dec. 13, $25
▲ ***Rockin' Robots*** – Dec. 20, $25
▲ ***Space World*** – Dec. 27, $25
▲ ***Mars Base 2000*** – Dec. 29-31, $60.

1998 NASA ACADEMY: Applications are due Jan. 30 for the 1998 NASA Academy Program. College juniors and seniors majoring in science, math, engineering, computer science or space-related subjects can apply to the Goddard Space Flight Center's Summer Academy. Send applications to the Virginia Space Grant Consortium's Web site at ***http://deimos.ucsd.edu/space grant/NASAspacegrant.html.*** For more information, call James Brice at 301-286-8733.

Dr. Tom Crouch, author of The Bishop's Boys: A Life of Wilbur and Orville Wright, *will deliver the 1997 Wright Brothers Memorial Lecture, Dec. 17, 1 p.m., at the H.J.E. Reid Conference Center. All employees, retirees, and contractors are invited to attend. Time may be charged to IO B1010.*

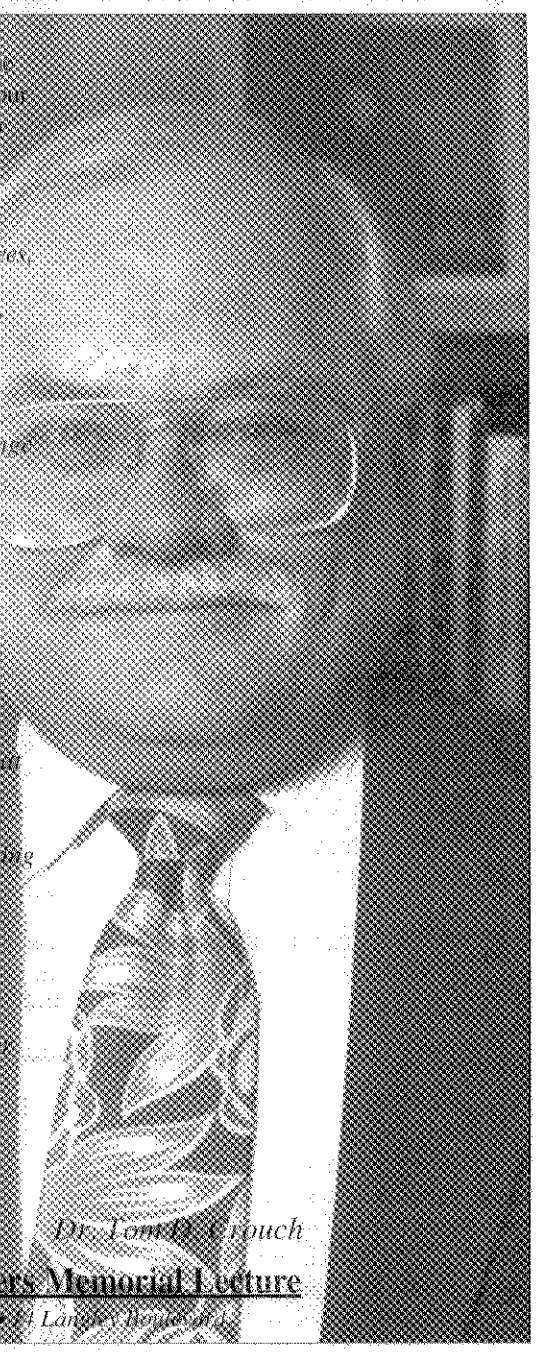
The book is available for purchase at the NASA Exchange Shop. Copies will also be available for purchase at the Reid Conference Center. A book-signing will follow the lecture.

Crouch will also present a Sigma Series Lecture the evening of Dec. 17 at the Virginia Air & Space Center at 7:30 p.m. Copies will also be available for purchase at the VASC Gift Shop. A book-signing will follow the lecture.

Wednesday, Dec. 17

1 p.m.
H.J.E. Reid Conference Center
Annual Wright Brothers Memorial Lecture

7:30 p.m.
Virginia Air & Space Center
Sigma Series Lecture



Dr. Tom Crouch

Annual Wright Brothers Memorial Lecture

H.J.E. Reid Conference Center • 44 Langley Boulevard

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Hampton, Virginia 23681-0001

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Langley Research Center

Researcher News

Biweekly Employee and Contractor Publication

Volume 11 ❖ Issue 25 ❖ December 19, 1997

Kansas universities team wins design competition

A team of students from four Kansas universities has won the "Design It, Build It, Fly It" award in the National General Aviation Design Competition, a first-of-its-kind competition sponsored by NASA, the Federal Aviation Administration (FAA), the U.S. Air Force and the Experimental Aircraft Association (EAA).

The team received a $10,000 award in a ceremony held at Wichita State University on Dec. 9. At project completion, the team will fly the award-winning design as a highlight of the EAA Annual Convention and Fly-In at Oshkosh, Wis., in August and will receive a $500 award from the EAA.

The universities are University of Kansas, Lawrence; Wichita State University, Wichita; Kansas State University, Manhattan; and Pittsburg State University, Pittsburg, Kan.

The competition seeks to involve students at U.S. engineering universities in a national effort to rebuild the U.S. general aviation sector through design efforts that meet general aviation revitalization goals. In the competition, student teams competed for an opportunity to take a well-evolved design concept with innovative general aviation applications to a proof-of-concept phase. Flight concept demonstrations included approaches such as radio-controlled models, prototype

(see DESIGN, page 3)

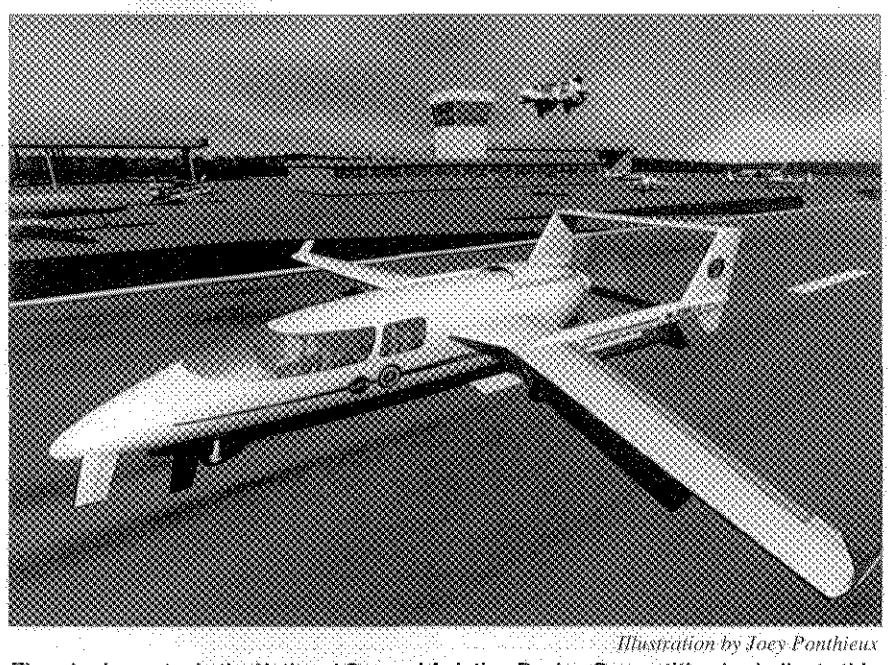


Illustration by Joey Ponthieux

The winning entry in the National General Aviation Design Competition is similar to this computer-generated graphic. The Kansas universities student design team incorporated technologies being investigated for single-engine personal aircraft of the future, including a forward-swept wing and a lightweight, affordable turbofan engine for cruise speeds greater than 250 mph.

Colloquium Communiqué

Reusable launch vehicles to take off into new millennium

Delma C. Freeman Jr., director of Langley's Aerospace Transportation Technology Office, will deliver the January Langley colloquium lecture, Jan. 13, 2 p.m., at the H.J.E. Reid Conference Center. The talk is entitled "Access to Space Beyond 2000."

He will present the talk again that evening as a Sigma Series Lecture, 7:30 p.m., at the Virginia Air & Space Center in Hampton.

Access to space began with the successful launch of the Sputnik 1 satellite, Oct. 4, 1957. Thus began a race to space that has spanned 40 years and has resulted in spectacular achievements in communication, human presence in space and its exploration, research in space and earth sciences and a multitude of spinoffs that have positively affected virtually everyone on earth.

NASA is facilitating an industry-developed, commercial reusable launch system, the Reusable Launch Vehicle (RLV) Program, which is an option to succeed the space shuttle and to provide significantly reduced cost to access space in the first decade of the new century.

Freeman will present an historic perspective on the analysis, discussions, and processes that led to the decision to proceed with the RLV Program. He will also discuss the political, technical and administrative activity required to implement the Phase 1 Advanced Launch Technology Program, the Phase 2 X-33 Program, and the Phase 3 RLV Commercial Development Program.

Freeman

Freeman began his career as an aerospace engineer in 1964 working in dynamic stability and control at the Langley Full-Scale Wind Tunnel. In 1970, he became involved in the development of the space shuttle, defining the aerodynamic stability and control of the orbiter, the launch, and the approach and landing configurations.

Since the completion of the shuttle development work, Freeman has been involved in the concept, definition, analysis and the optimization of advanced space transportation systems. He has recently completed a special assignment as a member of a five-person team that defined a Space Transportation Investment Strategy for NASA that will facilitate the transition from the space shuttle to a new replacement system.

In his current position as director of the ATTO, he is responsible for Langley's activities in space transportation and hypersonic technology.

Freeman has chaired the American Institute for Aeronautics and Astronautics (AIAA), Hampton Roads Section, has served on the AIAA Atmospheric Flight Mechanics and Space Transportation technical committee and is an AIAA Fellow in space and missile systems. He has chaired the International Astronautical Federation (IAF) Space Transportation Technical Committee, as well as IAF symposia.

Colloquium & Sigma Lectures

Colloquium Lecture:
"Access to Space Beyond 2000"
Delma C. Freeman Jr., Jan. 13, 2 p.m.
H.J.E. Reid Conference Center

Sigma Lecture:
"Access to Space Beyond 2000"
Delma C. Freeman Jr., Jan. 13, 7:30 p.m.
Virginia Air & Space Center
Downtown Hampton
Info: 727-0900

Center director sends 'season's greetings' to Langley employees

Hopefully a time of joy, the holidays also pose a good opportunity for reflection. As we look back over the past year, we can certainly be proud of our many accomplishments.

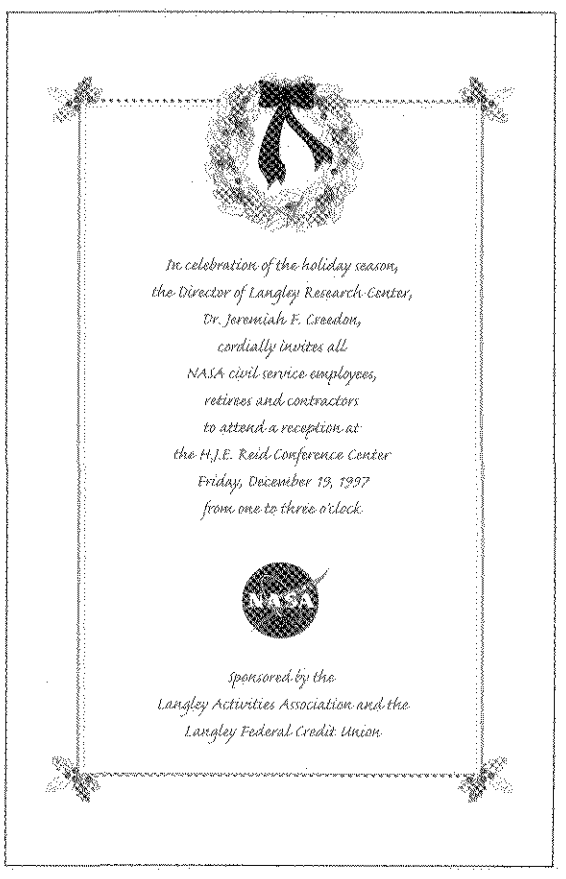
Langley is on a leadership track within the agency. We are offering the aerospace community five impressive product lines – aeronautics, space transportation technology, atmospheric science, space technology and nonaerospace applications. In addition, we are continually improving our internal structure and processes.

Furthermore, I believe we can look to the future with confidence. We have a lead role in aeronautics and are playing a key role in space transportation technology. We are leaders in NASA's atmospheric science and are developing innovative technologies for spacecraft and remote sensing instruments. We are the clear leader of NASA in technology commercialization.

We have been able to assume these leadership roles because of you. I want to thank you for your role in these accomplishments.

On behalf of the entire senior staff, let me extend to each of you and to your family a happy, healthy and safe holiday season. I wish you a new year that is joyful, challenging and fulfilling.

– Jeremiah F. Creedon
Director



In celebration of the holiday season,
the Director of Langley Research Center,
Dr. Jeremiah F. Creedon,
cordially invites all
NASA civil service employees,
retirees and contractors
to attend a reception at
the H.J.E. Reid Conference Center
Friday, December 19, 1997
from one to three o'clock

Sponsored by the
Langley Activities Association and the
Langley Federal Credit Union

News Briefs

Around the Agency

INTERSTELLAR TRAVEL POSSIBLE – (Lewis Research Center, Cleveland, Ohio) Discover NASA's perspective on today's prospects for science-fiction-style travel to distant solar systems via a new World Wide Web site called "Warp Drive, When?" at ***http://www.lerc.nasa.gov/WWW/PAO/warp.html.*** The site explains the challenges of interstellar travel, the prospects and limitations of existing propulsion ideas, and the prospects emerging from science that may one day provide the breakthroughs needed to enable practical interstellar voyages.

HAWAIIAN ASTRONAUT REMEMBERED – (Dryden Flight Research Center, Edwards, Calif.) NASA representatives presented a memorial plaque to dedicate the world altitude record for a propeller-driven aircraft to the memory of Col. Ellison S. Onizuka at a ceremony on Dec. 10, at the U.S. Navy's Pacific Missile Range Facility, Barking Sands, Kauai. The record symbolizes reaching for the heavens and striving for excellence. The plaque was presented to the Onizuka family and the Hawaiian community. Onizuka, Hawaii's first astronaut, was killed in the space shuttle Challenger accident in January 1986.

TAILLESS FIGHTER SUCCESSFUL – (Ames Research Center, Moffett Field, Calif., and Dryden Flight Research Center, Edwards, Calif.) The NASA/Boeing X-36 Tailless Fighter Agility Research Aircraft successfully completed its flight research program – demonstrating the feasibility of future tailless fighters achieving agility levels superior to today's best military fighter aircraft. The project goals are to develop and demonstrate enhanced technologies to improve the maneuverability and survivability of future fighter aircraft.

For more information on the above news items, check the Internet, NASA Public Affairs Home Page, News Room 1997 News Releases, at ***http://www.hq.nasa.gov/office/pao/NewsRoom/releases97.html.***

MULTICULTURAL LEADERSHIP TEAM
MCLT
NASA LANGLEY RESEARCH CENTER

Multicultural Facts

▲ Kwanzaa, which means "first fruits of the harvest" in the African language Kiswahili, is observed by more than 13 million people worldwide. A California professor started Kwanzaa in 1966 by encouraging blacks to celebrate their heritage, build strong families and create a sense of unity. On each consecutive day, one of the seven Kwanzaa principles (unity, self-determination, working together, sharing, purpose, creativity, faith) is practiced. Kwanzaa begins Dec. 26.

▲ See the MCLT home page at ***http://mishss20.larc.nasa.gov/MCLT/homepage_mclt.html.*** To suggest ways to make Langley a better multicultural workplace, send an e-mail to MCLT+IDEAS@LaRC.NASA.GOV.

NASA funding reviewed over past two years

BY LEE RICH
Congressional Affairs Officer

If current trends continue, a surplus in the annual federal budget is predicted to occur before the end of 1998. The table at right shows a comparison of NASA appropriations with those for other science and technology programs (percent of change) selected by the American Institute of Physics for fiscal years 1996 to 1998.

NASA Appropriations Compared with Other Programs

Agency/ Program	% Change FY 96-98	Agency/ Program	% Change FY 96-98
NIST Manufacturing Extension Partnerships	+35.7	NASA Human Space Flight	-4.1
NSF Research & Related Activities	+4.6	NASA Total	-6.7
NIST Total	+4.0	DOD Basic Research	-8.2
DOD Applied Research	+3.0	NASA Science, Aeronautics & Technology	-8.8
NIST Core Laboratories	+1.5	NIST Advanced Technology Program	-17.2
NSF Total	+1.2	DOE Basic Energy Sciences	-19.8
DOE Total	-1.8		

'Researcher News' announces publication schedule for 1998

Submission deadline	Issue date	Submission deadline	Issue date
Jan. 12	Jan. 23	July 13	July 24
Jan. 26	Feb. 6	July 27	Aug. 7
Feb. 9	Feb. 20	Aug. 10	Aug. 21
Feb. 23	March 6	Aug. 24	Sept. 4
March 9	March 20	Sept. 8	Sept. 18
March 23	April 3	Sept. 21	Oct. 2
April 6	April 17	Oct. 5	Oct. 16
April 20	May 1	Oct. 19	Oct. 30
May 4	May 15	Nov. 2	Nov. 13
May 18	May 29	Nov. 16	Nov. 27
June 1	June 12	Nov. 30	Dec. 11
June 15	June 26	Dec. 14	Dec. 24
June 29	July 10		

Pope noted for social contributions

Dr. Alan Pope, a senior research engineer in the Crew/Vehicle Integration Branch at NASA Langley, has received the 1998 award for Aerospace Contribution to Society.

Pope

The award, which recognizes notable contributions to society through the application of aerospace technology to societal needs, cites Pope for his "outstanding contributions in developing and applying aerospace biocybernetic technologies to transportation safety and to the medical and educational problems of Attention Deficit Disorder, Diabetes and stress-related disorders."

Since coming to Langley in 1980, Pope has been conducting crew systems engineering research. He also leads the Hazards and Error Management research program.

Pope has received two patents – one for a system designed to assist the treatment of Attention Deficit Disorder, the other for the assessment and treatment of stress-related disorders. He is a research assistant professor in the department of psychiatry and behavioral sciences at the Eastern Virginia Medical School and a senior lecturer at Christopher Newport University, and has mentored more than 20 undergraduate and graduate students.

A licensed clinical psychologist, Pope practices psychotherapy, behavioral medicine and stress management with the Behavioral Medicine Institute in Newport News.

Announcements

AIAA names fellows

The American Institute of Aeronautics and Astronautics (AIAA), Hampton Roads Section, has named Bobby L. Berrier, Configuration Aerodynamics Branch; Darrell R. Branscome, Space and Atmospheric Sciences Program Group; and Bruce J. Holmes, Advanced Subsonic Technology Program Office, as AIAA fellows.

Historically, fellows must demonstrate strong potential for leadership and must distinguish themselves in the field of aerospace. For every 1,000 voting members of the AIAA, one fellow is selected. The Hampton Roads Section now has 45 fellows.

Harper named Analyst of the Year

Sharon A. Harper, a procurement analyst with the Acquisition Division, Acquisition Operations Office, was selected as NASA's Procurement Analyst of the Year by Deidre Lee, associate administrator for procurement. Harper received a certificate of recognition Nov. 26.

The program rewards deserving civil service employees from NASA's procurement workforce for outstanding achievements in eight distinct categories of procurement activity. Harper has been with Langley's Acquisition Division since 1978 and serves as the focal point for procurement policy and regulatory matters and performs special assignments covering a wide range of procurement actions.

Speakers Bureau November activities

John Mouring addressed the Portsmouth Executives Club on "Archaeology to Aerospace: Management of Historic Cultural Resources at NASA."

Darrell Branscome presented an overview of NASA's space program to the students in the honors program at North Carolina State University.

Dr. Mary Ann H. Smith talked to 6th-graders at Hines Middle School about careers in atmospheric science.

Mary McCaskill presented two seminar sessions at the Ramada Inn Williamsburg on technical writing for high school teachers.

Bobby Braun addressed the Hampton Roads Software Process Improvement Group in Virginia Beach on software reliability as it relates to the Russian space shuttle Mir.

He also spoke to the Hampton Roads Chapter of the Society of Allied Weight Engineers on NASA's robotic planetary exploration program, highlighting the Mars Pathfinder mission.

Angela Mason spoke to the Hampton University Mathematics Club on "Mathematics: An Open Door to Engineering and Technology."

Dan Vicroy visited students at Fuqua Elementary School in Terre Haute, Ind., to talk about NASA's aeronautical research and how airplanes fly.

Turkey winners named

Winners of the drawing for a free turkey held after the November blood drive are J. B. Lovell, Keith Johnson, Bill Chambers, Staten R. Spruill, Melvin Ferebee, Stephen Hughes and Bob Gifford.

Correction

The photo of CERES instruments that appeared on page 1 of the Dec. 5 issue of the *Researcher News* was incorrectly credited to NASA. The photo was provided by TRW.

Researcher News

The *Researcher News* is an official publication of Langley Research Center, National Aeronautics and Space Administration, Hampton, Va., 23681-0001. It is published every other Friday in the interest of all Langley staff, contractors and retirees and has a circulation of approximately 8,100. It is distributed to all Langley civil service employees, contractors, retirees and on-site university personnel, with limited distrubution to NASA Headquarters, other NASA centers and, by special request, to other non-NASA individuals and organizations. Questions related to the content and distribution of the *Researcher News* should be addressed to Keith Henry, Mail Stop 115, (757) 864-6120. Submit contributions to the editor via e-mail (m.l.graves@larc.nasa.gov) (researcher-news @larc.nasa.gov), fax (757) 864-8810, telephone (757) 864-6126 or Mail Stop 146. Articles, photos and announcements are due at noon the Monday following the date of this issue.

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Science and Technology Corp.

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Science and Technology Corp.

The privilege of listing announcements in this publication is restricted to the employees, contractors and retirees of the Langley Research Center. Articles must be offered without regard to race, color, religion, sex or national origin. All materials are subject to editing.

Langley gathers rainwater samples for Virginia's acid rain program

BY BARBARA BODENSTEIN

For the past 15 years, NASA Langley has been involved with Virginia's Department of Environmental Quality (DEQ) Acid Precipitation Network. Of the seven sites statewide, Hampton is only one in southeastern Virginia.

Ingrid Carlberg and Warren Kelliher, both of the Process Systems Branch, have been collecting weekly samples of rainwater for DEQ lab analysis for pH levels, sulfates and nitrates. The Office of Environmental Engineering is also assisting with the collection effort.

The rainwater collection apparatus has a moisture sensor that opens the collection bucket during rainstorms but closes off the bucket during sunny weather to minimize evaporation.

Each week, workers weigh the collected rain in the bucket, analyze the rain gauge report, fill a sample bottle, calculate the rainfall in inches from the weight of the water in the bucket and reset the collection station for the next week.

DEQ is working with James Madison University to create a large database of pH results from the various collection sites over the years.

Improvements due to the implementation of the 1990 Clean Air Act Amendments may already be noticeable when the database is analyzed for trends. According to a recent study released by the U.S. Geological Survey, the National Atmospheric Deposition Program (NADP), which monitors three sites in the Blue Ridge Mountains for sulfate deposition and pH, has seen a 10 to 25 percent drop in wet deposition sulfate concentration and rainfall acidity.

The pH of Virginia's rainwater varies by season and by amount of rainfall; pH is lower during summers and during periods of drought. Rainwater in equilibrium, with normal amounts of carbon dioxide, has a pH in the 5.0 to 5.6 range. Rain is considered acidic when it has a pH of less than 4.0.

The pH of Virginia's rainwater usually varies between 4.1 and 4.4, with very few sites reporting levels below 4.0 over the years, and Hampton has never been one of them.

The Environmental Protection Agency's Chesapeake Bay Program (CBP) office is also interested in Hampton's rainwater data, as it is the only rainwater collection site in the southern part of the bay. The CBP has been focusing efforts on linking air and water models to study the impact of atmospheric pollution reductions on nitrogen loads to the bay. DEQ's pH and nitrate deposition data assists the CBP in this effort.

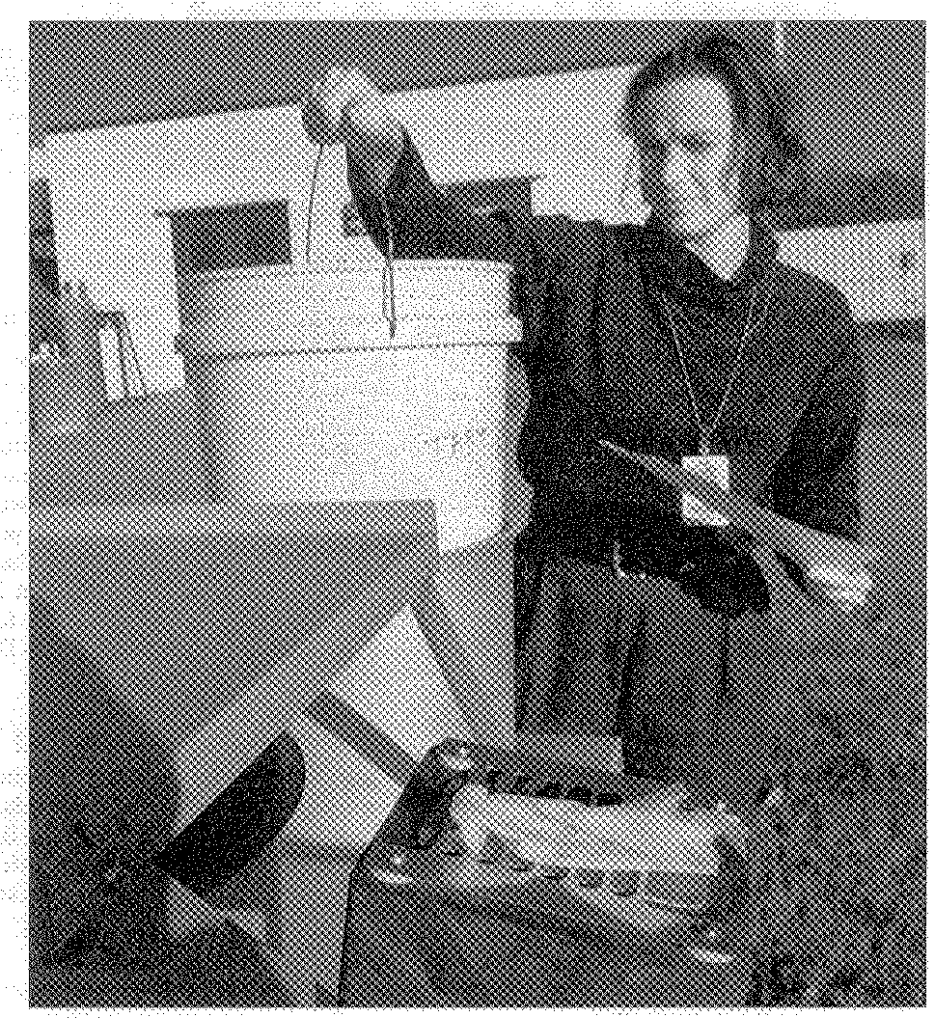

Photo by Jeff Caplan

Barbara Bodenstein, of the Environmental Office, retrieves the collection bucket for the weekly sampling exercise. NASA Langley voluntarily serves as Virginia's southeastern area rainwater collection site.

Science educators converge on Langley

BY JEANE SHANKS AND NANCY FINN

Langley's Atmospheric Sciences Division (ASD) hosted an educator workshop, Dec. 2, at the H.J.E. Reid Conference Center. Some 80 local and national educators, from kindergarten through high school, as well as from universities, museums and NASA Headquarters, attended the event.

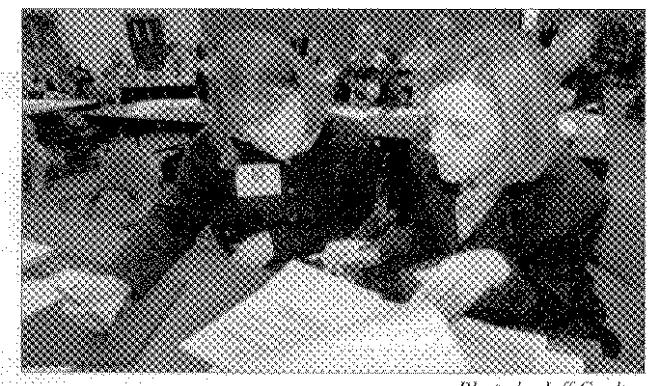

Photo by Jeff Caplan

Jennifer Hindman, left, of Dozier Middle School, and Kate Chesley of Crittenden Middle School follow the speaker during the Atmospheric Science Educator Workshop, Dec. 2, at the H.J.E. Reid Conference Center.

William Smith, deputy director, Space and Atmospheric Sciences Program Group (SASPG), and Dr. William Smith, chief, ASD, both spoke of the importance of earth science in the world today.

"While world leaders discuss the global changes at the global warming conference in Kyoto, Japan, this workshop emphasizes research in the field," said SASPG's Smith.

Joel Levine, assistant head of ASD's Theoretical Studies Branch, presented information on the Earth's system – the atmosphere, the oceans, the land and the biosphere.

Dr. Donald Johnson, director of Earth System Science Education program, University of Wisconsin, detailed a NASA-sponsored cooperative program, involving scientists, universities and government, to develop an undergraduate earth system and global change curriculum.

Other presentations included the Earth Radiation Budget Experiment, SAGE III program, clouds and climate, remote sensing, the Students' Cloud Observations On-Line project, EarthKAM and Global Learning and Observations To Benefit the Environment.

Other speakers from Langley included Dr. Bruce Barkstrom, Radiation Sciences Branch; Susan Walters and Dr. Bill Chu, Aerosol Research Branch; Dr. Geoff Considine, Theoretical Studies Branch; Ed Prior, Dr. Shelley Canright, Dr. Stanley Jones and Nick Koltun, Office of Education; Fran McLemore, Distributed Active Archive Center; Dr. Lin Chambers, Radiation Sciences Branch; and Jeff Seaton, Research and Technology Group.

"NASA's Mission To Planet Earth (MTPE), SASPG and ASD have given outreach and education programs the highest priority," said Dr. Arlene Levine, manager of the outreach and education program for ASD. "We plan similar workshops in the future that will focus on other aspects of MTPE."

DESIGN

(continued from page 1)

flight testing, in-flight simulation, or software in-flight demonstrations.

The Kansas Design Team's proposal is for two advanced radio-controlled (RC) models of a next-generation, turbofan-powered, general aviation aircraft. Most small airplanes flying today are equipped with technologies at least 30 years old, including piston-propeller engines that fly at speeds below 250 mph.

The aircraft design being modeled by the Kansas team is based on the new FJX-2 small turbofan engine being developed by Williams International, Walled Lake, Mich., and NASA Lewis Research Center, Cleveland, Ohio. This engine offers potential for a faster and quieter aircraft design capable of flying at higher altitudes than piston-powered aircraft.

Dubbed "Aladdin" by the team, the design includes a study of user-friendly (de-coupled) flight control systems predicted to offer a major improvement in ease of operation. The team hopes its work will encourage the general aviation industry to transition from piston to small turbofan engines.

The students, under the guidance of faculty advisors, plan to build two quarter-scale models of four-passenger, single-engine aircraft. The first model will be flown as a conventionally controlled, jet-powered RC model. The second will be used to gather data on the full-sized aircraft configuration.

The first model will contain instruments, including a Global Position System receiver, to provide real-time flight and position information. This data will be used to predict flying characteristics of the full-sized aircraft. The second model will be controlled via real-time imaging on a ground station that simulates the pilot's field of view. The image will be transmitted from a video camera in the model.

In addition to the $10,000 Design It, Build It, Fly It award, the team will also receive support from the Wichita State University National Institute for Aviation Research; Finley's Hobbies, Air Capitol Hobbies and Precision Pattern, all of Wichita; Foam Enterprises, Inc., Minneapolis; Shell Resins, Robart Manufacturing and The Turbine Connection, all of Plainfield, Ill.; and the Wichita State University Student Government Association. The students will produce a peer-reviewed technical report on the flight testing. The aviation safety review portion of the project will take place at EAA's Sun and Fun Fly-In in Lakeland, Fla., in April. The Kansas Design Team will also provide presentations and demonstrations at the EAA Annual Convention and Fly-In at Oshkosh, Wis., in August.

The National General Aviation Design Competition also provides a range of awards for student teams developing paper designs tied to national general aviation revitalization goals. Letters of intent to participate in this phase of the competition are due by Jan. 30. The competition is managed for the sponsors by the Virginia Space Grant Consortium.

For more information, contact mls@penngrad.pgtt.odu.edu or call 865-0726.

AdVentures

FOR SALE: Pet containment system, radio fence with 500-foot wire, for large dog. New, never used. $70. Call Dick at 865-1849.

FOR SALE: Beanie Babies, $10 and up. 1996 Holiday Barbie, $150 or best reasonable offer. Call 865-0586.

FOR SALE: Renovated 2-BR, 1-bath rancher in historic Wythe, large living room, spacious kitchen, hardwood floors throughout, enclosed front patio, privacy fence, large detached garage/workshop, water view from front yard, one block from Chesapeake Bay in established neighborhood with lots of trees. $69,900. Call 247-5144.

FOR SALE: 3-BR rancher near Main St. in Newport News, 1 1/2 baths, wall-to-wall carpet, central air/heat, energy efficient, attached garage, eat-in kitchen, new roof, large fenced back yard, near elementary school, good location, on cul-de-sac, 20 minutes to NASA/Langley Air Force Base. $77,500. Call 838-0726.

FOR RENT: 2-BR Hampton house, 1 bath, den with fireplace, large eat-in kitchen, utility room with washer/dryer hookup, detached garage with electricity, fenced in yard. $515/month. Call Vicki O'Neill at 728-0505 and leave a message.

VOLUNTEERS NEEDED: Peninsula READS needs volunteers to tutor adults in English conversation skills and American customs. Training for new volunteers begins Jan. 8. All tutoring is done in English; volunteers do not need to speak another language. For more information, call 838-5300.

ALUMNI NEWS: The NASA Langley Alumni Association's annual **dinner/dance/meeting** is set for Jan. 17, 6:30 p.m., at the H.J.E. Reid Conference Center. Cost is $13.50 per person. To make a reservation, send a check by Jan. 10 to the NASA Langley Alumni Association, Mail Stop 184, Langley Research Center, Hampton, Va. 23681-0001. For more information, call ext. 47330.

DANCIN' THE NIGHT AWAY: The Langley Activities Association (LAA) will hold its **Holiday Dance**, Dec. 19, 4-9 p.m., immediately following the director's social, in the H.J.E. Reid Conference Center, featuring favorites in holiday music and dance tunes by Top Scale Music Entertainment. Plenty of holiday treats. LAA also presents a **Country-Western New Year's Eve**, Dec. 31, 7 p.m. until 1998, entertainment by Ramblin Country; tickets are $12.50 in advance from the LAA office. For more information, call ext. 46369.

SAY 'SO LONG' TO ROY: A retirement social, dinner and program for Roy V. Harris Jr., assistant director for research and engineering, is scheduled for Jan. 9, 6 p.m., in the H.J.E. Reid Conference Center. Dinner cost is $15.50 per person or $30 per couple; checks payable to Dina Weiss at Mail Stop 215. Contributions for a gift should also be sent to Dina. Responses due by Jan. 2.

NASA SKI WEEK VII: The seventh annual agency-wide ski trip is scheduled for the week of Jan. 24-31 to British Columbia. For more information, call Michael Sorokach at ext. 47143 or at 868-0054.

SAIC SEEKS INTERNS: Science Applications International Corporation (SAIC)-Hampton is seeking highly qualified and strongly motivated upper-level undergraduate and graduate students to participate in our Summer Intern Program, May 26-Sept. 4, 1998, in affiliation with an ongoing contract at NASA Langley. Candidates may have experience or a degree, or may be seeking a degree, in earth sciences, physics, engineering, mathematics, scientific computer programming. For applications or more information, contact Summer Intern Program, SAIC, 825-0001, fax 825-4968, e-mail saic+intern@larc.nasa.gov. SAIC is an Equal Opportunity Employer.

PAVING THE WAY: "Pavers," the interlocking bricks that create the main courtyard at the Virginia Air & Space Center, are available at the discounted holiday price of $50. Engravable brass plates are embedded on the face of each paver to convey whatever message you want thousands of visitors each year to see. Pavers make great gifts, memorials or commemorations of birthdays, weddings, anniversaries, graduations, retirements. The courtyard has a private section for NASA pavers. For more information, or to order by phone, call Sharon Gates at 727-0900, ext. 718.

TITANIC RISES AGAIN: The 90-minute IMAX film ***Titanica*** returns to the Virginia Air & Space Center for a limited time, now through Jan. 14, Thursdays-Sundays. Other IMAX films playing at the VASC include: ***Stormchasers*** and ***Cosmic Voyage***, through Jan. 14; and ***Magic of Flight***, through June 30. Admission for IMAX films is $5.50 for adults and $4.50 for NASA, military, seniors and children under 12; evening double-feature tickets are $8 for adults and $7.50 for NASA, military, seniors and children under 12. For reservations or more information, call 727-0900, ext. 746.

THE NUTCRACKER: Chamber Ballet of Williamsburg will present *The Nutcracker* at Phi Beta Kappa Memorial Hall, the College of William and Mary, Dec. 20, 2:30 and 8 p.m., and Dec. 21, 2:30 and 7:30 p.m. Come meet Klara and other cast members in the Land of Sweets, Dec. 20, 12:30-2 p.m. To reserve tickets, call 229-1717. For more information on Chamber Ballet, visit the Web site at ***http://hampton.worldreach.net/jantol/chamber.htm***

UMPS NEEDED: The District 7 Umpires Association is accepting applications for little league volunteer umpires in Hampton, Newport News, Poquoson and York County. Requirements include good character, good judgment and the ability to get along with youngsters. For more information, call 595-8400.

Center Snapshots

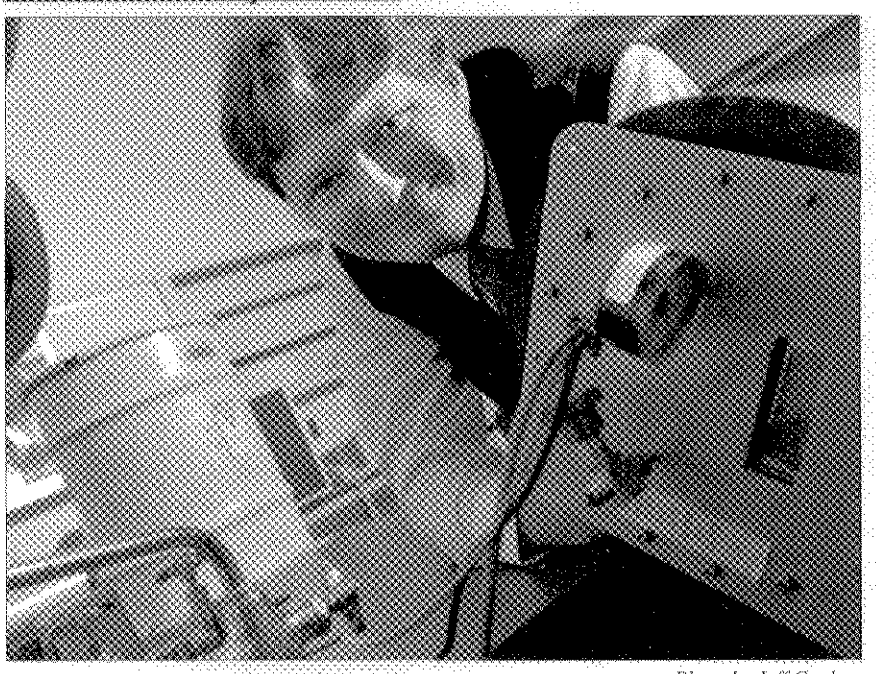

Photo by Jeff Caplan

Dr. Robert C. Singleterry Jr. received bachelor's, master's and Ph.D. degrees in nuclear engineering from the University of Arizona. Born in Fayetteville, N.C., Singleterry joined NASA Langley in August of this year. He has worked for Georgia Power in Baxley, Ga., E.I. International and Argonne National Laboratory West in Idaho Falls, Idaho.

Singleterry is one of four people working on the Aircraft Shield Materials Flight Experiment, sponsored by the Director's Discretionary Fund. Researchers study the response of various materials to radiation during high-altitude flights. Using materials such as carbon fiber composites and titanium, pre-flight testing using neutrons will help determine the effects of radiation on the flight crew and passengers. Piggyback testing on NASA's ER-2 aircraft is scheduled to begin in 1998. The results will be applied to the High-Speed Research program.

* * * *

"NASA Langley gives me the opportunity and the ability to do cutting-edge research in an exciting area of relevant technology."

– Robert Singleterry

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