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Langley Research Center

NASA

Langley Researcher

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Johnson Named Lead NASA Center for Space Station

The Johnson Space Center has been named "lead center" for the space agency's new Space Station Program, NASA Administrator James M. Beggs announced last week.

In a letter to center director Gerald D. Griffin, Beggs said he was requesting the center to form a program office to execute five basic program responsibilities: Systems Engineering and Integration, Business Management, Operations Integration, Customer Integration, and Support of NASA Headquarters Space Station Program Office.

Beggs also requested other NASA center directors to assist in development of a detailed functional plan for the new management and directed Headquarters and other centers to recommend key personnel from their offices and centers to aid in the detail planning and staffing of the program.

Beggs noted that he plans to form a new organization at NASA Headquarters in Washington to direct the Space Station Program. He also said he will make assignments to other centers under overall project management of Johnson.

Shuttle Orbiter Makes First Landing at KSC

With its sonic shock waves booming across the Florida peninsula, Challenger made a perfect and first-ever landing at the Kennedy Space Center February 11, completing a busy mission that lastest just under eight days.

Mission specialists Bruce McCandless and Robert Stewart proved the safety and efficiency of the manned maneuvering unit during their spectacular space walks, and the landing at Kennedy provided an awesome ending to the tenth Shuttle mission.

The failure of two communications satellites–Westar VI and Palapa B2–was the major disappointment of the mission, but the deployment by Challenger's crew went exactly as planned.

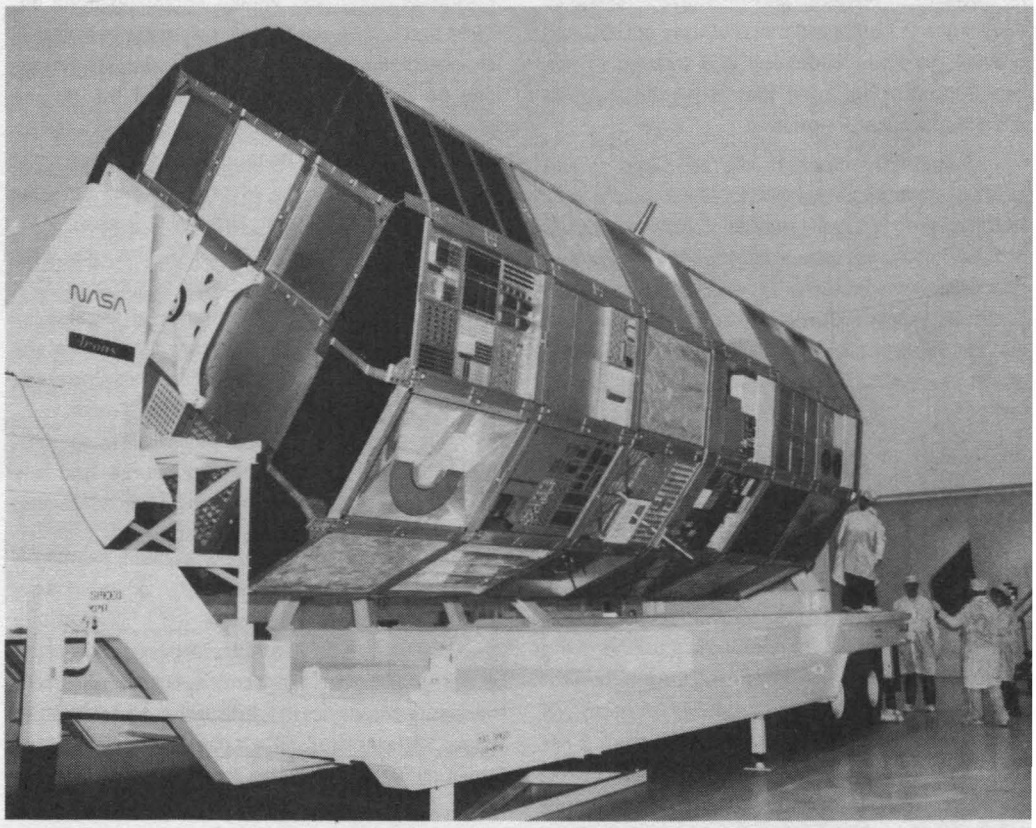
"This crew had a little bit of bad luck to begin with," said NASA Administrator James Beggs just after Challenger landed, "but they brought a marvelous finish to what turned out to be a good mission."

Challenger first became visible to watchers as it crossed Merritt Island at about 50,000 feet. Turning from east to north, the craft caught the sunlight and glowed like an odd-shaped coin. Seconds later, two cannon-like booms reverberated through the air, and Challenger disappeared in the haze as it completed its turn and continued to lose altitude.

When it reappeared from the north, it looked like the top half of a black cross, with only its nose, wing leading edge and tail visible. It grew larger by the second and pilots Vance Brand and Robert Gibson set Challenger's main landing gear down about 2,000 feet from the concrete runway's end, eased the nose wheel down about 13 seconds later and completed a 10,700-foot rollout with about 2,300 feet of runway to spare.

Landing the Shuttle at Kennedy was not only a spectacular sight, it will save more than a week of valuable time in preparing the craft for its next launch, scheduled for April 4. The turnaround time from landing to launch totals 53 days, the shortest time yet between Shuttle flights.

Continued on page 2.



-photo courtesy of KSC

The Long-Duration Exposure Facility (LDEF) will be placed in Earth orbit by the Shuttle Orbiter Challenger in early April. Now being prepared for launch at the Kennedy Space Center, LDEF and its more than 50 passive experiments will remain in orbit for up to one year, then be retrieved by a Shuttle Orbiter and returned to Earth. LDEF is managed by the Langley Research Center, and its experimenters represent more than 30 U.S. organizations and eight foreign countries.

EEO AWARD. The voting members of the Langley Equal Opportunity Steering Committee were the recipients of Langley's Equal Opportunity Award for the fourth quarter of fiscal year 1983. The award was presented by Langley Director Donald P. Hearth on January 16, "in recognition of Langley-wide affirmative action/equal opportunity positive results which have significantly aided the advancement of minorities, women and handicapped individuals through management initiatives." Receiving honorary plaques were (from left) John F. Stokes, Director for Management Operations; Howard T. Wright, Director for Projects; Robert L. Swain, Director for Systems Engineering and Operations; Richard H. Petersen, Deputy Director and Chairman of the committee; Hearth; Charles P. Blankenship, Director for Structures; William D. Mace, Director for Electronics; Joseph B. Talbot,Technical Assistant to the Director for Space, accepting for Paul F. Holloway, Director for Space; and Robert E. Bower, Director for Aeronautics.

ICAM Established at Old Dominion

An Institute for Computational and Applied Mechanics (ICAM) has been established at the Old Dominion University (ODU). The main goal of ICAM is to develop and maintain a center of excellence in computational methods at ODU and provide graduate education and training in this very important discipline that is of great national and international interest.

Immediate attention will be given to the area of Computational Fluid Dynamics (CFD), but the long range goal of ICAM will be to provide intensive education, training, research and consulting services in other areas as well. The interdisciplinary programs of ICAM will involve various departments in the School of Engineering and School of Sciences and Health Professions.

One of the main objectives of ICAM, however, is to provide training of the graduate students at the master and Ph.D. levels with emphasis in CFD. The educational program will proceed along the existing guidelines for each participating department, however, each department will now offer its respective degree as well as a minor in CFD. Graduate students in the Applied Mathematics Program and the Mechanical Engineering and Mechanics (MEM) Program will complete a minimum of four courses from a list of eight courses, that have been approved by the ICAM faculty, in order to meet the requirements for a minor in CFD.

During the summer, ICAM will offer a seminar course in "Computational Aerodynamics" at Langley. The course will be offered over a period of about ten weeks beginning June 11, 1984 and will be open to all interested individuals. By completing the course three graduate credits can be earned and applied toward the degree program in MEM or Applied Mathematics at ODU.

The course will be taught in a seminar format by several individuals which presently includes the following speakers: Drs. W.D. Laken, P.W. Smith, and S.N. Tiwari of ODU, Drs. Douglas L. Dwoyer and Robert E. Smith of Langley, Drs. C.W. Mastin and J.F. Thompson of Mississippi State University, Dr. A.J. Baker of the University of Tenn., Dr. T.J.R. Hughes of Stanford University and J.T. Oden of the University of Texas.

Dr. Smith, ext. 3978, and Dr. Tiwari, 440-3720, will be coordinating the course and any specific information can be obtained by contacting either one at the numbers indicated.

Safety Tip

Hot liquid scalds are the largest single cause of burns. Scalds can be prevented by turning the temperature to the hot water tank down to below 130 degrees. If a scald does occur treat the burn with cold water to drain away residual heat. If the skin is blistered or charred, seek emergency medical attention.

First Landing

Continued from page 1.

The 11th mission will take Langley's Long-Duration Exposure Facility into Earth orbit, and manned maneuvering units will be used to retrieve the Solar Maximum Mission satellite for repair attempts inside Challenger's cargo bay.

Both of those activities require the aid of the Orbiter's remote manipulator arm. Troubleshooting began last week on the arm problems that occured during mission 10's second spacewalk; engineers think they have isolated failure indications on two vernier thrusters to a bad load controller assembly.

Other preparations of Challenger for its next flight include replacing its left-hand Orbital Maneuvering System pod with a similar pod from Discovery, the third Orbiter, which is scheduled to fly for the first time on the twelfth Shuttle mission in June.

MATHCOUNTS Competition Set for Tomorrow

The Langley Research Center will host the regional competition of the first annual National MATHCOUNTS Program tomorrow in the Langley Activities Center.

The Peninsula Chapter of the Virginia Society of Professional Engineers will administer the competition beginning at 8 a.m.

The MATHCOUNTS Program, designed to improve mathematics achievement levels among seventh and eighth grade students, is sponsored by the National Society of Professional Engineers, the National Council of Teachers of Mathematics, the CNA Insurance Companies, the National Science Foundation and NASA.

The program involves a series of competitions beginning at the regional level in February, during National Engineers Week, and proceeding to the state level at Langley in April and the national level in Washington, D.C. in May.

The regional competition will involve teams from 12 area middle and junior high schools–three from York County, three from Hampton and six from Newport News.

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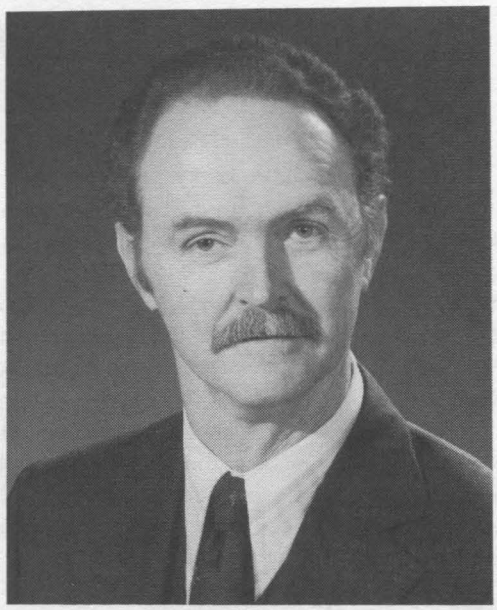
Staff Photographer ..... Bob Nye

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

Aeronautics Directorate

Jackson Named HSAD Assistant Chief



Charlie M. Jackson Jr. has been designated Assistant Chief for Special Programs, High-Speed Aerodynamics Division, at Langley. In this position, he is primarily responsible for managing special military-related research programs and coordinating these activities with the Department of Defense and the aerospace industry. In addition he provides assistance to the division chief in other areas of research, management and administration.

In October 1955, Jackson began his career with NASA's predecessor agency, the National Advisory Committee for Aeronautics, as an engineering co-op in the Fabrication Division. Since then, he has specialized in aerodynamic performance, stability and control, fluid and flight mechanics, as well as propulsion integration. He has also been head of the Propulsion Aerodynamics Branch and the Supersonic Aerodynamics Branch.

He graduated with honors from the Virginia Polytechnic Institute in 1959 where he earned a bachelor of science degree in aeronautical engineering. The author or co-author of 36 technical publications, Jackson has two patents, is a registered professional engineer of Virginia and is an Associate Fellow of the American Institute of Aeronautics and Astronautics.

He and his wife, Mary, live in Yorktown, Va. and have two children.

NASA Tests Inflight Refueling for Shuttle Ferry Flights

NASA is conducting flight tests to determine the feasibility of inflight refueling for Space Shuttle ferry flights using the 747 Shuttle Carrier Aircraft. The initial series of flights tests are being conducted from the Ames Dryden Flight Research Facility.

The 747 Shuttle Carrier Aircraft is used to transport Space Shuttle orbiters from remote landing sites back to the launch site at the Kennedy Space Center. Should the landing occur at an overseas location, inflight refueling capability could increase the range of the SCA/orbiter without off-loading equipment or payloads.

Nine flights are scheduled for the refueling tests. The first three test flights are to be made with the 747 Shuttle Carrier Aircraft without the orbiter, using a KC-135 tanker for two flights and a KC-10 tanker for one flight. An additional six flights will be made carrying the orbiter Enterprise and using the two types of tankers. Each flight will be approximately two and one-half hours long at speeds and altitudes expected to be used during actual ferry missions.

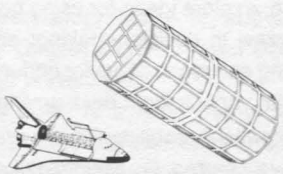
Both the Enterprise and its 747 carrier are specially instrumented to evaluate structural effects encountered during the tests. Enterprise is equipped with 31 pressure sensors and nine accelerometers. Two jet exhaust sensors are located in the orbiter's payload bay to monitor any possible payload bay contamination from tanker engine exhaust. Other minor modifications to the SCA include marking the positions of the refueling receptacle on the nose of the aircraft and tufting the nose, top and sides of the forward fuselage.

Enterprise will also carry Thermal Protection System tile samples, as well as Flexible and Advanced Flexible Reusable Surface Insulation (special silica fabric insulations) specimens for evaluation. To simulate the weight of an operational orbiter, ballast will be placed onboard the Enterprise to increase its weight to a representative ferry weight of 182,000 pounds.

In addition to investigating the structural effects of inflight refueling on the orbiter and Shuttle Carrier Aircraft, the handling qualities and performance of the 747/orbiter and tanker aircraft will be evaluated, along with tanker and boom handling qualities. The tanker aircraft will be flown in light, medium and heavyweight conditions and at various center of gravity configurations.

Flying the 747 Shuttle Carrier Aircraft for the inflight refueling tests will be Ames Dryden pilots Fitzhugh L. Fulton Jr. and Thomas C. McMurtry, astronaut C. Gordon Fullerton, and Johnson pilot A.J. Roy.

LDEF Status



The LDEF structure and all experiments are once more buttoned up inside Spacecraft Assembly and Encapsulation Building No. 2 at KSC.

Next week, on March 1, LDEF will be transported to the Operations and Checkout Building, where it will be integrated into the Shuttle payload canister. That activity–scheduled to be completed March 5–is the final verification that LDEF will physically fit into the Orbiter's payload bay.

McConnell Appointed to Headquarters Post

Nadia K. McConnell has been appointed Deputy Assistant Administrator for Legislative Affairs at NASA Headquarters. She filled the position vacated by Patrick Templeton who became Associate Administrator for External Relations.

McConnell came to NASA from the Federal Emergency Management Agency, where she served as Director, Congressional Affairs since October 1981. Prior to that she was Director of Government Relations for the Arizona Multihousing Association; and Vice President of Program Development Corporation, a political consulting firm specializing in campaign management, government relations and correspondence/marketing systems. Other government service includes work at the Department of Transportation in 1972-73.

Most people never forget a favor–especially if they did it.

Electronic Advances Used for 'Desk Top' Cockpit Simulator

-by Keith Henry

A futuristic aircraft cockpit simulator–which looks more like a set from a space movie than a research tool – is being incorporated into flight simulation facilities at the Langley Research Center; the Ames Research Center, Mountain View, Calif., and Lockheed-Georgia, Marietta, Ga.

When linked with advanced air traffic control system computer models, these simulators will provide full mission capabilities for researching issues that will affect transport aircraft flight stations and crews by the mid 1990's.

The unique desk top simulator design uses the latest improvements in electronics to help the pilot and crew become effective managers of increasingly complex aircraft flight systems. The design represents a three-year effort involving mission analysis, technology forecasts, preliminary design and pilot evaluation in 'soft' mockup.

Until recently, explains Samuel A. Morello of the Flight Control Systems Division, aircraft flight station designs have evolved through the incorporation of improved or modernized controls and displays for individual systems. New displays and controls have simply replaced outmoded units.

"Coupled with a continuing increase in the amount of information displayed," Morello says, "this process has, in many instances, not only produced a complex and cluttered conglomeration of knobs, switches, indicators and electromechanical displays, but has frequently contributed to a high crew workload, missed signals and misinterpreted information.

"Now, however, advances in electronic technology offer new concepts in flight station design which provide for safer and more efficient system operations by reducing clutter and through an orderly flow of information controlled by the flight crew."

The simulator's row of five cathode ray tubes, aligned left-to- right at the rear of a nearly flat control surface, are programmable so that flight information may be displayed in a logical, easy-to-see format. Traditional columns and wheels have been replaced by less bulky side stick controllers, which makes room for the desk top design and increases the pilot and copilot' field of view.

All three simulator facilities are expected t begin operations early next year. Capabilities w grow through succeeding years as researcher gain experience with the system and introduce ne elements to their respective research program

The Ames simulator will support an extensiv human factors research program, taking detaile looks at the human side of the people-machin relationship. For example, researchers woul like to know if, after long hours in what i essentially a video cockpit, the pilot or copilo will experience more or less fatigue compare with a conventional cockpit.

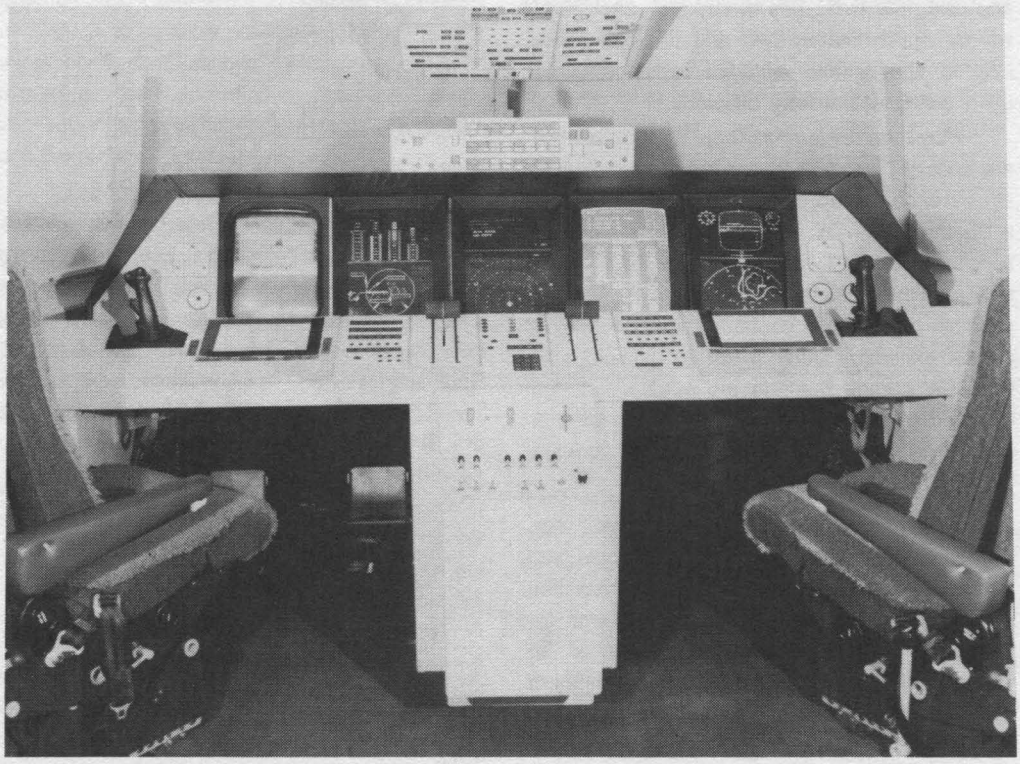
The Langley simulator, which will study the total system, may change somewhat before a final work station design is selected. Differen types of controllers, keyboards and flying task will be examined.

The idea of totally redesigning the transpor work station is largely an outgrowth of anothe Langley research project that introduced elec tronic cathode ray tubes to the cockpit of a specially instrumented Boeing 737. The fligh work has already proven that computer-driver electronic controls and displays can save tim and fuel, especially during approach to termina areas.

Langley's major research objectives for its simulator are to examine needs for transfer o information to and from the flight crew; study th use of advanced controls and displays for all weather flying; explore ideas for using computer to help the crew in decision-making; and stud visual scanning and reach behavior under differen conditions with various flight deck arrangements

"The potential capabilities of the system ar exciting," says George G. Steinmetz, researc project manager for Langley's advanced concept simulator. "Take all-weather flying, for example The pilot of the future may be enroute, with a nice preprogrammed route already stored in th computer, when a thunderstorm drifts across th flight path. We want it to be very convenient fo the pilot to change the course of the airplane skirt the thunderstorm and get back on schedule

"As we envision it, one possibility is to have the pilot look at his map display (on one of th video screens), reach over and touch it in th right places and say, 'I want a new way poin there, there and there,' and have the compute



Looking more like set for a space movie than an aircraft research facility, this advanced concepts simulator reflects the latest NASA thinking in efficient airplane cockpit displays and controls. Its row of cathode ray tubes was designed to display flight information in a logical, easy-to-see format. The simulator design takes advantage of advances in electronic and computer technology. The design is being incorporated into flight simulation facilities by Langley, the Ames Research Center and the Lockheed-Georgia Company, Marietta, Ga. The facilities will eventually provide full mission capabilities for looking at issues that will affect transport aircraft flight stations and crews by the mid-1990s.

do most of the work. The computer would take care of finding the new course and computing the new bearings. It would even increase the speed of the airplane just the right amount to compensate for travelling the extra distance, so the pilot could stay on schedule."

In Steinmetz's example, the pilot used two new tools that will be studied in the Langley simulator: touch panels and voice recognition systems. Touch panels can be made a part of a video display, extending a pilot's control through vision. Voice systems may be used to extend a pilot's control through speech at times when hands are busy with other tasks. Experience in the simulator is needed to determine which method, or combination of methods, is better for certain tasks.

Experience is also needed to determine how to reduce the workload, yet keep the pilot involved and alert to avoid complacency.

Billy R. Ashworth, of ACD, is project manager for programming and construction of Langley's advanced concepts simulator.

Retiree Death

Eugene Hoge, who retired from the Technical Information and Utilization Division in June 1970, died February 3. He was 65.

Kinard Presents LDEF Program

The Langley Visitor Center will sponsor a presentation on the Long-Duration Exposure Facility Wednesday, March 21, at 8 p.m. William Kinard of Langley's LDEF Project Office will give the public presentation.

The LDEF is a large free-flying reusable satellite. The first flight will carry 57 small passive or self-contained active experiments that require prolonged exposure to space. For example, one experiment will compare the growth rate of tomato seeds exposed to the space environment with another control group of tomato seeds retained on earth. School and young students from around the country will assist NASA with this experiment. The LDEF experiments range in research interest from materials to medicine to astrophysics.

LDEF, to be launched on the next Space Shuttle mission in April, was built at Langley. It is a 12-sided structure approximately 14 feet in diameter and 30 feet long. LDEF will fit in half of the Shuttle's payload bay.

Orbiter Columbia Undergoes Modifications

The Space Shuttle Orbiter Columbia has been returned to the final assembly facility at Palmdale, Calif., for modifications prior to its next flight.

The original flight vehicle in the Space Shuttle program, Columbia has flown six times and will require mission peculiar modifications and some equipment replacements in order to support its next assigned mission, flight 41-G, scheduled in August.

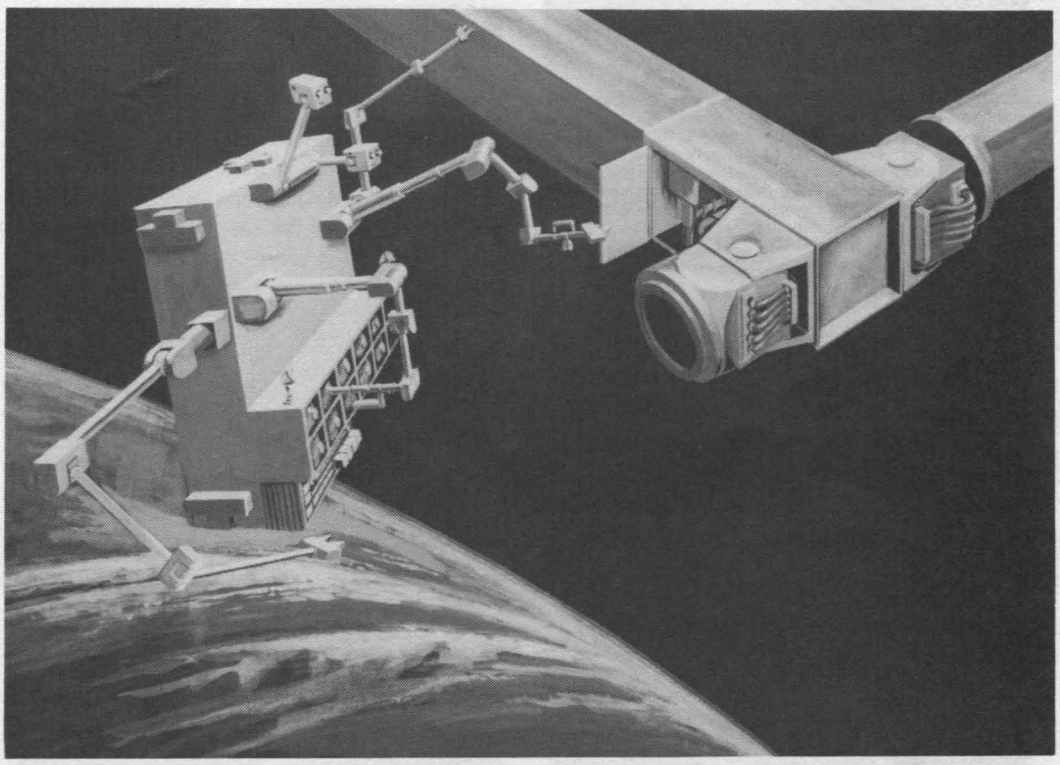
The Palmdale facility was selected for the changes because the work flow at the site lends itself to a timely modification of the vehicle prior to the August flight.

Admirer of Space Writes Poem

The following poem was written by Derek Kahn, a 12-year-old Hampton boy, who is a NASA and Visitor Center admirer. His family requested that the Researcher staff share the poem with Langley employees.

If I Were A Space Shuttle

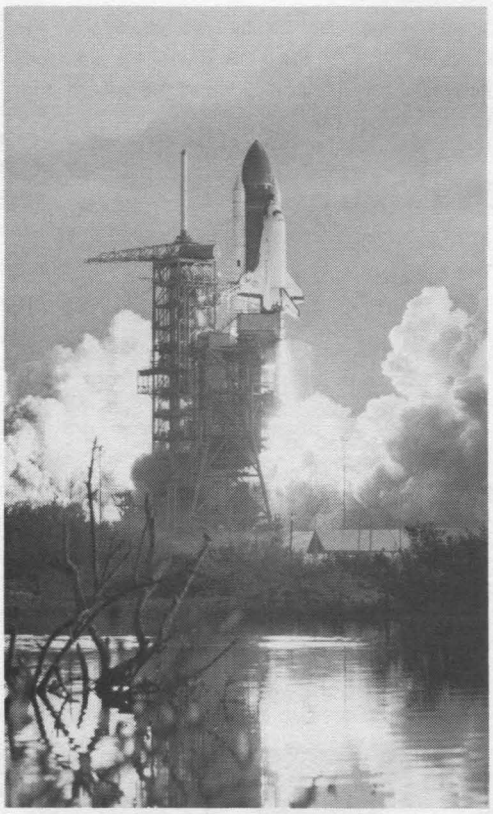
If I were a Space Shuttle I would rev up
my engines and fire away,
I would soar right pass the Milky Way.
Finding new and stranger things in outer
space,
Hoping that I would see the Sun's face.
I would stop at the Moon for a little rest,
Then I'd travel on doing what I do best.
Orbiting the Earth at a frantic rate,
One time, two times, three times, eight.
I would send out my little buddy Satellite,
Who was at first terrified of flight.
Lots of pictures he would take for the
Spacelab to see,
Until he falls out of orbit in the year 2033.
By then I'll be a very old shuttle,
Whose engines do nothing but gruttle and
muttle.
But now I'm still young and returning to
Earth,
The fifth largest planet of our Solar System
and the place of my birth.



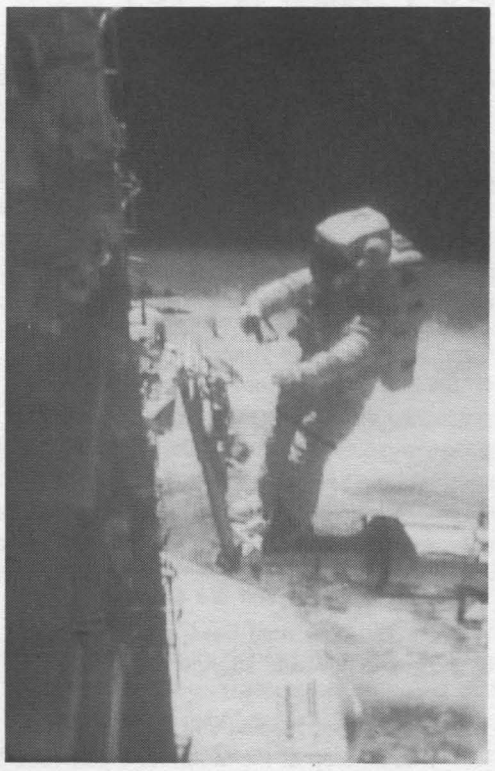
-photo courtesy of Marshall

TELEPRESENCE. In this artist's concept, a telepresence actuator reaches out to a large structure in space to repair an internal mechanism. Controlled from the ground, the multi-armed actuator would be equipped with lights, stereo television cameras, and tactile sensors to enable the Earth-bound operator to perform the work just as if the operator himself were in space to do the hands-on repair. Telepresence is an exotic field of automation and robotics that has been under study at the Marshall Space Flight Center. A telepresence device such as the one depicted in this artist's concept may be operational in the 1990s.

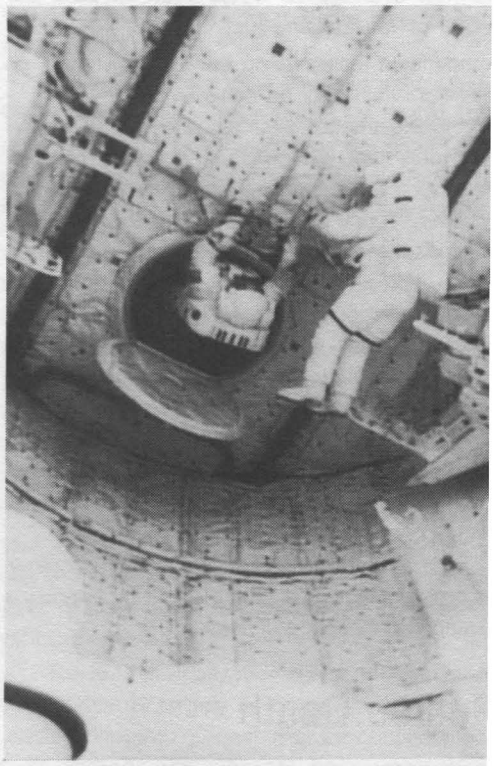
STS-11: Perfect Launch, Untethered Space Walks,



LAUNCH. The countdown ticked down to zero flawlessly and launch was perfect as Challenger clawed its way into the skies on the 10th Space Shuttle mission. Liftoff came at 57.5 milliseconds after 8 a.m. EST February 3. Challenger's cargo included a five-member crew, communications satellites for the Republic of Indonesia and the Western Union Corporation, the Shuttle Pallet Satellite, six "Getaway Special" experiment canisters and several important scientific experiments. The communications satellites that were launched during the mission failed to attain correct orbit, making them just more space debris.



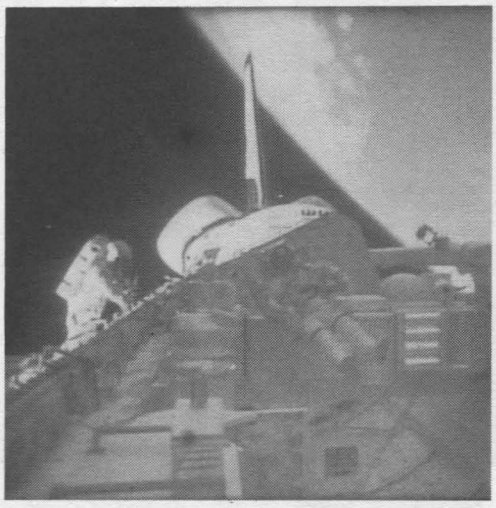
41-B TV SCENE OF EVA. Astronaut Bruce McCandless II, mission specialist, is perched on the foot restraint device on the end of Challenger's remote manipulator system arm. The astronaut earlier tried out the manned maneuvering unit and turned it over to Astronaut Robert L. Stewart. Among the cargo silhouetted in the foreground are some getaway special canisters and part of the Shuttle pallet satellite. At right edge of the frame is the empty shield for the Westar VI satellite.



TV SCENE. Astronaut egresses the airlock hatchway into th cargo bay of the Challenger to join McCandless already in th bay. McCandless is about to back into the MMU, positioned the flight support station at frame's edge.

Flawless First Landing at KSC

CREW TALKS TO PRESIDENT. The "indoor" astronauts are pictured inside the forward cabin of Challenger during a talk with President Reagan. They are (right to left) Vance D. Brand, Robert L. Gibson and Ronald E. McNair.



TV SCENE. McCandless (right) and Stewart are just a few feet apart in the aft cargo bay of the Challenger just prior to a communications linkup with the President. Stewart is actually outside the bay, holding onto restraint devices, while McCandless is able to control his own movement via the MMU.

LANDING. Commander Brand and Pilot Gibson guide Challeng to the first-ever landing of a returning spaceship at Kenned The historic touchdown occurred at 7:16 a.m. EST, February 1 about five miles from Launch Pad 39A where the 41-B missi began eight days earlier.

Happenings

HAPPY HOUR will be held today from 4 to 6:30 p.m. in the Activities Center.

BUSCH GARDENS season passes are for sale in the LAA Office for $39.50.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30 p.m.

GOLF NEWS. The organizational meeting and election of officers for the 1984 Golf Association season will be held March 2 at 6 p.m. in the Activities Center. All interested NASA employees and retirees should attend.

SOCCER. Anyone interested in playing soccer or in helping to organize an intramural Soccer League under the sponsorship of the Langley Activities Association, please call Steve Katzberg or Michael Hart, ext. 3535.

SKI TRIPS are planned for Fridays, March 2 to Bryce Mountain and March 9 to Wintergreen. The bus will leave Newmarket South, in front of Hechingers, at 5 a.m. Ski from 9:30 a.m. to 5 p.m. and return home by 9:30. Trips are open to all NASA employees, contractors and friends. The cost, including transportation, equipment and lift ticket, is $39; $31 with own equipment. Make checks payable to Richard Bennett and mail to him at Mail Stop 397 or 11 Bosch Lane, Newport News, VA 23606. Your check reserves your trip.

GARDEN CLUB. The 1984 organizational meeting of the NASA Garden Club will be held March 1 in the Activities Center at 12 p.m. This will be the only scheduled meeting this year; everyone interested in a garden plot is urged to attend. Topics to be discussed are plans for the year, budget, election of officers, plots, fees and committee assignments. For more information, call Jack Neubauer, ext. 3457, or write to him at Mail Stop 494.

SHUTTLE PASSES. Car passes for viewing the Space Shuttle launch scheduled for April 4 are available by calling Ann Suit, ext. 3967. This next flight includes the deployment of Langley's payload, the Long Duration Exposure Facility.

NEW ARRIVAL. Gail D. Fisher, formerly of the Management Support Division, gave birth to a daughter, Virginia Gail, on January 30. Gail is married to Bruce D. Fisher, Low-Speed Aerodynamics Division; they have one other child.

ARCHITECTURAL HISTORIANS. The Virginia Chapter of the Society of Architectural Historians and the Science Museum of Virginia will sponsor a special lecture February 29 at the Science Museum on West Broad Street in Richmond at 8 p.m. Steven M. Bedford, Virginia Historic Landmarks Commission, will discuss "John Russell Pope Comes to Richmond." Pope was the architect of the Union Station, now the Science Museum of Virginia. Admission is $2; a wine and cheese reception follows the lecture.

THE NASA COUNTRY-WESTERN DANCE CLUB will hold its monthly dance at the Activities Center Saturday, February 25, from 7:30 to 11:30 p.m.

BOATING SAFETY COURSE. The Williamsburg Flotilla of the Coast Guard Auxiliary is offering a free course on boating safety and seamanship at the Lafayette High School in Williamsburg, beginning Monday, March 5. The course will meet Monday and Thursday evenings from 7 to 9 p.m. for 13 sessions including final exam. All who pass the exam receive a certificate and ID card. Texts and charts needed for the course will be available at cost and may be shared by participants. A sailing course will be offered in addition if there is interest, also at no charge. For further information, call Robert Murden, instructor, 220-3699.

BUFFA. The Newport News Branch of the American Association of University Women is sponsoring, for its Eighth Annual Young People's Performance, a presentation of BUFFA. BUFFA, under the direction of the Virginia Opera Association, is a light-hearted look at the humorous side of opera. It is an ideal way to introduce children to the pleasures of great music. The performance is scheduled for Sunday, March 18, at 2:30 p.m. at the Hellenic Community Center. Tickets are $2 and will be available at the door. AAUW will use the funds raised from this performance to support the Educational Foundations Program. The EFP provides grants and fellowships to women pursuing higher degrees, changing careers, or who have a community project that needs support.

TOASTMASTERS helps you express your thoughts, ideas, opinions and develop your leadership potential through an enjoyable–yet thoroughly professional–educational program. You learn and improve through active particiation in roles of prepared speaking, impromptu speaking, group leadership, and speech and meeting evaluation. Whether you are a person hesitant to speak before an audience or a person who can speak confidently in any situation, Toastmasters provides valuable opportunities. The TAC Air Toastmasters Club meets at the Langley Officers' Club at 7:15 p.m. on the second and fourth Wednesdays of each month. For further information, call Davis Wright, ext. 4631 or 826-5597,

BARBERSHOP HARMONY. The Norfolk Chapter of SPEBSQSA will present its spring show, "A Night at Rehearsal," Saturday, March 17, at Indian River High School in Virginia Beach at 8 p.m. The concert will feature the Commodore Chorus and several local barbershop quartets. Special guests will be "Four Under Par," an outstanding comedy group who is well-seasoned by international quartet competition. Call Roy Albang, ext. 3737, or Jim Youngblood, ext. 3666, for tickets and information.

CHORAL SOCIETY. An "Evening of Durufle" will be the Virginia Choral Society's offering at its second concert of the 1983-84 season to be presented Monday, March 5, at Hampton Institute's Ogden Hall at 8 p.m. The concert will consist of works by Maurice Durufle,including the Durufle Requiem, and variations on "Veni Creator," a piece for organ. Tickets are $5 for general admission, $3 for military, students and senior citizens, with group rates available. For additional information call 596-2278. **NOTE**. To facilitate parking, a shuttle bus will run from the Hampton City Hall parking lot to the front door of Ogden Hall with continuous runs from 7 to 8 p.m. Return transportation will be provided after the concert.

Retirement Party

A retirement party honoring **Charles L. Breckinridge, Willis E. Hunt and Edward L. McClelland**, Flight Electronics Division, will be held Friday, March 16, in the Activities Center. A cash bar social will begin at 6:30 p.m. and a steamship round roast beef dinner will be served at 7:30. The cost, including gift, will be $11 per person or $21 per couple. Contributions to gifts only ($2) will be accepted. Please send check to Edward H. Kist Jr., Mail Stop 488, by March 12.

Gough Named VC Lecturer

William H. Gough has been named lecturer at the Langley Visitor Center.

Gough earned a bachelor of science degree in political science from Southern Methodist University in Dallas, Tex. He received master's degrees in aviation management from Embry-Riddle aeronautical University in 1983 and in marketing from the College of William and Mary in 1980.

Previously, Gough served in the U.S. Navy and worked for Flight International, Inc.

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
23665

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Chapman, Science Fair Judge

Michael A. Chapman, Instrument Research Division, represented the Hampton Roads Chapter of the National Technical Association in the judging of the Newport News Middle School City Science Fair at Newport News Park Middle School January 28.

The science fair included projects in the technical areas of physics, engineering, mathematics and computer sciences, as well as in the Earth sciences of biology, chemistry, botany, behavioral and social science.

OUT OF THE LATE WINTER STORMS of February, a warming sun breaks through. The cold begins to lose its hold upon the land, and seed and bulb thrust up green shoots with the promise of spring. How like the sun is the transformig power of love in our lives. Love is a gift each one of us can give. It costs nothing yet is valued more highly than any other gift. If we all shared the gift of caring, we could change the world!

Fire-Wise Tip

We all need to be a little extra fire-wise, to protect ourselves from fire. Here are a few tips that may help.

Don't smoke in places where you might fall asleep, whether in bed or in your easy chair.

Sleep with bedroom doors closed to delay the entrance of smoke.

If you have an ambulatory problem, call your fire department today and have them enter that information in their records, so firefighters will be ready to rescue you if fire strikes.

Young or old, the biggest key to fire safety is common sense.

Visitor Center Offers Bus Trip

The Langley Visitor Center will sponsor a one-day bus trip to the National Air and Space Museum in Washington, D.C., Friday, March 23.

The bus will leave the Visitor Center at 7 a.m. and return by 9:30 p.m. The cost of the round-trip bus transportation is $20. Meals are not included; however, a dinner stop is planned in Fredericksburg on the return trip.

Seating is limited and reservations are required. For more information or to make reservations, call 865-2855.

Directory Call Notice

Changes for inclusion in the next Langley Directory must be submitted to Mail Stop 196 no later than March 14.

Employees are reminded that the furnishing of accurate information for the Alphabetical Personnel Section of the Langley Directory is the resonsibility of each individual employee.

Langley Form, "Personnel Locator File" is provided in the back of the Langley Directory for reporting changes in Mail Stop, Building Number, Room Number and Telephone Number.

Offices are reminded that any changes in the Organizational Listing or the Service Directory Listing are overdue.

Retiree Deaths

EARL G. POPP, who retired from the Instrument Research Division in May 1980, died January 13. He was 63.

RONALD G. BRAXTON, 69, died January 15. He retired as an electrician from the Operations Support Division in October 1976.

CARSON S. COLLINS, who retired from the Operations Support Division in June 1973. died January 21 at the age of 72.

cafeteria menu

Week of February 27-March 2

MONDAY: Old Fashioned Bean Soup, Chicken Pot Pie, Bake New England Scrod and Chuckwagon Steak. Snack Bar: Corne Beef Reuben and Knockwurst.

TUESDAY: Cream of Mushroom Soup, Baked Lasagna, Countr Style Steak and Chicken a la King. Snack Bar: lb. Baco Cheeseburger and Chicken NASA.

WEDNESDAY: Fresh Vegetable Soup, Beef Chow Mein, Frie Filet of Flounder and Chicken Cordon Bleu. Snack Bar: He Ham and Swiss and Super 6 oz. Burger.

THURSDAY: Split Pea Soup, Veal Parmigiana w/pasta, Oper Faced Beef Sandwich and Braised Chicken Livers. Snack Ba Chuckwagon and Hot Italian Sausage.

FRIDAY: Bull Island Clam Chowder, Fish Dinner, Chicken an Yellow Rice and Chopped Steak. Snack Bar: Fried Oysters an Grilled Ham and Cheese.

Week of March 5-9

MONDAY: Ham and Lima Bean Soup, Seafood Creole and Yello Rice, Baked Chicken and Noodles, and Beef Liver and Onion Snack Bar: Poor Boy Sandwich and Beef and Cheese Burrit

TUESDAY: Beef and Noodle Soup; Clam Strips, Fries, Tea Coffee; Salisbury Steak; Pork Chops and Applesauce. Snac Bar: lb. Cheeseburger and Chicken NASA.

WEDNESDAY: Fresh Vegetable Soup, Fried Chicken Dinne Braised Beef and Vegetable and Quiche Lorraine. Snack Ba Polish Sausage and Super 6 oz. Cheeseburger.

THURSDAY: Chicken Gumbo Soup, Crab Cakes, Swedis Meatballs and Noodles and Braised Chicken Livers. Snac Bar: American Boy and Steak and Cheese Sub.

FRIDAY: Bull Island Clam Chowder, Fish Dinner, Swiss Stea and Ham Au Gratin. Snack Bar: Crab Cutlet and Cheese Pizz

swap and shop

WANTED

Female roommate to share three bedroom house with same. Location is near Fox Hill Road and Mercury Boulevard intersection. Prefer non-smoker. Rent is $150 per month and utilities if you furnish own bedroom furniture or $175 per month and utilities if I furnish bedroom furniture. Call 850-2178 after 4 p.m. weekdays, anytime weekends.

To carpool from Hidenwood area to West area on 7:30 a.m. shift. Call Wilson, ext. 3535.

FOR SALE

Articles

Langley Apicultural Club honey for sale; new crop from the Langley apiary. Cost is $2.50/pint; $4.50/quart. Call Harvey, ext. 2576.

Thinking Out Loud

IN THIS WORLD OF CHANCE, nought whic comes stays, and nought which goes is los

–Mme. Swetchin

THE GIFT OF LOVE shows itself in the smalle of ways.

National Aeronautics and
Space Administration

Langley Research Center

NASA

Langley Researcher

March 9, 1984

Langley Payload To Fly In April

LDEF to Carry International Research Experiments

When Langley's Long-Duration Exposure Facility is put into Earth orbit in early April, its 57 experiments will be one of the largest accumulations of international scientific and technical research yet assembled in space.

Developed by 194 principal investigators from the United States and eight foreign countries, the experiments represent 16 U.S. universities, 13 private companies, NASA Headquarters and seven field centers, eight research laboratories of the Department of Defense, and 34 similar organizations in Canada, Denmark, the Federal Republic of Germany, France, Ireland, The Netherlands, Switzerland and the United Kingdom.

The experiments range in research interest from materials to medicine to astrophysics. They all require free-flying exposure in space, but not extensive electrical power, data handling or attitude control systems.

Many of the investigations are relatively simple and some will be completely passive while in orbit. The results of their exposure in the space environment will be analyzed in post- flight laboratory investigations after LDEF's return to Earth, now scheduled for February 1985.

EXPECTED BENEFITS

The expected benefits of the first LDEF mission are difficult to summarize because of the number and diversity of the experiments. The interstellar gas, micrometeoroid and cosmic-ray experiments are examples of scientific investigations that should provide a better understanding of the origin and evolution of the universe, the solar system and the Earth.

The crystal growth experiment is an example of an applied scientific investigation. Superior crystals may provide valuable information about the unique properties of crystals and their possible applications in new devices. Studies conducted in the space environment may also lead to the discovery of ways to manufacture crystals on Earth.

The technology experiments on this first LDEF mission are the beginnings of broad NASA research programs to test new technologies that will be required for future space missions, such as the planned Space Station. These kinds of experiments cannot be conducted on Earth, and could not even be done in space without the Shuttle and LDEF. All of the technology experiments are expected to provide three specific kinds of information: flight data that can reduce the risk of using a new technology in space; evidence that new technologies may be used sooner than has been predicted; and data on new technology that can only be developed in weightless space.

The relative low cost of LDEF experiments has encouraged high- risk/high-return investigations and makes experiments particularly attractive to students and organizations unfamiliar with space research; they have been able to take advantage of expertise from NASA and private aerospace companies to get their experiments developed and into orbit. The experiments range in cost from less than $10,000 for a small experiment to about $400,000 for the most elaborate investigations.

The greatest potential benefit of the LDEF mission may well be some unexpected–possibly inconceivable–result from one or more of the investigations.

Continued on page 2.

Levine to Speak at Langley Colloquium

"The Earth's Early Atmosphere: A New View" will be the topic discussed at a Langley colloquium Monday, March 12.

Dr. Joel S. Levine, senior research scientist in the Atmospheric Sciences Division, will speak at 2 p.m. in the Activities Center followed by a question and answer session and an informal discussion.

According to Levine, the composition of the atmosphere changed significantly, over geological time, as a result of volcanic emissions, the gravitational escape of light gases, the formation of the oceans and sedimentary carbonate rocks, changes in the radiation emitted by the Sun, various atmospheric photochemical and chemical processes and the emergence of life.

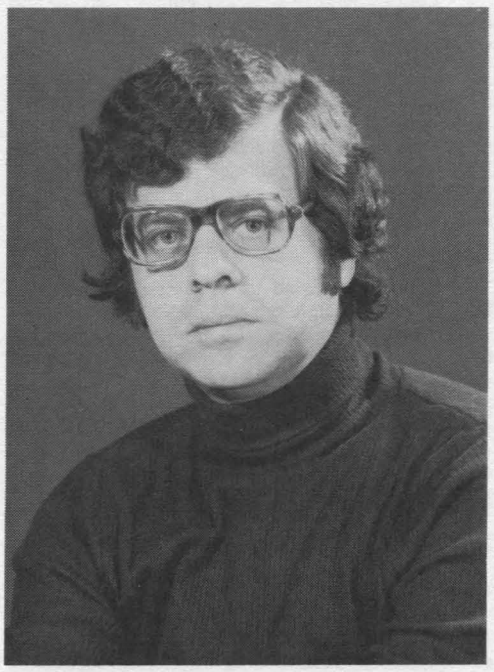
Recent studies have suggested a new picture for the composition of the early atmosphere and its evolution over geological time. The early atmosphere is now believed to have been composed of nitrogen, carbon dioxide and water vapor rather than ammonia, methane and molecular hydrogen. Other new ideas concern the synthesis of complex organic molecules (the precursors of life) in an early mixture of nitrogen, carbon dioxide and water vapor; the buildup of oxygen and ozone in the early atmosphere; and the timetable for the shielding (by atmospheric ozone) of the Earth's surface from biologically-lethal solar ultra-violet radiation.

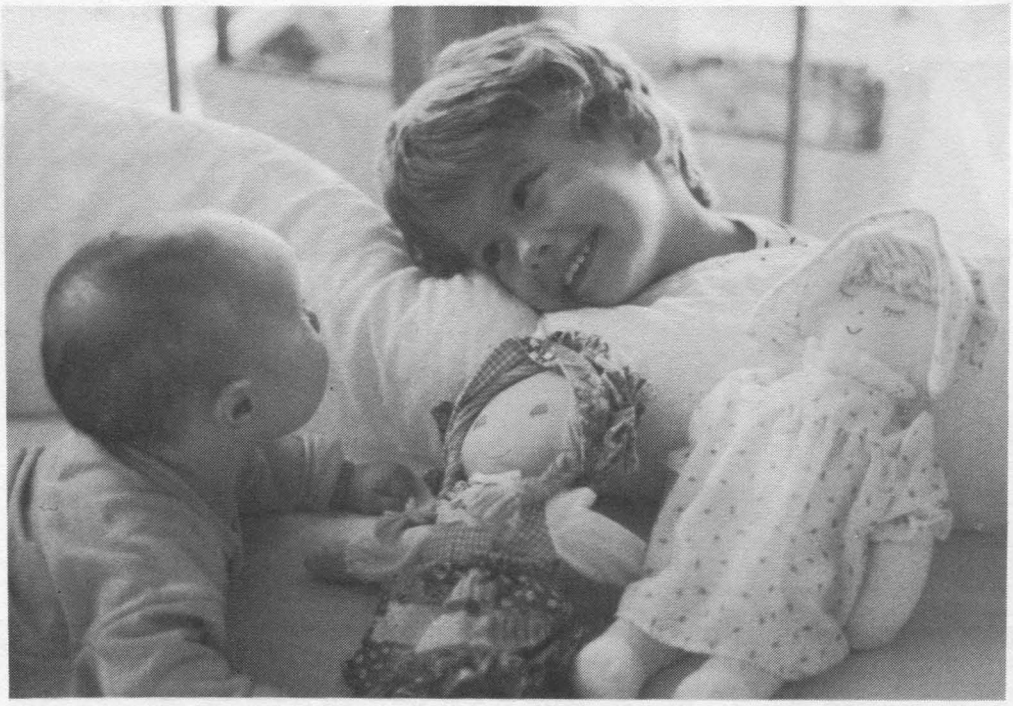
Levin said the chemical evolution of the atmosphere is continuing at the present time, primarily as a result of the input of gases from anthropogenic activities that include the burning of fossil fuels, high temperature combustion and various industrial and agricultural activities. Measurements indicate that atmospheric levels of carbon dioxide, methane, nitrous oxide and chlorofluoromethanes are increasing, Levine explained All these gases impact the Earth's climate via the greenhouse effect. Anthropogenic gases may also affect levels of ozone in the stratosphere and lead to the formation of acid precipitation.

Levine joined Langley in 1970, after six years at the Goddard Institute of Space Studies in New York City. His present research activities include theoretical photochemical modeling of the atmosphere with particular emphasis on the early atmosphere and the present troposphere, atmospheric chemistry initiated by lightning and the production of atmospheric gases by biogenic activities.

He received a bachelor of science degree in physics from Brooklyn College of the City University of New York, a master of science degree in meteorology from New York University, and a master of science degree in aeronomy and planetary atmospheres and a doctorate in atmospheric sciences from the University of Michigan.

In 1982, Levine became the youngest person and the first U.S. government employee to receive the Halpern Award from the New York Academy of Sciences. He also received the NASA Medal for Exceptional Scientific Achievement in 1983 for his research work.





-photo by Ann Worth

JON AND KATIE. Ann Worth, Transonic Aerodynamics Division, captured a nice moment and a first place in the Daily Press and The Times-Herald Shutterbug Sweepstakes. The two "little ones" in the picture just happen to be her grandson and granddaughter. Worth received a cash award and certificate from the Daily Press. Her photograph was then entered in the 1983 Kodak International Newspaper Snapshot Awards competition where she received a merit award including a cash prize. All prizewinning photographs are appearing in a major exhibit of prints which, during this year, will appear in nine cities across the United States. There is a possibility that the exhibit will be shown somewhere in the Virginia Beach area, but this is not finalized yet.

Queens Lake Wins Regional MATHCOUNTS Competition

Queens Lake Intermediate School in York County won first place in the MATHCOUNTS regional competition held at Langley February 25.

Second place award went to Dozier Middle School of Newport News, third place went to Tabb Intermediate School in York County and fourth to Hines Middle School in Newport News.

Laura Lising of Spratley Junior High School in Hampton won the individual award for earning the highest individual score.

The day-long competition consisted of five distinct segments, each with its own procedures, rules and requirements. Four written sections were administerd in the morning. The ten individuals with the highest scores participated in an oral segment, rated by a panel of three judges, during the afternoon. These individual scores were added to the team scores to reach a final score.

Langley assisted the Peninsula Chapter of the Virginia Society of Professional Engineers with the regional competition. Also sponsoring the program, which is designed to improve mathematics achievement levels among seventh and eighth grade students, are the National Society of Professional Engineers, the National Council of Teachers of Mathematics, the CNA Insurance Companies, the National Science Foundation and NASA.

Langley will honor the four teams at a luncheon in the cafeteria March 14. Dr. Robert Tolson, Langley's Chief Scientist, will present certificates of achievement to each individual.

On April 7, these four teams will participate in the state competition and then the top winners will go on to compete at the national level in May.

Receiving trophies for placing in the regional competition were Chris Boynyon, David Defashy, Michael Fripp and Brian West, Queens Lake Intermediate School; Yujin Asai, Billy Glidden, Banon Jackson and Michelle Spinka, Dozier Middle School; Nathan Brierly, Karen Hawk, Andrew Luh and Robbie Thompson, Tabb Intermediate School; and Brian Bevins, Jordan Grant, Marty Conn and Kathy Taylor, Hines Middle School.

NEBA Drive is Underway

The NASA Employees Benefits Association is conducting its annual membership drive during March by offering all full-time permanent employees the opportunity to enroll for group life insurance protection at excellent rates.

Depending upon an employee's salary, up to $85,000 in Basic Life coverage is offered. Dependent coverage is also available.

In addition, an "Optional Insurance Plan" has been developed for members of the basic plan who are under 60. An eligible employee can purchase optional insurance in amounts up to $150,000 if he or she is under 55. Employees who are 55 through 59 can purchase up to $100,000 of optional coverage.

Persons interested in obtaining additional information about either of these programs, may call the Employee Services Branch, ext. 2266.

Thanks

Q.C. Davis IV writes, "Thank you, friends and co-workers, for the blood donations. They are greatly appreciated."

LDEF Experiments

Continued from page 1.

LANGLEY EXPERIMENTS

Seven of the experiments involve Langley researchers, working either alone or in cooperation with other investigators:

Wayne S. Slemp, Materials Division, is the principal investigator for two separate experiments. One is an evaluation of the effects of space on the physical and chemical properties of laminated continuous-filament composite materials and composite resin films that may be used for large space structures and for advanced spacecraft.

The second Slemp experiment will determine the effects of the space environment on new coatings that are being developed for spacecraft thermal control. Paint, other coatings and second-surface mirror samples will be exposed on LDEF, some to all mission environments and some to specific environments. Sample spectral reflectance will be measured before and after the mission.

Robert F. Greene Jr., Systems Engineering Division, developed an experiment, called the Thermal Measurements System (THERM), that will measure the average LDEF flight temperature and the temperature history of selected components and representative experiment boundary conditions.

Philip C. Kassel Jr., Instrument Research Division, is working with two researchers from the University of Virginia and one from North Carolina State University to measure the impact rate and the direction of meteoroids in near-Earth space. Six groups of detectors can detect dust from all directions, and impact data will be recorded. The experiment may provide the first proof that micrometeoroids are of cometary origin.

Donald H. Humes, Space Systems Division, is investigating the impact of space debris on spacecraft. Many passive targets will be exposed to impacts by meteoroid and man-made space debris to determine the type and degree of damage that can be expected on future spacecraft. Man-made debris may well be a greater hazard than meteoroids.

Three Langley researchers–Dr. James B. Robertson, Flight Control Systems Division, and Ivan O. Clark and Dr. Roger K. Crouch, both of Instrument Research Division–are seeking to determine the effect of launch and space exposure on pyroelectric infrared detectors. Performance factors such as responsivity, detectability and spectral response, and materials properties such as pyroelectric coefficient and dielectric loss tangent, will be measured before and after the mission.

Langley researchers will also be part of a consortium of several LDEF investigators who will study meteoroid damage. Examples will be gathered of meteoroid impact damage to typical spacecraft components in order to help establish designs that will reduce the effects of meteoroid damage on future spacecraft.

The *Langley Researcher* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia 23665. It is published every other week in the interest of its employees. Address contributions to the Editor, Mail Stop 115, telephone 3006.

Editor ..... Jean Saunders

Staff Photographer ..... Bob Nye

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

NASA Names Crews for Three Space Shuttle Missions

NASA has announced crew assignments for three Space Shuttle missions in 1985 and 1986.

The flights are mission 51-D, scheduled for launch in February 1985; 51-K, scheduled in September 1985; and 61-D in January 1986.

Commander of 51-D will be Brewster H. Shaw Jr., 38, of Cass City, Mich. Shaw was pilot of the orbiter Columbia on STS-9, the first Spacelab mission flown in November and December 1983.

Shaw's crew will consist of Bryan D. O'Connor, 37, of Twentynine Palms, Calif., pilot; and Dr. Mary Cleave, 36, Southampton, N.Y.; Sherwood C. Spring, 39, Hartford Conn.; and Jerry L. Ross, 35, Crown Point, Ind., mission specialists.

Space Transportation System Flight 51-K, will have a total of eight crew members. Named as mission specialists for 51-K were Dr. Bonnie Dunbar, a native of Sunnyside, Wash., and USAF Colonel Guion S. Bluford Jr., Philadelphia, Pa. One of the three-member flight deck crew will be pilot Stephen R. Nagel, Major, USAF, Canton, Ill.

The 51-K mission will be the second for Bluford, who was a mission specialist on STS-8 in August 1983. Nagel has also been selected to fly as a mission specialist on STS Flight 51-A in October 1984. It will be the first flight for Dunbar. Both Bluford and Nagel were selected for the astronaut corps in 1978 and Dunbar was selected in May 1980.

NASA will name the 51-K commander and another pilot at a later date, and announcement of the European crew members will also be made at a later date. NASA plans to have three-member crews share flight deck responsibilities on future Spacelab-type missions.

Mission specialists for mission 61-D will be James P. Bagian, M.D., 31, Philadelphia; and Rhea Seddon, M.D., 36, of Murfreesboro, Tenn. John M. Fabian, 44, Pullman, Wash., will fly as one of the pilots. He is an Air Force pilot with more than 3,500 hours of flying time.

Fabian flew as a mission specialist on STS-7 in July 1983 and is scheduled for 51-A in October as a mission specialist. Dr. Seddon is also scheduled to fly on mission 41-F in August. Mission 61-D will be Dr. Bagian's first space flight.

A commander and another pilot for 61-D will be named later.Mission specialists are selected earlier since their training is more specialized and requires more time.

Mission 51-D is to be the 21st Space Shuttle flight and the ninth for the orbiter Challenger. Principal objectives of the six-day flight will be deployment of a SYNCOM communications satellite and retrieval of the free-flying Long Duration Exposure Facility.

The LDEF is scheduled to be deployed in April on mission 41-C, and contains experiments which require long-term exposure to the space environment.

Spacelab D-1 is a dedicated mission purchased by the Federal Republic of Germany. It will involve significant materials science and life science experiments. This mission will be the third flight of the orbiter Atlantis and the fourth flight of Spacelab.

Mission 61-D will be the fourth Spacelab flight and will focus on experiments in the field of life sciences for its seven days in space. It will be the ninth flight of the orbiter Columbia.

NASA to Fly Canadian as Shuttle Payload Specialist

NASA will fly a Canadian as a payload specialist on Space Shuttle mission 51-A, set for launch in October, in addition to two earlier Canadians already scheduled for Shuttle flights.

Announcement was made by Donald J. Johnston, the Canadian Minister of State for Science and Technology. NASA offered Canada the opportunity to fly a payload specialist this year in keeping with President Reagan's initiative to increase international cooperation.

The Canadian crew member and backup for the October flight will be announced later this month. Selection will be made by the National Research Council of Canada from a team of six chosen December 5, 1983. Canadians will also fly on Shuttle flights in 1985 and 1986.

Shuttle Flight 51-A in October will be a six-day flight, carrying Telesat Canada's ANIK C-1 satellite and a Getaway Special experiment designed by two Canadian high school students.

NASA Administrator James M. Beggs stated, "We are happy to make this offer to Canada, one which will enhance the already long-standing strong cooperation between our two countries in space activities.

"NASA's offer at this time is an additional recognition of Canada's contribution to the Space Shuttle–in particular, the delivery of CANADARM, the robot arm now part of the Space Shuttle."

In response, Minister Johnston said, "I am pleased to accept the offer of an extra mission. The exciting opportunity to have a Canadian astronaut in space so quickly is of great importance to the eventual success of both experiments and a major step towards expanding Canada's space capability."

Key Positions

John Fryer Jr. has been selected Head, Technical Support Section A, Laboratories Operations Branch, Operations Support Division, under Competitive Placement Plan 84-3.

James D. Keller has been selected Assistant Head, Theoretical Aerodynamics Branch, Transonic Aerodynamics Division, under CPP 84-7.

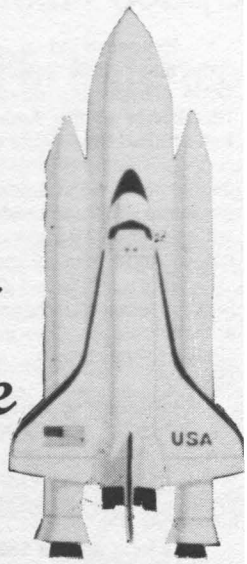
AIAA Meets March 13

Some of the significant naval mine applications and results during the past 65 years will be reviewed at the March 13 meeting of the American Institute of Aeronautics and Astronautics.

Dr. Mark Vedder, Naval Mine Warfare Engineering Activity, Naval Weapons Station in Yorktown, will cover present mine technology and organization of the relevant naval commands. The corresponding role of the Naval Weapons Station will also be included in this presentation.

Vedder's talk will be held in the Langley Activities Center, at 5:15 p.m., preceded by a social at 4:30.

Space Shuttle Update



Shuttle mission 41-C continues to move smoothly toward an April 6 launch. Exact launch time will be calculated based on a closer look at the location of the Solar Maximum Satellite, but mission planners are quoting "approximately 9 a.m., EST."

Orbiter Challenger will rendezvous with the disabled satellite on the third day of the mission. By that time, Langley's Long Duration Exposure Facility (LDEF) will have been deployed (see LDEF Status elsewhere in this issue).

Repair of Solar Max will begin when an astronaut uses his manned maneuvering unit, like those checked out on the last mission, to leave the orbiter and approach the satellite. Challenger will stay about 300 feet away until the astronaut attaches himself to the satellite and stops its slow rotation. He will fly in formation around the eight-sided satellite, connect himself to a trunion pin and fire his manuevering jets. Once the spinning is stopped, the orbiter will fly over and grasp Solar Max with its robot arm. At that point, the astronaut will detach himself from the satellite and use his MMU to stay clear. The arm will gently lower the 12 1/2-foot tall spacecraft into the cargo bay in a vertical position, locking it into a special holding fixture, or cradle, about one half the size of a Shuttle pallet.

Most of the actual repair work is scheduled for mission day five, when a second astronaut will perform an EVA from the work platform attached to the end of the arm. Among other things, the astronaut will try to replace one of the modules in the control system.

After the spacecraft is serviced, it will remain in the cargo bay while it undergoes an extensive checkout from the ground. Assuming the on-orbit repair is successful, the arm will simply remove the satellite from its fixture in the bay and let go of it. The orbiter will back away from Solar Max, as with the deployment of LDEF.

If the solar research satellite is not ok, it will remain in the cargo bay. The solar wings will be jetisoned and the hinged cradle will lower the satellite into the bay, ready for its return to Earth and a more detailed look at its systems.

Space Research Indicates Gravity Affects Bone Growth

Exposure to a gravity-free environment may alter basic mechanisms affecting normal bone growth and development, according to a researcher at the Ames Research Center who has studied the effects of spaceflight on animals.

Dr. Emily Morey-Holton, a pharmacologist in the Ames Biomedical Research Division, has studied rats flown aboard the Soviet Cosmos series spacecraft and examined data documenting calcium and mineral loss in space.

In ground-based simulations of spaceflight, Morey-Holton found decreased bone growth, fluid and mineral loss. The ground-based findings were similar to the data documented in the spaceflight studies.

"Gravity may be much more important than we believed," Morey-Holton said. "Gravity has always been a constant in our evolutionary past, and it must have had profound effects on living things. Yet we know very little about how gravity influences life."

As long ago as 1638, Galileo speculated on the effects of gravity on the strength of bones.

Joint U.S./Soviet experiments with rats flown aboard the Cosmos spacecraaft found that the rat bones developed improperly in space. In these experiments, Morey-Holton found arrest lines in the rat limbs, indicating that bone growth actually stopped in weightlessness. In ground-based spaceflight simulation studies, similar arrest lines on bones have not been seen, although reduced bone growth was documented. This discrepancy is explained by the fact that gravity cannot be completely removed in simulation studies.

Minerals found in bone such as calcium, zinc, potassium and sodium are excreted during spaceflight. Because bone is the storehouse of calcium, continous calcium loss in missions of long duration could cause decreased skeltal strength as well as disruptions of systems dependent on calcium for normal function. On earth, common problems associated with calcium loss include heart irregularities, decreased blood clotting, muscle cramps and kidney stones, as well as weaker bones.

Bone changes can be caused by physiological circumstances, such as the lack of weight-bearing which occurs during bed rest, or by pathological circumstances, such as severing the spinal cord. Physiological changes are reversible, whereas some pathological changes may not be reversed.

Scientists know adult humans can tolerate spaceflight for up to 211 days with no severe biomedical problems, but have no information on the effects of longer exposure.

"We need to have some long-term studies," Morey-Holton said. "We really have no idea how animal form or function will be altered by long-term exposure to spaceflight.

"What we're engaged in is descriptive biology," she said. "We're trying to determine how bone cell activity changes, how much it changes and if the changes are permanent. After the basic mechanisms are defined, we can start looking for causes and preventions."

But in space, even prevention may not be a simple matter.

"If what we're seeing is normal adaptation to the micro- gravity environment of space, we have to consider if we really want to prevent that adaptation. By trying to prevent the bone's adaptation we might introduce other, unwanted changes. It might be better to keep the level of adaptation controlled only to the point where return to earth would not be a problem."

Ames biomedical researchers study the physiological effects of weightlessness under the Ames Life Sciences Directorate, part of the Life Sciences program in NASA's Office of Space Science and Applications.

Speakers Bureau

William Scallion gave a Space Shuttle presentation to the Men's Club at First Presbyterian Church in Hampton February 7.

Kenneth R. Yenni spoke February 8 to the Norfolk Composite Squadron of the Civil Air Patrol about Langley flight research programs.

Robert L. Calloway gave a Shuttle update to members of the Newport News Rotary Club February 8.

Buddy DeRyder discussed the Space Station at the Tidewater Rotary Club meeting in Norfolk February 10.

Katherine Johnson spoke on math careers at Sedgefield Elementary School February 10 and Phillips Elementary School February 23 and careers in space sciences at Woodrow Wilson High School in Portsmouth, February 23.

George M. Ware discussed the Space Shuttle February 12 at the DAR-Colonial Francis Mallory Chapter meeting in Hampton.

George Ashby talked about the Space Shuttle at the Ghent Methodist Church Men's Club meeting February 13.

Joel Levine discussed "A New View of the Earth's Early Atmosphere" at Tidewater Community College February 15.

Naomi Kepley spoke at Asbury Elementary School February 16 about manned space flight.

John R. Davidson briefed members of the Society for Non- Destructive Testing of Metals on "Reliability of Unique Structures After Non Destructive Testing" February 16.

Brian Pritchard spoke about the Space Station at the Greensboro Boy Scouts Adult Awards Banquet February 17.

Charles Eldred discussed the Space Shuttle February 21 at the International Test and Evaluation Association meeting in Norfolk.

Ronald Brown discussed engineering at NASA February 22 at Norge Primary School.

Mary Jackson reviewed the techniques for presenting scientific papers at the Minority Students in Science Symposium, National Security Agency, Fort Meade, Md., February 23.

Frank Farmer discussed the excavations at the George Wythe home site at the Fort Eustis Historical and Archaeological Association February 23.

Lester J. Rose spoke at the Norfolk Pioneer Kiwanis Club February 28 on "Spinoffs from Aerospace Technology."

James M. Patton Jr. spoke to FAA Accident Prevention Specialists on stall/spin research February 23.

Langley Directives Announced

Announcements will be made in the Langley Researcher when there are new, revised or canceled Langley Management Instructions or Langley Handbooks.

LMIs and LHBs are available for review in each organizational office. Secretaries are available for assistance or call the Directives Office, Management Support Division, ext. 3511.

NUMBER	TITLE	DATE	T.S.#	DATE DISTRIBUTED
REVISED:				
LMI 2400.1	Management of Automatic Data Processing (ADP) Resources	12-5-83	1315	1-19-84
LMI 5000.2	Procurements	12-5-83	1316	1-19-84
LMI 2410.7	Computer Security Program	12-19-83	1317	1-19-84
LMI 9500.1	Contractor Financial Management Reporting (NASA Form 533 Series)	12-19-83	1318	1-19-84
LMD 1200.8	Delegation of Authority to Operate the Labor-Management Relation Program at Langley Research Center	12-19-83	1320	1-19-84
LMI 3711.3	Labor-Management Relations Program	12-19-83	1321	1-19-84
LMI 1410.1	Langley Research Center Directives System	1-18-84	1322	2-10-84
LMI 1700.7	Traffic Safety Program	1-30-84	1323	2-22-84
CANCELLED:				
LMI 1100.4	Financial Management Reporting Committee and Subcommittee	12-19-83	1319	1-19-84

Thanks

Ed Burcher and **Bob Spiers** wish to thank everyone who had a part in the presentations and luncheon given recently on the occasion of their retirement. The recognitions and best wishes expressed by their friends and relatives made this a very happy occasion which will be long remembered.

NASA Research Finds Aircraft Surface Grooves May Tame Turbulence

-by Keith Henry

Barely visible grooves, on the surface of an airplane, may help to tame drag-producing air turbulence and increase fuel efficiency, NASA research has shown.

The grooves, shaped like tiny "v's" with the angle pointing forward on the fuselage, might be no more than two-thousandths of an inch deep. But they would be deep enough, NASA thinks, to favorably alter the turbulent flow of air that forms over the surface of a moving airplane.

On today's airplane surfaces, most of the air flow is turbulent. Within this flow are violent eruptions called bursts that begin at the surface which are responsible for most of what aerodynamicists call "skin friction drag" and nearly half the total aerodynamic drag on an airplane. If the intensity of these bursts can be reduced, the reduction in drag would translate directly into lower fuel consumption or an increase in aircraft speed.

Reducing skin friction drag has been targeted by the Langley Research Center as a research goal of the 1980s, with a major focus on understanding and control of turbulent bursts.

Experiments at Langley have shown that small "v" grooves with equal height and spacing can reduce net turbulent skin friction drag up to 10 percent, compared with ungrooved smooth surfaces. The grooves, also called "riblets," were machined into flat aluminum samples and tested in wind tunnels.

A turbulent drag reduction of 10 percent would translate to a fuel savings of about 2 1/2 percent, a potentially hefty $200- 300 million annual savings for the U.S. commercial airline fleet, estimates Jerry N. Hefner, a researcher in the High-Speed Aerodynamics Division. The division's long-range goal, he says, is to double the demonstrated drag reduction to 20 percent, providing a five percent savings in fuel.

"When we change a flat smooth surface into small riblets of the size we're studying," says Hefner, "we're really talking about v-shaped valleys the size of scratches. Although these precise little grooves are small, they obviously have a pronounced effect on the turbulence and skin friction drag."

Confidence is rising that these relatively small-scale results can be repeated under flight conditions on a full-sized air transport. If the concept continues to prove itself in ground tests, the first flight test could come in 18 to 24 months.

An item published in NASA's "Tech Briefs," a magazine devoted to transfer of technology to U.S. industry, prompted the 3M Co. of St. Paul, Minn., to design and produce test specimens of riblets in tape form. The company determined it would be simpler to take a lightweight extruded film with adhesive backing and press it into place, rather than groove the metal skin.

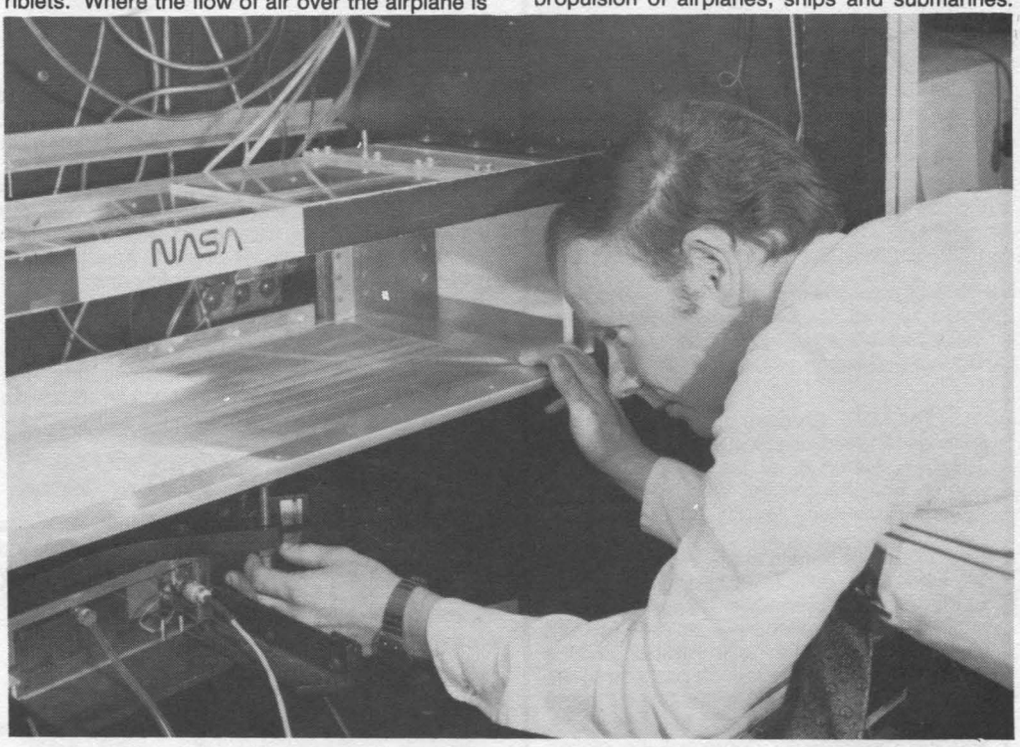
In Langley tests, these grooved plastic films are reducing turbulent drag as well as, or better than, machined aluminum surfaces with the same groove sizes and shapes, reports Michael J. Walsh, principal researcher in Langley's riblet work.

Some surface areas may not benefit from riblets. Where the flow of air over the airplane is not turbulent, a smooth ungrooved surface would be best; in highly complicated flows over wing and tail surfaces, further research is needed to determine if riblets will significantly reduce skin friction drag. Even with these exceptions, a majority of the fuselage – representing about half the area of the aircraft – remains a good candidate for riblets.

Repair of damaged riblet surfaces is not expected to be a problem on an airplane with plastic film. The old sheet would simply be pulled off and a new sheet, cut to fit, would be applied in its place. In much the same way, plastic or some similarly grooved film could be applied to existing aircraft as a relatively economical retrofit measure.

Recent observations indicate that projections on the skin of fast-swimming sharks resemble riblets. Called dermal denticles, the projections are made of the same material as shark's teeth and typically have four or five very small grooves on what looks, to the unaided eye, like tiny flat surfaces. Slower sharks also have grooved projections, but the grooves do not line up to create the effect of continous v-grooves.

Research at Langley identified the riblet concept and its precise v shape before this clue from nature was found. The concept was derived by NASA from research indicating favorable flow characteristics of water through triangular pipes. The idea of adding sharks data came from an effort in the Soviet Union to uncover secrets from the animal world to aid in the more efficient propulsion of airplanes, ships and submarines.



Mike Walsh adjusts an alignment test plate in the Langley 7- by 11-Inch Low Speed Wind Tunnel. The grooved test plate is one of several concepts being tested at Langley to reduce turbulent drag on aircraft surfaces.

FEHB Program Amended

Several amendments have recently been made to the Federal Employees Health Benefits Program.

Among these is a provision whereby a non-participant may register to be enrolled within 31 days after he/she loses coverage under his/her parent's non-federal health plan for a reason other than death. An employee may register to be enrolled within 60 days after loss of coverage because of the parent's death.

Any interested employee who has lost health insurance coverage under a parent's or spouse's enrollment should call Lahoma Hart, ext. 2266.

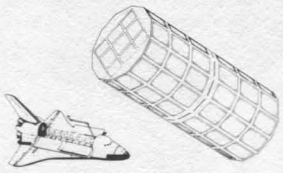
Thinking Out Loud

NONE OF US is ever done preparing. Each act we perform, even if it seems at the time practically our whole purpose in life, is really nothing but a preparation for something we'll do at some future time. So long as we live, we're never done. Today prepares us for tomorrow. What a dull life it would be if we came to a time when there was nothing left for which to prepare.

Welcome New Employees

Langley welcomes the following employees to the center: (top row from left) Steven D. Young, Flight Electronics Division; John T. Batina, Loads and Aeroelasticity Division; Vernie W. Boyd, Ronald G. Hermansderfer, James A. Irwin, Barry K. Lawhorne (bottom row) Richard G. Lyeth and Joseph S. Murray, Operations Support Division; Elizabeth G. Fedors, Research Information a Applications Division; Jane V. Gage, Management Support Division, Rodney T. Harris, Faciliti Engineering Division; and Barbara J. Kloc, Space Systems Division.

LDEF Status



The LDEF structure and all experiments were placed inside the Shuttle payload canister Tuesday, March 6, at the Kennedy Space Center, and the canister was moved to the Vertical Processing Facility (VPF) Thursday, March 8.

LDEF will remain in the VPF until March 14, when it is scheduled to be transported to the Vertical Assembly Building. There the entire payload canister will be rotated from its horizontal position to a vertical position for its transport to the launch pad March 15.

LDEF is scheduled to be placed in the Orbiter Challenger's payload bay March 19, and the payload bay doors will be closed March 22, 15 days before the planned April 6 launch.

Video Recording System to be Demonstrated

Spin Physics Inc. will present and demonstrate the state-of-the- art in high-speed video recording March 15 from 9 a.m. to 4 p.m. in the Activities Center.

The unique digital instrument, the SPIN PHYSICS SP2000 Motion Analysis System, can record at 2000 full frames per second or up to 12,000 partial frames per second. An experiment or test can be reviewed immediately and precisely measured using a RS232 or IEEE488 Computer Interface.

The Industry Assistance Office and the Photo/Graphics Branch are sponsoring the demonstration by Spin Physics, an Eastman Kodak Division.

Minnis, Schy Win

Patrick Minnis, Atmospheric Sciences Division, and **Albert Schy**, Flight Dynamics and Control Division, won the January and February drawings for $20 each, presented to car pool participants by the Langley Exchange Council.

Thanks

George L. Meidinger writes his friends "Thanks for the heartwarming retirement dinner given me on February 1. The gifts were exceptional and the well wishes were gratifying. Thanks for a memorable evening."

Retiree Deaths

Charles Pere, who retired from the Ope ations Support Division in December 1982 w 30 years of service, died February 17. He w 64.

Elizabeth D. Jefferson, a purchasing cle in the Acquisitions Division until her retireme in December 1973, died February 13 at 69.

Sarah R. Beadles, who retired from t Financial Management Division in August 197 died February 17. She was 72.

Fire-Wise Tip

How do you call for help when fire strike First, get out of the burning structure and th call the operator or fire department for hel Give your name, address and the exact natu of the emergency. Keep calm, speak slow and clearly. Stay on the line in case th dispatcher needs more information.

Our community is protected by some the finest fire fighters in the country, but th can't help you if they can't find you!

Happenings

A SPECIAL ST. PATRICK'S DAY HAPPY HOUR will be held today from 4 to 7 p.m. in the Activities Center.

SHUTTLE PASSES. Car passes for viewing the Space Shuttle launch scheduled for April 6 are available by calling Ann Suit, ext. 3967. This next flight includes the deployment of Langley's payload, the Long-Duration Exposure Facility.

COMPUTER SCIENCE SEMINAR on Thursday, March 22, will feature Dr. Fred Furtek of Charles Stark Draper Laboratories, Cambridge, Mass., speaking on "Software Specification and Verification Tools." The seminar will be held in the Activities Center at 3 p.m.

COMPUTER SHOW. A Color Computer Show will be held at the Langley Visitor Center Saturday, March 17, from 10 a.m. to 4 p.m. The purpose of the show is to demonstrate the multiple uses of a home computer, stimulate interest in computing as a hobby, inform the local community of the existence of user groups for many brands of home computers and to demonstrate computer systems ranging from the simplest to rather complex. Admission is free and open to the public.

CHRISTIAN SINGLES MEET. The Peninsula Christian Singles, an interdenominational support organization for single people, meets on Thursday nights in the Family Life Center behind Liberty Baptist Church, Todds Lane, Hampton, at 7:30 p.m. Members pay $1 a month dues to cover newletter expense. Free babysitting is provided.

JAMBOREE. The Virginia Country Music Association will hold a Super Jamboree Sunday, March 18, at the Moose Lodge 898 in Portsmouth from 2 p.m. to 12 midnight. The Jamboree, sponsored by the Founders Chapter of Norfolk, Peninsula Chapter 1 of Hampton and Newport News and the Williamsburg Chapter, will benefit the Arthritis Foundation. A donation of $3 will be accepted at the door.

TOASTMASTERS. The TAC Air Toastmasters Club meets at the Langley Officers' Club at 7:15 p.m. on the second and fourth Wednesdays of each month. For further information, call Davis Wright, ext. 4631 or 826-5597.

DIRECTORY NOTICE. Changes for inclusion in the next Langley Directory must be submitted to Mail Stop 196 no later than March 14.

LOCKER ROOMS. Effective immediately, the exterior doors leading to the ladies' and men's locker rooms located in the Activities Center, Building 1222, will be locked from 10 p.m. to 6 a.m. daily. Please plan your use of these rooms accordingly.

BARBERSHOP HARMONY. The Norfolk Chapter of SPEBSQSA will present its spring show, "A Night at Rehearsal," Saturday, March 17, at Indian River High School in Virginia Beach at 8 p.m. The concert will feature the Commodore Chorus and several local barbershop quartets. Special guests will be "Four Under Par," an outstanding comedy group who is well-seasoned by international quartet competition. Call Roy Albang, ext. 3737, or Jim Youngblood, ext. 3666, for tickets and information.

THE TIDEWATER CLUB OF SIGMA XI has recently applied to chapter status. This will make the Sigma Xi lectures available to the local organization and enhance participation by area researchers. Langley researchers who are former Sigma Xi members or affiliated with other chapters who would like to participate can obtain further information by calling Dr. Paul Homsher at ODU, 440-3595.

AUDITIONS FOR CAMELOT. Charlie Husson, Flight Control Systems Division, will direct the musical "Camelot" for the Peninsula Community Theatre. He will hold auditions March 11, 12 and 13 at the theatre, 7610 Marshall Avenue, Hampton, beginning at 7:30 p.m. Scheduled for performance in May, "Camelot" has a cast of 30 with singing, acting and dancing roles. All parts are open; none have been pre-cast. Technical crews are also needed for set construction and the performances. If you are interested, attend one of the auditions or contact Husson.

BLOODMOBILE. The American Red Cross will sponsor a Bloodmobile at the Activities Center Wednesday, March 21, from 9 a.m. to 3 p.m. For more information or an appointment, call the Health Unit, ext. 3976 or 2246.

LAA ARTS AND CRAFTS SHOW will be held Saturday, April 14, and Sunday, April 15, from 12 to 5 p.m. in the Activites Center. Included in the show will be country carving, woodwork, jewelry, ceramics, flower arrangements, weaving, paintings, stained glass, crochet and home-made candies. Anyone interested in displaying their crafts should call Betty Hughes, ext. 2476 or Mail Stop 138, for further information.

NEW ARRIVAL. Nadine McHatton, Low-Speed Aerodynamics Division, and Rusty McHatton, Operations Support Division, are the proud parents of a son, Corey Austin, born February 18.

CHILDREN'S MOVIE. "The Sword in the Stone," an antimated film adaptation of T.H. White's classic book about the legendary King Arthur, will be shown at the Activities Center March 18 at 2 p.m. Admission is 75 cents per person. This will be the last film in the children's activities season which will conclude with the annual Easter Egg Hunt on April 15.

BUFFA. The Newport News Branch of the American Association of University Women is sponsoring, for its Eighth Annual Young People's Performance, a presentation of BUFFA. BUFFA, under the direction of the Virginia Opera Association, is a light-hearted look at the humorous side of opera. It is an ideal way to introduce children to the pleasures of great music. The performance is scheduled for Sunday, March 18, at 2:30 p.m. at the Hellenic Community Center. Tickets are $2 and will be available at the door. AAUW will use the funds raised from this performance to support the Educational Foundations Program. The EFP provides grants and fellowships to women pursuing higher degrees, changing careers, or who have a community project that needs support.

THE NASA TENNIS CLUB is holding its annual membership drive. Sponsored by the LAA, the club is open to all NASA emloyees and contractors, as well as dependents. Some of the activities the club sponsors are ladder competitions, league play and tennis instructions. The NASA facilities include four newly surfaced tennis courts, two of which are lighted for night play, and complete locker room facilities. The membership fee is $4 per year. For more information call Bill Weaver, ext. 3431, or the LAA Office, ext. 3139.

TIDEWATER DINNER THEATER. A British comedy, "Bedroom Farce," will run through April 8 at the Tidewater Dinner Theater in Norfolk. Discount tickets are available at the Activities Center.

AFGE. The American Federation of Government Employees, Local 2755, will meet Wednesday, March 21, in Building 1232B at 4:30 p.m.

REMARRIAGE SEMINAR. The Salvation Army-Virginia Peninsula Community Center will sponsor a workshop, "Blueprint for a Successful Remarriage," beginning Thursday, March 1. Seven sessions will be held from 7 to 9 p.m. for persons who want to learn more about remarriage. Dr. Pam Turner will lead the workshop, which costs $15 per person. Pre-registration is preferred. Call 838-1403 for additional information.

THE LANGLEY HISTORICAL SOCIETY will meet Wednesday, March 21, beginning with a buffet luncheon at 11:30 a.m. in the new dining room, Langley AFB Officers' Club. Dr. James Hansen, NASA Historian, will give a slide presentation at 12 p.m. on "Engineering the NACA Cowling: A Case Study of Research Method at the Langley Aeronautical Laboratory, 1926- 1936." For further information, call Lt.Col. Gene Alfaro, 595- 9300.

THE PENINSULA LITERACY COUNCIL'S Third International Dinner will be held March 16 at 5:30 and 7 p.m. (two seatings) at the Christopher Newport College cafeteria. The ticket price of $6 includes a sampling of international cuisine and a dance performance by the Heritage Folk Dancers. Proceeds from the dinner will benefit the tutoring program offered by the council, a United Way agency. Tickets are available by calling the Literacy Council Office, 838-5300.

SOFTBALL. The organizational meeting of the NASA Softball Association will be held Monday, March 12, at 4:30 p.m. in the Activities Center. A representative from each prospective team must attend.

CAMP NIMROD. Consider Camp Nimrod for your son or daughter this summer! The private brother-sister camps in the Virginia mountains, near Hot Springs, offer two to six weeks of summer fun for children 6 to 15. The camps' directors will be at St. Andrews Episcopal Church, 45 Main Street, Newport News, Saturday, March 10, at 2 p.m. for a slide presentation. For further information, applications or camp brochures, call Ann Jobson, 596-9540.

BUSCH GARDENS season passes are for sale in the LAA Office for $39.50.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30 p.m.

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
23665

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MAIL STOP 494 BLDG 1298

Visitor Center Offers Bus Trip

The Langley Visitor Center will sponsor a one-day bus trip to the National Air and Space Museum in Washington, D.C., Friday, March 23.

The bus will leave the Visitor Center at 7 a.m. and return by 9:30 p.m. The cost of the round-trip bus transportation is $20. Meals are not included; however, a dinner stop is planned in Fredericksburg on the return trip.

Seating is limited and reservations are required. For more information or to make reservations, call 865-2855.

Kinard Presents LDEF Program

The Langley Visitor Center will sponsor a presentation on the Long-Duration Exposure Facility Wednesday, March 21, at 8 p.m. William Kinard of Langley's LDEF Project Office will give the public presentation.

The LDEF is a large free-flying reusable satellite. The first flight will carry 57 small passive or self-contained active experiments that require prolonged exposure to space. For example, one experiment will compare the growth rate of tomato seeds exposed to the space environment with another control group of tomato seeds retained on earth. School and young students from around the country will assist NASA with this experiment. The LDEF experiments range in research interest from materials to medicine to astrophysics.

LDEF, to be launched on the next Space Shuttle mission in April, was built at Langley. It is a 12-sided structure approximately 14 feet in diameter and 30 feet long. LDEF will fit in half of the Shuttle's payload bay.

THUS CAME the lovely spring, with a rush of blossoms and music, flooding the earth with flowers and the air with melodies vernal. -Henry Wadwroth Longfellow

Retirement Party

Joseph W. Jewel Jr., Low-Speed Aerodynamics Division, will be honored with a retirement dinner Friday, March 30, in the Activities Center. A cash bar social will begin at 7 p.m., followed by a steamship round beef dinner at 8 p.m. The cost will be $11 per person or $21 per couple. Contributions of $2.50 for gift only are welcome. Call Merle Ott, ext. 3274 or send reservations to her at Mail Stop 247, no later than March 23.

Swander Named Visitor Center Lecturer

Dr. Alice J. Swander has been named lecturer at the Langley Visitor Center.

She has been employed as an educator and instructional supervisor in local schools in Hampton and York County. She has also taught in the Department of Defense overseas schools and has worked for a number of colleges and universities.

She received a bachelor of science degree in secondary education from Radford College, a master of education degree in supervisory management and curriculum development from the College of William and Mary and a doctorate in foundations of education/linguistics from the University of Utah.

Swander was born and has lived much of her life in Hampton. Thus, she has a special interest in presenting NASA Langley's aeronautical, space and general research accomplishments to the public.

FEGLI Disaster Clause Changes

New regulations, effective February 24, allow an employee to designate an alternate beneficiary to inherit his/her insurance if the primary beneficiary dies in the same accident as the policy holder.

Previously, if a beneficiary survived the employee by even an instant and then died before receiving payment, the insurance was automatically payable to the beneficiary's estate. Under the new rules, if a beneficiary does not survive the employee by the specified period (not more tha 30 days), payment of the proceeds of the insurance will be paid to the individual or group designated as an alternate.

If you need further information about the changes in the law, call Lahoma Hart, ext. 2266.

cafeteria menu

WEEK OF MARCH 12-16

MONDAY: Seafood Gumbo, Chicken-Fried Steak, Pepper Steal and Rice, Tuna-Noodle Casserole. Snack Bar: Meatball Sub 1/4 lb. Cheeseburger.

TUESDAY: Old Fashioned Bean Soup, Baked Stuffed Fish, Rib Eye Steak Sandwich, Turkey Breast Nuggets. Snack Bar: Steal and Cheese Sub, Chicken NASA.

WEDNESDAY: Fresh Vegetable Soup, Beef Enchiladas, Baked 1/: Chicken, Escalloped Ham and Noodles. Snack Bar: Pizzaburger Hot Ham and Cheese.

THURSDAY: Chicken Vegetable Soup, Roast Beef Hash, Braise Chicken Livers, Veal Cordon Bleu. Snack Bar: Beef and Chees Burrito, Super 6 oz. Cheeseburger.

FRIDAY: Bull Island Clam Chowder, Fish Dinner, Chicken Teriyak Corned Beef and Cabbage. Snack Bar: Grilled Ham and Cheese Knockwurst.

WEEK OF MARCH 19-23

MONDAY: Beef and Barley Soup; Beef, Macaroni and Tomatoes; Beef Liver and Onions and Seafood Quiche. Snack Bar: 1/4 lb. Bacon Cheeseburger, Italian Sausage.

TUESDAY: Minestrone Soup, Chuckwagon Steak, Chicken Chow Mein, Roast Pork and Dressing. Snack Bar: Poor Boy Sandwich Corned Beef Reuben.

WEDNESDAY: Fresh Vegetable Soup, Chicken and Dumplings Meat Loaf and Onion Gravy, Polish Sausage and Sauerkraut. Snack Bar: American Boy and Italian Beef and Pepper Sub.

THURSDAY: Chicken Noodle Soup, Veal Parmigiana, Beef Pot Pie Braised Chicken Livers. Snack Bar: Super 6 oz. Cheeseburger, Polish Sausage.

FRIDAY: Bull Island Clam Chowder, Fish Dinner, Chopped Steak Franks and Baked Beans. Snack Bar: Clam Strips, Chicken NASA.

swap and shop

LOST

One tie tack shaped like a parachute lost in vicinity of Building 1206 or cafeteria. Call Timmons, ext. 4621.

Tan Isotoner glove for left hand. Call Mary Moore, ext. 3871, if found.

FOUND

Ladies Timex watch found between buildings 1152 and 1219 Call Security Office, ext. 2452, to identify.

NASA 20-year pin, off center. Call Keith Henry, ext. 2934, for information.

WANTED

Driver for car pool from Norfolk to West area on 7:30 a.m. shift Call Hudgins, ext. 3072.

Female roommate to share three-bedroom house with sam near Fox Hill Road and Mercury Boulevard; prefer non-smoke Furnish own bedroom furniture, $200 per month. Call 850-217 after 4 p.m. weekdays, anytime weekends.

Fire-Wise Tip

Teach your children how to save themselve from fire. A three -year-old child can learn t stop, drop and roll if clothing ignites, or to craw to safety when there is smoke.

Make fire safety a fun activity. Teac children in frequent, short sessions, and sho plenty of enthusiasm. When fire strikes, the will be able to look out for themselves.

For information on the stop, drop and ro techniques, call the Newport News Fire Preventio Bureau, 247-8873.

National Aeronautics and
Space Administration

Langley Research Center

NASA

Langley Researcher

Volume 3, Issue 6 **March 23, 1984**

LDEF Staff to be at KSC and JSC for Launch

When the Long-Duration Exposure Facility is launched and deployed during the next Shuttle flight, more than a dozen Langley employees will be monitoring the payload from duty stations at the Kennedy and Johnson Space Centers.

Project Manager Leo Daspit, who has been overseeing LDEF launch preparations at KSC for the past several months, will head a small team of Langley people in the KSC Mission Director Center during launch and deployment.

With Daspit will be LDEF Chief Scientist William Kinard and LDEF Experiment Managers David Carter, Lenwood Clark and James Jones Jr. Glenna Martin, Project Assistant, will be there, along with two people "on loan" to the LDEF Project Office: Carol Kiser, Systems Engineering Division, who is working with the LDEF experiments, and Louis Hunt, Flight Electronics Division, Lead Electronics Engineer for LDEF.

A second team of Langley people will be on duty in the Mission Control Center at JSC. Deputy Project Manager Robert O'Neal will be located in the Customer Support Room and nearby, in the Multipurpose Support Room, will be LDEF Operations Manager Charles Tynan; Mission Analyst Joe Drewry, Atmospheric Sciences Division; Thermal Analysts Robert Greene and William Berrios, both of Systems Engineering Division; and Electronics Engineer Thomas Shull, Flight Electronics Division.

Space Station Office Formed, Walberg Goes to Headquarters

President Reagan's "go ahead" for NASA to design and develop a Space Station has created several organizational changes within the Space Directorate at Langley.

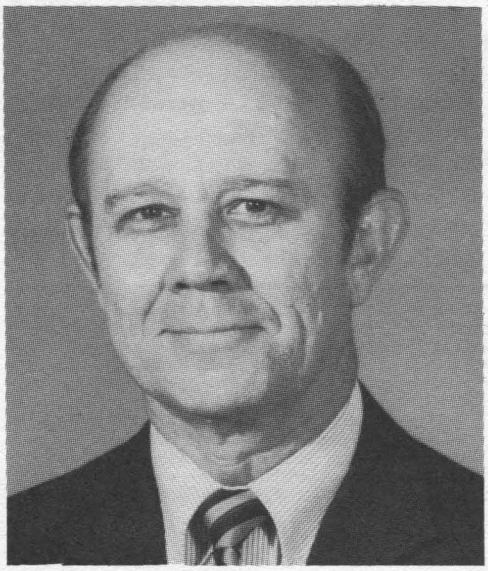
A Space Station Office has been formed to develop detailed plans for a permanent Space Station organization at Langley and identify the associated staffing requirements. Additionally, the Space Station Office is to immediately develop the working relationships and contacts with other NASA centers and Space Station organizations which will be required to insure a successful Langley Space Station program.

The office, which reports directly to the Director for Space, is headed by W. Ray Hook, who has been detailed from the Space Systems Division. Dr. Ralph J. Muraca is detailed from the Systems Engineering Division as deputy.

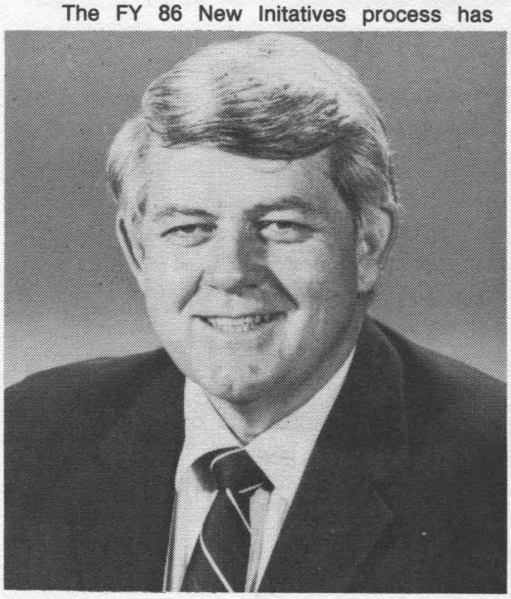
Dr. Gerald D. Walberg, Chief, Space Systems Division, has accepted a special assignment at NASA Headquarters through April, where he will coordinate Space Transportation New Initiatives. He will be working in the Transportation Systems Office and will be responsible for reviewing the various proposed initiatives and augmentations, and working with various NASA centers and offices and with the DOD to develop a strong national program. Based on the results of these reviews and studies, Walberg will propose one or more coordinated initiatives in the area of space transportation.

The FY 86 New Initatives process has produced a large number of proposals which deal with technology developments required for advanced space transportation systems. They include flight and ground-based research programs and a wide range of technologies, including advanced structures, materials and thermal protection systems, computational fluid dynamics and aerothermodynamics, cryogenic fluid management and advanced rocket and airbreathing propulsion.

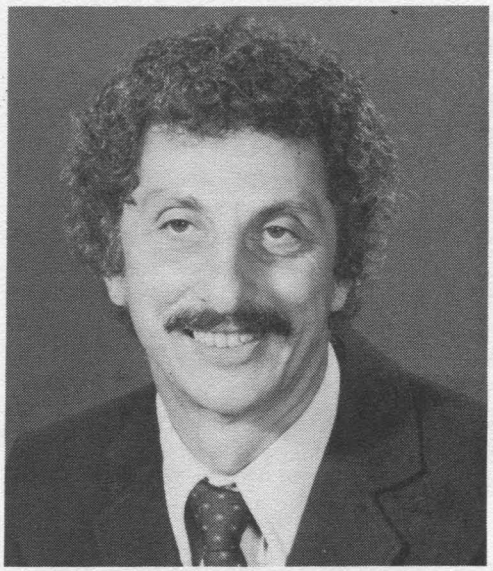
The proposals are related in the sense that they all support the development of advanced space transportation systems with special emphasis on aero-assisted orbital transfer vehicles, high-L/D "transatmospheric" vehicles and advanced launch vehicles.



Dr. Gerald D. Walberg



W. Ray Hook



Dr. Ralph J. Muraca

-photo by Fred Jones

The Soaring Society of America, Inc. presented a Certificate of Appreciation to the Langley Research Center for its "continued contribution to the art, sport and science of motorless flight and its support of the Society's annual National Soaring Week programs." Langley helped the Tidewater Chapter of the Society with an exhibition at the Visitor Center for two consecutive years and hosted a symposium on "The Technology of Motorless Flight" several years ago. Floyd Sweet (left), the Regional Director of the Society, presented the certificate to Langley's Director Donald Hearth on February 23.

Langley to Host Shuttle Student Conference

The 1984 Space Shuttle Student Involvement Project Regional Conference will be held at the Langley Research Center March 25- 28.

The Shuttle Student Involvement Project (SSIP) is designed to stimulate student interest and participation in science and mathematics by providing the opportunity for students to submit experiment proposals for possible selection to fly on the Space Shuttle.

The regional conference, to be held in the Activities Center, will be attended by 20 winning semi-finalists, accompanied by their teacher/advisors. During the conference, each student will present their experiment proposal orally. NASA consultants and university professors will be present to give suggestions and recommendations on how the students may improve their proposals.

After the regional conference, each student will resubmit their experiment proposals for national judging. If selected, the student's experiment will be developed into flight hardware and scheduled for future flight on board the Space Shuttle.

The subject areas for proposals include biology, astronomy and astrophysics, physics, medicine, earth science, chemistry, electronics, engineering and environmental and psychology/behavioral science.

LFCU Annual Meeting Approaches

The Langley Federal Credit Union will hold its 48th annual meeting March 27 at Denbigh High School. All LFCU members are invited to be present; the doors will open at 6:30 p.m. with the meeting beginning at 7.

Highlights will include the election of officers, an audiovisual presentation and the drawing of prizes. The grand prize to be given away this year will be a trip for two to Frenchman's Reef Resort in the Virgin Islands.

Mark March 27 on your calendar; you could be the lucky winner at this year's meeting.

Scholarships Offered to NASA Dependents

Applications are being accepted for two scholarships to be awarded by the NASA College Scholarship Fund, Incorporated.

The fund, set up in 1982 through an endowment from Pulitzer Prize winning author, James Michener, provides college scholarships for qualified dependents of NASA and former NASA employees. Last year, James O. Pendergraft, whose father, Odis, is an aerospace engineer in Langley's Transonic Aerodynamics Division; and Paul A. Schliesing of Houston, each received $1,500 renewable scholarships from the endowment.

Applicants must be pursuing a course of study in the science and engineering fields that will lead to a recognized undergraduate degree at an accredited college or university in the United States.

Two scholarships will be awarded in the amount of $1,500 each for the 1984-85 school year. The renewable scholarship cannot exceed $1,500 per dependent per academic year, to a maximum of $6,000 over six calendar years.

Persons interested in being considered for a scholarship should contact the Langley Employee Services Branch, ext. 2266, to receive more detailed information and copies of the application forms. All applications must be received by the Scholarship Committee at the Johnson Space Center by March 30.

PROGRESSION

With joy and happiness I stroll
Through pasture ways
To watch the winter snow depart
For spring-time days,
And while the pines nod in the wind
I listen – hear
A robin's lovely, trilling notes,
Chee-cheer, my dear.
I bid adieu to winter – grab
The hand of Spring
And with a gay-clad spirit, dance
Or shout and sing!

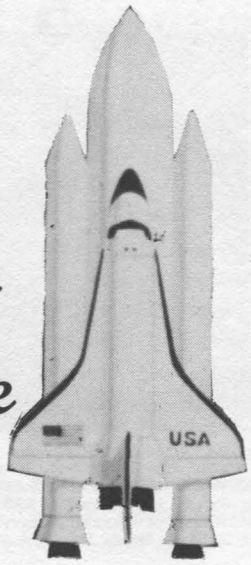
– Cherry L. Van Deusen Bechtol

The *Langley Researcher* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia 23665. It is published every other week in the interest of its employees. Address contributions to the Editor, Mail Stop 115, telephone 3006.

Editor ..... Jean Saunders
Staff Photographer ..... Bob Nye

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

Space Shuttle Update



The Challenger was moved to the Vehicle Assembly Building last week where it was joined with the external tank and twin solid rocket boosters. The orbiter was then put through some attachment tests starting on Friday and taken to its seaside launch pad three and one half miles away Monday morning.

At press time, launch was holding firm for Friday, April 6, at about 9 a.m. EST.

Highlights from the mission timeline include the LDEF deployment sequence starting at about 9:45 a.m. Saturday, April 7, when the orbiter's robot arm takes hold of grapple fixture number two. Actual release of LDEF is set for about 12:30 p.m. the same day. Other highlights include Solar Max approach for capture and repair beginning at about 9:15 a.m. Sunday when Challenger pulls to a point 800 feet from the crippled satellite, and the second-ever landing at KSC shortly after 8 a.m. Thursday, April 12.

The crew on 41-C include Robert L. Crippen, commander; Francis R. Scobee, pilot; and George D. "Pinky" Nelson, James D. "Ox" Van Hoften, and Terry J. Hart, mission specialists. Nelson will fly to the initial rendezvous with Solar Max using a manned mobility unit. Van Hoften will be the principal repairman in the cargo bay, and Hart will operate the robot arm for both LDEF deployment and Solar Max operations.

The mission will be the first for the entire crew except Crippen. This will be his record-breaking third.

Astronaut Charles Bolden to give Keynote Address

NTA Holds Student Symposium

The Hampton Roads Chapter of the National Technical Association will hold its third Region II Minority Technical Student Symposium/Opportunity Fair March 30-31.

The symposium, sponsored by NTA and the Langley Research Center, will consist of one day of technical sessions and interfacing with NASA staff at Langley and a one-day Opportunity Fair at the Chamberlin Hotel.

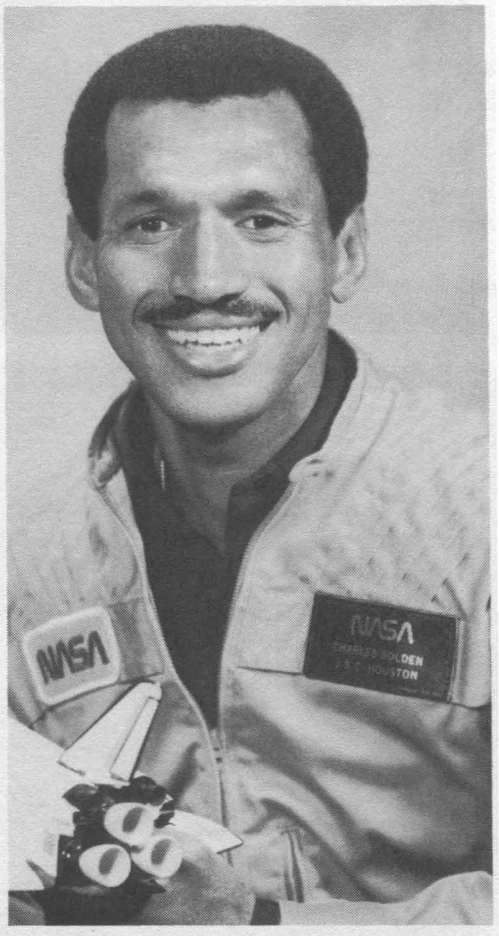
The conference is geared primarily for, though not limited to, minority and female undergraduate and graduate students majoring in natural sciences, engineering and mathematics. Approximately 200 students and faculty advisers from colleges and universities in Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Maryland and the District of Columbia have been invited to participate. Twenty-four students have been selected to present technical papers at the symposium.

Lt. Col. Charles F. Bolden, Jr., one of NASA's black astronauts, will speak to the conference attendees and invited community educators on March 29, the eve of the symposium, at the Chamberlin Hotel at 7 p.m. He is also the keynote speaker for the opening session, which will be held March 30 in the Langley Activities Center, at 8:30 a.m.

Bolden was selected as an astronaut candidate in 1980. Upon completion of a one-year training period, he was declared a pilot eligible for assignment to future Space Shuttle missions.

On Saturday morning, March 31, the Opportunity Fair will be held in the lobby of the hotel. Ten exhibit booths will be operated by various private industries and federal agencies for recruiting and job information purposes.

In the afternoon an awards luncheon will be held to announce the three winners of scholarship awards for the most outstanding technical papers. The first place winner will present their paper at the 6th Annual NTA Convention in Cleveland, Ohio, in August. The speaker at the awards luncheon wil be Dr. Theodore R. Bunch, local physician and chairman of the Hampton City School Board.



Marshall Rouse, Structures and Dynamics Division, is president of the local NTA chapter. Dr. Christine Darden, High-Speed Aerodynamics Division, and Gilbert Haynes, Flight Control Systems Division, are co-chairmen of the two-day conference.

Key Position

Vernon P. Gillespie has been designated Head, Technical Contract Management Section, Engineering Administration and Scheduling Branch, Facilities Engineering Division.

Visitor Center Holds Shuttle Briefing

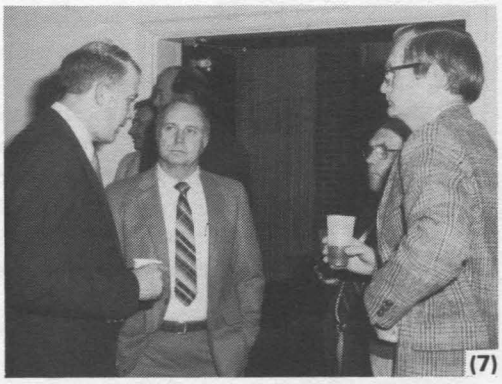
The Langley Visitor Center will hold a special briefing for the public on the next Space Shuttle mission. The briefing will be held March 28 at 2 p.m.

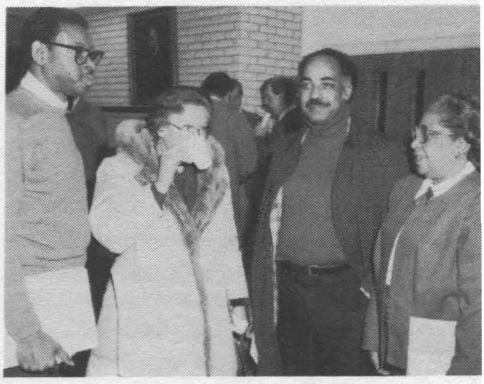
The next flight of the Space Shuttle will be one of the most ambitious missions yet. The launch is now scheduled for April 6. During the mission, the Shuttle Challenger will launch the Langley-developed Long-Duration Exposure Facility. In addition, astronauts, wearing the backpack manned maneuvering unit, will fly free of the Shuttle to lock onto the spinning Solar-Max satellite, stop its rotation and repair it in orbit.

Langley Receives Equal Opportunity Trophy

(1) Dr. Harriett Jenkins, Assistant Administrator, Office of Equal Opportunity Programs, NASA Headquarters, presented the Equal Opportunity Trophy to Langley during a special ceremony March 13. Langley shares the award this year with NASA Headquarters. With Jenkins are Langley Deputy Director Richard Petersen, who is also Chairman of Langley's Equal Opportunity Steering Committee, and Langley Director Donald Hearth. (2) Jenkins presented Hearth with the plaque accompanying the trophy. The citation read, "In recognition of well planned an executed management strategies which have contributed to the employment, development an utilization of minorities, women and the handicapped at NASA, and which have shared th agency's resources with a broader array of American citizenry." (3) Jenkins is greeted at th reception following the ceremony by Thayer Sheets, Head, Office of Equal Opportunity Program

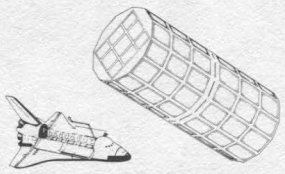
Mary Jackson, Manager, Federal Women's Program; and Hearth. (4) Langley Directors share a happy moment with Robert Lee, (second from left) former Head, EOP, as they gather around the trophy. The Directors, who received the Langley Equal Opportunity Award for the last quarter of 1983 for their work on Langley's EO Steering Committee, are (from left) Robert Bower, Director for Aeronautics; Robert Kirby, Chief of Programs and Resources Division and representing John Stokes, Director for Management Operations; Howard Wright, Director for Projects; Paul Holloway, Director for Space; Charles Blankenship, Director for Structures; and Robert Swain, Director for Systems Engineering and Operations. Absent was William Mace Director for Electronics. (5) Present and past heads, Office of Equal Opportunity Programs, paus with Petersen and Jenkins following the ceremony. From left are Petersen; Sheets; Burnett Peters, now Chief, Management Support Division; Lee, now assigned to the Space System Division; and Jerry Hansbrough, now Assistant Chief, MSD. (6) Hearth; Vivian Merritt, EOP; an Lee, toast Langley's equal employment opportunity accomplishments, such as, this being th first time a NASA center has met or exceeded all of the agency affirmative action guidelines





increasing the minority and women workforce representation 12 and 14 percent respectively; and increasing the minority/women GS-14 and supervisory representations 39 and 35 percent respectively. (7) Others attending the reception include, with Blankenship and Swain, Robert Dinkins (second from left), Assistant for Management and Resources, SE&O; and Hubert Clark (second from right), Assistant Director, SE&O. (8) Weldon Staton, Systems Safety, Quality and Reliability Office; Katherine Johnson, Flight Dynamics and Control Division; Peters; and Jackson celebrate Langley's selection for the EO trophy. Langley was also cited for increasing grants awarded to minority colleges from $.6 million to $2.5 million; informally resolving all potential discrimination complaints since July 1981; initiating a dare care center; and involving the senior staff in implementing the affirmative action/equal opportunity programs.

LDEF Status



The Long-Duration Exposure Facility and other Shuttle payload elements were transferred from the Orbiter payload canister to the Orbiter payload bay on Tuesday, March 20, using the payload changeout room.

Today, March 23, the final protective covers were removed from experiments, and the Orbiter's payload bay doors will be closed Saturday. The LDEF payload is now ready for its scheduled launch aboard Challenger on Friday, April 6.

CHRISTIAN E. CHARLES once wrote the following relative to the meaning of character: "We are the architects and builders of our own characters and must dwell within them. Character is developed under pressure. If we never met opposition and obstacles, we would soon become weak. As the athlete develops physical strength by exercise, so mental strength comes from facing problems. The fight for character is real in the life of all those who are not drifting down the current of pleasure, but rowing upstream. Moral strength is developed in places of difficulty and trial. Character is like the foundation of a house; it is below the surface. The qualities of character are revealed eventually even as the quality of a building is revealed under the stress of time. When we see character as a supreme purpose of life, we recognize all the difficulties as lessons and challenges, and seek to master them. When we do less than our best, we only cheat ourselves."

– From The Better Way

Thanks

Alex Peterson wishes to thank all those who participated in his retirement festivities. He said he is sorry that his 1955 Ford broke down.

1984 Savings Bonds Campaign Underway

The 1984 Savings Bonds Campaign is being conducted throughout NASA. The program offers many advantages to participants. Here are just a few:

o Savings Bonds are affordable, as little as $3.75 per pay period.

o Savings Bonds are guaranteed as to principal and interest by the United States Government

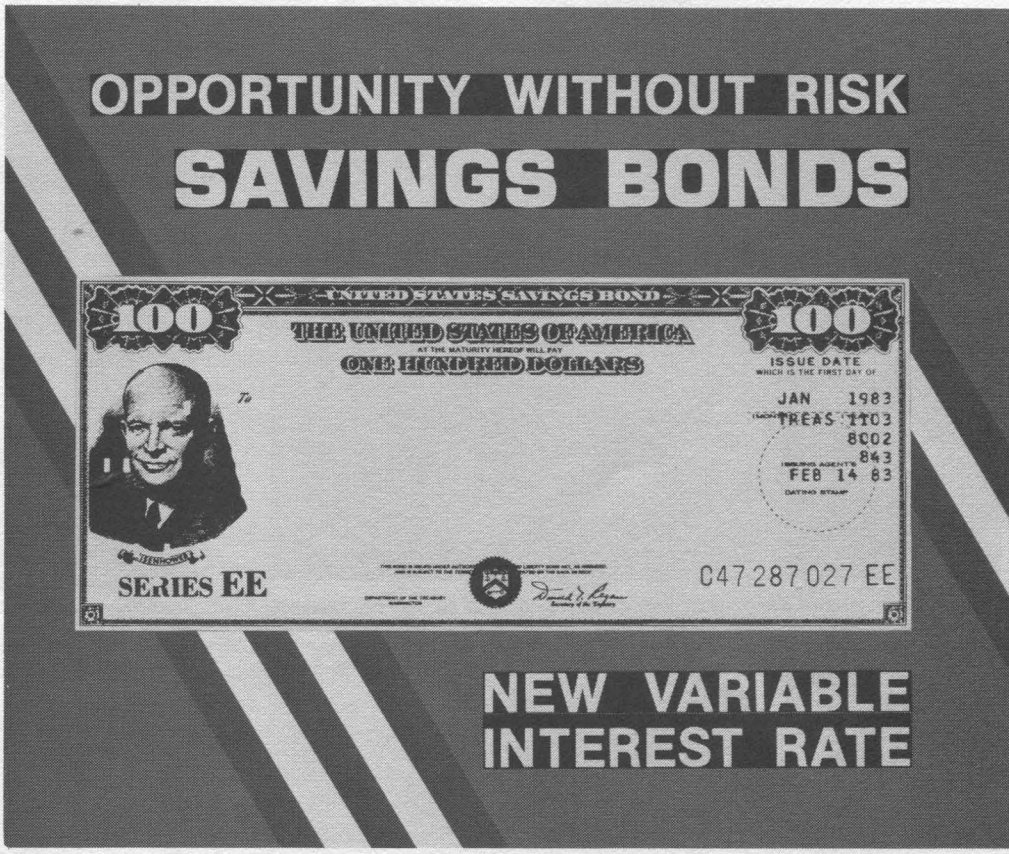
o Savings Bonds offer a variable market-based interest rate. The current interest rate is 9.38 percent.

o Savings Bonds are exempt from state and local taxes.

o Savings Bonds are replaced free by the Treasury Department if lost, stolen or destroyed.

o Savings Bonds provide tax advantages which can be used to great benefit when saving for such goals as children's education or supplementing your retirement income.

Join with 1,504 of your fellow employees and take advantage of the benefits of the Savings Bonds Program.



Upcoming Workshops

IPAD II Symposium - Advances in Distributed Data Base Management for CAD/CAM, April 17-19 Marriott Hotel, Denver, Col., contact Susan Bostic, ext. 3401.

Symposium on Recent Experiences in Multidisciplinary Analysis and Optimization, April 24-26, Langley Activities Center, contact Jim Gardner, ext. 3721.

Langley Directives Distributed

REVISED:	DATE	T.S.#	DISTRIBUTED
Table of Contents to the Management Manual	2-9-84	1324	3-5-84
Index to the Management Manual	2-10-84	1325	3-5-84

Five Groups Receive First Quality Circle Awards

The first "Quality Circle Achievement Award" has been presented to five Langley Quality Circles. There are 12 circles in operation at Langley with several others ready to start.

These certificates have been developed to recognize the efforts of the circle members who have made significant contributions to the improvements of productivity and quality of Langley's day-to-day operation.

"The Perfect Impressions" were presented awards for the "Improvement in the Method of Receiving a Processing Work Request in the Publications Branch." Jess Ross, (right), Chief, Research Information and Applications Division, presented awards to Harold Orr, Benjamin Franklin, Benjamin Defendeifer, Roland Hatten, Alvin Buggs and Joseph May. Not pictured: Joan Hintz.

The "Ten Sense" received awards from Phillips for "Improvements of the Tool Crib Operation in the Advanced Machining and Development Section." Seated are Donald Athearn, Henry Zumbrun, Robert D'Agostino, David Nicholls, Phillips; standing are Ellery Vandenbree, Head, Materials Applications Technologh Branch; Daniel Milburn; Danny Barrow; Victor Wilson; Joseph Hickman; and Bruce Little.

The "Problem Seekers/Solvers" received awards for "The Improvement in Maintaining the Operational Status of Portable Electronic Equipment in the Structures and Materials Research Laboratory." Earl Stahl (left), Chief, Operations Support Division, presented awards to Donald Coffey, Eugene Brady, Robert Garletts, George Willis and George Johnson.

"The Alloyist" received awards for the "Reduction of Damage to the Power Brake Dies in the Metals Applications Technology Development Section." Phillips presented awards to (seated) Charles Wittkopp, Jim Johnson, Mark Lord, Norman Willey; (standing) Kyle Ballew Jr., Gerald Miller, Russell Parr, Tom Mitchell, Frank Lawrence and William Drummond.

"The Model Circle" received awards for "The Improvement of the Vacuum System in the Composites and Models Development Section." The awards were presented by W. Morris Phillips (seated in center), retired Chief, Fabrication Division. Pictured with Philips are (from left) Howard Wilson, Mark Hudgins, Gary Johnson, William Conkling; (standing) Richard Chatten, William Page and William Derby, section head. Not pictured: Donald Smith.

Happenings

HAPPY HOUR will be held today from 4 to 6:30 p.m. in the Activities Center.

EASTER EGG HUNT. The LAA will hold the annual Easter Egg Hunt April 15 at 2 p.m. on the Activities Center grounds. Let your children hunt for eggs while you shop at the Arts and Crafts Show (see related article below). Tickets for the egg hunt are on sale in the Activities Office for 75 cents per person.

SHUTTLE PASSES. Car passes for viewing the Space Shuttle launch scheduled for April 6 are available by calling Ann Suit, ext. 3967. This next flight includes the deployment of Langley's payload, the Long-Duration Exposure Facility.

THE WILLIAMSBURG PLAYERS will present Tom Stoppard's mystery comedy, "The Real Inspector Hound," March 28 - April 14, at the James-York Plaza, 200 Hubbard Lane, Williamsburg. Evening performances are at 8 p.m. with a Saturday matinee April 7 at 2 p.m. Call 229-1679 or 877-6468 for information and reservations

TOASTMASTERS. The TAC Air Toastmasters Club will meet March 28 in Building 1209, Room 180, at 7:30 p.m. For further information, call Davis Wright, ext. 4631, Gale Wilson, ext. 3535, Bob Miserentino, ext. 2817, or Karen Credeur, ext. 4501.

LOCKER ROOMS. Effective immediately, the exterior doors leading to the ladies' and men's locker rooms located in the Activities Center will be locked from 10 p.m. to 6 a.m. daily. Please plan your use of these rooms accordingly.

THE TIDEWATER CLUB OF SIGMA XI has recently applied for chapter status. This will make the Sigma Xi lectures available to the local organization and enhance participation by area researchers. Langley researchers who are former Sigma Xi members or affiliated with other chapters who would like to participate can obtain further information by calling Dr. Paul Homsher at ODU, 440-3595.

BUSCH GARDENS season passes are for sale in the LAA Office for $39.50.

THE VIRGINIA STAGE COMPANY will present A.R. Gurney's comedy, "The Dining Room," beginning with low- cost previews Friday and Saturday, March 30 and 31, at 8 p.m. Opening night is Sunday, April 1, at 7 p.m. The show will continue through April 21, with shows nightly, except Monday. Tickets are available by calling 627-1234 or through the First Virginia Bank. Half-price tickets are available the day of the peformance at the kiosk at Waterside in Norfolk.

LAA ARTS AND CRAFTS SHOW will be held Saturday, April 14, and Sunday, April 15, from 12 to 5 p.m. in the Activities Center. Included in the show will be country carving, woodwork, jewelry, ceramics, flower arrangements, weaving, paintings, stained glass, crochet and home-made candies. Anyone interested in displaying their crafts should call Betty Hughes, ext. 2476, for further information.

THE NASA TENNIS CLUB is holding its annual membership drive. Sponsored by the LAA, the club is open to NASA employees, contractors and dependents. Some of the activities sponsored are ladder competitions, league play and tennis instructions. The NASA facilities include four newly surfaced tennis courts, two of which are lighted for night play, and complete locker room facilities. The membership fee is $4 per year. For more information, call Bill Weaver, ext. 3431, or the LAA Office, ext. 3139.

CALLIGRAPHY COURSES. An eight-week beginning Calligraphy course starts Monday, April 2, at Thomas Nelson Community College. An eight-week advanced course begins Wednesday, April 4. Wesley Berryman is the instructor. Call the Office of Continuing Education, 825-2935, to enroll.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30 p.m.

NASA GARDEN CLUB. The Garden Club is preparing for the new season. For the benefit of potential new members we have two acres of plowed land, three tillers (three sizes), and water spigots available within 20 feet of each plot. Costs for the season are $10 fee for new members (for use of tillers), $8 for a 20' x 40' plot or $5 for a 20' x 20' plot Contact Jack Newbauer, ext. 3457, or Larry Bement, ext. 4621, for information or an application.

DISCOVERY, an inter-denominational group for singles, will meet tonight at 7:30 at the Unitarian Church on Youngs Mill Lane for a social hour and informal discussion. For more information call Moses Farmer, ext. 2661.

CLASS RINGS are available for any engineering technician apprentice graduate, no matter what year you graduated. Jim Wolk, from Herff Jones Company, will be in the lobby of Building 1194A Monday, April 2, from 8:45 to 11:30 a.m. to take orders. Prices vary according to the order.

SPECIAL PROGRAMS. Registration has opened for William and Mary's Special Programs. Offerings include skills and crafts, personal growth, careers and professions, historic studies, business and careers, financial planning, as well as seminar, conferences, workshops and lectures. New programs starting monthly include computer seminars, art and home repairs; future programs include career development, fiction writing, auto repair, archaeology, photography and grammar. For registration, free lecture tickets, or a catalog of course descriptions, call 253-4084 or 4047.

NEW ARRIVAL. Weighing in at 6 pounds, 14 ounces on February 28 was Glen Allen Doyer Jr., son of Winona and Glen Doyer. The proud father works for Harvey Janitorial Company.

Kepley Promoted to Lecturer

Naomi Kepley has been promoted to a lecturer at the Langley Visitor Center, after having worked there since September 1979.

Kepley has become very knowledgable in aeronautics, astronautics and astronomy. For several years, she has conducted guided tours and given theater presentations to adults and children. Her successful performance has resulted in recognition from visiting educators and many others.

Her special contribution to the Visitor Center is attributed to her ability to reach children. She developed and presented a highly successful summer children's program, "Exploration." Many hands-on demonstrations and group participation activities were included in the program.

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
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swap and shop

FOR SALE

REAL ESTATE

Indian Cove Resort: Associate membership, ideal for retirees, those w/recreational vehicles and families who love the great outdoors; entitles you to membership in Camp Coast-to- Coast; great buy at $1,500 and assume $85.23/month. Associate memberships now sell for $7,000; save over $1,000. Call 850-2178 after 4 p.m. weekdays, anytime weekends.

Cemetary lots in Veterans Memorial Gardens: two choice lots and two crypts, $2,000, OBO. Call 826-0619.

Courthouse Green Townhouse: Three bedrooms, 1 1/2 baths, AC, EC; owner will help with closing costs, 7 percent assumable loan, $52,300. Call 874-2246 after 5 p.m.

ARTICLES

Two sets of twin-size box springs, EC, $5 each. Call Gary Warren, 838-4633.

Signature frostless freezer, upright, looks and runs like new, coppertone; $275 OBO. G.E. refrigerator/freezer, upright, frostless, side by side with ice maker, deluxe model; $695 OBO. Set of golf clubs with carrying case, $100. Call 826-0619.

Ethan Allen three-cushion wing sofa, beige, LN, 80"x32"x32"H, $400. Ethan Allen cabinet cocktail table, antiqued pine, LN, two doors simulating apothecary drawers on both sides, two shelves, 56"x23"x17"H, $175. Call 877-8263.

VEHICLES

Pontiac 1983, 6000 LE, fully equipped, 4 doors, AM/FM stereo cassette, front seats fully recline, tilt steering wheel, cruise control, lock-wire wheels, electric doors and windows, LN, 8,000 miles, $12,500 OBO. Call 826-0619.

WANTED

One additional driver to car pool from Norfolk to West area on 7:30 a.m. shift. Call Hudgins, ext. 3072.

Fourth driver (non smoker) to complete car pool from Virginia Beach to West area on 7:30 a.m. shift. Call Allen Waters, ext. 4199; Janet Brunelle, ext. 3681; or Bagher Tabibi, ext. 3781.

cafeteria menu

WEEK OF MARCH 26-30

MONDAY: Old Fashioned Bean Soup; Meat Balls Stroganoff; Chicken Gizzards; Macaroni, Franks and Cheese. Snack Bar: Italian Beef and Pepper Sub and Super 6 oz. Cheeseburger.

TUESDAY: Turkey Noodle Soup, Baked Lasagna, Pork Chow Mein and Fried Filet of Flounder. Snack Bar: Chicken NASA and Meat Ball Sub.

WEDNESDAY: Fresh Vegetable Soup, 1/4 BBQ Chicken, Ham and Cheese Omelet, and Beef Tips and Noodles. Snack Bar: Steak and Cheese Sub and Knockwurst.

THURSDAY: Chicken and Vegetable Soup, Braised Beef and Vegetables, Stuffed Italian Shells and Braised Chicken Livers. Snack Bar: Ham and Cheese Club and Pizza Burger.

FRIDAY: Bull Island Clam Chowder, Fish Filet Dinner, Knockwurst and Sauerkraut and Chicken Teriyaki. Snack Bar: Hot Italian Sausage and 1/4 lb. Cheeseburger.

WEEK OF APRIL 2-6

MONDAY: Seafood Gumbo; Burrito and Spanish Rice; Beef Stew; Pork Chop, Apple Sauce and Vegetable. Snack Bar: Corned Beef Reuben and Polish Sausage.

TUESDAY: Beef and Vegetable Soup, Spaghetti Dinner, Beef Liver and Onions and Baked Filet of Fish. Snack Bar: Chicken NASA and Super 6 oz. Cheeseburger.

WEDNESDAY: Fresh Vegetable Soup, Fried Chicken Dinner, Chopped Steak and Broccoli and Cheddar Quiche. Snack Bar: Poor Boy Sandwich and Beef and Cheese Club.

THURSDAY: Chicken Gumbo Soup, Veal Parmigiana w/Pasta, Beef Pot Pie and Braised Chicken Livers. Snack Bar: American Boy and NASA Sub.

FRIDAY: Bull Island Clam Chowder, Fish Filet Dinner, Chicken Creole w/Dirty Rice and Country Style Steak. Snack Bar: 1/4 lb. Bacon Cheeseburger and Crab Cutlet.

Female roommate to share 3 bedroom house w/same, prefer non-smoker, $175 per month plus part of utilities. Call 850-2178 after 4 p.m. weekdays, anytime weekends.

Choice Bit

Every man carries with him the world in which he lives.

CREW INSIGNIA. The patch to be worn by the five members of NASA's 41-C space mission tells the story of that flight. It features a helmet visor of an astronaut performing an extravehicular activity. In the visor are reflected the sun's rays, the Challenger and its remote manipulator system deploying the Long-Duration Exposure Facility, the Earth and blue sky, and another astronaut working at the damaged Solar Maximum Satellite (SMS). The scene is encircled by the surnames of the crew members.

NASA and Italian Space Agency Sign Two Agreements

James M. Beggs, NASA Administrator and Professor Ernesto Quagliarello, President of the Italian National Research Council of Italy (CNR), signed two Memoranda of Understanding March 7 in Rome. The two separate agreements establish the development of the Tethered Satellite System and the development and launch of the Laser Geodynamics Satellite-2 (Lageos-2).

The Tethered Satellite System (TSS) is a data-gathering satellite that will be carried into orbit by the Space Shuttle and released from the payload bay on a tether in late 1987. It will provide an important new reusable, multidisciplinary facility for conducting space experiments in earth orbit and will open the way to several areas of long-term scientific experimentation otherwise impossible.

NASA and CNR will jointly plan and implement the intial tether satellite mission. In addition to launching the TSS on the Shuttle, NASA will develop the TSS deployer and perform the system-level engineering and integration. CNR will develop the two-module (science and service) TSS satellite and provide system-level support to NASA for technical aspects of the satellite.

The other agreement signed by NASA and CNR outlines the terms for the development of Lageos-2. It will be identical to Lageos-1, which was launched by NASA in 1976, and will be placed in an orbit of similar altitude, but with a different inclination.

The Lageos-2 satellite, in essentially opposite orbit to the Lageos-1, will significantly enhance study and understanding of the solid earth and its dynamic processes. The improvements that it will supply will particularly benefit studies of regional crustal deformation associated with the occurrence of earthquakes in the Mediterranean area being undertaken by the United States and a consortium of European countries. Similarly, studies of the San Andreas Fault System will benefit from Lageos-2 and from the Mediterranean studies.

CNR and NASA will work jointly on this project also. CNR is responsible for the fabrication of the Lageos-2 satellite, integration of the apogee stage, the Italian Research Interim Stage and delivery to NASA. NASA will provide existing ground support equipment, hardware and software remaining from the Lageos-1 mission, technical consultation and launch on the Space Shuttle as a payload of opportunity with a planned launch in 1987.

National Aeronautics and
Space Administration

Langley Research Center

NASA

Langley Researcher

Volume 23, Issue 7

April 6, 1984

Challenger to Deploy LDEF; Solar Max to be Repaired

Eleventh Space Shuttle Mission Begins Today

The eleventh Space Shuttle mission, scheduled for launch at 8:59 this morning, will be devoted to two major activities during its six-day flight:

o Deployment of Langley's Long-Duration Exposure Facility into Earth orbit.

o Capture and repair of the malfunctioning Solar Maximum Mission satellite.

LDEF DEPLOYMENT

LDEF deployment comes first, beginning about 9:24 Saturday morning, April 7, when Mission Specialist Terry Hart will maneuver the Orbiter's remote manipulator arm to engage a grapple fixture on the LDEF structure. That will activate the Experiment Initiate System and turn on those experiments that require power during their 10-month exposure to the space environment. The arm will then be maneuvered to attach to a second LDEF grapple fixture to begin the deployment.

Four support trunnion latches and a keel fitting that hold LDEF in the Orbiter payload bay will be released and the RMS will begin to move LDEF out of the bay. Several short tests of the arm, while supporting the structure, will be done by Hart during this operation.

During deployment, the Orbiter will be traveling almost on its back, in relation to Earth, with the tail section down and forward and the forward end up and aft.

LDEF will be placed in a gravity-gradient stabilized attitude, inclined approximately 28.5 degrees to Earth, and at an altitude of 250 nautical miles (288 statute miles). One end of LDEF will always point toward Earth and one end will point toward space. One side of the structure's circumference will point in the direction of orbit; the opposite side will be the structure's trailing edge.

Once LDEF is positioned, the Orbiter will stabilize itself and the payload before release. After deployment is completed, the Orbiter will fire small thrusters to separate itself from LDEF at a speed of half a foot per second. The Orbiter will then track LDEF for about one hour.

LDEF orbital vector data will be provided to NASA by the North American Aerospace Defense Command (NORAD). Intensive C-band radar tracking will begin 72 hours before the launch of Shuttle mission 51-D (scheduled to retrieve LDEF in February 1985) to provide accurate information required for Orbiter and LDEF rendezvous.

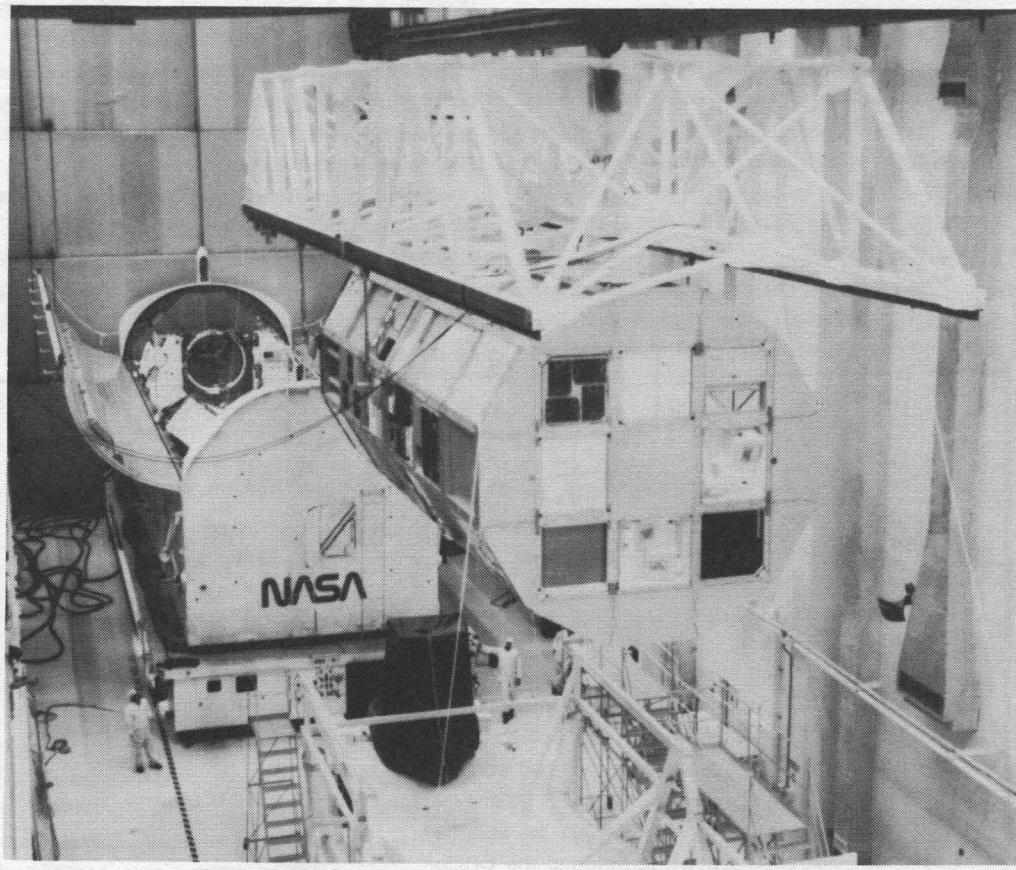
When LDEF is landed at the Kennedy Space Center, its 57 experiments will be returned to their principal investigators for detailed post-flight analysis.

SATELLITE REPAIR

The Orbiter Challenger will make necessary maneuvers during its first two days in space to intercept the SMM satellite at the beginning of the third mission day, arriving to within 800 feet of the faulty SMS. Commander Robert Crippen and Pilot Richard Scobee will then maneuver Challenger to within 200 feet of the spacecraft.

Meanwhile, Mission Specialists George Nelson and James van Hoften will have donned their spacesuits for the first of two spacewalks.

Continued on page 2.



Langley's Long Duration Exposure Facility is shown in the Operations and Checkout Buildin at the Kennedy Space Center ready to be installed in the Payload Canister for transportatio to Launch Pad 39A. LDEF is scheduled to be deployed tomorrow to begin a one-year stay The Flight Support Structure and the repair equipment for the Solar Max satellite are show already positioned in the Payload Canister. The FSS will serve as a cradle for the disable Solar Max while astronauts attempt to replace faulty equipment during the 41-C mission.

ASTRONAUT CREW. These five astronauts represent the crew members of NASA's 41-C (STS-13) space mission scheduled for launch April 6. Pictured in front of an extravehicular activity scene with the Space Shuttle Orbiter Challenger are (from left) Robert L. Crippen, commander; Terry J. Hart, James D. van Hoften and George D. Nelson, all mission specialists; and Francis R. (Dick) Scobee, pilot.

Space Shuttle Launch

Continued from page 1.

Nelson will use a propulsive Manned Maneuvering Unit backpack to fly untethered to the satellite. Small backpack thrusters will allow Nelson will rotate himself to match the slow one-half degree-per-second rotation rate of the SMM. He will then dock with it, using a device connected to the front of his backpack that will attach to a pin on the satellite.

The small backpack jets will fire to stop the satellite's motion, and Challenger will be maneuvered close enough so that Astronaut Hart can use the remote manipulator arm to grasp the SMM, pull it into the Orbiter's payload bay and position it in a special cradle (called the Flight Support System) in the aft end of the bay.

The cradle provides an electrical path between the satellite and the Orbiter so the SMM systems can be monitored, and then checked after repair is completed.

Astronaut van Hoften will join the repair team by attaching himself to a special foot restraint connected to the tip of the manipulator arm. Astronaut Hart will operate the arm from inside the Orbiter to allow van Hoften to reach places on the satellite where repairs must be made.

The main repair activity on the first spacewalk is replacement of the satellite's attitude control module with a plug-in unit that will restore fine-pointing capability. A baffle will also be installed over the spacecraft's X-ray polychromator experiment. The first EVA will end with preparations for removal of the main electronics box on the satellite's coronograph polarimeter instrument, which failed less than a year after the SMM was launched in February 1980.

Nelson and van Hoften will suit-up and return to the payload bay on mission day five, April 10 to remove the faulty electronics box and install a new component, replace protective thermal insulation and check their work. Challenger's orbit will have been boosted 31 miles to be at the proper altitude to redeploy SMM.

In the small hours of April 11, at 3:39 a.m. EST, the satellite will be lifted out of the payload bay by the manipulator arm, given a final check and released back into orbit. Challenger will remain nearby for another eight hours while SMM is put through a final series of tests.

Also aboard Challenger is a buzzy student experiment that will study the weightless honeycomb structures built by 3,300 bees in space to compare them with honeycombs built on Earth. Proposed by Dan Poskevich of Tennessee Technological Institute, the experiment is sponsored, believe it or not, by Honeywell Inc.

The final payload of this Shuttle mission consists of two camera systems. Cinema 360 will film mission events to provide planetariums with a 360-degree film documentary for projection onto special domes. An IMAX camera will film events with special film that is larger and wider than standard 35mm and 70 mm film, allowing it to be shown on extremely large screens.

After just less than six days, Challenger is scheduled to make its second landing at the Kennedy Space Center at approximately 8:10 a.m. Thursday, April 12.

41-C TV Schedule

These 41-C Shuttle mission events will be available on the NASA television network at both the Langley Activities Center and the Visitor Center:

FRIDAY, APRIL 6:

7:00 a.m. - Countdown to launch

8:59 a.m. - Launch

SATURDAY, APRIL 7:

9:24 a.m. - LDEF activation begins (live TV &tape playback will last about 30 minutes)

10:47 a.m. - LDEF deployment begins (live &playback TV will last about one hour)

12:29 p.m. - LDEF release begins (live &playback TV will last about 45 minutes)

SUNDAY, APRIL 8 (Total activities will last about 5 1/2 hours):

10:20 a.m. - First spacewalk (EVA) to the Solar Maximum Mission (SMM) satellite

10:32 a.m. - Orbiter begins approaching the satellite

12:11 p.m. - Astronauts begin re-entering the Orbiter

1:40 p.m. - EVA into Orbiter payload bay to repair satellite

3:21 p.m. - Wrap-up of EVA activities

EOP Office Moves

The Equal Opportunity Programs Office has moved to trailers 1 and 2, Building 1195-T. Thayer Sheets and Janice Edwards can be reached on ext. 3487, Mary Jackson on 3488, and Vivian Merritt on 2124. The Mail Stop remains 178.

The *Langley Researcher* is an official publication of the Langley Research Center, National Aeronautics and Space Administration, Hampton, Virginia 23665. It is published every other week in the interest of its employees. Address contributions to the Editor, Mail Stop 115, telephone 3006.

Editor ..... Jean Saunders

Staff Photographer ..... Bob Nye

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

Young Receives 1984 AIAA Ground Testing Award

James C. Young, an aerospace engineer in the Space Systems Division, has received the 1984 Ground Testing Award presented by the American Institute of Aeronautics and Astronautics. The award is presented annually "for outstanding achievement in the development or effective utilization of technology, procedures, facilities, or modeling techniques for flight simulation, space simulation, propulsion testing, aerodynamic testing, or other ground testing associated with aeronautics and astronautics."

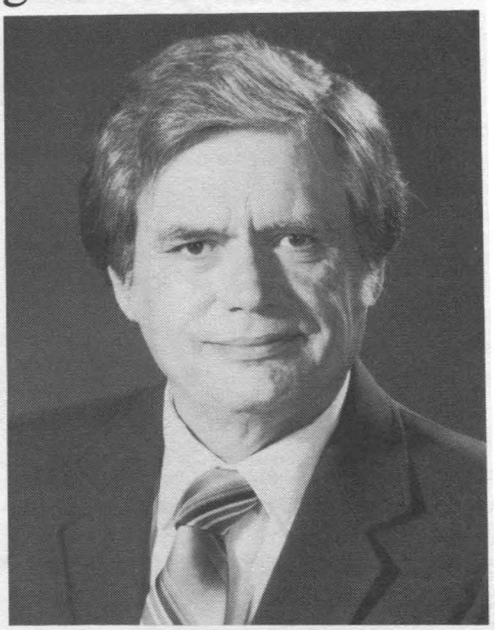
The award, presented to Young March 6 at the 13th Aerodynamic Testing Conference in San Diego, included a medal, certificate of citation and rosette pin. The accompanying citation reads, "in recognition of singularly outstanding contributions to the wind tunnel testing and aerodynamic design of the Space Shuttle. His technical and managerial contributions have been vital to the Shuttle's success from concept through flight."

Young's outstanding contributions toward the aerodynamic design, development and testing of the Space Shuttle were made while he was Manager of the Shuttle Aerodynamics Subsystem Program at the Johnson Space Center, where he worked from May 1967 until he transferred to Langley in July 1983.

Young began his NASA career in February 1963 at the Marshall Space Flight Center. He has specialized in applied aerodynamics, project management and supervision and has served as lead engineer on aerodynamic configuration design studies and as a consultant to Space Shuttle ascent and entry aerodynamics subsystems managers. At Langley, his work includes performing analysis of Shuttle flight test data.

Before joining NASA, Young worked for Chrysler Corporation, Huntsville; McDonnell Aircraft, St. Louis; and Convair, Ft. Worth.

A native of Texas, Young graduated from Frost High School and received a bachelor of science degree in aeronautical engineering from the University of Texas in 1956. He has done graduate work at the University of Alabama.



The author or co-author of five technical publications, Young has received many awards for his research work and contributions to the Space Shuttle Program.

Young and his wife, Deborah, live in Gloucester. They have two sons and a daughter.

Magnetic Fluids, Topic of Langley Colloquium

Magnetic fluid, or ferrofluid, becomes magnetized in the presence of an external magnetic field, but it also acts as a fluid, capable of assuming the shape of its container and of flowing downhill or around obstacles, according to Dr. Ronald E. Rosensweig, Senior Research Associate for Exxon Research and Engineering Company. The interaction of the magnetic and the fluid properties give rise to quite unusual phenomena.

Rosensweig, who has researched and directed fluid mechanical studies in energy related problems since 1973 at the Corporate Research Laboratories in New Jersey, will discuss "Magnetic Fluids: Phenomena, Analysis and Applications" at a Langley colloquium Monday, April 9. His lecture will be held in the Activities Center at 2 p.m., followed by a question and answer session and an informal discussion.

Rosensweig's color slide presentation will provide an overview of the phenomena and of ferrohydrodynamics, the theoretical description accounting for the behavior. A number of applications including lesser known uses will be introduced in illustration of the principles.

A native of Hamilton, Ohio, Rosensweig earned a bachelor of science degree from the University of Cincinnati, and master and doctor of science degrees in chemical engineering from the Massachusetts Institute of Technology. At MIT, Rosensweig originated the scattered light technique for detection of turbulent mixing and also contributed to the statistical theory of turbulence.

Following a faculty appointment at MIT and serving as a consultant to industry in problems of heat transfer and reentry ablation, Rosensweig joined Avco Corporation in 1962. There he led an effort in the pioneering of magnetic fluid technology that resulted in the spin-off in 1968 of Ferrofluidics Corporation. He served as the firm's founding President and Technical Director, and Board Chairman until 1973.

Moore to Direct Space Flight Program; Abrahamson Goes to DOD

Jesse W. Moore will become Acting Associate Administrator for Space Flight on April 15, NASA announced last week.

He will succeed Lt. Gen. James A. Abrahamson, USAF, who will become Director of Strategic Defense, a new position in the Department of Defense, reporting directly to the Secretary of Defense.

Abrahamson's appointment came approximately one year after President Reagan's speech to the nation in which he called for a national effort to rid the world of the threat of nuclear-armed ballastic missiles. The Strategic Defense Initiative Program, as the administration calls it, has been designed to look for ways to use lasers and other high-technology devices to ward off missile attacks.

Abrahamson, an aeronautical engineer who had directed the Air Force's F-16 air combat fighter program, will continue to direct the Space Flight program through the 41-C Space Shuttle mission. Abrahamson has been credited with moving the Shuttle program forward at a time when it was suffering many technical problems. His planning advanced, by several months, the first Shuttle space walks, the first outside excursion by free-flying astronauts and the first satellite repair mission, which is planned for this mission.

Moore, who had been Abrahamson's Deputy, joined NASA Headquarters in 1978 as the Deputy Director of the Solar Terrestrial Division in the Office of Space Science. He was the Director of the Spacelab Flight Division until December 1981, at which time he assumed the position of Director, Earth and Planetary Exploration Division in the Office of Space Science and Applications, where he remained until being appointed in February 1983 to the position of Deputy Associate Administrator for Space Flight.

Prior to these assignments, he was employed at the Jet Propulsion Laboratory beginning in 1966 where he worked in a variety of areas, including guidance and control, advanced programs and flight projects. His last assignment at JPL was as the Science and Mission Design Manager for Project Galileo.

NASA Langley Inventors Honored at Luncheon

Thirty-eight Langley inventors who received United States patents in 1983 and recipients of Langley's Technology Transfer awards, were honored at the annual Inventors' Luncheon Thursday, March 29, at the Langley Officers' Club.

Dr. Donald P. Hearth, Langley Director, presented the awards. Dr. Joseph S. Heyman, NASA's Inventor of the Year for 1982, was the guest speaker. Heyman is Head, Materials Characterization Instrumentation Section, Instrument Research Center, at Langley.

Inventors receiving awards were Ashby G. Lawson, for a modified spiral wound retaining ring; Robert V. Doggett Jr. and Rodney H. Ricketts (two awards each), for aeroelastic instability stoppers for wind tunnel models; Richard R. Adams, Ian O. MacConochie and Bordie D. Poole Jr., for a miniature spectrally selective dosimeter; Paul M. Hergenrother, for polyphenylquinoxalines containing pendant phenylethynyl and ethynyl groups; Dr. Ja H. Lee and Frank Hohl (posthumously), for a solar driven liquid metal MHD power generator;

James I. Clemmons Jr., for an instrument for determining coincidence and elapse time between independent sources of random sequential events; Dr. Ronald K. Clark and W. Barry Lisagor, for a fixture for environmental exposure of structural materials under compression load; Robert D. Averill, for a vibration isolation and pressure compression apparatus for sensitive instrumentation; Charles S. Gilliland and Roy J. Duckett, for a variable anodic thermal control coating;

Dr. Lucio Maestrello, for an apparatus and method for jet noise suppression; Laurence J. Bement, for explosively activated egress area; Robert R. McWithey, Dick M. Royster and Thomas T. Bales, for a metal matrix composite structural panel construction; Kevin W. Noonan, an Army employee, for a family of airfoil shapes for rotating blades; Dr. Jack D. Leatherwood, Thomas K. Dempsey (posthumously), Sherman A. Clevenson and David J. Stephens, for a ride quality meter;

Dr. Jag J. Singh and Dr. George M. Wood Jr., for a low energy electron magnetometer using a monoenergetic electron beam; William H. Phillips, retired, for a solar powered aircraft; David C. Grana, retired, and Spencer V. Inge Jr., for a vertical shaft windmill; Robert M. Baucom, for a medical clip; H. Douglas Garner, for a magnetic heading; and Donald J. Progar, for a hot melt recharge system; and

Dr. John H. Cantrell Jr. and Dr. Joseph S. Heyman, for frequently tracked gated pulse technique for ultrasonic frequency. Heyman will receive another award with Dr. John R. Davidson, for error correction method and apparatus for electronic timepieces.

Dr. Terry L. St. Clair will receive three awards, one he shares with his wife, Anne K. St. Clair, for elastomer toughened polyimide adhesives; the others for thermoset-thermoplastic aromatic polyimide containing N-propargyl groups and for solvent resistant, thermoplastic aeromatic poly(imidesulfone) and process for preparing same.

Technology Transfer awards were presented to Dr. Terry L. St. Clair and to the Instrument Research Division. The citation accompanying St. Clair's award reads, "for outstanding effort and achievements in the transfer of NASA technology through the successful application of research in polymer chemistry to industrial, civil and military sector requirements and objectives."

The division's award, to be accepted by David R. Johnson and Marvin F. Burgess, will be given for "sustained superior performance in broadening and accelerating the transfer of NASA technology resulting in increased benefits to the industrial, medical, civil, and private sectors thereby reflecting great credit to NASA."

Key Position

Dr. William L. Grose has been designated as Assistant Head, Theoretical Studies Branch, Atmospheric Sciences Division.

Competitive Placements

83-23– Secretary (Stenography), GS-0318-6 or 7, Office of Director for Structures, Acoustics and Noise Reduction Division, Office of the Chief, closes today.

83-24– Assistant Chief, Fabrication Division, GM-1601-13 or 14, Office of Director for Systems Engineering and Operations, Fabrication Division, Office of the Chief, closes April 13.

Learn how to get Better Photographic Services

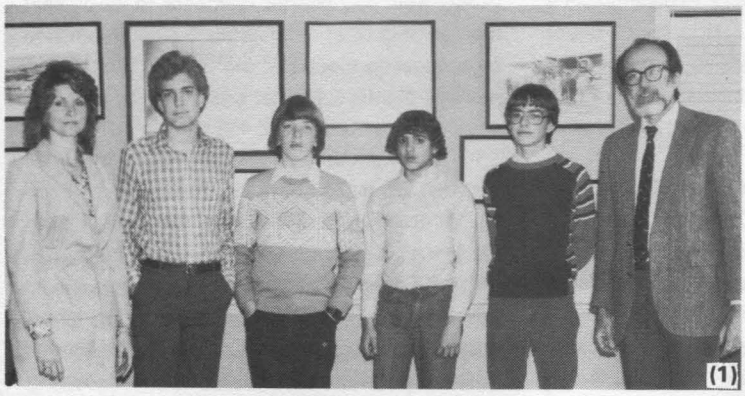
The Photographics Section will hold a meeting for users and potential users of photographic services Friday, April 13, in the Activities Center from 1:30 to 2:30 p.m.

Langley engineers, scientists, secretaries anyone who wants to learn about the photographic services provided by the section and anyone who is presently a customer and wants to obtain better photographic services, is invited to attend.

Questions regarding the topics to be covered should be addressed to Al Moore, ext. 3521.

These 1983 Langley inventors were honored March 29 at an awards luncheon at the Langley Officers' Club. Receiving awards were (seated) Ian O. MacConochie, Charles S. Gilliland, William H. Phillips, Paul M. Hergenrother, Dr. Jag J. Singh, Mrs. Margaret Hohl, accepting for her late husband, Frank Hohl, Dr. Joseph S. Heyman, Spencer V. Inge Jr., David C. Grana, Dr. John H. Cantrell Jr., Sherman A. Clevenson and James I. Clemmons. Standing are Dr. Ja H. Lee, Donald J. Progar, H. Douglas Garner, Robert M. Baucom, Robert R. McWithey, Dr. Terry L. St. Clair, Anne K. St. Clair, Dr. Ronald K. Clark, W. Barry Lisagor, Dick M. Royster, David G. Stephens, Laurence J. Bement, Rodney H. Ricketts and Robert V. Doggett Jr.

Regional MATHCOUNTS Competition Winners



These Peninsula teams were the top four winners in the recent regional MATHCOUNTS competition held at Langley. (1) The team from Queens Lake Intermediate School in York County won first place. From left are Mrs. Carolyn Gaertner, coach; Chris Boynton; Michael Fripp; David Dafashy; Brian West; and Dr. Archie Fripp, coach. (2) Second place award went to Dozier Middle School of Newport News. Pictured are Rick Jones, coach; Michelle Spinka; Banon Jackson; Yujin Asai; Billy Glidden; and Ms. Laurie Jones, coach. (3) Tabb Intermediate School in York County took third place. The team includes Robbie Thompson; Karen Hawk; Mrs. Pat Reed, coach; Nathan Brierly; and Andrew Luh. (4) Capturing fourth place was Hines Middle School of Newport News. Pictured are Jordan Grant; Ms. Julia Bivins, coach; Marty Conn; Brian Bivins; Ms. Debbie Fields, coach; and Kathy Taylor. The MATHCOUNTS program is designed to strengthen the mathematics skills in seventh and eighth graders. Each level of competition consists of four written segments and one oral presentation rated by a panel of three judges. Queens Lake will compete in the state competition tomorrow in Richmond.

Langley Area Considered Safe

Trashburner Dioxin Study Completed

An analysis of chlorinated organic compounds found in soil samples around the Langley-built trashburner plant has proven that levels of the chemical commonly called dioxin are far below what the Environmental Protection Agency considers to be safe.

Results of the study ""indicate that the NASA solid waste incinerator has not resulted in the accumulation of high concentrations of hazardous chlorinated organic compounds since it has been in service," according to a preliminary report submitted to Langley by the independent evaluators of the soil samples.

Samples taken from 10 sites near and downwind of the plant revealed the highest amount of dioxin to be 0.08 parts-per- billion, well below the one part-per-billion that is considered safe.

There was never any concern about dioxin safety, according to Hubert Clark, Assistant Director for Systems Engineering and Operations, but because of several EPA analyses made during the past two years, Langley wanted to make certain that everything possible was being done to insure the well-being of employees and safe operation of the plant.

The 10 sample sites were on NASA-Langley property, ranging from 100 yards to about 1,000 yards from the plant, located in the directions of prevailing winds. An eleventh site, located 13 miles from Langley in the Yorktown area, provided a control sample.

The chlorinated organic compounds analyzed included chlorinated dibenzo-p-dioxins, chlorinated dibenzo-furans, chlorobenzenes and chlorophenols. Miniscule amounts of each of the compounds except chlorobenzenes were found in the samples.

The analysis was conducted by the Brehm Laboratory of Wright State University, Dayton, Ohio, under the direction of Scott Environmental Technology Inc., Plumsteadville, Pa. Wright State is a leader in complex analysis programs and has helped develop many of the methodologies used world-wide for this kind of analysis.

Speakers Bureau

Bruce D. Fisher presented an overview of the NASA Storm Hazards Lightning Research Program to the Southern Peninsula Amateur Radio Klub (SPARK) March 20.

John B. Anders Jr., High-Speed Aerodynamics Division, discussed "Kite Design and Construction" at Grafton-Bethel Elementary School March 14.

Acoustical Society of America to Meet in Norfolk

The 107th meeting of the Acoustical Society of America will be held Sunday through Thursday, May 6-10, at the Omni International Hotel in Norfolk.

Approximately 450 papers, some authored by Langley researchers, which describe recent U.S. and foreign advances in acoustics, will be presented during the 49 sessions. Topics to be discussed during the meeting include architectural acoustics, noise, physical acoustics, shock and vibration, physiological acoustics, psychological acoustics, speech communication, acoustical engineering, underwater acoustics, music, and education in acoustics.

On Tuesday, May 8, the Society will present two awards in recognition of distinguished contributions to acoustics. Robert T. Beyer of Brown University will receive the Society's Gold Medal and Peter N. Mikhalevsky of the Massachusetts Institute of Technology will receive the Biennial Award.

Former astronaut, Richard H. Truly, Commander of the Navy Space Command and Commander of Space Shuttle Columbia on its second flight, will be the guest speaker at the awards ceremony.

The Acoustical Society of America was founded in 1929 to increase and diffuse the knowledge of acoustics and promote its practical applications. During the past 55 years it has grown from 450 charter members to its present membership of approximately 5,600. In addition to conducting meetings, the Society publishes a monthly technical journal and develops technical standards for acoustics.

NASA employees who are not members of the ASA are being offered a reduced registration fee of $10 which will cover the cost of both the technical and several planned social events. Non-ASA members interested in attending should pre-register by sending the registration fee, name, organization and mail stop to the Acoustics and Noise Reduction Division, Mail Stop 462, by May 1. Meeting information, programs and badges will be sent to those who pre-register.

Fisher to Discuss Lightning Research at AIAA Meeting

The atmospheric conditions conducive to the occurence of lightning strikes on airplanes and the results of NASA's test program, will be discussed at the April 23 meeting of the American Institute of Aeronautics and Astronautics.

Bruce D. Fisher, Special Projects Office, Low-Speed Aerodynamics Division, will discuss "Storm Hazards Lightning Research" beginning at 8 p.m. in the Activities Center.

During his presentation, Fisher will show photographs of lightning strikes taken by onboard camera systems. This work was featured in a recent "Aviation Week and Space Technology" article.

Fisher is project engineer for the NASA Storm Hazards Program on which an extensively instrumented F-106B (two-place) airplane is flown through thunderstorms in order to gather direct strike lightning data.

Prior to his assignment to the program in 1978, Fisher was involved in research on airspeed calibration techniques and crosswind landing gear technology.

The program will be preceded by a social hour at 6 p.m. and a steamship round roast beef dinner at 7 p.m. The cost is $8 per person, $2 for student members. Reservations must be made prior to April 18 by calling Dave Harmon, ext. 3615 or 850-4840, or Lisa Richardson, ext. 3611.

AEROVAN II Departs on First Journey

NASA's AEROVAN II, a large traveling exhibit unit which tells the public the story of the first 'A" in NASA– Aeronautics, left Langley March 26 on its first journey. Langley's Director for Aeronautics Robert Bower presents the van keys to Bill Gough, AEROVAN lecturer, during a brief ceremony prior to Gough's departure to the Naval Air Museum in Pensacola, Fla., and then to the Kansas Cosmosphere and Discovery Center in Hutchinson, Kan. The large, walk-through trailer features nine colorful exhibits that focus on current aeronautical research in safety, energy efficiency, environmental compatibility and improvements in passenger comfort and convenience. Other exhibits include models and videotapes portraying NASA's role in America's national security, future directions in aeronautics and how NASA's aeronautics research benefits the United States economy.

Recent Retirees

The following employees retired from Langley March 30:

Roland G. Kitts, Operations Support Division; **George W. Holden**, Systems Safety, Quality and Reliability Office; **Joseph W. Jewell Jr.**, Low-Speed Aerodynamics Division; **Herbert F. Shackelford**, Fabrication Division; **Bettye J. Fields**, Army employee, Structures Laboratory, USARTL, U.S. Army Aviation Systems Command, and **Moody J. Firman Jr.**, Operations Support Division.

Charles R. Lewis, Fabrication Division, retired April 3.

Thanks

Sylvia Lawson writes, "Thank you for donating blood at the last Bloodmobile in behalf of my mother, Mrs. Lounetta T. Berry, who recently underwent open heart surgery. Your generosity and thoughtfulness is deeply appreciated."

Happenings

HAPPY HOUR will be held today from 4 to 6:30 p.m. in the Activities Center.

EASTER EGG HUNT will be held April 15 at 2 p.m. on the Activities Center grounds. Tickets are on sale at the Activities Office for 75 cents each. Children will be divided into the following age groups: 0-2 years, 3-4, 5-6, 7-8 and 9- 12.

BUSCH GARDENS AND KINGS DOMINION day passes are on sale in the Activities Center for $11.50 and $10.50, respectively.

"WOMEN AT WAR": The War Memorial Museum of Virginia has opened its new permanent exhibit gallery, "Women at War," which traces the contributions of women during American conflicts from 1775 to the present, primarily stressing the changing role of women during the 20th century. This study of women during wartime includes homefront activities, active duty service, and paramilitary organizations. This exhibit graphically portrays the role of women in military service and the support of America during war.

THE WILLIAMSBURG PLAYERS are performing Tom Stoppard's mystery comedy, "The Real Inspector Hound," through April 14 at the James-York Plaza, Williamsburg. Evening performances are at 8 p.m. with a Saturday matinee tomorrow at 2 p.m. Call 229-1679 or 877-6468 for information and reservations.

THE VIRGINIA STAGE COMPANY is presenting A.R. Gurney's comedy, "The Dining Room," through April 21. Nightly performances, except Monday, begin at 8 p.m. Tickets are available by calling 627-1234 or through the First Virginia Bank. Half-price tickets are availabe the day of the performance at the kiosk at Waterside in Norfolk.

THE VIRGINIA COUNTRY MUSIC ASSOCIATION, Peninsula Chapter 1, will have a Jamboree Sunday, April 15, at Hornes. Live entertainment, buffet dinner with assorted salads and desserts, $3.95 per person; special prices on drinks. Guests $3 donation; members free.

CPR. Training in Cardio-Pulmonary Resuscitation and Basic Cardiac Life Support is scheduled for Friday, April 13, and Monday, April 30, through Tuesday, May 1, respectively. Employees wishing to enroll in CPR and/or BCLS courses should obtain approval from their immediate supervisor and coordinate enrollment with division coordinators. Then, please call Jim Norris, ext. 2611, as soon as possible.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30 p.m.

Come and see

SPRING TREASURES

at the

Activities Center, Building 1222

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Artwork

Woodworking

Easter Candies

Arts and Crafts Show

April 14 and 15

12-5 p.m.

Sponsored by NASA-LAA

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Country Carvings

Needlepoint

Much More

Register to Win Busch Garden Tickets

DOG TRAINING. TNCC, in cooperation with the NASA Dog Training School, is accepting registrations for eight-week puppy and basic control obedience classes in the College of the Young and Adult Mini Course Program to be held Saturday mornings starting April 7. These classes are an introduction to dog training and control, including behavior, health care, first aid and traveling. Doris Bryan is the instructor. For more information, contact Jo Horvath, 825-2936.

The NASA Dog Training School is registering a novice obedience class to follow the TNCC class. This class is designed for owner and dog who have completed a puppy or basic control class and will offer advanced off-leash control exercises, retrieving and hand signals. For information regarding this class, call Doris Bryan, 898-6273 after 5 p.m.

IMAGINATION IS MORE important than knowledge.– Albert Einstein

Thanks

Frances E. Thompson wishes to thank everyone who contributed to and attended her retirement party. "For more than 37 years at Langley, I enjoyed the daily interfacing with so many good people. Friendships blossomed through these contacts that will continue to be a great part of my future. The electric typewriter will be put to good use and the mementoes greatly cherished for years to come. My family and I enjoyed the fellowship shared with so many good friends and associates, many of whom are also retired. Thanks again for the beautiful party; it was one that will be long remembered."

Nancy R. Quinn wishes to express her thanks and appreciation to everyone at NASA who gave blood in her behalf. "Your acts of kindness have been a major factor in my rapid recovery. To every person who participated, my sincere appreciation, and I shall be ever grateful for your concern."

National Aeronautics and
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MAIL STOP 494 BLDG 1298

Retirement Party

Charles R. Lewis, who recently retired from the Fabrication Division with 35 years of government service, will be honored with a dinner-social at Sammy's Steak House, 12399 Warwick Boulevard, April 26. A cash bar will begin at 6:30 p.m. and a stuffed flounder or Delmonico steak dinner will be served at 7. The cost, including gift, will be $8 per person. Please send check to Richard L. Hall, Mail Stop 389, by April 20. Contributions to gift only ($2) will be accepted.

swap and shop

FOR SALE

Vehicles

1975 Datsun 710 SW, original owner, AC, 4 spd, new carb., steel belted radials, good mech. cond., $1,200 neg. Call Brooks, 898-6517, evenings and weekends.

Toyota, Celica GT hatchback, 1978, 5 spd, AC, AM/FM, one owner - all records, $3,800. Call 229-9541 after 6 p.m.

Tartan 30 1973 Atomic Four engine, fully equipped for cruising and racing, Hood Roller furling, fully equipped plus gear to start sailing, $29,000. Call Hooker, 245-3078.

Real Estate

Sandbridge: Charter membership in Indian Cove; take over deed and membership with $1,600 down and $112.98 per month; entitles you to deluxe camping coast to coast; save $1,500 and get owner's premiums, too. Call 642-4649.

WANTED

Drivers for car pool from Gloucester Point to West area on 7:30 a.m. shift. Call Burner, ext.3234, or Parrish, ext. 2259.

One additional driver to car pool from Norfolk to West area on 7:30 a.m. shift. Call Ed Hudgins, ext. 3072.

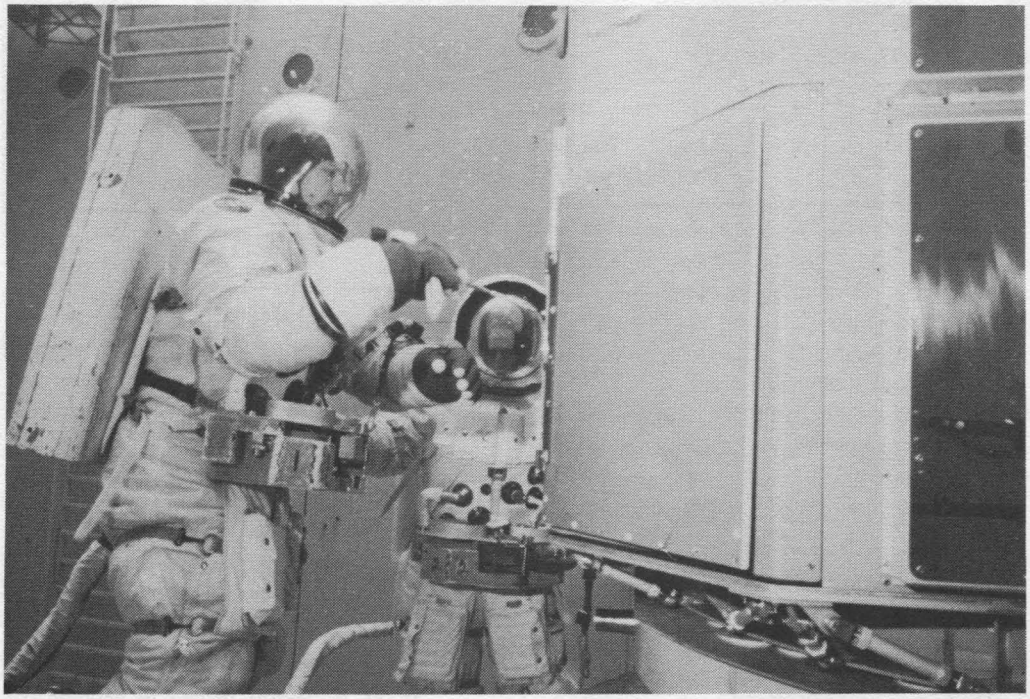
cafeteria menu

Week of April 9-13

MONDAY: Old Fashioned Bean Soup, Chicken Pot Pi Baked New England Scrod, Chuckwagon Steak. Snack Ba Corned Beef Reuben and Knockwurst.
TUESDAY: Cream of Mushroom Soup, Baked Lasagn Country Style Steak and Chicken a la King. Snack Bar: 1/ lb. Bacon Cheeseburger and Chicken NASA.
WEDNESDAY: Fresh Vegetable Soup, Beef Chow Mei Fried Filet of Flounder and Chicken Cordon Bleu. Snac Bar: Hot Ham and Swiss and Super 6 oz. Burger.
THURSDAY: Split Pea Soup, Veal Parmigiana, Open-Face Beef Sandwich and Braised Chicken Livers. Snack Ba Chuckwagon on Bun and Hot Italian Sausage.
FRIDAY: Bull Island Clam Chowder, Fish Dinner, Chicke and Yellow Rice and Chopped Steak. Snack Bar: Frie Oysters and Gilled Ham and Cheese.

Week of April 16-20

MONDAY: Beef and Vegetable Soup; Chicken Croquette Seafood Quiche; and Beef, Macaroni and Tomatoes. Sna Bar: Italian Beef and Pepper Sub and Hot Ham and Swis
TUESDAY: Seafood Gumbo, Teriyaki Chopped Steak, Be Burgundy and Chicken Parmigiana. Snack Bar: Poor B Sandwich and Hot Smoked Sausage.
WEDNESDAY: Fresh Vegetable Soup; Roast Turkey Dinne Fish Almondine; and Macaroni, Franks and Cheese. Sna Bar: 1/4 lb. Cheeseburger and Chicken NASA.
THURSDAY: Turkey Noodle Soup, Roast Beef Sandwic Roast Pork Chop Suey and Braised Chicken Livers. Sna Bar: American Boy Sandwich and Knockwurst.
FRIDAY: Bull Island Clam Chowder, Fish Dinner, Pot Roa and Knockwurst with Sauerkraut. Snack Bar: Beef a Cheese Burrito and Crab Cutlet.



SATELLITE REPAIR SIMULATION. Astronaut Dr. George Nelson (left) prepares to unbolt the panel to which a main electronics box is attached on the mock-up of the Solar Maximum Mission satellite while testing repair techniques in the Neutral Buoyancy Simulator at the Marshall Space Flight Center. Working underwater simulates the weightlessness of space. Looking on is astronaut Francis R. Scobee, who will pilot the Shuttle Orbiter on mission 41-C, during which Nelson and astronaut James Van Hoften will repair the disabled satellite. In addition to repairing failed parts in the main electronics box on the coronagraph/polarimeter instrument, they will also replace the inoperable 500-pound attitude control subsystems.

Intercenter Meets Set

1983 proved to be a good year for th Runners Club with Langley winning both th spring and fall competitions and Joe Kubala repeating as runner of the year, winning all h events.

It is Spring Intercenter Competition tim again and meets are planned April 7-29. All mile and 10k runs conducted on certified course (e.g. the run for children April 17) are acceptabl Scheduled NASA runs are April 10 (10k), Ap 12 (2m), April 17 (10k, 2m), April 18 (2m), Ap 19 (10k, 2m), April 24 (2m) and April 26 (10k

All NASA runs are at 5 p.m. on the NAS course except the 2-mile run on April 18 at Beth High School. That race will be at 11:30 a.m.

Volunteers to conduct the races will b needed. Call Bill Woods, ext. 2483, for addition information.

National Aeronautics and
Space Administration

Langley Research Center

NASA

Langley Researcher

Volume 23, Issue 8 **April 20, 1984**

Shuttle 41-C Successfully Deploys LDEF, Repairs Solar Max

"Steady as the Rock of Gibralter–and just about as big."

That's the way Shuttle Commander Robert Crippen described Langley's Long-Duration Exposure Facility (LDEF) just after it was deployed from the Orbiter Challenger during the busy, sometimes hectic, eleventh Shuttle mission.

Capsule Communicator (Capcom) Jerry Ross answered Crippen's LDEF description by saying, "All the Langley folks are cheering downstairs (in support rooms at the Mission Control Center), and we've got our LDEF buttons on up here."

The LDEF deployment went exactly as planned. Astronaut Terry Hart, operating the remote manipulator arm that deployed LDEF, reported that the structure was released "on time" at 12:26 p.m. EST Saturday, April 7.

Deployment was over the Pacific Ocean, just east of Wake Island, shortly after Challenger began its 19th orbit of Earth. The spacecraft was out of communications range at the time, passing between ground stations at Guam and Hawaii.

The first TV pictures showed LDEF hanging in space like a giant Christmas tree ornament, its surface a variety of textures and its multicolored trays reflecting sunlight.

Challenger began its separation from the facility by firing small thrusters that moved the Orbiter away at a rate that began at .55 feet per second and went up to just under five feet per second. The crew tracked LDEF periodically, and had it in sight well into Saturday afternoon.

LDEF is in an orbit with an apogee of 298.095 statute miles and a perigee of 293.677 statute miles. Its inclination to Earth is 28.3709 degrees. It will remain in that orbit until retrieved by Challenger in early February 1985.

Just after the first television pictures of the still-berthed LDEF were received at Mission Control early Saturday morning, Capcom Ross good-naturedly described it as "quite a blivit . . . ," using a Navy vulgarism to describe an object that is bursting at the seams.

LDEF deployment turned out to be the easiest task of the mission; capturing the Solar Maximum Mission (Solar Max) satellite was a more complex story.

Problems began Sunday morning, April 8, when Astronaut George Nelson–wrapped in a manned maneuvering unit (MMU) and with a device called a trunnion pin attachment device (TPAD) strapped to his chest–tried unsuccessfully to connect with Solar Max and stabilize its slow rotation. Three attempts failed to securely lock the TPAD to the satellite.

Nelson then moved around to grasp one of Solar Max's two solar panels and fired MMU

Continued on page 2.

Davenport Named Chief of Fabrication Division

Joseph B. Davenport has been selected to head the Fabrication Division, replacing Morris Phillips, who retired in January.

In this position, Davenport is responsible for planning, developing, directing, programming and evaluating technical services to build research test models and associated systems and equipment in support of Langley projects and programs requirements; administering contracted services, including metal, wood, composite, electronics and fabrication support contracts; and for the continuing development of processes, procedures and programs for improving fabrication methods and practices, including effective and efficient use of numerical-controlled machining systems and computer-aided fabrication equipment.

Davenport began his NASA career in November 1961 as an apprentice machinist. Since graduating from the Langley Apprentice School in 1965, he has been an experimental machinist, engineering technician, a supervisory engineering technician, a supervisory production controller and Assistant Chief of the Fabrication Division. He has specialized in aeronautical research model fabrication, cryogenic model fabrication techniques and fabrication contract management.

Before joining Langley, Davenport designed interior displays for a private museum in Lenox, Mass.

Davenport has received five Langley Suggestion Awards and numerous Group Achievement Awards. He was the fabrication session chairman for the Industry-wide Cryogenic Models Workshop held at Langley in 1982.

Davenport and his wife, Ann, live in Hampton. They have two sons.

Shuttle Mission 41-C

Continued from page 1.

thrusters in the opposite direction from the satellite's rotation. That didn't work either.

Nelson backed away and returned to Challenger. Commander Crippen then maneuvered the Orbiter close enough to Solar Max to try two "rolling grapples," attempts by the remote arm to move with the satellite and grasp it. Four attempts were unsuccessful. What was worse, Nelson's attempts to stop Solar Max had started it spinning in three axes, causing it to wobble.

Crippen then backed Challenger away while the crew, mission controllers and engineers at the Goddard Space Flight Center considered other options.

The chosen procedure was for Goddard controllers to try to stabilize Solar Max with magnetic torquers, using Earth's magnetic field to slow the rate of rotation to a single spin axis. That took several hours and required draining the Solar Max batteries, since the solar panels were not always pointing at the Sun because of the erratic rotation.

The batteries did their job, however, and Solar Max's rotation was stabilized. Further attempts at grappling were delayed for another day, however, to allow the batteries to fully recharge.

The crew spent Monday, April 9, preparing for the new grappling attempts, and showing the 3,300 bees aboard Challenger that were busy building hexagonal honeycombs–just like those they made on Earth. Instinct seems to have had a stronger influence than lack of gravity.

Solar Max was successfully captured with the remote arm early Tuesday morning and placed in the payload bay. The rolling grapple maneuver had worked. Two repair tasks–replacing the satellite's attitude control system and main electronics box– were scheduled back to back for early Wednesday morning.

During a seven-hour, 18 minute extra-vehicular activity (EVA) astronauts Nelson and van Hoften completed the two primary chores, did some smaller tasks and had Solar Max ready for redeployment. After checkout of the replacemen packages by ground controllers, Solar Max wa put back into orbit early Thursday morning.

One reporter wrote that "NASA preserve its reputation and a damaged satellite today. Another said that NASA should present Nelso and van Hoften with a special award as "Celesti Mechanics."

The mission continued as a cliffhanger t the end. Weather at the Kennedy Space Cente was perfect on Thursday morning, the origin landing day. It was predicted to be good f Friday morning, the new landing day, but a clou cover at about 2,500 feet caused some concer

As clouds continued to obscure vision, th first landing attempt at 7:07 a.m. was canceled. second KSC attempt at 8:47 a.m. was announce Rain was then predicted, and an alternate landi at Dryden Flight Research Facility was selecte At 8:25 a.m., a torrent of rain decended on t Cape Canaveral area.

Challenger finally plummeted to Earth Dryden, touching down at 8:38 a.m. EST a rolling to a stop 49 seconds later, ending eventful and successful mission of six days, hours, 40 minutes, 54 seconds.

Robb Speaks at High-Tech Conference

-photo by Fred Jones

Governor Charles Robb (right) is greeted by Langley Director Dr. Donald P. Hearth during Robb's March 27 visit to Williamsburg. Robb was a keynote speaker at a Virginia conference for high-technology opportunity, sponsored by NASA and the Small Business Administration at the Fort Magruder Conference Center. The conference was designed to acquaint firms with the support programs offered through federal and state governments, and the opportunities for small high-tech companies in the state. Robb said small businesses, specifically those involved in high technology, will have a major impact on Virginia's economic health in the 21st century.

DST Starts

Daylight Savings Time begins at 2 a.m. Sunday, April 29. Remember to turn clocks forward one hour before going to bed Saturday night.

Retiree Deaths

Robert J. Keller, 67, died March 26. H was an engineering technician in the Fabricatio Division at the time of his retirement in 1975.

Quinton C. Davis IV, who retired as a engineering technician in the Fabrication Divisio in 1980 after serving 37 years at Langley, die March 30. Following his retirement, Davis worke in the National Transonic Facility Project Office a a reemployed annuitant for about a year. Dav was 63.

Henry G. Williams died March 31 at th age of 81. At the time of his retirement i 1966, he was assigned to the Plant Maintenanc Division.

The *Langley Researcher* is an official publication of the Langle Research Center, National Aeronautics and Space Administratior Hampton, Virginia 23665. It is published every other week in th interest of its employees. Address contributions to the Editor, Ma Stop 115, telephone 3006.

Editor ..... Jean Saunders

Staff Photographer ..... Bob Nye

The privilege of advertising articles in this publication is restricte to employees of Langley Research Center. Articles advertised her must be offered without regard to race, color, religion, sex or nationa origin. All materials submitted are subject to editing.

High School Co-op Wins FBLA Regional Award

She has a warm smile and a quiet confidence, and is enthusiastic about her work.

Her name is Kim Durham and she won the first place Regional Award in the Future Business Leaders of America competition for clerk typing on March 17 at Thomas Nelson Community College. The contest tested the clerical skills and style of each of the fifteen contestants, of which Kim proved to be the best.

She is a senior at Bethel High School and works under a cooperative education program as a clerk typist in the Employee Development Branch, Personnel Division. She will be a co-op until June 1986 when she plans to graduate from TNCC.

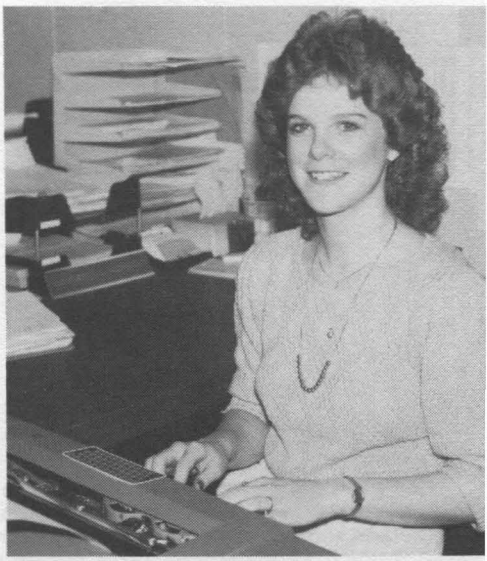
Shyly, she said, "I hope to get a permanent position here at NASA after I finish TNCC. I want to be an executive secretary."

She currently goes to school from 8:15 to 12:15 and works from 1-4:30, Monday through Friday, but doesn't find the workload to heavy. "I have plenty of time left for homework," she said.

She said it makes her feel good to say she works at NASA when people ask her. "It's an interesting and challenging job, and I like it a lot."

Millie Boone, an employee development clerk who works in the same office as Kim said, "She's a joy to work with. She's lovable and willing to do things beyond her responsibility and she doesn't mind doing them. She's an asset to the office. I could go on and on, but she's just a great person."

Evelyn Harris, the cooperative education coordinator for the center said, "She has excellent typing and shorthand skills. She also has good communication skills and gets along well with others. She's dependable and professional, and a joy to work with."



Kim's pleasant personality and obvious outstanding clerical skills, have helped her so and will undoubtedly help her as she continu to reach for her goals in the future.

Enterprise Goes to World's Fair in Unusual Way

The Space Shuttle Orbiter Enterprise earned its "sea legs" during a land, sea and air move from the West Coast to the Louisiana World Exposition. The move began on March 21 and the the final leg of the 4,300-kilometer (2,300-mile) trip ended on April 7. The 68,000-kilogram (150,000-pound) orbiter test vehicle will be displayed at the fair from May 12 through Nov. 11.

The barge trip from Mobile was the only viable method of transporting the DC-9 size orbiter to the New Orleans waterfront. It is too large to transport by rail or road and particularly through the streets of New Orleans to the fair location.

Complete mating of the Enterprise to the 747 took place on March 21. Then the Enterprise, atop the Shuttle Carrier Aircraft, flew from Edwards Air Force Base, Calif., to Vandenberg Air Force Base, Calif., on March 22, where it underwent fit-and function checks for several days. Space Shuttle launches from the Vandenberg site are scheduled to begin in late 1985.

On March 27, the 747/Enterprise flew from Vandenberg AFB to Little Rock Air Force Base, near Jacksonville, Ark., where it was on display for two days.

The 747/Enterprise then flew to Mobile on March 29. The flight from Little Rock AFB to Mobile included a flyover of New Orleans and the fair site; NASA's Michoud Assembly Facility, near New Orleans; and the National Space Technology Laboratories at Bay, St. Louis, Miss. Next the aircraft followed the Gulf Coast east to Mobile.

The Enterprise arrived at 3 p.m. CST, March 29, at Brookley Field in Mobile. General public viewing was held on March 31 and April 1.

At Brookley Field, two large transportable cranes and other special ground support equipment detached the orbiter from the 747 and positioned it on a 90-wheel transport trailer. From the airfield the Enterprise was moved to the nearby Mobile-Brookley Coast Guard Station for loading aboard a large ocean barge for the water leg of the trip.

The barge was towed from Mobile through Mississippi Sound, then south through Chandeleur Sound. The barge entered the Mississippi River near Venice, La., and proceeded upriver to New Orleans. The barge trip took three days.

The Enterprise arrived at the Louisiana World Exposition site on the New Orleans Waterfront the afternoon of April 5. On April 6 the transpo trailer was off-loaded and towed to a locat in front of the U.S. Pavilion. There cranes a ground support equipment removed the Enterp from the transporter. On April 7 the 37-me (122-foot) - long vehicle was placed on its disp location.

At the conclusion of the Louisiana Wo Exposition the Enterprise will be ferried ba to Vandenberg AFB where it will be used additional fit-and-function checks at the W Coast Shuttle launch facility.

Thanks

Thomas Straganac writes, "I wish express my sincere gratitude for all those w have donated blood on behalf of my mother, Straganac. Thirty-two units have been give her name! Thank you very much!"

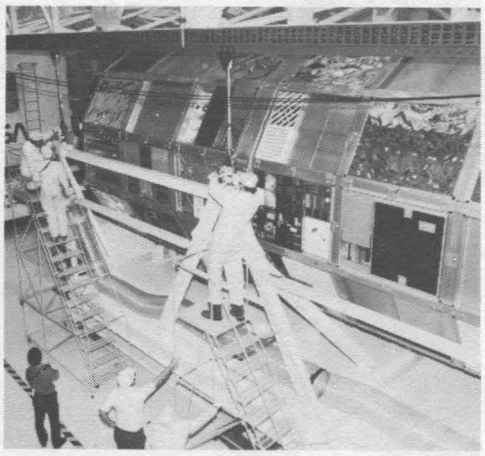
Joe Jewel writes, "My family and I tha all of you for your thoughts, presence and g on my special retirement day, March 30. I h never spent a more enjoyable evening, tha to you. I sincerely hope for those who have retired that your day will be as great as m and for those who have retired that life's b will be yours. Bless you all!"

Phil Smith thanks everyone who contribu to and attended his retirement luncheon on Ma 15. "Your friendship and gifts will always remembered."

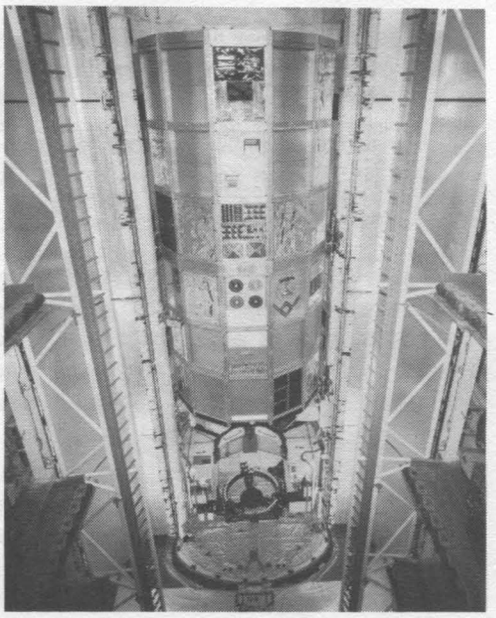
Upcoming Workshop

Integrated Digital/Electric Aircraft Systems Studies Contracts - Final Oral Reviews; May 1 and 2; Langley Activities Center; Cary R. Spitzer, ext. 3318, contact.

Astronauts Perform Spectacular Mission

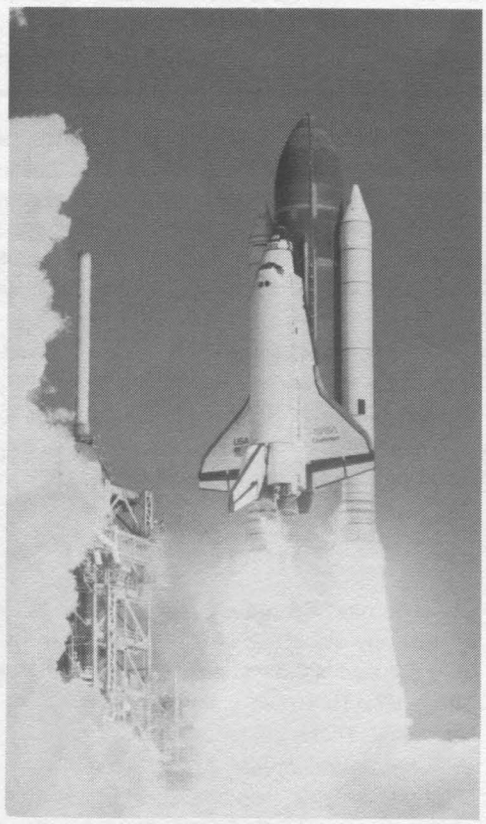


LDEF PREP. The Long Duration Exposure Facility is shown here being lifted out of its support stand and into the Payload Canister for transportation to Launch Pad 39-A. The cargo was installed into the Challenger's payload bay in the vertical mode at the pad.

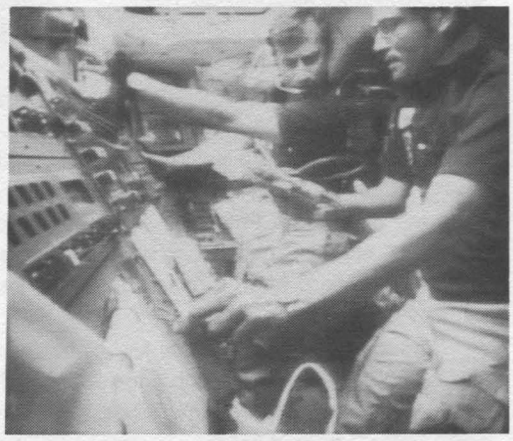


LDEF IN BAY. Orbiter Challenger sits at launch pad 39-A before Mission 41-C launch. The view from the Payload Changeout Room shows the school bus-sized LDEF containing 57 active and passive experiments from nine nations. The facility also contains devices designed to capture cometary dust and record the effects of impacts from gamma rays and other particles. In the lower portion of the photograph is the Flight Support Structure which served as the cradle for the Solar Maximum Mission Satellite during the repair work.

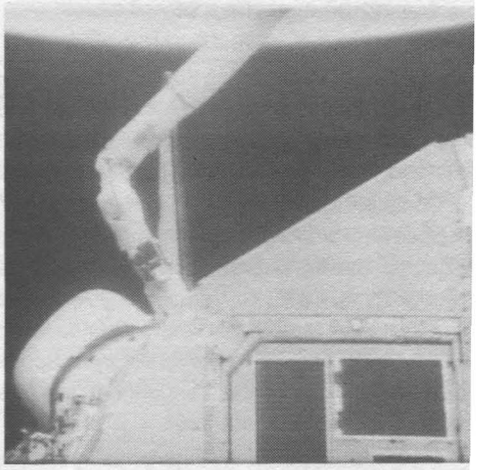
CREW. The Flight 41-C crew departs t O&C Building enroute to the launch pad pr to the 11th Space Shuttle flight. Leading t five-man crew is Commander Robert Cripp about to make his third flight into space. his right is Pilot Dick Scobee. From left right behind Crippen and Scobee are Missi Specialists James van Hoften, George Nels and Terry Hart.



LAUNCH. In a roll of thunder and a pillar of flame that made the morning Florida sun seem pale, NASA's pioneer satellite rescue mission lifts away from Pad 39-A. Challenger began its flawless launch into Earth orbit April 6 at 8:58 a.m.

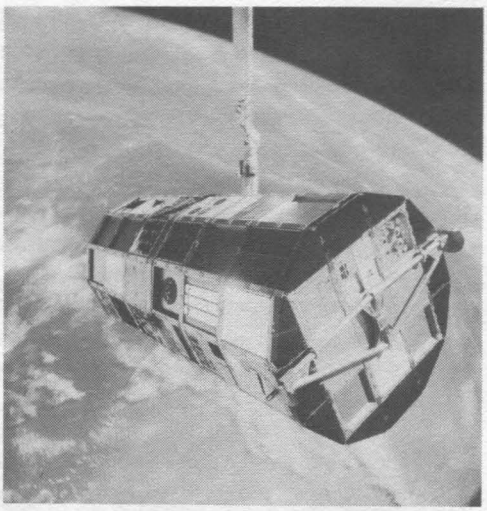


LDEF ACTIVATION. Astronauts Crippen, right, and Hart work at the Challenger's aft flight deck during activation of LDEF located in the cargo bay of the Earth orbiting spacecraft. The astronaut crew had just begun its second day in Earth orbit half an hour before this TV transmission.

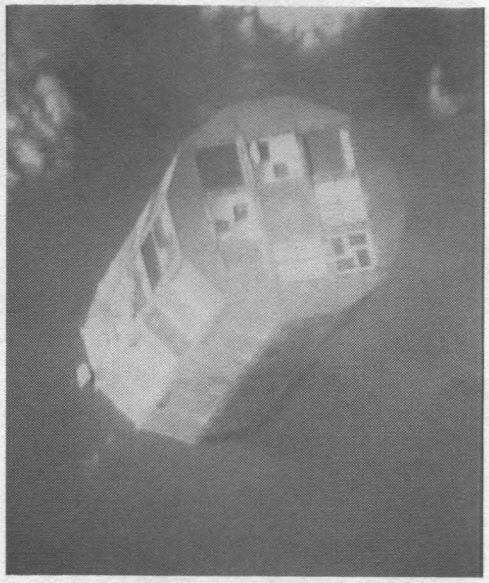


ARM GRASPS LDEF. The Canadia built remote manipulator system end effec latches onto the giant LDEF in the cargo bay the Challenger. Preparations had just beg for deployment of the experiment-carryi vehicle.

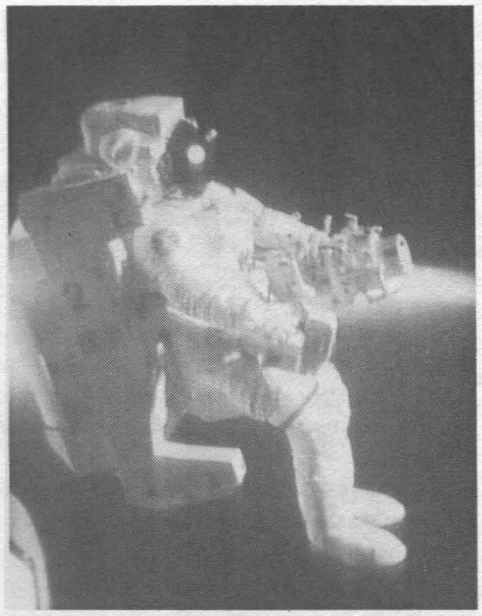
Langley's Payload, LDEF, Goes on Long Journey



LDEF DEPLOYMENT. The RMS suspends the giant LDEF high above the Gulf of Mexico prior to releasing it into a higher Earth orbital altitude than any previous Shuttle has been. The multi-colored cylinder carries experiments representing 194 investigators from around the world. Florida and the Bahama Banks are visible near the earth's horizon in the 70 mm frame taken by the onboard camera.



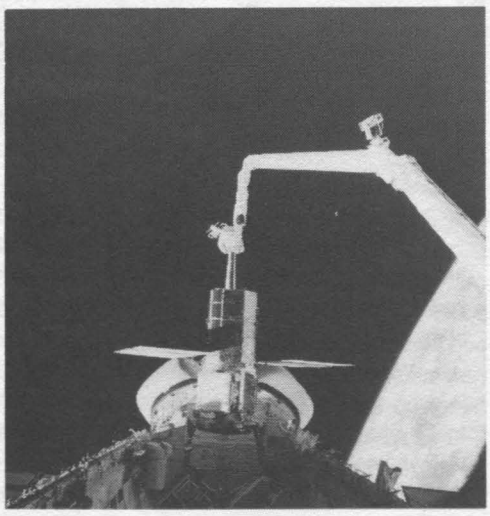
LDEF RELEASED. LDEF moves away from the Space Shuttle Challenger moments after being released from the grasp of the arm. The event was the principal activity of mission 41-C's second day in Earth orbit. LDEF will remain for about 10 months until retrieved by a future Shuttle crew.



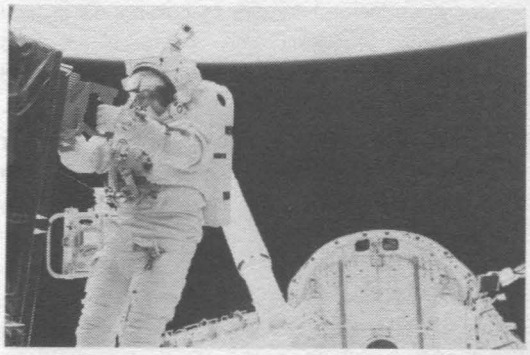
EVA. As the Challenger nears one of many returns to the sunlit side of the Earth, Astronaut Nelson exits the cargo bay and heads for the nearby Solar Maximum Mission Satellite to begin an attempt to stabilize the crippled vehicle. He moves about freely with the aid of a jet-powered back pack called the manned maneuvering unit. The protruding tool at right center is the trunion pin attachment device.

LDEF Deployed;

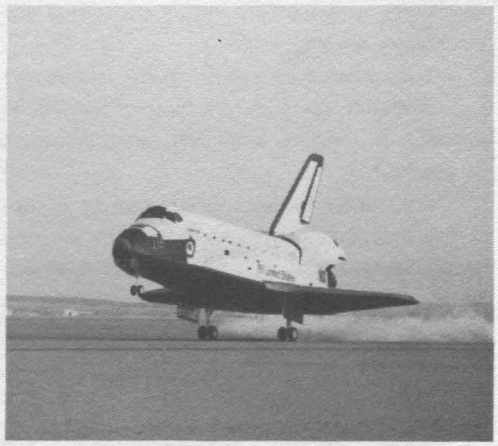
Solar Max Satellite Rescue Mission Successful



SOLAR MAX RETRIEVED. A scenic panorama is captured by an onboard 70mm handheld camera during the April 11 Solar Maximum Mission satellite repair job aboard the Earth-orbiting Challenger. The SMMS is temporarily docked at the Challenger's flight support system so the astronauts could perform a series of repair tasks. The arm was used to move the astronauts into position for their series of chores. Note the gibbous moon to the right of center and horizon of the Earth in the lower right quadrant.



SECOND EVA. Astronaut van Hoften progresses in his effort to repair a damaged area on the ailing SMMS, temmporarily "captured" in the cargo bay of the Earth-orbiting Space Shuttle Challenger. Following the repair work the satellite was deberthed but remained on the arm throughout the night while officials at the Goddard Space Flight Center performed a checkout of the repairs. The SMMS was released at 4:26 a.m. April 12, completing the second main objective of the mission.



LANDING. The Space Shuttle Challenger landed on the dry lake bed at Edwards Air Force Base Friday, April 13, at 8:38 a.m., after being diverted from the Kennedy Space Center due to bad weather. As the astronauts touched down, a superstitious official at Mission Control said to the crew, "Welcome Home, Friday, the 41-C."

Barker is 'Proud Pop'

Keith Barker, an aerospace technologist in the Flight Dynamics and Control Division, is the proud father of the newly crowned Miss Hampton/Newport News.

Debbie Barker was crowned on March 10 at the pageant held at Hampton High School because she had the highest total score on an interview with the judges, on talent, and on the swimsuit and evening gown competitions. She also won the talent award for a song and dance routine to "If My Friends Could See Me Now."

The pageant committee is looking for those who would like to help sponsor Debbie in the Miss Virginia Pageant which is held in the second week of July, but she is asking for moral support and prayers.

Barker said, "I'm very proud and happy for her. She was a honors student at Kecoughtan High School and graduated in the top one percent of her class. She was awarded a first-year merit scholarship to Old Dominion University where she is now a sophomore. Actually I thought she would end up in mathematics or computer science, but it appears that she has 'stars' in her eyes."

These stars refer to the fact that Debbie wants to be an actress, and if her past success is any implication of her future success, she should have no problem attaining her goal.

Debbie Barker

Langley Staff Supports Bloodmobile

Langley employees, contractors and retire donated 332 pints of blood during the visit the American Red Cross Bloodmobile March 2

Achieving gallon status were:

12 gallons - Neale H. Kelly.

11 gallons - Richard B. Holt.

10 gallons - Albert Cacioppo.

8 gallons - William Tuck and Everett Ha

6 gallons - Harvey N. Murray.

5 gallons - Kenneth E. Voss, Philip H. Glau and Linda A. Hunt.

4 gallons - Sandra Roark, Frank Jones a L. Conway Rogers.

3 gallons - Thomas W. Straganan ac, Jo A. Tanner, Steven F. Yards, Richard R. Antc Spencer Johnson, Elizabeth Williams and There C. Walker.

2 gallons - George P. Brown, Mark Lo Ernest Salisbury, Donald Athearn and John Ellingsworth.

1 gallon - Martha A. Brown, Millard Puckett, Glenn A. Woodell, Timothy D. Brya Thomas J. Doneson, John Brown, Edwin Foudriat, Leigh A. Smith and Ray L. Seals.

Donating blood for the first time were Nar Murawski, Jay Brandon, Mark Bryan, Patricia Smith, Vickie S. Connors, Donald K. Clarke a John Wager.

NASA Coordinators were Virginia Jones a Annette Forrest. Red Cross Coordinator was Buchanan. Typists were Octavia C. Judge a Queenella M. Perrin. Doughnuts and coffee w provided by the Langley Federal Credit Unic

Ames-Stanford Form Space Institute

The Ames Research Center and Stanford University have formed the Stanford-Ames Institute for Space Research to pursue joint undertakings in space research, astrophysics and technology development.

The agreement establishing the institute was signed March 16 by Ames Director William F. Ballhaus Jr. and by Dean Norman K. Wessels of Stanford.

Both organizations already carry out substantial independent space science activities, and have cooperated on some limited space efforts in the past. The new institute is intended to foster joint research, and the sharing of technical capabilities and people.

Plans are being considered for courses and seminars at Stanford in areas of Ames research to be taught by Ames scientists. In some cases, Ames researchers will hold uncompensated consulting professorships.

Stanford students may work on scientific projects at Ames. There will be mutual use of shops and computer facilities where practical. A space science and astrohysics seminar series to be held periodically each year, and a summer faculty fellowship program for professors from other universities are planned. Opportunities for post-doctoral fellows to collaborate in joint research programs may be provided, and distinguished scientists from the U.S. and abroad will be brought to Stanford-Ames.

First Chairman of the institute is Professor Vahe Petrosian, Stanford; and first Associate Chairman is Dr. Lawrence Colin, Chief of the Space Sciences Division at Ames. Stanford members of the executive committee are Profesors Arthur Walker, Von R. Eshelman, Robert Wagoner and Robert Helliwell. Ames members are Drs. Harold P. Klein, Palmer Dyal, Henry Lum and Patrick M. Cassen.

Energy Saving Tips

Plan to have your oil furnace serviced dur the coming summer. Such service could s you 10 percent in fuel consumption during coming winter.

When you are sure that the heating seas is over, you can save a considerable amoun fuel by having the furnace pilot light turned Remember to make a note to be sure to hav re- ignited before you turn the furnace on ag next fall.

Have Your Blood Pressure Checked

May is National High Blood Pressure Month and Langley will participate in this effort sending teams from the Occupational Medical Center to different locations for blood pressure che Employees are encouraged to have their blood pressure checked at the following locations:

Building 1209, May 10 and 24, 1 to 2 p.m.

Building 643, Room 100B, May 3 and 17, 1 to 2 p.m.

Building 1213, Cafeteria, May 7, 15, 23 and 3l from 11:30 a.m. to 12:30 p.m. each day.

Happenings

HAPPY HOUR will be held today from 4 to 6:30 p.m. in the Activities Center.

BUSCH GARDENS AND KINGS DOMINION day passes are on sale in the Activities Center for $11.50 and $10.50, respectively.

EASTER EGG HUNT will be held tomorrow at 11 a.m. at the Activities Center. Tickets are on sale at the Activities Office for 75 cents each. Children will be divided into the following age groups: 0-2 years, 3-4, 5-6, 7-8 and 9-12. The hunt was postponed from last Sunday due to rain.

PATRIOT PASSES for touring Colonial Williamsburg are available at the Activities Office. The $18.50 pass gives unlimited access to all buildings, including Bassett Hall, Carter's Grove and the Governor's Palace. Tickets for 10 attractions are $9 each; 18 attractions, $13.50.

PARENTS WITHOUT PARTNERS. The Peninsula Chapter 275 cordially invites single, divorced or widowed parents who desire good fellowship to join them for social and family activities. For information, call 380-9619 or 838-3956.

LAA EXERCISE CLUB fitness and dancing classes are held Mondays and Wednesdays from 5 to 6 p.m. in the Activities Center. The cost of the classes, taught by Sueellen Mauro, is $14 per month; the classes are open to all NASA and contractor employees and spouses. If interested, contact Sheryl Kluttz, ext. 3555, or Lisa Richardson or Fran Sabo, ext. 3611 or 2879.

THE LANGLEY TENNIS CLUB opens its season with the All Players Ladder tournament May 4-7. The Men's Championship Ladder and the Women's Ladder tournaments will be held May 18-21. The results of these tournaments are used to establish initial rankings on the ladders. If you would like to enter one of the tournaments and have not received an entry form, or if you would like more information, call Bill Weaver, ext. 3431.

THE VIRGINIA CHORAL SOCIETY will sing "Just For Fun" when they present their final concert for this season in Ogden Hall at Hampton Institute, Monday, April 30, at 8 p.m. The 90-voice chorus, under the direction of Gary Lewis, will perform a wide variety of favorite musical selections, including Shenandoah, Brahm's Love Waltzes, Black is the Color (of my true love's hair), Deep River, The Drunken Sailor and Dixie. Tickets will be available at the door: $5 for general admission with discounts for senior citizens, students and military; group discounts are available. For further information, call 596-2278. A shuttle bus will run from the Hampton City Hall parking lot to the front door of Ogden Hall from 7 p.m.

Retirement Party

Roland Kitts will be honored with a retirement luncheon Wednesday, April 25, in Room 121 of Building 1267. The cost, including gift, is $6 per person. Contributions to gift only will be accepted. Send reservations, no later than close of business today, to John Huffman or Warner Smith, Mail Stop 396. Call ext. 2821 for more information.

NASA Selects Lockheed-Georgia for Propfan Contract Negotiations

Early last month, NASA selected Lockheed-Georgia Div. of Lockheed Corp. in Marietta, Ga., for negotiations expected to lead to the award of a contract for the design, fabrication and ground test of a propfan propulsion system. It includes an option for flight test of the system mounted on the wing of a modified Gulfstream II testbed airplane.

Lockheed-Georgia's estimated value of the basic contract is approximately $31 million, with the flight test option estimated at $15 million.

Under the Propfan Test Assessment (PTA) contract, Lockheed- Georgia will verify the blade structural integrity and determine the acoustic characteristics of a large-scale (9-foot diameter) advanced propellor (propfan) being designed and fabricated by the Hamilton-Standard Div. of United Technologies Corp., Windsor Locks, Conn., under a separate NASA contract.

The propfan structural integrity and acoustic characteristics are the two major technical concerns. Neither issue can be adequately evaluated in the small scale model tests that have laid the technical foundation for this effort.

The propfan project will be managed by NASA's Lewis Research Center in Cleveland and is part of the NASA Advanced Turboprop Program.

The propfan to be evaluated will have eight highly swept thin blades integrated with a contoured spinner. This design is intended to minimize both compressibility losses and noise during high-speed subsonic cruise aircraft propulsion applications, such as for commercial airliners.

The advantage of this advanced propellor is that it will use 15 to 25 percent less fuel than a turbofan powerplant with the same level of engine technology.

Modified Gulfstream II Testbed Aircraft proposed by Lockheed-Georgia for the Propfan Test Assessment (PTA) Program with NASA Lewis Research Center.

National Aeronautics and
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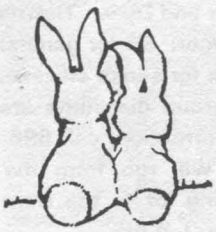

Key Positions

Burnie S. Williams has been selected Supervisory Engineering Technician, Technical Support Section B, Laboratories Operations Branch, Operations Support Division, under Competitive Placement Plan 84-17.

Robert K. Seals Jr. has been selected Head, Chemistry and Dynamics Branch, Atmospheric Sciences Division, under CPP 84-20.

Speakers Bureau

John Hudson spoke to the Downtown Kiwanis Club of Norfolk March 1 on the Space Shuttle.

James Patton gave a stall/spin briefing March 2 to the Flying Farmers of Virginia and discussed the General Aviation Stall/Spin Program March 13 at the EAA Fly-In in Lakeland, Fla. Also giving presentations at the EAA Fly-In were **Major William Neely** on the Thunderstorm Penetration Program and **Philip W. Brown** on Airplane Handling Qualities for the Designer, Builder and Test Pilot.

Donald Eide discussed the Space Shuttle March 7 at the Colonial Capital Kiwanis Club in Williamsburg.

Jane Hagaman discussed space research at the Norfolk Academy Career Day March 15.

James Schiess talked about computer science, mathematics and statistics at Virginia Commonwealth University March 16.

Ray Goodman discussed remote sensing and Space Station March 16 at the Junto Women's Club in Chuckatuck and March 31 at the Tidewater Regioinal Science Fair, respectively.

Lee Person Jr. briefed the Mercury Lions Club March 20 on the Kestrel/Harrier Flight Test Experience.

George Ware spoke about the Space Shuttle to students at Barron Elementary School March 20.

Sam Ketchum discussed the NASA Spinoff Program at the Exchange Club of York meeting March 20.

Tom Campbell spoke to students at Norfolk State on satellite communications March 27.

Robert Calloway discussed the current status and future plans of the Space Shuttle March 29 at the Retired Officers Association meeting.

George Ashby discussed the Space Shuttle at the Southside Church of the Nazarene March 31.

swap and shop

FOR SALE

Articles

Trampoline: 10x10-foot octagon shaped, EC, pads included, $350; Skates: Ladies Pacers, size 5, $45; Chair: Recliner with vibrator, tan, LNC, $100. Call 877-2210.

Outdoor wood slat roll shade, 11 feet x 7 feet, $30. Call 838-0352.

Animals

Puppies, small mixed breed, tan/black with white markings, good Easter gifts, $15 each. Call 599-3437.

Vehicles

Dinghy, 7-foot polyethylene, with oars, $60. Call 838-0352.

Valiant, 1971, 225ci, 6 cyl., 4 dr., AT, AC, 97,000 mi., VG tires, new brakes and paint, $800. Call 826-2165.

WANTED

To buy cameras, damaged beyond repair, for parts; single lens or twin lens reflex preferred. Call 898-4170.

Roommate to share two-bedroom apartment close to NASA; prefer quiet, responsible non-smoker. Call Ron Williger, 865- 7305.

Interested riders to join van pool from Williamsburg. Call Lee Foster, ext. 2614.

FOUND

NASA 20-year pin, off center. Call Keith Henry, ext. 2934, for information.

LOST

Men's cordovan wing-tipped shoes, size 10-D, in vicinity of Building 1225 on March 28. Call Clifton M. McMillian, 826-8448.

cafeteria menu

Week of April 23-27

MONDAY: Beef and Vegetable Soup, Burrit and Spanish Rice, Chicken Fried Steak an Grilled Ham Steak. Snack Bar: Hot Italia Sausage and Ham and Cheese Club.

TUESDAY: Ham and Lima Bean Soup, Frie Beef Liver, Braised Beef and Vegetables an Tuna Noodle Casserole. Snack Bar: Stea and Cheese Sub and Chicken Filet.

WEDNESDAY: Fresh Vegetable Soup, Stuffe Pepper, 1/4 Baked Chicken and Hot Smoke Sausage and Baked Beans. Snack Bar: Sup Cheeseburger and NASA Sub.

THURSDAY: Chicken Noodle Soup, Ve Parmigiana, Roast Beef Hash and Braise Chicken Livers. Snack Bar: Polish Sausag and 1/4 lb. Cheeseburger.

FRIDAY: Bull Island Clam Chowder; Fis Dinner; Hawaiian Chicken and Fried Ric Franks and Baked Beans. Snack Bar: Turke Club and Cheese Pizza.

Week of April 30-May 4

MONDAY: Old Fashioned Bean Soup, Pepp Steak and Rice, Cheese Omelet and Chuc wagon Steak. Snack Bar: Beef and Chee Burrito and Chicken Filet.

TUESDAY: Beef and Barley Soup, Brais Short Ribs, Quiche Lorraine, Baked Filet Fish. Snack Bar: Steak Nuggets and 1/4 l Cheeseburger.

WEDNESDAY: Fresh Vegetable Soup, Fri Chicken Dinner, Roast Pork and Dressing a Swiss Steak. Snack Bar: Italian Beef Su and Grilled Ham and Cheese.

THURSDAY: Chicken Gumbo Soup, Stuffe Veal Steak, Salmon Cakes, Braised Chicke Livers. Snack Bar: Beef and Cheese Clu and Mexican Pizza.

FRIDAY: Bull Island Clam Chowder, Fis Dinner, Creole- Style Chicken and Rice ar Chopped Steak. Snack Bar: Meatball Su and Crab Cutlet.

Thinking Out Loud

THERE IS SOMETHING that is much mor scarce, something far finer, something rarer tha ability. It is the ability to recognize ability.–Elber Hubbard

National Aeronautics and
Space Administration

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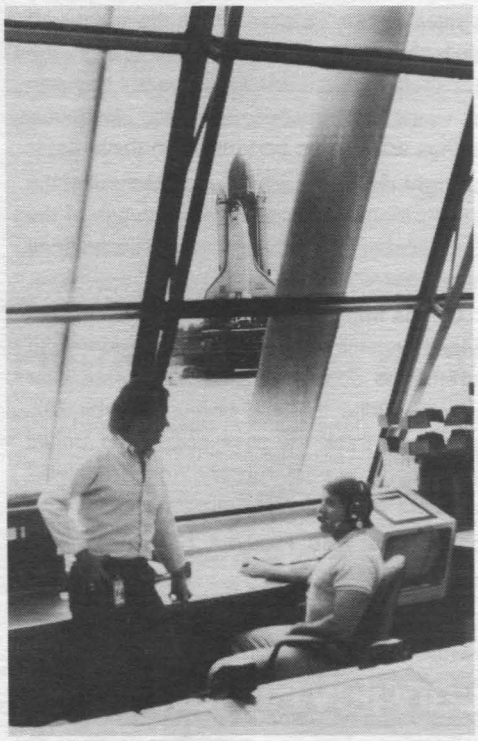
Langley Researcher

Volume 23, Issue 20 **October 5, 1984**

Challenger's Sixth Flight Highlights Earth Science

Space Shuttle Challenger is expected to return to space today for the sixth time on the 41-G mission with a record-setting seven crew members and a full slate of scientific instruments and payloads. Launch is set for no earlier than 7:03 a.m. EDT, at the beginning of a two-hour launch window. Landing is planned for KSC at approximately 12:23 p.m. EDT on Oct. 13.

The 41-G mission is the first space mission to include seven crew members, the first flight of a Canadian payload specialist, the first to include two women, the first spacewalk by an American woman, first crewman to fly a fourth Shuttle mission, first demonstration of a satellite refueling technique in space, and the first flight with a reentry profile crossing the eastern United States.



Workers in Firing Room 2 of the Launch Control Center monitor the progress of the 41-G rollout of Challenger to the launch pad. Challenger carries a crew of seven on the eight-day mission, which is scheduled to land on the KSC runway at 12:24 p.m. October 13.

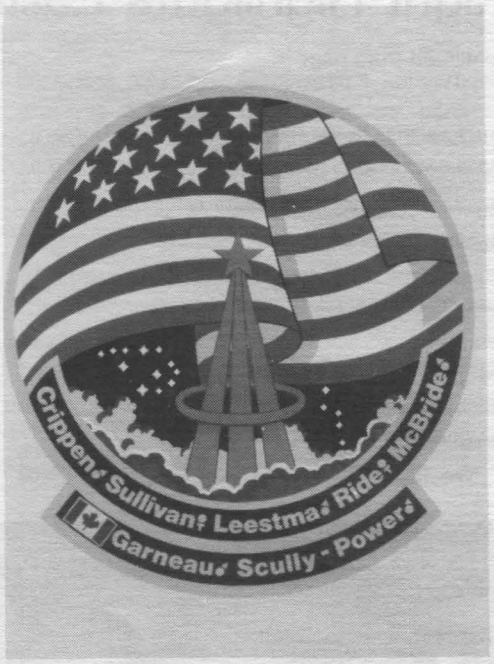
The major payloads being flown on this mission include: NASA's Earth Radiation Budget Satellite (ERBS); NASA's Office of Space and Terrestrial Applications (OSTA-3) payload; Orbital Refueling System (ORS) experiment; and the Canadian National Research Council's scientific experiment packages known as CANEX.

Flying again in the crew cabin will the large film format IMAX motion picture camera and a handheld device called Radiation Monitoring Equipment. The Aurora Photography Experiment and several battery powered devices to measure gamma radiation will be flying in the crew cabin for the first time.

Challenger's launch from Kennedy Space Center's complex 39A puts the spacecraft into a circular 219 statute mile orbit with an inclination to the equator of 57 degrees.

Activities during the crew's first day in space, in addition to the normal systems tasks, will include activating the OSTA-3 and ORS payloads, checkout of the Canadian developed Remote Manipulator System (RMS), unpacking and preparing the IMAX camera, and starting checkout operations for deployment of ERBS. (See Sept. 21, 1984 Researcher for details of Langley payloads ERBE, SAGE-II, MAPS and FILE.)

The ERBS spacecraft will be activated and given a systems checkout before being grappled by the RMS and lifted clear of the cargo bay. Suspended at the end of the arm, more checkouts will be performed and solar cell panels, antennas and other appendages will be extended and locked. Once the appendages are extended and locked, the spacecraft can no longer be returned to the cargo bay. Approximately nine hours after liftoff, ERBS will be released. The orbiter will separate from the satellite and the ERBS will be free to maneuver to its operational altitude of 329 statute miles.



41-G CREW EMBLEM. The 41-G mission insignia focuses on its seven crew members, the U.S. Flag and the unity symbol known as the astronaut pin. The pin design in center shows a trio of trajectories merging in infinite space, capped by a bright shining star and encircled by an elliptical wreath denoting orbital flight.

Flight day two activities will include the start of the Canadian experiments, visual performance tests for crew members, a change in orbital altitude and the first of four crew commanded transfers of fuel in the ORS.

ORS is attached to the same support

Continued on page 2.

NASA will Retrieve Two Satellites on 51-A Shuttle Mission

NASA will retrieve two spacecraft, the Palapa B-2 and the Westar VI, and return them to earth on the Space Shuttle under the terms of two agreements announced by the agency.

The agreements between NASA and two insurance organizations, Merrett Syndicates Ltd. and International Technology Underwriters (intec), have been signed. The two companies represent the majority of domestic and foreign insurance underwriters that wish to retrieve the communications satellites.

Westar VI was launched for Western Union during the 41-B Shuttle mission on February 3 and Palapa B-2 was launched for the government of Indonesia during the same mission on February 6. Neither spacecraft achieved the proper transfer orbits when the perigee kick motors failed.

The agreements call for NASA to retrieve the spacecraft on the 51-A Shuttle mission currently scheduled for launch in early November 1984. The insurance underwriters will pay NASA for costs incurred in preparing for and executing the retrievals, not to exceed $2.75 million each since 51-A is now a dual-retrieval mission.

The details of the rescue plan for both spacecraft will be stated in two separate standard launch services agreements. The agreements could include a commitment to relaunch the satellites in July 1985 should the underwriters request it.

Flight Highlights Earth Science

Continued from page 1.

structure that holds the Large Format Camera and is designed to develop and demonstrate the equipment and techniques for refueling existing satellites on orbit.

Four fuel transfers, controlled by the crew from within the crew cabin, will be performed during the mission in addition to a spacewalk designed to connect a servicing tool to valves which simulate existing satellites not orginally designed for on-orbit refueling.

On flight day three, the crew will again change orbital altitudes, this time maneuvering to the optimum altitude for SIR- B radar observations. From this point on, ground controllers will command the SIR-B and Large Format Camera activities from payload operations centers. The flight crew meanwhile will also perform a second ORS fuel transfer by remote control, conduct additional visual performance tests and conduct miscellaneous experiments and tests. On the next day, more IMAX footage will be taken, the CANEX series will continue, and mission specialists David Leestma and Kathryn D. Sullivan will perform extensive checkouts of the Extravehicular Mobility Units or spacesuits and will also configure the cabin for the spacewalk scheduled for flight day five.

The fifth flight day will see the first spacewalk by an American woman, a three-hour spacewalk in which Leestma and Sullivan will install a valve assembly into simulated satellite propulsion plumbing. The simulated plumbing duplicates that of existing Landsat spacecraft, a prime contender for orbital refueling and refurbishment.

Flight day six and seven will feature tests of the valve system installed during the spacecraft with hydrazine being transferred through the valve section. More IMAX footage will be taken and visual performance tests and dosimeter readings will also be performed on these days.

Flight day eight will include checkout of the Shuttle's flight control systems, stowage of the SIR-B antenna and cabin gear and perparations for deorbit.

On the final day, the crew will deactivate all payload systems, close the cargo bay doors and deorbit. The deorbit burn will take place over Australia during the final portion of orbit 132. The reentry track will pass across the United States along a path roughly from northwest Minnesota to southeast Georgia and on to a touchdown at KSC at about 12:23 p.m. EDT, on Oct. 13.

41-G CREWMEMBERS. The Space Shuttle Challenger will carry these seven persons into space for NASA's 41-G mission. They are (bottom row from left) Astronauts Jon A. McBride, pilot; and Sally K. Ride, Kathryn D. Sullivan and David C. Leestma, all mission specialists. Astronaut Robert L. Crippen, crew commander, is flanked by Paul D. Scully-Power and Marc Garneau, payload specialists. Scully-Power is an oceanographer for the U.S. Navy and Garneau represents the National Research Council (Canada). The replica of a gold astronaut pin near McBride signifies unity. The group represents the largest Space Shuttle crew thus far.

National Aeronautics and Space Administration
Langley Research Center

NASA

Langley Researcher

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Editor . . . . . Jean Drummond
Staff Photographer . . . . . Bob Nye

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

Berendzen, Speaker for Public Lecture and Colloquium

Lack of commitment to quality, diminished productivity, slackening of the work ethic, and deterioration of our most cherished institution, the family, have all contributed to problems in the American educational system and society at large, says Dr. Richard Berendzen, president of American University in Washington, D.C.

Berendzen will describe some of the problems involved in maintaining a quality educational system, and will outline solutions that are already being undertaken in various parts of the country at a Langley colloquim Tuesday, October 9, in the Activities Center at 2 p.m., followed by a question and answer session and informal discussion.

He will give the same talk, "HOME, SCHOOLS, SOCIETY: Partners in America's Future," that evening at the "Our Future in the Cosmos" public lecture at the Hampton Coliseum at 8 p.m. The public lecture series is sponsored by NASA and The College of William and Mary.

Berendzen contends that issues such as declining test scores, poor teacher preparation, and lack of discipline in schools, cannot be viewed in isolation. These problems reflect attitudes in the American home and workplace.

Believing that solutions to societies' problems may have much in common with improving our schools, Berendzen will review and share some of the recent advances and successes made in local school systems nationwide. Innovative ideas and a renewed commitment to excellence form the key to what each community can do to bring about a renaissance in American education.

An experienced public speaker with an important message, Berendzen's appearance presents a unique opportunity for parents, teachers and the general public to participate in a question and answer period after the lecture.

Berendzen, a noted astronomer, author, teacher and educator, has chaired numerous national committees studying the strengths and weaknesses of American education. He has also appeared as an education specialist on NBC News, the CBS Evening News, Nightline, Donahue, and the Today Show.

Visitor Center Features Special Shuttle Program

Langley-managed experiments dominate the payload for Space Shuttle Flight 41-G and the Visitor Center is featuring special programs and exhibits through October 21 in recognition of the four experiments aboard this mission

This flight is primarily an Earth survey mission. Langley's experiments are: Earth Radiation Budget Experiment (ERBE), Stratospheric Aerosol and Gase Experiment (SAGE II), Feature Identification and Location Experiment (FILE) and Measurement of Air Pollution from Satellites (MAPS).

The programs will be offered at 1 p.m. each day in the theater.

Visitors can also see live, large-screen television coverage of the key in-orbit activities of the eight-day mission and the landing, scheduled for October 13 at 12:24 p.m. (EDT) at the Kennedy Space Center.

Hampton Firm to Manage Visitor Center

J.L. Associates of Hampton has been awarded a contract to manage the NASA Langley Visitor Center, and has named three top officials at the facility.

Dr. Joan Sprigle-Adair of Williamsburg, is the new Director of the Visitor Center. James R. Rollings of Newport News has been appointed Programs Manager, and Linda D. Hunt of Poquoson is the new Public Relations Specialist.

J.L. Associates, with offices in downtown Hampton, is the city's fourth largest employer. The company specializes in management and operations support services for government agencies. The new five-year contract with NASA, which began September 1, is valued at approximately $1 million for the first three years with the last two years negotiable. The Visitor Center, which opened in 1971, has approximately 200,000 visitors per year and is one of Virginia's most attended museums.

Sprigle-Adair is formerly Director for Florida State University's Educational Research Center for Child Development, a former faculty member of the School of Education, College of William and Mary. She participated this past summer as an American Society of Engineering Education (ASEE) faculty fellow at Langley.

Rollings was Director of the Yorktown Victory Center, a state- operated museum. He is former Manager of Media Relations for the College of William and Mary and is an instructor there in the Office of Special Programs.

Hunt is a former lecturer and Teacher Resource Center Coordinator for the Visitor Center. She has also taught in the Hampton and Poquoson school systems.

EIC Holds Demos

Computer and peripheral demonstrations will be held as follows:

NEC Printers. On Tuesday, October 16, NEC dot- matrix and letter quality printers will be on display from 10 a.m. to 2 p.m.

AT&T Personal Computer. The demonstration of the AT&T Personal Computer and other office automation hardware and software has been rescheduled for Friday, October 19.

Both demonstrations will be conducted by company representatives who will be available to discuss their equipment and to answer questions. The Evaluation and Information Center is located in Building 1194, Room 106.

Suggestions for hardware, software and peripherals to be displayed in the EIC are desired. Please forward them to EIC, Mail Stop 192.

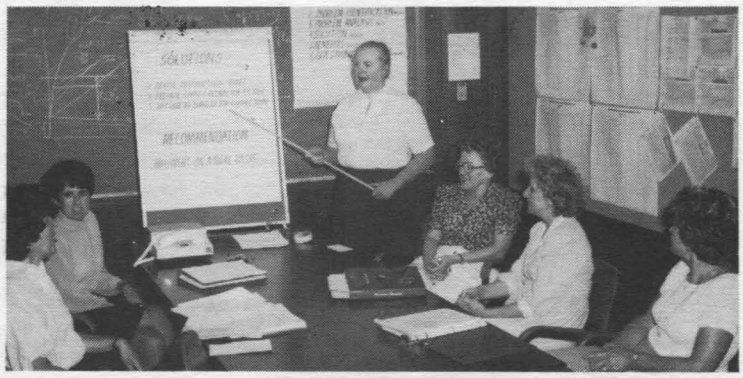
Thanks

Marion L. Jones writes, "On behalf of the family of Mrs. Marion Valentine, I would like to express my grateful and sincere thanks for the comfort, sympathy and support during our period of bereavement. I would like to especially thank my 'OSD family' for their support and prayers."

Quality Circles Increase

The Quality Circle Program at Langley is continuing to grow. It has expanded from six circles in the pilot program to 14, with several more anticipated to start in the next several months. The existing circles are in the administrative support services, operations support and fabrication areas. However, plans are underway to extend the program into the engineering/research side of the house. Eugene Kelsey, Systems Engineering Division, has been appointed facilitator for this area and is now in the process of training eight leaders.

Pictured are the new circles that have recently made presentations to management recommending solutions to problems they have identified. Their recommendations have been accepted and have been or are being implemented. This brings the total number of management presentations to 28. There has also been a number of small problems the circles resolved and implemented themselves. For further information on the program, call C.M. Cole, ext. 3101.

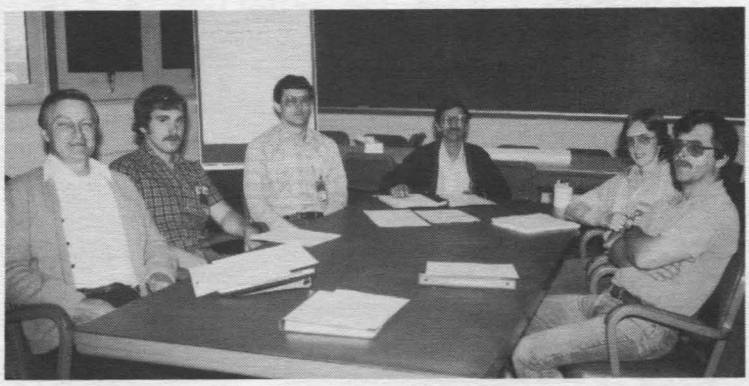


"The Travelteers" from the Travel Office, Financial Management Division, made its first management presentation in July. They made recommendations to resolve the problem of "Incomplete/Incorrect Information on Form 1012." The recommendations were to revise the instruction sheet and return it to the traveler, identifying the area where corrections are required. Members are Dolores Felty, Marjorie Mikula, Peggy Langford, Louise Storms (leader), Shirley Davis and "Dot" Ferrari.

"The Static Censors," comprised of members from three sections in the Electronics Technology Branch, Fabrication Division, have resolved their first problem pertaining to "Inefficient Machine Room Utilization." Their recommendations were to establish a working committee with representatives from each section in the branch to develop machine room operational guidelines. The committee would report directly to the branch head and also serve as a focal point for the employees to relate their needs concerning the machine room. The members (from left) are Jim Bartlett, Mark Wynkopp, Tim Bryant, Joe Goodwin, Thomas K. Lusby (leader), Sang Tran, Steve Wright, Art Hayhurst and Peggy Harmon.

"The Shopkeepers" is the second Quality Circle formed in the Advanced Machining Development Section, Fabrication Division. The members made recommendations to management regarding solutions to two areas: "Identification of Specialists" and "No Maintenance of Machine Accessories." The recommendation on the first was to list (at each specialized piece of equipment) the technicians that were experts in that area and the second was to institute a tagging system that would identify maintenance required and the procedure to follow for correction. Members are Tyrone Ellis, Del Croom (leader), Tom Barclay, Gene Bowen, Jim Anderson, Billy Allen and Floyd Backley.

"The RCA Wire Whizards," consisting of members from RCA and Langley, presented to management a solution to "Part Identification Washing Off During the Cleaning of P.C. Boards." Their recommendations involved changing the cleaning procedures now used and replacing the cleaning agent (alcohol) with freon. Members are (standing) Lloyd Binger, Glinnie Elvington, Peggy McCloud, Arlene Knick, Morriss Holliday (leader); (seated) Doris Gwilliams, Mary Murray, Viola Jackson, Ingelow Swain and Mary Jo Watterton. Absent are Ronnie Weber and Faye Ambrose.



"The Quality Processors," from the Materials Processing and Development Section, Fabrication Division, have completed their first task of "No Designated Area for Ultrasonic Contact Inspection." Their recommendation to management was to relocate machine tool equipment into another room. This would provide space for centralizing all UT inspection. Members are Wayne Wright (leader), Ron Hermansderfer, Tom Hall, Phil McElveen, Maggie Berry and Lawrence Cooper. Missing from the picture are Gilda Miner and Robert Berry.

NASA, AIAA Sponsor Aeroacoustics Conference

NASA and the American Institute of Aeronautics and Astronautics will sponsor the 9th AIAA Aeroacoustics Conference October 15-17. The meeting, which will be held at the Fort Magruder Inn, Williamsburg, is expected to attract about 150 industry, government and university researchers from the United States and abroad.

The technical program, which appears in the August issue of "Aerospace America," includes 23 sessions and six workshops. Approximately 120 papers will be presented on topics ranging from computational aeroacoustics and propeller, rotor and engine noise, to human factors in aeroacoustics. Langley researchers will present 18 papers on recent studies conducted at the Langley Research Center.

An awards banquet will be held at the Jamestown Festival Park Tuesday evening, October 16, at which time the Aeroacoustics Award will be presented to Professor Geoffrey M. Lilley, University of Southampton, England, for his "major contributions to aeroacoustics research."

NASA employees are being offered a reduced registration fee of $85 which covers the cost of the technical program and banquet. Those interested in further information, call Jim Yu, ext. 2619, or Dave Stephens, ext. 3577, who will be serving as Chairmen of the meeting.

Basford Named to ASME Committee

Robert C. Basford, an aerospace engineer in the Facilities Engineering Division, has been elected to serve on the 1985 National Nominating Committee of the American Society of Mechanical Engineers.

The committee nominates individual ASME members to serve as national officers of the 111,000-member organization. It nominates the president, board of governors and vice presidents of the various groups that make up the society.

To serve on the committee, a member must thoroughly understand the aims and objectives and operations of the society; know members in all segments of the society; and be known and respected by members.

At Langley since 1961, Basford is in charge of the design of research facilities and has published five papers. He has been active on various committees of ASME's Region IV.

Positions Available

The following Competitive Placement Announcements are currently open:

84-40: Secretary (Stenography) and Secretary (Typing), GS-0301-4 or 5, various locations at Langley, Open Continuous Announcement. NOTE: Consideration for this announcement is restricted to persons with competitive Civil Service status.

84-78: AST, Experimental Facilities Equipment, GS-0801-9, Systems Engineering Division, Aeronautical Systems Engineering Branch, Model Engineering Section, closes October 10.

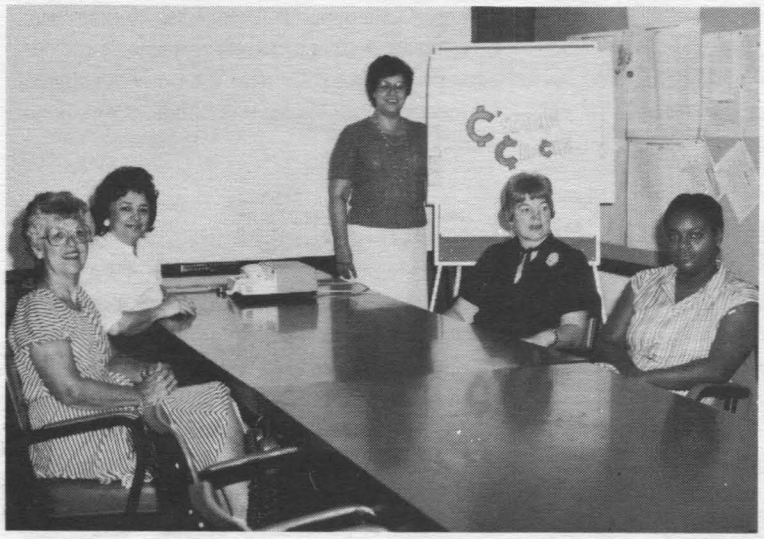
Upcoming Workshops

Low Observables Workshop, October 23-25, Langley Research Center. Contact Charlie M. Jackson Jr., ext. 2658, Mail Stop 407.

The Sixth VISTA Steering Group Meeting, October 10-11, Building 1268A, Room 2120. Contact Jerry Elliott, ext. 4681

Symposium on Advances and Trends in Structures and Dynamics, October 22-25, Sheraton National Hotel in Arlington, sponsored by George Washington University and Langley. Contact Jim Gardner, ext. 3721.

More Quality Circles



"The Centsable Circle" is located in the Payroll Section, Financial Management Division. They have resolved the problem of "Inconsistency in Preparing 1150s and T&A Cards on Separation." They recommended a workbook of samples and regulations be developed and given to each clerk. The circle members will assume the responsibility for developing the workbook. The members are Mary Bayless, Joyce Fly, Marie Storms (leader), Anita Runkel and Cassandra Favor. Missing from the picture is Marion Chaltry.

"The Buying Bunch," Purchasing Section, Acquisition Division, is the fourth circle formed in Management Operations. They made their first management presentation in August, recommending a solution to "Time Lost in Making Copies." The recommendation was to acquire a small copying machine for their section. The equipment is to be rented for several months with the option to buy if proven beneficial. The circle members are Joyce Rivera-Patterson, Deloris Hart, Sandra Ray (leader), Nancy Murawski, Sandra Glenn, Nancy Sessoms and William Tuck.

SHARECROPPING AT LANGLEY is not an every day occurrence, but perhaps it did occur this summer at the 16-Foot Tunnel. Thirty feet in the air on the side of a tunnel support corn is growing. Apparently pigeons dropped corn while building their nest. When Fred Jones was lifted up in a cherry picker to take the picture, the pigeons flew away. Wonder if the pigeons were succcessful in raising at least one ear of corn?

Thanks

Jack Dodgen writes, "Many thanks to all of you who helped me celebrate my recent retirement. The party was beautifully planned and carried out, and seeing my friends and co-workers once more was a real thrill. Particular thanks to the retirees who returned to take part. Langley was a great place to work, and my thanks also to those who gave me their time, efforts and advice through the years. With you folks helping, Space Station will have to be great!"

Retirement Party

A retirement party for **George R. Young** will be held in his honor October 12 in the Activities Center from 6:30 to 8:30 p.m. The menu will be heavy hors d'oeuvres and a cash bar will be open. The cost is $7.50 single, $14 per couple, including gift. For reservations, please contact A.W. Reid, Mail Stop 423, ext. 3431, by close of business today.

Handicapped Week Events at Langley

Special programs to make Langley managers and employees more aware of the value of handicapped employees are planned for three days next week, October 10-12.

The purpose of the Langley observance is to make all employees more aware of the abilities and contributions of Langley's handicapped workers. The programs will also provide insight into the sensitivity of handicapped employees to the work environment and the attitudes of coworkers.

Richard Pimentel, Training Consultant of the Windmills Training Camp, Portland, Ore., will conduct two training workshops Wednesday, October 10. The first, beginning at 9 a.m., will be for the Senior Staff in Headquarters conference room 225. A second workshop for Division Chiefs and Branch Heads will begin at 1 p.m. in the Activities Center.

John Chappell Jr., Executive Director of the Endependence Center of Tidewater Inc., will conduct two workshops for employees Thursday, October 11. The first will begin at 9 a.m., the second at 1 p.m., both in the Activities Center.

President Reagan has officially proclaimed the week of October 7- 13 as National Employ the Handicapped Week. Langley's special programs have been developed by the Center's Handicapped Workforce Advisory Committee, chaired by William Mace, Director for Electronics.

Langley activities will end Friday, October 12, with discussions between Langley Advisory Committee members, handicapped Langley employees and several invited guests. The morning discussions will be continued through lunch.

Minority Enterprise Development Week Set

The President has proclaimed October 7-13 as Minority Enterprise Development Week and NASA joins him in honoring the many valuable contributions minority businesses make to our society.

The theme for this year is "Minority Enterprise: Building America's Future Today." The national celebration, initiated in 1983, will honor the nation's minority entrepreneurs and their contributions to our country's economic well being.

In his proclamation, the President said, "America's growth and prosperity depend on the full participation of all its citizens. If we as a nation are to remain the world's leader in innovation, technology and productivity, we must ensure that all Americans are involved in our economic progress.

"The fulfillment of this challenge has become more realistic today, because of the significant contributions of minority American entrepreneurs to our economy. The nation's 600,000 minority-owned businesses reveal the true meaning of entrepreneurship. They have emerged as a dynamic force in the marketplace, bringing innovative products and services to our economy, and constituting the principal source for jobs and training for thousands of American workers."

Why Pre-Retirement Career Counseling?

Few people today opt for a rocking chair and a few good books to fill their retirement hours. Increasingly, Langley employees choose second careers which they launch after leaving here.

In some instances second careers are an obvious outgrowth of skills and interests developed in the principal career. Other times, however, employees pursue quite different lines of work. This is because job requirements and individuals' needs may change over time. A career development process can help employees discover new work options to satisfy such requirements and needs better.

As with other employees, pre-retirees must assume the ultimate responsibility for their career development growth and progress. The success of any venture hinges upon the individuals' commitment to planning and subsequent action.

The Career Development Center will support such commitment by providing tools for self-assessment, goal setting and strategy development. A confidential process, career development will enhance pre-retirees' continuing growth and vitality.

The Center is open Monday through Friday, 8:30 a.m. to 4:30 p.m. Individual appointments can be scheduled by calling ext. 3981. In addition, the Career Resource Library is open on a walk-in basis.

"A" LEAGUE SOFTBALL TOURNAMENT CHAMPIONS. The Ballers won the "A" League Softball Tournament for 1984 with a record of 4 wins, 1 loss. Picture are (kneeling) Dennis Mowrey, Courtney Russ, Wayne Williams, Alan Frizzell; (standing) Ernie Burt, Archie Dimery, Ed Covington, Tom Evans, Eric Wynings and Robert Fox. Not pictured: Ron Weber, Pat Turner and Ed Kerlin.

Langley Holds Intercenter Meet

Langley will hold the NASA fall intercenter running competition October 6 through October 28.

The 10-K races will be held at Langley October 9, 16, 18 and 25 at 5 p.m. The 2-mile races will be held at Langley October 11, 16, 18 and 23 at 5 p.m. and at the Bethel High School track October 17 at 11:30 a.m.

All NASA employees and contractors are eligible. Langley won the 10-K run last fall and was second in the spring.

Volunteers to to work the runs are needed. Call Bill Woods, ext. 2483, for more information.

Langley Staff Supports Bloodmobile

Langley employees and contractors donated 354 pints of blood during the American Red Cross Bloodmobile September 26.

Achieving gallon status were:

10 gallons - Henry H. Heyson.

9 gallons - Albert B. Stacey and Alton Barnes.

8 gallons - Lewis A. Horsley.

7 gallons - Merle S. Ott and Eugene B. McLemore.

6 gallons - Sharon Crockett and James Dorst.

5 gallons - John Haines and Richard L. Herndon.

4 gallons - Robert H. Daugherty.

3 gallons - James P. Bailey, George B. Finelli, Janice L. McCollum, James D. McMillan, Barry S. McGee, George Parker and Jeffrey P. Williams.

2 gallons - James A. Martin, Guy T. Kemmerly, Cadd T. Moore, Harley H. Cudney Jr., James E. Price, Julius F. Gibson, Patricia Paulin, Harold I. Simmons and Lonnie D. Hammonds.

1 gallon - Joseph V. Boyle, Franklin K. Harris, Paula A. Ware, Paresh C. Parikh, Diane C. Griffin, Franklin K. Goodson and Randy L. Simons.

Donating blood for the first time were Cecelia Huffman, Daniel W. Fisher, Diane Tingen, Raymond E. Sheldon, Ralph M. Marinard, Toni M. Meranda, Roger A. Lepsch, Robert S. Williams and Robert E. Grandle.

Red Cross Coordinators were Katherine Schatz and Marylan Asby. NASA Coordinator was Annette L. Forrest. Typists were Cathy Murray and Kelly Kidd. Coffee and doughnuts were provided by the Langley Federal Credit Union.

Happenings

HAPPY HOUR will not be held today due to a three- day weekend.

CPR. The Langley Activities Association will sponsor a CPR clinic October 27 from 8 a.m. to 7 p.m. in the Activities Center. Registration begins October 9 in the Activities Office. Individuals need to pick up books for previous study and to select a time from 8 a.m. to 2:30 p.m. to start the course.

ATLANTIC CITY TRIP. A few seats are still available for the November 2-4 trip to Atlantic City. The cost varies from $109 to $189 per person. Call the LAA Office, ext. 3139, for more information.

TURKEY SHOOT tickets will be on sale in the activities Office after October 9. The Turkey Shoot is scheduled for November 10 from 9 a.m. to dusk.

LAA ARTS AND CRAFTS SHOW will be held in the Activities Center November 10 and 11. Call Betty Hughes, ext. 3151, if interested in selling crafts at this year's show.

NASA/LAFB WEEKENDS AT KINGS DOMINION. This is the last weekend for NASA/Langley Air Force friends and families to enjoy Kings Dominion at reduced rates. Coupons are available in the Activities Office

NASA COUNTRY-WESTERN DANCE CLUB is starting a new season. The club features a western dance a month and western dance lessons on Monday nights at the Activities Center, hay rides and occasional special events. NASA employees, retirees and contractors are invited to join. Guests are welcome at all functions. For information, contact Claude Watts, Mail Stop 381, ext. 3023, or Sam Sokol, Mail Stop 488, ext. 3581.

NEWPORT NEWS FALL FESTIVAL, a folk life event featuring two days of traditional handcrafts, regional and ethnic foods, and two stages of continuous entertainment, will be held October 6 and 7 at the Newport News Park from 10 a.m. to 5 p.m. each day. For further information, call Kathy Gray, 247-8451.

MOVIE TICKETS for Coliseum Cinemas 1 and 2 and Riverdale, Beechmont and Williamsburg theaters are now available at the Activities Office at discount prices.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30.

COLONIAL WILLIAMSBURG discount admission tickets and Patriot passes are available at the Activities Office.

National Aeronautics and
Space Administration

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Top Positions Filled

Dr. L. Bernard Garrett has been selected Head, Systems and Experiments Branch, Space Systems Division, under Competitive Placement Plan 84-41.

Edgar J. Yarrington has been named Head, Technical Support Section C, Tunnels Operation Branch, Operations Support Division, under CPP 84-54.

Jerry R. Newsom has been selected Assistant Head, Aeroservoelasticity Branch, Loads and Aeroelasticity Division, under CPP 64-57.

Glenn R. Taylor has been named Head, Flight Instrumentation Branch, Flight Electronics Division, under CPP 84-58.

Dr. Harry F. Benz is Head, Information Systems Research Branch, Flight Electronics Division, under CPP 84-59.

Robert T. Magee has been selected Head, Resources and Contracts Branch, Fabrication Division, under CPP 84-60.

Harlan K. Holmes has been named Head, Electro-Mechanical Instrumentation Branch, Instrument Research Division, under CPP 84-61.

Robert C. Basford is Manager, 8 Foot High Temperature Tunnel Modifications Project Office, Facilities Engineering Division, under CPP 84-65.

Edwin B. Dean is Head, Cost Modeling and Control Section, Engineering Administration Branch, Facilities Engineering Division, under CPP 84-68.

James L. Puffenberger has been selected Head, Resources Control Section, Resources and Contracts Branch, Fabrication Division, under CPP 84-69.

swap and shop

FOR SALE

Articles

Air compressor, portable, 2 hp, Sears, 230 volts, $200. Call 596-2423 after 5 p.m.

Vehicles

1979 Ford Fiesta, sporty, w/sunroof, $2,000. Call Ed Harrison, 826-4344 after 5 p.m.

WANTED

Young, responsible female roommate, non-smoker to share 3 BR apartment in Wendwood Square Apartments. Call Yvonne, ext. 4469, or 877-6790.

Need players for a fantasy role-playing game. If you are interested, contact Wayne LaBar, 596-8399 after 5 p.m.

FOUND

Two men's watches found on tennis courts and Activities grounds and one hair dryer found in men's locker room. These items can be identified and picked up in the Activities Office.

Speakers Bureau

Dr. Edwin C. Foudriat, Flight Dynamics and Control Division, spoke on "Design Considerations for Time-Critical Distributed Computer Systems," at the II Encuentro Nacional Auc held in Medellin, Colombia, August 30-September 1.

cafeteria menu

Week of October 8-12

MONDAY: Holiday.

TUESDAY: Cream of mushroom soup, salmon cakes and slaw, beef stew and turkey and Swiss quiche. Snack bar: Polish sausage and kraut and pizza supreme.

WEDNESDAY: Fresh vegetable soup, fresh baked Boston scrod, eggplant parmigiana and chopped steak. Snack bar: Double cheeseburger and chicken filet.

THURSDAY: Old fashioned bean soup, corned beef and cabbage, chuckwagon steak and braised chicken livers. Snack bar: 1/4 lb. bacon cheeseburger and turkey and cheese club.

FRIDAY: Bull Island clam chowder, filet of fish dinner, chicken teriyaki and country style steak. Snack bar:

Corned beef Reuben and 1/4 lb. cheeseburger.

Week of October 15-19

MONDAY: Chicken noodle soup, chicken chow mein dinner, beef liver and onions, quiche Lorraine. Snack bar: Fried clam strips and beef and cheese club.

TUESDAY: Minestrone soup, beef stroganoff and noodles, veal cordon bleu and baked filet of flounder. Snack bar: Chicken filet and NASA sub.

WEDNESDAY: Fresh vegetable soup, Oktoberfest dinner, hot roast beef sandwich, chicken creole. Snack bar: Hot Italian sausage and ham and cheese club.

THURSDAY: Ham and lima bean soup, roast beef hash, chicken fried steak, braised chicken livers. Snack bar: Pizza supreme and chuckwagon on bun.

FRIDAY: Bull Island clam chowder, fish dinner, rib steak sandwich and 1/4 BBQ chicken. Snack bar: Steak and cheese sub and knockwurst and kraut on bun.

National Aeronautics and
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Langley Researcher

Volume 23, Issue 24 **December 3, 1984**

Langley Management Changes Hands

Hearth Announces Departure as Director; Petersen Will Succeed

Dr. Donald P. Hearth has announced his departure from the Langley Research Center. He will leave NASA February 1, 1985. Hearth became Langley's fourth director in September 1975.

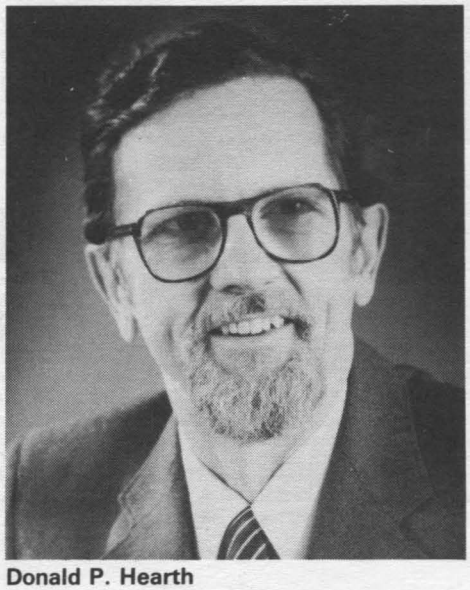
Deputy Director Richard H. Petersen will succeed Hearth as Langley Director February 2, 1985.

"This is not easy for me to say, but I've decided to leave NASA," Hearth told a stunned group of Langley supervisors at a hastily called meeting November 21 in the Activities Center.

"I have been at Langley for nine years, and this seems like a good time to move on. I knew I couldn't break Henry Reid's record," he joked, referring to Langley's first Director, who headed the center for more than 34 years.

Hearth has been asked to assist the NASA Administrator during the next two months, and Petersen will act for Hearth during December and January.

Hearth has not yet announced his future plans, except to say that they probably will involve working in a university "outside Virginia."



Donald P. Hearth

Administrator James M. Beggs said of the departure , "I regret Don Hearth's decision to leave NASA, but I am confident that Pete Petersen will provide the same caliber of leadership as his predecessors have at Langley. Upon his departure, I have asked Dr. Hearth to assist me for 60 days during this critical period in the establishment of the Space Station program, expansion of private sector involvement in civil space activities and the development of new markets for the Space Transportation System."

Hearth has led three special activities for NASA Administrators: head of a one-year study of NASA's "Outlook for Space," 1974-75; chairman of NASA's Equal Opportunity Council, 1974-75; and head of a study on the effectiveness of NASA Project Management, 1980.

Hearth was Deputy Director at the Goddard Space Flight Center from 1970 until he came to Langley. He was Director of Planetary Programs at NASA Headquarters from 1967 to 1970, responsible for managing NASA's planetary exploration programs and initiating programs to explore Mercury, Venus, Mars and Jupiter.

He was Manager of Advanced Programs for Lunar and Planetary Programs at Headquarters from 1962 to 1967. He worked for the Marquardt Corporation from 1957 to 1962 as manager of hypersonic propulsion research projects and manager of the Hypersonic Research Projects Department.

He began his career in July 1951 as an aeronautical engineer at the NACA Lewis Flight Propulsion Laboratory, Cleveland, Ohio, He did analytical and experimental research on air inductions and exhaust systems for supersonic turbojet and ramjet applications.

Hearth is a native of Fall River, Mass., and earned a bachelor of science degree in mechanical engineering from Northeastern University in 1951. He has done post-graduate work at the University of California at Los Angeles

Richard H. Petersen

and the University of Southern California, and he is a graduate of the Federal Executive Institute.

He was awarded the Rank of Meritorious Executive by President Carter in 1980, and the Rank of Distinguished Executive by President Reagan in 1981.

He has been awarded two honorary doctoral degrees: Doctor of Science from George Washington University in 1978 and Doctor of Engineering from Northeastern University in 1982. He received the Outstanding Alumni Award in the field of science and technology from Northeastern University in October of this year.

Hearth's NASA awards include: the agency's highest award, the Distinguished Service Medal, 1975; the Exceptional Service Medal, 1969, the Executive Performance Award, 1975; and the Equal Opportunity Medal, 1981.

Continued on page 3.

OUTSTANDING ALUMNI AWARD. Langley Director Dr. Donald P. Hearth receives Northeastern University's Outstanding Alumni Award from the university President, Dr. Kenneth G. Ryder. The award, given in the field of science and technology, was presented during homecoming weekend activities October 28. Hearth was cited for his achievement, integrity, character, and professional, community or alumni contributions which, in general, have enhanced his prestige and have added honor to Northeastern University. Also pictured in Jeanne Craigie, President, Alumni Association.

Discovery Completes Retrieval; December Mission Delayed

The Discovery salvage vehicle returned home November 16 with a belly full of satellites to end a dramatic and cost-effective space mission.

The outstanding visual rememberance of the flight was the television view of Joe Allen, looking like a present-day Atlas, balancing the Palapa satellite above his head and, indeed, high above all the Earth. Allen, 5 feet, 6 inches tall, and weighing about 130 pounds, appeared to handle the drum-shaped satellite with relative ease.

Allen's and David Gardner's quick response to some minor problems during retrieval and stowage of Palapa seemed like second nature to them. They quickly switched to what they called "Plan B" and used human strength and ingenuity to complete their task. Westar VI was retrieved in a similar manner, and the two satellites were securely stowed in Discovery's payload bay.

Weather in the Cape Canaveral area was barely mentioned before Discovery made the third Shuttle landing at the Kennedy Space Center. Visibility was very good as the Orbiter broke through scattered clouds to land, ending a mission just 15 minutes short of eight days.

NEXT MISSION DELAYED TO JANUARY

Discovery is now being readied to fly in January for a Department of Defense mission originally scheduled for early December. Tile problems on the Orbiter Challenger, however, have made necessary cancellation of the December launch and reuse of Discovery.

The DOD mission, numbered 51-C, will not be launched before January 21, according to Shuttle manager Jesse Moore. The delay will probably cause some payload reshuffling for the next several missions to keep the Shuttle manifest on schedule.

CHALLENGER TILES BEING REPLACED

Orbiter Challenger, meanwhile, is having many of its thermal protection system tiles replaced because of softening in the screed adhesive material that helps smooth irregularities in the Orbiter surface. Between 3,800 and 4,000 tiles (little more than 10 percent) must be replaced, including about 1,200 in screed areas.

Career Corner

The Career Development Center recently has added the following books to its Career Resource Library:

"Bernard Haldane Associates' Job and Career Building".

This book by Richard Germann and Peter Arnold follows the idea that successful careers don't just happen; they are the result of careful planning. The advice in this book comes from one of the nation's leading job counseling firms and relates to such topics as contacts, the job and career market, the job interview, negotiating the job offer and the long-distance campaign. The clear step-by-step method presented will let the reader grow from the present to the ultimate career goal.

"The Two-Career Couple".

He works, she works, but how does the relationship work? You and your partner work long hours, cope with the pressures of two jobs and worry about finding enough time for each other and your family. In this book by Richard Germann and Peter Arnold, the authors offer commonsense advice and focus on the major issues of today with research, interviews and questionnaires, all designed to help develop a working plan for today's two-career couple.

"The Retirement Threat".

This book by Tony Lamb and Dave Duffy is directed toward men and women who have been sold the Great Retirement Lie – that retirement is something you don't have to worry about until you are in your sixties, and that your pension and Uncle Sam will take care of all your needs. This book is an effort to convince people to plan now for their retirement life, and covers such topics as planning a retirement budget, how to stay healthy in body and mind, and includes appendices of organizations that deal with these issues.

The Career Development Center is located in Building 1194, Room 118. Employees may use the Career Resource Library on a walk-in basis, Monday through Friday, 8 a.m. to 4:30 p.m.

National Aeronautics and Space Administration
Langley Research Center

NASA

Langley Researcher

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Editor . . . . . Jean Drummond

Staff Photographer . . . . . Bob Ny

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

NASA Holds Large Space Antenna Systems Conference

The Langley Research Center will host the second NASA conference on Large Space Antenna Systems Technology December 4 - 6. The conference is being sponsored by the NASA Office of Aeronautics and Space Technology and Langley.

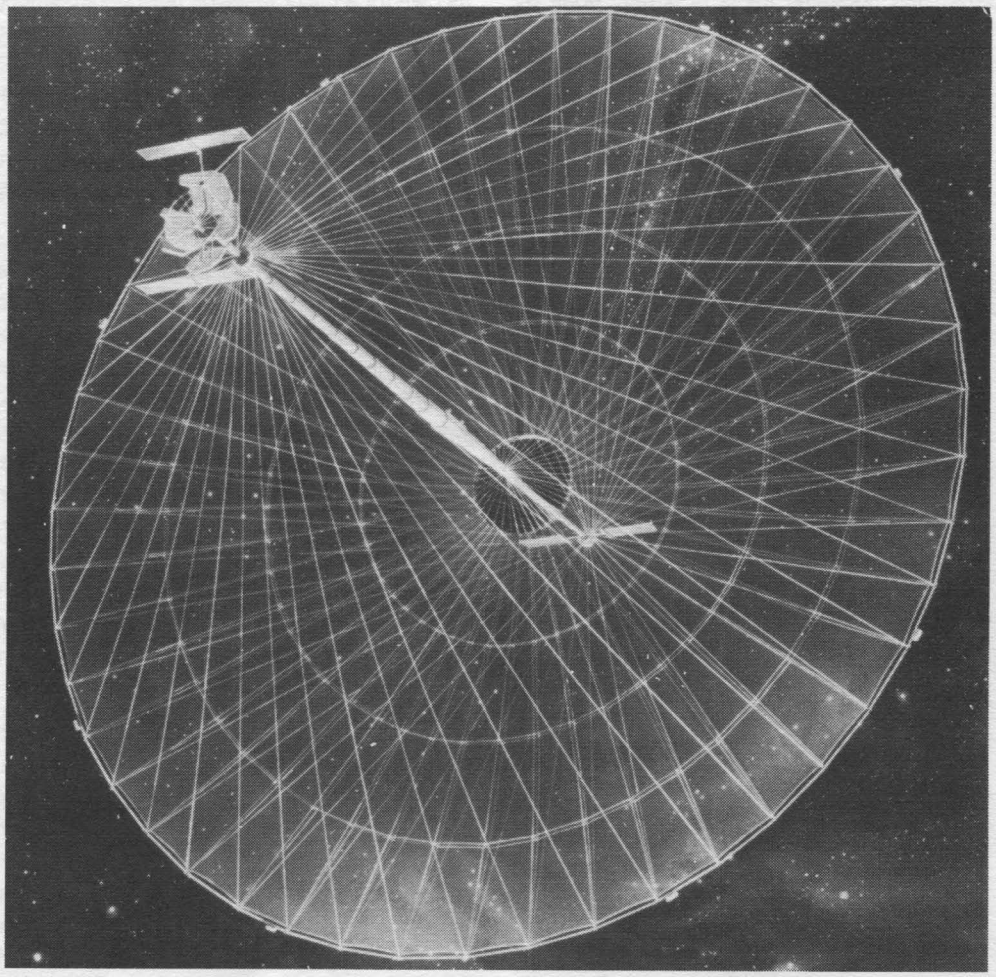
Several hundred representatives from government, industry and universities are expected for the three-day meeting. Over 50 technical papers (including 21 from Langley) will be presented in sessions on Mission Applications for Large Space Antenna Systems, Large Space Antenna Structural Systems, Materials and Structures Technology, Structural Dynamics and Control Technology, Electromagnetics Technology, Large Space Antenna Systems and the Space Station, and Flight Test and Evaluation.

Langley Director Dr. Donald P. Hearth said that this year the conference brings several new and exciting topics to the agenda. Several authors will address potential new applications of large space antenna systems. Several papers will provide the first glimpse of data obtained on the recent Solar Array Flight Experiment, the first test of a large flexible structure in space.

Maturing of the flight experiments program will be evident in papers on the erectable structures flight experiments: Assembly Concept for Construction of Erectable Space Structures (ACCESS) and Experimental Assembly of Structures in EVA (EASE), the Space Technology Experiment Program (STEP), and the Control of Flexible Structures (COFS) experiment series. An entire session will examine early thoughts on the potential impact of the Space Station on the technology for large space antenna systems.

Dr. Leonard A. Harris, OAST Director for Space, and Paul F. Holloway, Langley Director for Space, are general chairmen. Dr. Earle K. Huckins III, who heads the Langley Large Space Antenna Systems Technology Office, and William J. Boyer, who heads Langley's Office of Space Flight Experiment Definition and Integration, are conference technical program chairmen. Caro A. Lightner is the administrative chairperson.

Additional information concerning the conference may be obtained by calling Lightner ext. 3661.



LAND MOBILE SATELLITE SYSTEM SPACECRAFT. This is an artist's concept of a 120-meter quad aperture Hoop-Column reflector spacecraft. It is one of many spacecraft that will be discussed at the NASA conference on Large Space Antenna Systems Technology at Langley. It would be capable of relaying radio messages to land mobile units such as ambulances, police cars and taxis from its position in geosynchronous orbit. The spacecraft is sized for a single Shuttle launch and a 10-year life beginning in the mid 1990s.

Thank You for Considering Others

At the beginning of the Combined Federal Campaign, I set a tough goal of $225,000 for Langley. We far surpassed that goal, reaching $230,672.

The 1984-85 campaign has ended but your contributions will go on to help those less fortunate for a long time.

Thank you for considering the needs of others when you made your pledge. A special thank you goes to the retirees who contributed $16,377 this year. They, too, continue to generously support the campaign.

Donald P. Hearth
Director

Hearth Departs NASA

Continued from page 1.

He is a Fellow of the American Institute of Aeronautics and Astronautics and is on the Institute's Committee of International Activities; a Fellow of the American Astronautical Society; and a member of the Board of Governors of the National Space Club.

Governor Charles Robb appointed him to the Board of Directors for Virginia's Center for Innovative Technology (CIT) in May 1984. Hearth was previously on the Governor's Task Force on Science and Technology, and chaired the committee that developed the CIT concept.

He is a member of the Industrial Advisory Committees of both the Massachusetts Institute of Technology and the University of Virginia; a Director-at-Large for the National Council and a member of the Corporation of Northeastern University, and an Adjunct Professor at George Washington University. He is a member of the Board of Directors of public television station WHRO-TV and the Board of Directors of the United Virginia Bank.

NASA Program Advancing Composite Flight Research

-by Keith Henry

As part of its continuing effort to develop the super-efficient airplanes envisioned for tomorrow, NASA has embarked on a new research program to show that a transport airplane's metal skin and supporting structure can be replaced with nonmetallic composite material to save weight and manufacturing costs. Reducing an aircraft's weight increases its fuel efficiency.

Work under this new phase of study will represent the first application of composite materials in the construction of primary wing and fuselage structures for transport-class aircraft.

NASA's long-range goal is to provide commercial air transport manufacturers with the technology to produce composite structures and apply them on new aircraft, or on derivatives of current aircraft, in substantial amounts by the early 1990's. By the mid-1990's, researchers at Langley Research Center, where the new composites program will be managed, expect to see about 75 percent of the airframe structure of a transport made of composites.

Says Herman L. Bohon, manager of Langley's aircraft energy efficiency (ACEE) composites project office, "If that should be the case, aircraft would be about 15 percent more fuel-efficient than today, just from the reduction in weight alone." Added Bohon, "A 15-percent reduction in fuel on a wide-bodied aircraft like a DC-10 or Boeing 747 represents a savings of 750,000 gallons of fuel each year. That begins to add up when an airline has a fleet of 100 to 200 aircraft."

Bohon cites ACEE program projections that transport wings made of graphite epoxy composites would average about 35 percent lighter than their aluminum counterparts, while a fuselage made of composites would be about 25 percent lighter.

Composites also may reduce the manufacturing cost of transport aircraft. Bohon says the fuselage in particular would benefit from composite construction through a dramatic reduction in parts and an equally dramatic reduction in labor-intensive work. Fitting and joining metal body sections around the fuselage of a transport now requires thousands of rivets and other parts, and fastening joints is largely done by hand. Composite construction may reduce the number of joints through fabrication of larger body sections, and eliminate rivets.

NASA's advanced composite structures technology is part of the agency's multi-center program – a cooperative effort with the nation's major transport airframe manufacturers: Boeing Commercial Airplane Company, Seattle Lockheed-California and Lockheed-Georgia Com panies; and Douglas Aircraft Company, Long Beach, Calif. The Langley Research Center manages the ACEE composites program.

The airframe manufacturers will begin their contribution to the new initiative with a round of focused technology efforts. Through 1986, Douglas will study structural problems of fuselage areas with large cut-outs (as in the window belt area). Lockheed will document the structural performance under impact loads of a composite fuselage and study energy-absorbing designs for the lower fuselage. Boeing will work to improve the damage tolerance of composites. These are all areas of structures technology in which Langley has had a pioneering role.

Following these efforts, Boeing will incorporate the Lockheed and Douglas information with its own for a major fuselage design that, among other things, is to be highly damage-tolerant. NASA hopes by 1988 to have the design and manufacturing technology that will justify additional funding for subsequent fabrication and ground tests of full-size barrel sections to simulate structural behavior to impact and flight loads.

Concurrent with the fuselage studies, the new initiative includes programs with Lockheed and Douglas to develop and demonstrate composite wing technology, including ground tests of large segments of wing boxes. Lockheed will concentrate on redesign of the center wing section of a Lockheed C-130 cargo transport using composite material. The 37-foot section will provide opportunities to study the operational aspects of fuel in a composite wing and address questions of high local stresses from pylon attachments and major control surfaces. The Douglas program is in final stage of definition.

The six-year Advanced Composite Structures Technology program builds upon a series of laboratory and commercial flight tests begun by NASA by 1976. The composites program achieved an important milestone this spring and summer when the first composite primary tail structure went into commercial flight service. Marking the conclusion of several years of effort, five pairs of horizontal tails – called sh sets – have been installed on Boeing 737-200'

Now in flight service, this set of Boeing 737 horizontal tails was the first composite primary structure installed on a commerical aircraft.

Continued on page

NASA Seeks Teacher for Early 1986 Shuttle Mission

NASA, in conjunction with the Council of Chief State School Officers, has released the Announcement of Opportunity (AO) specifying the eligibility requirements for selection of a teacher in NASA's Space Flight Participation Program.

Through the program, NASA will extend Shuttle flight opportunities to a wide segment of private citizens with the purpose of communicating the experience of space flight to the public through educational and information programs. NASA eventually intends to fly various categories of Space Flight Participants two to three times per year.

Teachers meeting the requirements may request an application packet, which will be available after December 1 from the NASA Teacher in Space Project, Council of Chief State School Officers, 400 North Capitol Street, N.W., Suite 379, Washington, D.C. 20001. The application period is from December 1, 1984, through February 1, 1985.

The AO is open to elementary and secondary level teachers in all public, private and parochial schools in the United States and U.S. territories and in Department of Defense overseas dependents schools and Department of State overseas schools and in the Bureau of Indian Affairs. The teacher must:

- Be a U.S. citizen;
- Be a full-time classroom teacher;
- Have been a full-time classroom teacher for the past five years;
- Provide verification of teacher eligibility and consent to participate which will be included in the application packet;
- Meet all medical requirements as defined;
- Not be a spouse of a current or former NASA employee.

The school in which the teacher teaches, if it is non-public, must advertise that it does not discriminate in admissions based on race.

Teachers applying for this flight opportunity will submit an application to illustrate their qualifications and excellence as an educator and to demonstrate how they would share the experience with the public.

All applications received will be screened to eliminate those not meeting the basic requirements. Remaining applications will be forwarded to State Review panels which will evaluate the proposals and select two teachers per state as nominees. The 120 nominees (two per state, plus U.S. territories, Department of Defense and State dependent schools and Bureau of Indian Affairs schools) will be forwarded to a National Review Panel for further evaluation. All state nominees will attend a teachers' workshop and recognition banquet in the summer of 1985 in Washington, D.C. The workshop will inform the participants of current developments in the space program, and applicants will undergo further evaluation and screening by the National Review Panel in the form of personal interviews.

From the state-level nominees, the National Review Panel will recommend ten teachers as semifinalists for consideration by the NASA Space Flight Participant Evaluation Committee. This committee is comprised of seven senior NASA officials.

The semifinalists will go to the Johnson Space Center in Houston for thorough medical examinations, in-depth briefings and interviews by the NASA Evaluation Committee. Based on results of the physical examinations and the interviews, the Evaluation Committee will determine which applicants are qualified to undergo necessary training and will recommend five finalist candidates.

The names of the five finalists will be submitted to the NASA Administrator, who, along with the Evaluation Committee, will select the primary and back-up candidates to undergo training for space flight. The specific flight opportunity is under review; however, the goal is to fly the first teacher on a mission in early 1986.

Research Program

Continued from page 4.

Lockheed also designed and fabricated two L-1011 vertical tails, that will not fly. And by early next year, Douglas will have produced three DC-10 vertical tails, one of which will fly. Performance of the components in flight service will be monitored by the airlines for about 10 years.

Tagge, Speaker for Colloquium

Gordon E. Tagge, The Boeing Commercial Airplane Company official responsible for planning, directing and controlling all technical and business activities of the NASA sponsored IDEA program, will speak at a Langley colloquium Monday, December 3.

Tagge will discuss "A 1990 Integrated Digital/Electric Aircraft" at 2 p.m. in the Activities Center. A question and answer session and an informal discussion will follow the lecture.

Tagge says that the application of advanced systems technology has shown increasing promise for significant potential gains in airplane performance and deficiency. In late 1983, NASA initiated the Integrated Digital/Electric Aircraft (IDEA) programs, to determine the impact of extensive use of advanced electrical and digital systems on future aircraft. Tagge will discuss the objectives of the program, the basis for recommending the research and development necessary to implement IDEA concepts, the research programs recommended for high-risk, high- payoff areas appropriate for implementation under NASA leadership, and the application taking place by 1990.

Tagge has been with The Boeing Company since 1951. He has 33 years of experience in aircraft systems design, analysis and development, of which 15 years have been in

engineering management. During that time he has had overall responsibility for system technology activities for secondary power systems, environmental control systems, actuation systems, avionics and flight deck systems, and air traffic control systems.

Key Position

Thomas E. Deans Jr. has been selected Supervisory Engineering Technician, Technical Support Section D, Tunnels Operations Branch, Operations Support Division, under Competitive Placement Plan 84-79.

Klate Holt Apprentices Graduate

The sixth graduation for the Peninsula Joint Apprenticeship Training Program took place September 28 at the Hampton Holiday Inn. Receiving journeyman certificates at the ceremony were (from left) Charles Fuller, mechanic; Louis Randall, mechanic; Franklin Goodson, rigger; David Breen, pipefitter; Curtis Jiminex, refrigeration and air conditioning mechanic; and Lee Bumgardner, electrician. Graduate Leo Harris, refrigeration and air conditioning mechanic, was absent. Guest speaker for the occasion was W. E. Marshall, Apprentice Field Supervisor, Virginia Department of Labor, who spoke on "The Beginning – Not the End." The program is a joint venture by Klate Holt Company and Local 1340 International Brotherhood of Electrical Workers.

NOAA-F Launch Rescheduled

As of **Researcher** press time, launch of the NOAA-F satellite had been rescheduled to Friday, November 30, according to project officials. High winds in the upper atmosphere caused several delays, and a malfunctioning radar monitor caused one delay.

Langley's second set of Earth Radiation Budget Experiment (ERBE) instruments are one of the payloads aboard NOAA-F, which will be launched into a near-polar orbit from Vandenberg Air Force Base, Calif. A third ERBE instrument package will be launched next spring aboard NOAA-G.

Wright Brothers Featured at Visitor Center

"How Strong is the Wind," a new film documentary of Orville and Wilbur Wright and their first successful airplane flight, will be featured at the Visitor Center at noon each day during December. A brief presentation on the Wright Brothers will precede the film.

December 17 marks the 81st anniversary of the historic Wright Brothers flight in 1903.

The new film, on loan from the Wright Memorial in Kitty Hawk, N.C., site of the first flight, is narrated by author Harry Combs. Combs' newest book is "Kill Devil Hill," a biography of Orville and Wilbur Wright.

Wright Brothers exhibits on display at the center during the December anniversay celebration include a scale model of the Wright Flyer and a model of their first wind tunnel.

Three other films celebrating the history of flight will be shown throughout December. They are "Flying Machines," "A Man's Reach Should Exceed His Grasp," and "To Fly."

LAA Executive Board Elected

Six Langley Activities Association Executive Board members were elected during the November 5-19 election.

Elected to serve for two years were **William E. Sanders**, President; **Paula A. Ware**, Secretary; **Robert L. Huffman Jr.**, Chairman, Activities Committee; **George F. Palko**, Chairman, Building and Grounds Committee; and **Frances E. Sabo**, Chairman, Children's Committee.

Elected for a one-year term was **Jean W. Drummond**, Publicity Chairman.

New Courses Available

The following new courses are available in the Learning Center to NASA personnel and contractors:

- "Introduction to the BASIC Language"
- "Technical Presentations for Engineers"
- "Indsutrial Hydraulic Technology"

Please call the Learning Center, ext. 3014 for more information.

Speakers Bureau

Leroy Spearman spoke at a PEO meeting on "Perceived Threat to the Free World - Economic and Military" October 2.

James M. Patton Jr., talked on the Stall/Spin Program at the FAA Regional Headquarters DER Seminar October 11 and at the York County Ruritan Club meeting October 15.

Roger Hathaway discussed Shuttle utilization at the New Kent Middle School October 16.

Anne St. Clair talked on high performance aerospace polymers at the Old Dominion Chapter of the Society for Advanced Materials Process Engineering October 16.

Ben Smith gave a presentation to the Henrico County Science Teachers on educational programs resources at Langley October 17.

Ray Hook discussed the Space Station at Hampton's First United Methodist Church Men's Club meeting and at the Newport News Rotary Club meeting October 17.

Lester Rose spoke to members of the Virginia Peninsula Campers Association October 17 on "Spin Offs from Aerospace Technology."

Cary Spitzer discussed planetary exploration with students at the Old Donation Center for the Gifted October 23.

Gilbert Haynes talked about job alternatives for industrial education October 24 at the School of Industrial Technology.

Richard H. Jones gave a presentation on "Data Basis Management System in the Business Computer Environment" at the Federa Automated Data Processing Council of Tidewater October 24.

Archie Fripp discussed careers in aerospac October 24 at the Sandston Rotary Club's Aviation Career Day.

James Harris talked about use of computers at NASA at Virginia Wesleyan College Octobe 25.

Jane Hagaman discussed the Space Shuttle at the Virginia Beach Boy Scouts meetin October 30.

John H. Cantrell Jr. gave a presentatio at the University of Houston November 29 o "Adjabatic Invariance and acoustic Nonlinearit in Solids."

Happenings

HAPPY HOUR is held each NASA pay day from 4 to 6:30 p.m. in the Activities Center. LAA invites all employees, contractors, friends and family to join them after work.

NEW YEAR'S EVE DANCE. Tickets are on sale in the Activities Office for the annual New Year's Eve Dance. The cost is $20 per couple and includes setups, favors and breakfast. "The Virginia Reelin" will provide music.

THE CHILDREN'S CHRISTMAS PARTY will be held December 16 at 2 p.m. in the Activities Center. The full-filled afternoon will include a visit with Santa.

RUNNERS' CLUB. The Interdirectorate and Company 5-k race will take place Monday, December 10, at 4:45 p.m. at the NASA course on Doolittle Road. Cross country scoring will be used and a directorate must have five participants to field a team. If contractors do not have enough runners, those runners may run for the directorate they support. Call Bill Woods, ext. 2483, for more information.

SANTA HOUSE, a community project of the Newport News Woman's Club, will be open to the public through December 8. It features the NASA robot and a Fantasyland, as well as Santa Claus. It will be held at the clubhouse across from Riverside Hospital.

TIDEWATER DINNER THEATER. "The Man Who Came to Dinner" will be performed at the Tidewater Dinner Theater in Norfolk from December 5 through January 6. Kaufman & Hart's classic comedy concerns the funniest dinner guest you'll every meet; the trouble is, he brings along with him several ex- convicts, a $784 phone bill, penguins, an octopus and other assorted items. The real fun starts when everyone realizes that their dinner guest has no intention of leaving. The story is set during the holiday season and is a perfect holiday celebration for the whole family.

AL-ANON and A-A. Are you concerned about someone's drinking? Al-ANON and A-A meetings are held every week during lunch time at NASA-Langley. For information, call Wayne Simonton, ext. 3600, or Virginia Jones, ext. 2605.

BINGO is played every Thursday night in the Activities Center, beginning with an early bird special at 7:10 p.m. and regular games at 7:30.

COLONIAL WILLIAMSBURG discount admission tickets and Patriot passes are available at the Activities Office.

MOVIE TICKETS for Coliseum Cinemas 1 and 2 and Riverdale, Beechmont and Williamsburg theaters are now available at the Activities Office at discount prices.

THE PENINSULA CHRISTIAN SINGLES, an interdenominational support group for single people, meets Thursday nights at 7:30 at the Family Life Center behind Liberty Baptist Church. The meetings are open to singles of all ages in the Tidewater community. Free babysitting is provided.

SPACE CAMP. Applications are now being taken at The Space and Rocket Center, Tranquility Base, Huntsville, AL 35807, for the 1985 United States Space Camp. One-week camp sessions are offered beginning next March and tenth graders. Campers will experience the reduced gravity of space travel and train like a real run through next September for fifth through astronaut for a Space Shuttle mission. They will feel the trembling roar of the propulsion system developed by the Marshall Space Flight Center and NASA contractors as they are launched toward orbit. The cost ranges between $350 and $400, depending upon camper's age. The fee is payable in advance with completed application and health information forms, which are available at the center.

SKI AUSTRIA. Enjoy one glorious week of skiing in the Stubal Valley – Austria's perfect Alpine setting. Just 15 miles south of the Olympic city of Innsbruck and 25 miles from the spectacular Brenner Pass into Italy, the Stubal Valley is an ideal location for the avid skier and sightseer. The cost of the trip is approximately $882. and includes roundtrip air transportation and transfers, seven nights accommodations with private bath or shower, special "skier's breakfast" and full-course dinner daily, welcome cocktail party at the hotel, local host, tips and taxes, and travel documentation. Depart March 1 and return March 10. For more information, contact Jim Post, 244-7284, or at Mail Stop 495A.

Don't Stop on Ames

Employees are reminded that LMI 1700.7, Traffic Safety Program, dated January 30, 1984, prohibits vehicles from stopping or waiting for carpool passengers or contract delivery service on Ames Road. Strict adherence by all employees is essential to preclude the potential of a serious accident.

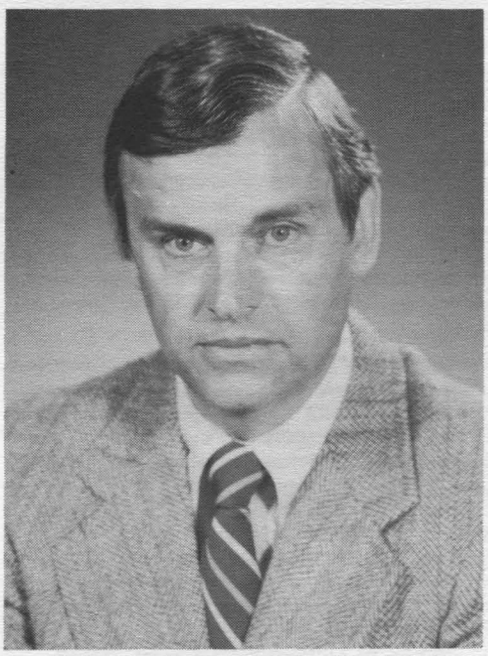
Friend Heads Langley Exchange

Arthur R. Friend, Industry Relations Officer, has been named Chairman of the Langley Exchange. He replaces Jess G. Ross, who is on a one-year assignment to NASA Headquarters.

The Langley Exchange promotes employee welfare and morale activities. It operates the cafeteria, reception and souvenir counters, and oversees employee activities such as banquets, dances, picnics and entertainment of official guests. It also fosters athletic events and other recreational activities. The five-member council, appointed by the Langley Director, oversees the operations of the exchange. The chairman carries out policies established by regulations and directs the management of various branches of the exchange in accord with recommendations of the Exchange Council.

Friend has been with NASA since August 1958. He has been a budget analyst; Head, Budget Unit; and Assistant Chief, Programs and Resources Division.

He received a bachelor of arts degree in business administration from the College of William and Mary in 1958 and a master of public administration degree from Indiana University in 1968.



Friend and his wife, Merida, live in Williamsburg. They have one daughter.

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Articles

Planimeter, compensating polar, K&E model 4236, mint cond., $100, Call 877-4372 after 6 p.m.

Man's large overcoat, grey jacket, grey sweater and gloves; like new; fits man 6 feet tall, 185 lbs. Call 851-2518.

WANTED

Carpool between Colonial Place and Riverview area of Norfolk (near ODU) and West area on 8 a.m. shift needs two more members. Call Dan Giesy, ext. 4591 or 625-7558.

Non-smoking drivers from Glendale and Hidenwood area for 8 a.m. shift. Call Sherman Clevenson, ext. 3561 or 596-8319.

cafeteria menu

Week of December 3 - 7, 1984

MONDAY: Old fashioned bean soup, braised beef and vegetables, tuna noodle casserole, knockwurst Reuben. Snack bar: Double cheeseburger and chuckwagon.

TUESDAY: Minestrone soup, baked lasagna, chicken cordon bleu and hot beef sandwich. Snack bar: Chicken filet and 1/4 lb. cheeseburger.

WEDNESDAY: Fresh vegetable soup; fried chicken dinner; roast pork and dressing; macaroni, franks and cheese. Snack bar: Bacon cheeseburger, turkey and bacon club.

THURSDAY: Chicken gumbo soup, braised beef tips, seafood quiche and braised chicken livers. Snack bar: Hot Italian sausage, crab cutlet.

FRIDAY: Bull Island clam chowder; fish dinner; beef, macaroni and tomatoes; chicken teriyaki. Snack bar: Steak and cheese sub, Polish sausage.

Week of December 10 - 14, 1984

MONDAY: Ham and lima bean soup, chicken chow mein dinner, beef liver and onions, western omelet. Snack bar: Mexican pizza, grilled ham and cheese.

TUESDAY: Split pea soup, spaghetti and meat sauce dinner, baked filet of flounder, chicken fried steak. Snack bar: Knockwurst and chicken filet.

WEDNESDAY: Fresh vegetable soup, baked stuffed cornish hen, chopped steak, franks and baked beans. Snack bar: Ham and cheese club, pizza supreme.

THURSDAY: Chicken noodle soup, beef stew, chuckwagon steak, braised chicken livers. Snack bar: 1/4 lb. cheeseburger, NASA sub.

FRIDAY: Bull Island clam chowder, fish dinner, burrito and Spanish rice, baked 1/4 chicken. Snack bar: Hot Italian sausage, 1/4 lb. bacon cheeseburger.

Space Telescope Optics Arrive in California

The optics for a NASA telescope so powerful that it may enable scientists to see to the edge of the known universe arrived on the west coast November 1, where it will be integrated with the other telescope components and prepared for launch aboard the Space Shuttle in 1986.

The Optical Telescope Assembly for NASA's Hubble Space Telescope was transported from its manufacturer, the Perkin-Elmer Corp., Danbury, Conn., to the Lockheed Missiles and Space Co., Sunnyvale, Calif. Much of the trip was by Super Guppy, a NASA aircraft specially modified to carry oversized cargo.

The 10-foot diameter, 30-foot long assembly, which consists of the primary and secondary telescope mirrors, associated electronics, and supporting structure for the telescope's instruments, left Perkin-Elmer by truck October 29, and was flown from Stewart Airport, Newburgh, N.Y., October 31.

At Lockheed, the assembly will be integrated with sensitive scientific instruments shipped earlier and with other Lockheed supplied spacecraft components, then checked out, and prepared for shipment to the Kennedy Space Center for launch.

"The move went flawlessly," said Jim Odom, Space Telescope Project manager at NASA's Marshall Space Flight Center, Huntsville, Ala. "Things went so smoothly, in fact, that we completed the move ahead of schedule."

The overall telescope, 43 feet long and weighing more than 25,000 pounds, will become the largest scientific payload ever placed in Earth orbit.

From its vantage point 320 nautical miles in altitude and above the Earth's distorting atmosphere, the telescope will enable scientists to see some 14 billion light years and to observe celestial objects some 50 times fainter than now possible. Some scientists have termed the telescope the greatest advance in astronomy since the invention of the simple telescope almost four centuries ago.

The Marshall Space Flight Center has overall management responsibility for the Hubble Space Telescope project. Science instrument development was led by the Goddard Space Flight Center in Greenbelt, Md. Once in orbit around the Earth, the telescope's astronomical research work will be guided by Goddard and the Space Telescope Science Institute in Baltimore, Md.

Scattered Sunshine

JOY can be real only if people look upon their life as a service, and have a definite objec in life outside themselves and their persona happiness.