

The Astrogram

VOLUME XIX NUMBER 21

July 14, 1977

Hans Mark leaves Ames for Pentagon post

Center employees wished Dr. Hans Mark, Center Director of Ames for the past 8 years, a fond farewell and best wishes on Friday, June 30, at two separate functions. Dr. Mark will become the Undersecretary of the Air Force and will work in the Pentagon in Washington, D.C. for the next three and 1/2 years.

A ceremony took place in Dr. Mark's honor outside Aircraft Bldg. 211, where gifts were presented to him. Dr. Irving Statler and Bill Carlson of the U.S. Army Air Mobility Research and Development Laboratory offices gave the ARC Center Director helicopter models and plaques commemorating the strong affiliation which has developed between those offices and ARC during Dr. Mark's leadership.

Center — a six-foot redwood tree which was promptly planted at the main entrance to the Center next to the sign designating NASA/ARC. It is in direct view of the Director's office windows.

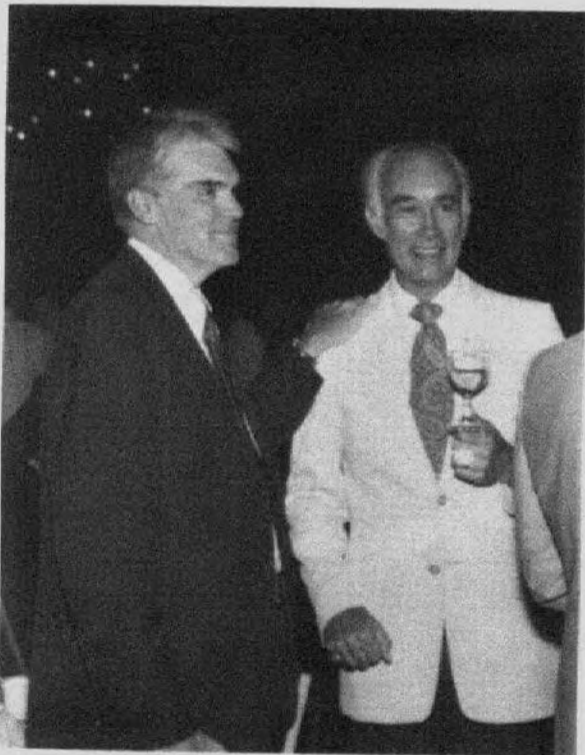
Dr. Mark's job will be as the major deputy to the Air Force secretary, John Stetson.

Dr. Mark came to Ames in 1969, shortly after the previous director, H. Julian Allen, decided to retire from NASA. He is a native of Mannheim, Germany. He moved to the United States in 1940 and became a citizen in 1945. Six years later he received a bachelor's degree in physics from the University of California at Berkeley. He earned a doctorate at Massachusetts Institute of Technology in 1954.

He was a research associate at MIT until 1955, when he joined UC-Berkeley as a research physicist. He taught nuclear engineering there and was chairman of that department until he came to Ames. He was also administrator of the Berkeley Research Reactor, and earlier had been experimental physics division leader at the Lawrence Radiation Laboratory.

Dr. Mark has been a consulting professor of engineering at Stanford University.

Mark, and his wife, Marion, have two children, a son, Rufus, at Yale and a daughter, Jane, graduating this year from UCLA.

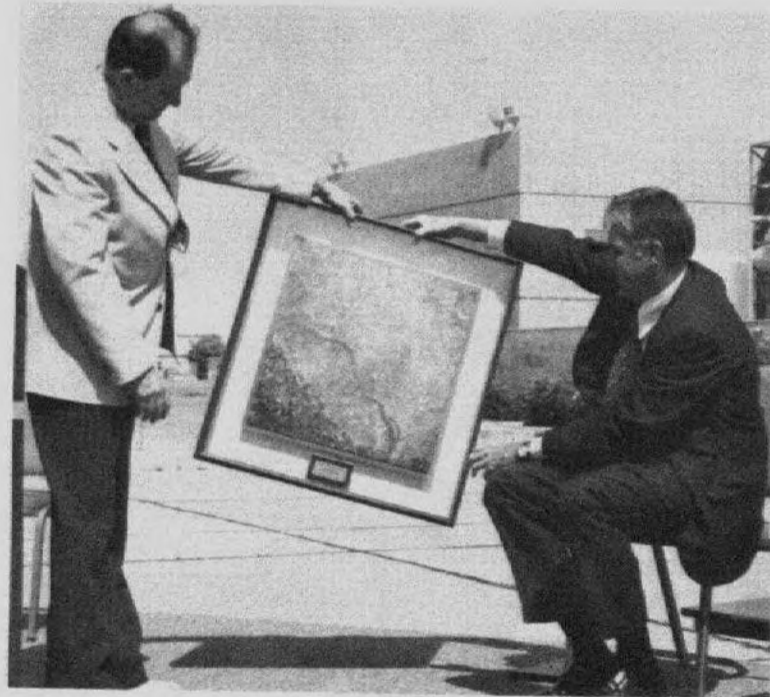


Drs. Hans Mark and Loren G. Bright

Dr. Leonard Roberts, Director of Aeronautics, gave him a handsome plaque depicting major program accomplishments at Ames which occurred during these past eight years such as the Augmentor Wing, "The Buffalo," the Tilt Rotor, Lift-Fan Aircraft, and Computation of Aerodynamics. Aeronautics Director, Dr. Dean Chapman, presented Dr. Mark with a large U-2 photo of the San Francisco Bay area. Louis Brennwald, Director of Administration, awarded him a U-2 photo of Dr. Mark's "new home," the Pentagon and its surroundings. Dr. Harold P. Klein, Life Sciences Director, presented the Center Director and his wife, Marion, a set of season tickets to the Washington Symphony Orchestra. Research Support Director, Loren S. Bright, gave Dr. Mark a beautiful set of pipes.

More gifts were shed on the departing administrator during the evening festivities at Rickey's Hyatt House in Palo Alto. Over 300 friends of the Center Director and his wife, Marion, gathered to wish them both the best in their careers in Washington, D.C.

Dr. Mark says he "hates like hell to leave." On his last official day, July 7, he bought a gift for the



Louis Brennwald presents U-2 photo to Dr. Mark.

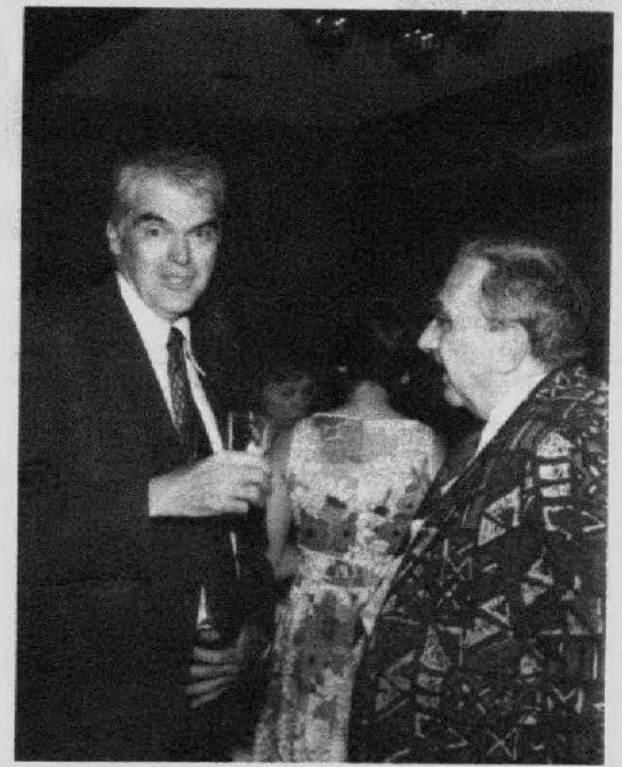


All of Dr. Mark's past Technical Assistants pose with him. (l. to r.) Al Chambers, Dale Compton, Jack Boyd, J. Lloyd Jones, and John Dusterberry.

More photos of Dr. Mark's party



Jack Boyd and Marion Mark remark on the festivities.



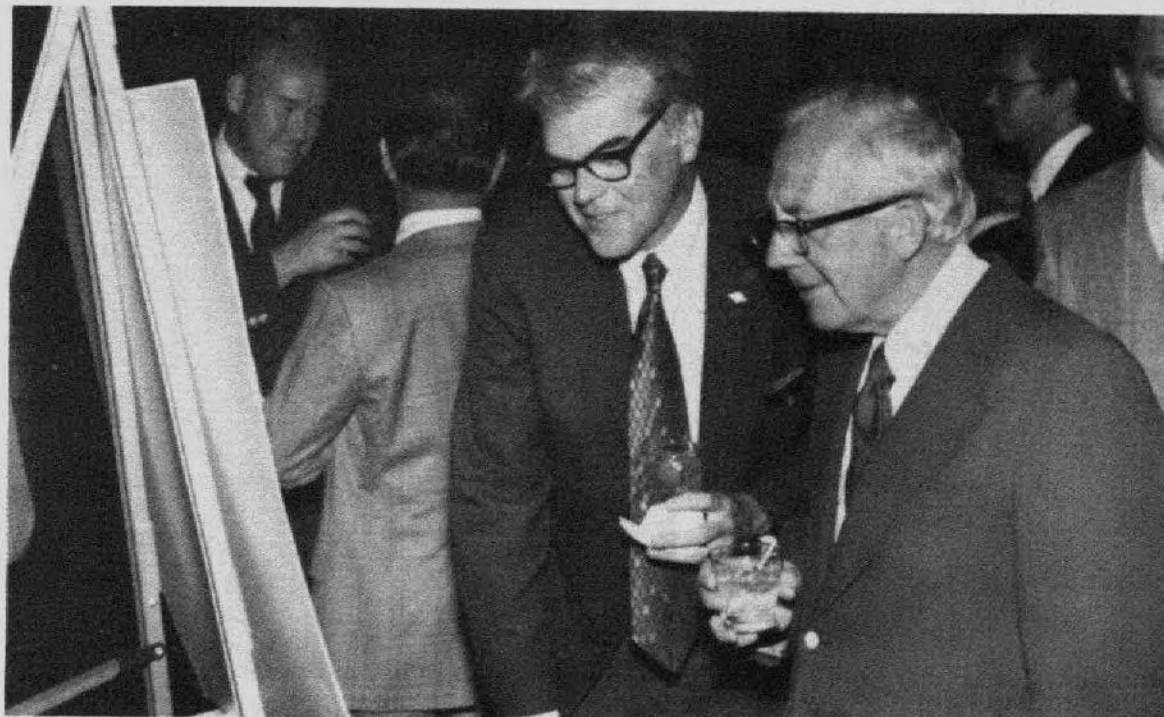
Hans Mark and Dr. Edward Teller



Lee Stollar, Carol Pike, Bob Pike, Edie Watson, and Ilse Stollar chat before dinner.



Cindy Smith and Tim Gregory



Hans Mark and Lester Briggs review collage photos.

Solar heating

The Ames ACES meeting on Wednesday July 20, 1977 at 11:30 a.m. in the Space Science Auditorium, Bldg. 245, will feature a presentation of a "Do-It-Yourself" solar heating project.

Phil Thompson, from the Model Shop, will show the results of several energy saving projects which have been studied and effected in his home. These projects range from insulation to solar panels and a storage system, to potential generation and storage of electricity. For those considering similar undertakings, this program will provide an insight into what factors should be considered and pitfalls to be aware of when adapting Alternate Consumer Energy Projects to your home.

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Von Braun dies

Dr. Wernher von Braun, former Deputy Associate Administrator of NASA and former Director of NASA's Marshall Space Flight Center, Huntsville, Alabama, is dead at 65. Death occurred in a hospital in Alexandria, Virginia, following a lengthy illness.

Dr. von Braun's greatest contribution to the exploration of space has been the direction of the design and development of the Saturn family of launch vehicles. The Saturns sent men to the Moon in Project Apollo, placed the Skylab space station in Earth orbit, sent three separate crews to visit it for lengthy periods of experimentation, boosted American astronauts into Earth orbit for linkup with Russian cosmonauts in the Apollo-Soyuz Test Project, and orbited three Pegasus meteoroid detection satellites.

Always interested in his adopted hometown of Huntsville, Dr. von Braun led other civic leaders in the establishment of the University of Alabama in the Huntsville Research Institute, the Research Park and the Alabama Space and Rocket Center. Reflecting the esteem of his fellow townsmen, Huntsville's civic center was named the Von Braun Civic Center.

NASA's Acting Administrator Dr. Alan M. Lovelace made the following announcement, "We feel a deep sense of personal loss at the passing of Dr. von Braun, one of the world's outstanding pioneers in the field of space exploration. His integrity, his personal dedication to excellence, his personal faith in the future offer examples for all of us to emulate and pass on to future generations of Americans."

Blue Angels air show

Moffett Field is planning an Open House and Air Show on 30 and 31 July. Featured will be the Blue Angels and the Navy Parachute Team. Two top civilian aerobatic acts have been booked - the ACROJETS and Art Scholl. The F-14 Paris Airshow flight demonstration is also planned along with the AV-8A Harrier flight demo. Admission is free. Gates will open at 1000 for viewing static displays and exhibits. Air Show is scheduled for 1330-1600.

Senator Stevenson visit Ames



When Senator Adlai Stevenson (right) visited the Center last week, Acting Director C. A. Syvertson presented the Senator with a U-2 photo of the Washington D.C. area. The Senator is the chairman of the Senate Subcommittee on Science, Technology and Space.

Senator Stevenson toured Ames and visited several of the facilities before continuing on to visit DFRC and JPL.

ARA ACTIVITIES

ROYAL LIPIZZAN STALLION SHOW

Reduced ticket coupons for the Royal Lipizzan Show at the Oakland Coliseum July 22 and 23, and at the Cow Palace July 24, are available at the ARA Store.

HIGH-ALTITUDE 16 X 20 PHOTO

Infrared photographs of the lower Bay Area (Size 16x20) taken by the U-2 are available now for \$10.00 at the ARA Store.

Jetsetters "Hula Day"

NASA Ames Jet-Setters Hawaiian "Hula Day," Sept. 8-15, 1977, only \$399 per person, 8 days and 7 nights on Maui - Golf - Tennis - Swimming - Relaxation. Time is running out, space is limited so don't miss out, sign up now to avoid disappointment. Send reservations or call Linda Atwood - (415) 369-1711 at Bulanti Travel, 2808 El Camino Real, Redwood City, CA 94061.

Library notice

The Main Library Bldg. 202 is preparing to surplus books no longer needed in the library or branch library collections.

Before instituting formal surplus procedures, the staff wants to be certain that all local needs are being met: therefore, the items being surplus will be available for examination by NASA-Ames employees. They may select any titles pertinent to their work for retention in offices or laboratories, during the period Aug. 1-Aug. 12, 1977.

Stop by the library during the period Aug. 1-Aug. 12, 1977, any time during the day, and the staff will be happy to show employees where the material is on display.

Persons selecting materials are reminded that the material remains government property and may not be appropriated for addition to private libraries or collections.

PAET project... a look back

The July issue of Scientific American contains an article on the Martian atmosphere as obtained from Viking data. Reference is made to analyses of these data by Alvin Seiff and Donn Kirk of Ames Research Center. It's appropriate to provide a little historical perspective on the role that Ames has played and the planning and effort that goes into these incremental advances of knowledge.

In the beginning it was Al Seiff who wondered whether the state conditions of a gas could be determined from the flight behavior of a shape of known aerodynamic characteristics flying through the gas. The reverse had been going on for some time in our ballistic ranges. Al wrote about this in TN D1770, dated 1963; only 14 years ago.

A sphere seemed to offer the most advantage as a shape since the drag was independent of attitude. Si Sommer, Roger Hedlund and Al Boissevain built some spheres for drop tests. (Actually, Les Buettner of the Model Shop did all the real work.) Some fancy models with parachutes and on-board cameras were taken to El Centro where the Navy kindly dropped them from an airplane at 40,000 feet. The wild gyrations the spheres went through on descent, as recorded by the cameras, was enlightening, albeit a tad discouraging, and persuaded everyone that spheres were not the way to go. (Everyone except the Russians. Their Venera probes were spheres, but stabilized by drogue chutes.) Any golfer could have told that spheres, no matter what the size, seldom fly in predictable trajectories. All this took place through 1965.

In spite of it all, things were still looking encouraging, so another model was built - of a different shape. This one had telemetry for pressure cells, temperature probes and accelerometers. It was dropped from a balloon at 100,000 feet over the White Sands Missile Range. The flight characteristics of the model had been checked by hand-dropping it from a helicopter over the tomato patch just off the runway here at Ames. The balloon drop was successful in that the characteristics and height of the atmosphere were actually reconstructed from just the on-board measurements of pressure, temperature and acceleration as they varied with time during the descent. One of the key elements was the ability to measure the pressure accurately through large changes. It turns out that John Dimeff and company had just developed a vibrating diaphragm type cell that was able to do this. This was in June 1966, only 11 years ago.

But now the pace starts to pick up.

The PAET (Planetary Atmospheres Entry Test) Project Office was formed, led by Dave Reese. Its objective was to prove the ability of a probe to enter the atmosphere of a planet at planetary entry speeds, take and record during communications blackout the internal measurements of what it felt and did during entry and transmit all these good things back to base before destroying itself on impact. A concomitant requirement was that those on the ground had to be smart enough to take these data and reconstruct the characteristics of the atmosphere through which the probe had fallen. The planet chosen for this test was the Earth for two reasons, it was close at hand and prior knowledge of what the answers were supposed to be was available, helpful in any scientific endeavor. So it was launched by a Scout rocket out of Wallops with impact near Bermuda. The flight, on June 20, 1971, was successful.

The PAET project was unique in that it involved the full spectrum of considerable talent then available at Ames to design, build in-house, and test an actual piece of space hardware. That one flight, in fact, opened the way for the whole series of planetary entry probes now in being, and successfully applied, so far, in the Viking flights to Mars.

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-97	Clerk Typist	GS-3/4	SEM	Centerwide & Outside	7-22-77

TO APPLY: Call Extension 5599 or 5600.

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-83	Secretary (Typing)	FD	Joan Showers

Career Workshop July 22, 29

A two-day workshop on Career Development will be offered to all interested Ames employees. The dates are set for July 22, 1977 and July 29, 1977 at Rickey's Hyatt House in Palo Alto. For more information please contact Meredith Moore or Teri Fowler in the Training Branch, extension 5623, Mail Stop 241-3.

IWY book available

The report to the National Commission on the observance of International Women's Year, titled "... To Form A Perfect Union ...", is now available for check out at the Ames main library. The report looks into the barriers that keep women from participating in American Life as full partners and makes recommendations aimed at eliminating the inequalities that still linger.

Golf

A beautiful day was on hand for the Blind Bogey Tournament held at Delaveaga Golf Course in Santa Cruz on June 25, 1977. Co-chairmen Jack Lee and Len McCulley report the following winners:

First flight: 1 - P. Kutler, 2 - D. Banducci, 3 - T. Almojuela, 4 - F. Lazzeroni, 5 - O. Koontz. Closest to pin - J. Lee.

Second flight: 1 - B. Scott, 2 - J. Silver, 3 - L. Hochstein, 4 - J. McCloy, 5 - E. Tischler. Closest to pin - B. Kelley.

Third flight: 1 - T. Pulliam, 2 - B. Quattrone, 3 - C. Banducci, 4 - S. Brovarney, 5 - I. Rathert. Closest to pin - C. McCloskey.

Want ads Transportation

1976 Celica ST, like new, 16K mi., 5 speed, AM/FM, radial tires, tan int. and white ext. \$4250 or best offer. Call 266-4458 eves.

1970 Maverick, 3 speed, excellent condition, brown vinyl top, \$950. 926-3114

1971 Toyota Pick-Up for sale, excellent condition, \$1,500. Call 734-5800 days.

1967 Mustang, 289, 2 BBL, runs great, \$950 or best offer. Call Tammy, 965-5610.

1965 Corvette Stingray, 4 speed, 327/300 HP, all stock. Mechanically excellent with new carburetor, radiator, and balanced clutch assembly. Rebuilt transmission and drive line. Low mileage on engine, \$4,990. 732-7384

For sale: '76 Mustang II Ghia, V-6, 4-speed console, power brakes, white with blue vinyl top, blue interior, 21,000 mi., \$4150, 295-4673, 324-1360, 967-8240.

FOR SALE: 1975 MG Midget, white (w/stripes), AM/FM, luggage rack, excellent condition. \$3497. Call 379-1753 after 7 p.m.

Housing

FOR RENT: Beach House at Pajaro Dunes (near Watsonville). Completely furnished, including linens; cleaning included in the rent; beautiful views of Monterey Bay, 100 feet from the beach; tennis courts. Reserve now for Autumn, call John Lundell, 252-7260.

FOR RENT: Contemporary home, beautifully furnished, 3 bdrm., 2 bath, study, garden. Adult family preferred, no pets, \$600. Available for one year starting about Sept. 1, 1977 (negotiable). Rental agent Mrs. Theobald, 321-3434.

House for Rent-Cupertino: 3 bedroom, 3 bath, family room, 2 car garage, patrially furnished, new washer/dryer. \$425 per month. Available Aug. 1 to June 30. Call Dennis Cunningham, 255-7408.

House for rent near Ames Research Center, 3 bdrm., 2 bath, family room kitchen, living room with dining room, has big backyard, \$390/month. Close to shopping centers and schools, available August 1, 1977. Call Gilda after 5 p.m., 964-0596.

For Sale - excellent condition - by owner, 4 bdrm., 2 bath, desirable Cupertino School District. Enclosed patio, custom drapes, near-new carpets and furnace, step-down living room. 253-1191

FOR RENT: Luxurious 2 bdrm, 2 BA, condominium with living room off pool patio, AEK, wood-burning fireplace on lovely quiet cul-de-sac. Lighted, all weather tennis courts, inside parking and storage. Adults only, no pets. In Mountain View. Available August 1. \$375/month. 967-5660.

Miscellaneous

Flamenco Guitar-perfect condition, case included, \$150. Call 969-5068 after 5 p.m.

Oak bedroom suite, double bed, triple dresser (w/2 mirrors), chest, night stand, excellent condition, \$400; Swag lamps - 1 modern, 1 Spanish, \$7.50 each. Call 379-1753 after 7:00 p.m.

Recliner, dark brown vinyl, like new, \$175. Call 923-2710 after 5 p.m. and evenings.

WANTED: Carpool to and/or corner of Middlefield and Loma Vierde in Palo Alto. Am blind, therefore cannot drive. Will share expenses. Call Jim Stevenson at ext. 5720 or 494-3311.

Window air conditioner for sale - Call 494-3311.

Sailboat, Lone Star design, molded 13 ft, main and jib, trailer, berth at Vasona, excellent condition, good learner, \$650. Call 253-6294.

Sleeping bag, very little used, \$15; wall lamp, excellent condition, \$15; study lamp, \$10. Call 964-1725.

Twin-size blankets, nice colors, like new, \$10 each, twin-size bed covers in very good condition, \$5 each. Call 964-1725.

FOR SALE: G.E. Electric Stove, four burners, oven, 30-inches wide, like new, \$100. Call Demo, ext. 5673.

FOR SALE: Frigifote thermoelectric portable refrigerator/freezer/warmer. Six-pac size, draws only 3 amps at 12 volts. Call 248-5546.

FOR SALE - LENS, 500 mm Kamura f.7, Minolta mount, includes carrying case. Lens recently inspected. Inspection results available. \$90. firm. Call 969-1494 after 5 p.m.

FOR SALE: 1-Stereo cabinet, oak, and/or components, best offer; 2-Maple dinette table, \$20; 3-Kenmore gas dryer, \$50; 4-Floor polisher, \$10; 5-Portable roaster-oven, \$10. Call 345-3924 after 4:30 p.m.

OPERA TICKETS: 1-Aida, Sat. November 5, 1:30 p.m., 2 tickets, \$22.00 each; 2-Faust (Gounod), Sat. November 26, 1:30 p.m., 2 tickets, \$14.00 each. Seats are N112 and N114 (center of the orchestra). Call 851-0137.

WANTED: Carpool to and/or from corner of Middlefield and Loma Vierde in Palo Alto. Am blind, therefore cannot drive. Will share expenses. Call Jim Stevenson at ext. 5720 or 494-3311.

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The Astrogram

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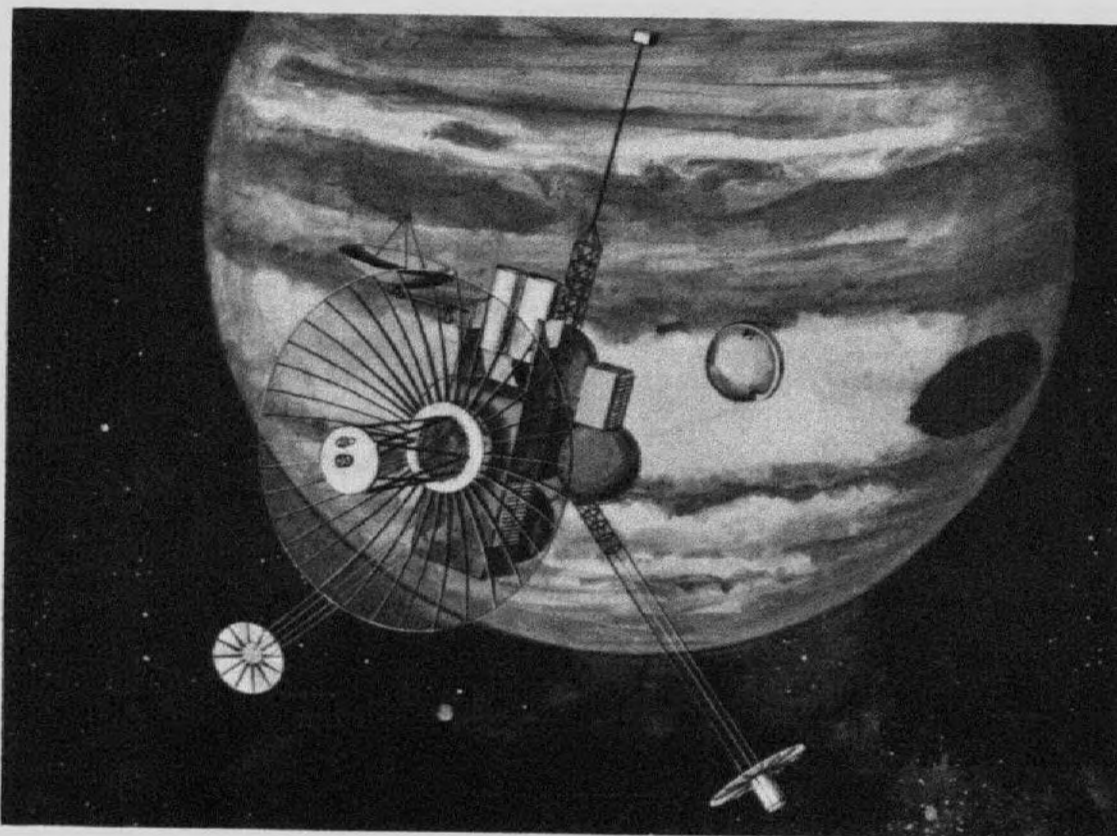
Congress approves JOP mission funds

By a vote of 280 to 131 on Tuesday, July 19, 1977, the House of Representatives restored funds totaling 17.7 million dollars to the NASA budget for a new start of the joint JPL-ARC Jupiter Orbiter with Probe (JOP) program in fiscal 1978. This is the first NASA planetary project undertaken by the Office of Space Science since the Ames Pioneer Venus Project was initiated in 1972. Total program cost will be 280 million dollars.

Nick S. Vojvodich, Deputy Manager of the Ames JOP project, enthusiastically described the program objectives and status as follows: "The combined orbiter/probe exploration of Jupiter and its environment will be marked by many firsts: The first cooperative JPL-ARC space project with JPL having responsibility for program management and the orbiter hardware and Ames having responsibility for the atmospheric entry probe; first use of the ERDA developed multi-hundred watt selenide RTG power sources; and first planetary mission to be launched by the Space Shuttle-Interim Upper Stage vehicle. In addition, JOP will involve international cooperation since the Federal Republic of Germany has agreed to provide the orbiter retropropulsion unit and some of the science instruments. Scientific interest in Jupiter is high because it is believed to hold many clues to the origin and evolution of the solar system. With its retinue of 14 moons, this giant globe of gaseous hydrogen and helium is theorized to be comprised of the primordial building blocks of the universe and, therefore, direct measurements of its atmosphere will yield information on the sun and overall planetary system."

The thousand-day journey to the cloud-shrouded planet with the mysterious red spot - thought by many to be a gigantic cyclone - will begin in January of 1982. Fifty days before encounter with the largest, most massive planet in the solar system, the 1.2-m diameter, 250-kg atmospheric probe will be separated from the orbiter and start its coasting, autonomous journey toward its rendezvous with Jupiter. As it reaches the upper atmosphere on the sunlit side near the equator, the probe will be hurtling through space at a speed of 50 km/sec (111,600 mph) which is five times faster than the speed that any other man-made object has ever attained. After protecting the probe on its precarious passage through the hostile radiative heating environment - predicted to be as high as 30 kW/cm² - the incandescent, 100-kg forebody heat shield will be jettisoned by deploying a parachute in the vicinity of the ammonia cloudtops (approximately 0.1 the surface pressure of Earth) exposing the probe's instruments to Jupiter's atmosphere. Data continuously obtained by the 25-kg complement of highly specialized scientific instruments will include the first "in-situ" or direct measurements of: the atmospheric composition (particularly precise determination of the hydrogen/helium ratio); structure (temperature, pressure, and density); cloud location and physics; and net radiative

(Continued on Page 2)



Atmospheric probe being released from orbiter 50 days before encounter with Jupiter.



JOP project staff members Duane Dugan, Larry Colin, Terry Grant, Tom Edwards, Nick Vojvodich, and Dick Schaupp with mock-up of early version of Outer Planet Probe, developed by McDonnell-Douglas in phase A study.

Sam White to head Helicopter Division



Ames has selected Samuel White, Jr. to serve as Chief, Helicopter Technology Division. He will join

the Ames staff in this capacity effective July 17, and will also continue in his current assignment at Langley Research Center as Acting Manager, Rotor Systems Research Aircraft Project (RSRA) for the present time.

White, a graduate of the United States Military Academy (West Point) and Purdue University, served in the Air Force for eight years as both a jet fighter pilot and Assistant Professor at West Point. He was employed by Sikorsky Aircraft for 18 years, during which time he was responsible for developing test programs for a wide variety of helicopters as well as helicopter development test facilities. During his three years at Langley, he has been involved in the RSRA Project both as Chief Engineer and currently as Acting Project Manager.

Mr. White holds membership in Tau Beta Pi and Chi Epsilon National Engineering Honorary Societies, and the American Helicopter Society. He has been a guest lecturer on technical management for the American Management Association and at the U.S. Military Academy.

JOP mission funds approved (Continued from Page 1)

energy flux. During its 30-minute descent to the bottom of the water clouds (10 Earth atmospheres of pressure), a continuous flow of data will be telemetered to the orbiter which will serve as a relay link to the Earth. The orbiter will then continue to operate for 20 months, monitoring the charged particle environment and taking pictures of the planet and the largest of its 14 moons (Io, Ganymede, Callisto, and Europa).

Two contractor teams, Hughes/General Electric and McDonnell Douglas, are currently performing competitive design studies of the atmospheric entry probe system. The \$350,000 studies, which started on April 1, 1977, will be completed in December. The winning contractor will start fabrication of the selected design in the summer of 1978. The selection of the science experiments is expected to be announced by NASA Headquarters in August 1977.

The JOP project will be carried out within the Astronautics Directorate with overall responsibility for management assigned to the Space Projects Division, R. R. "Skip" Nunamaker, Chief. Dr. Larry

Colin of the Space Sciences Division is Probe Project Scientist and Dick Schaupp is Systems Engineer. The Thermo and Gas Dynamics Division support of the project in the areas of heating analyses and heat shield tests in the newly developed Giant Planet Pilot Facility is being coordinated by Dr. Philip Nachtsheim of the Thermal Protection Branch.

Vojvodich concluded by saying that, "Many people, including contractors, scientists, and members of the NASA-JPL team, have worked long and hard to make this program a reality. We are all eagerly looking forward to the challenge of making it a success in the tradition of the past historic flyby missions to Jupiter of the Ames developed Pioneers 10 and 11 spacecraft. Looking to the future, the JOP project, in combination with the ongoing Pioneer Venus probe development, will establish the required technology base for similar exploratory missions to the more distant outer planets - Saturn, Uranus, and Neptune - during the rest of the century."

New Tilt Rotor manager

Lt. Col. James H. Brown has been appointed Manager, Tilt Rotor Research Aircraft Project Office effective immediately, it was announced by Dr. Irving C. Statler, Director, Ames Directorate, Army Air Mobility R&D Laboratory, NASA-Ames Research Center. Colonel Brown, who had been Deputy Manager of the project for almost two years, succeeds David D. Few, NASA-Ames Research Center, who has been promoted to the position of Assistant Division Chief, V/STOL Technology Division.



The XV-15 Tilt Rotor Research Aircraft is a joint Army-NASA project being built by Bell Helicopter Textron Corporation. The XV-15 is a 42 ft long, 32 ft wing span aircraft, incorporating wingtip mounted engines, transmissions, and 25-ft prop rotors which tilt from a helicopter position for hover, vertical takeoffs and landings, to a horizontal position for forward flight.

In the airplane mode, the aircraft is capable of forward speeds in excess of 300 miles per hour. It is expected that the tilt rotor will operate with less noise than conventional helicopters or turboprop aircraft of comparable size.

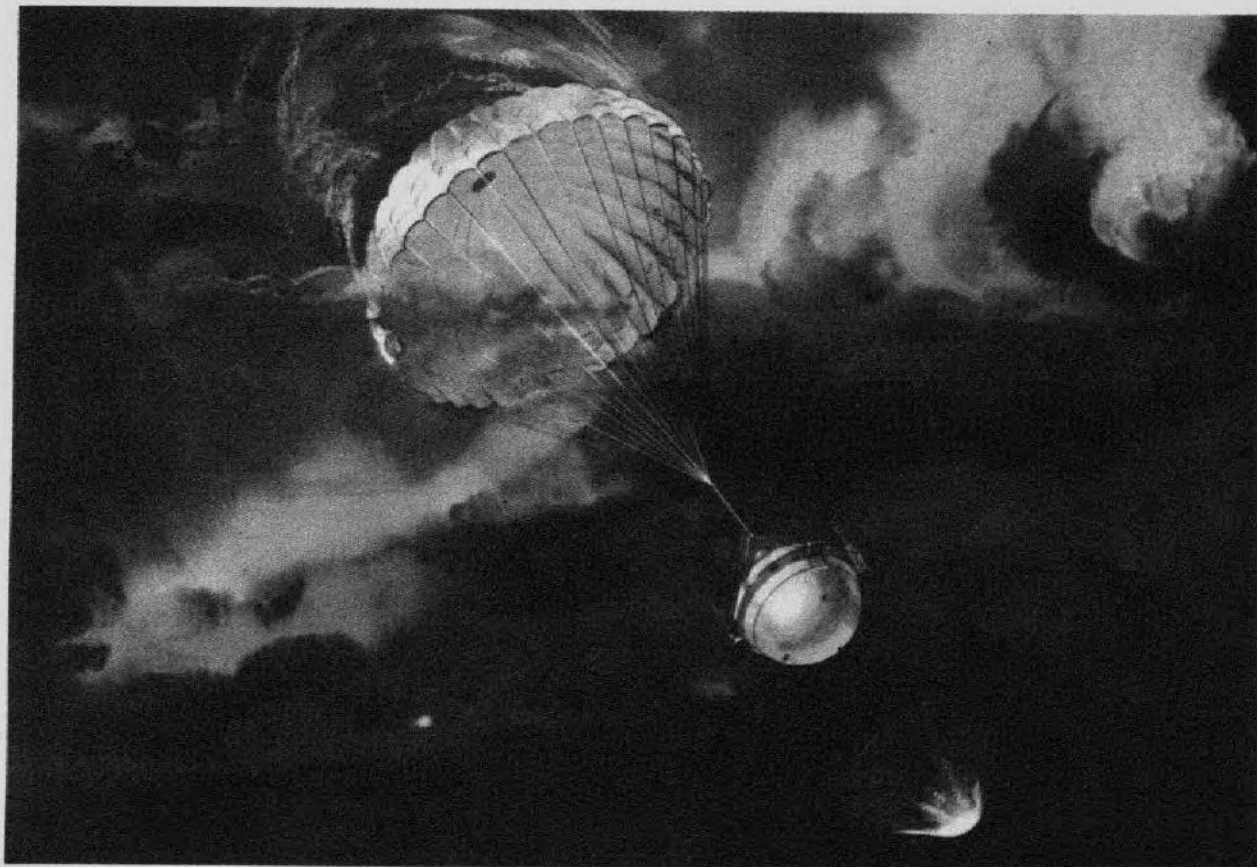
Two aircraft will be built and tested under the contract. The No. 1 aircraft made its first initial hover flight May 3 at Bell's Flight Research Center, Arlington, Texas.

Fitness for busy people

How often have you thought of starting a fitness or exercise program? What kind of physical exercise do you now get? Are you satisfied with your physical condition? If not, a lecture on new concepts in exercise for fitness motivation is for you.

A representative from the Fitness Motivation Institute of America will be in Mountain View on September 13. The lecture on "Total Isokinetic Aerobic Exercises" for busy, working people will instruct you in a new concept of exercise involving controlled speed and controlled resistance through a full range of motion. The exercise program being described is designed to build cardiovascular endurance, muscle balance, flexibility, and muscle tone. This program was used as a sole means of exercise in all Apollo Space Flights.

The South Bay Chapter of Federally Employed Women welcomes all those interested in attending this beneficial lecture. "Fitness for Busy People" will be presented at the Mercury Room, Mercury Savings & Loan, San Antonio Shopping Center, September 13, at 5:30 p.m.



Following survival of entry heating environment, red hot heat shield is jettisoned and probe starts its descent on parachute through clouds.

Ames Bond participation reaches 77.7% in '77

The success of this year's U.S. Savings Bond Campaign was a result of team efforts of a number of key individuals. One key member of the team was John Giboney of the Financial Management Division, who maintained the records and submitted the reports to Headquarters. He was strongly supported by his Division Chief, Ralph Shawlee, by Helen Bolt, Chief of the Pay and Travel Branch, and by the staff of the Payroll section — Corazon Licerio, Dorothy Hicks, Phyllis, Jensen, Eleanor Holt, Robin Thomas, and Donna Plumlee — who transcribed the pledge cards and prepared the new deduction allotment schedules.

The new billboard posters and charts in the cafeteria were coordinated through Germaine Lord of the Graphics and Exhibits Branch and some of last year's posters were retouched by Tommie Rodriques of the Paint Shop. They were installed through efforts of Leo Magazu of the Facility Services Branch. The large poster outside the 40- by 80-Foot Wind Tunnel, depicting this year's theme, was designed by Joel Mendoza of the Aircraft Aerodynamics Branch, edited by Germaine Lord, reproduced by Bill Balandis of the Reproduction Services Branch, and installed by Tony Grcich and Isidoro Diaz of the Facility Services Branch (who were strongly supported by Jack Barrie and O. B. Ray). The Special issue of the Astrogram was prepared by Marcia Kadota of the Training and Special Programs Branch and included pictures taken by Roger Brimmer of the Photographic Technology Branch.

An essential contribution to the success of the campaign was the strong support of the Center management. Particular support was given by Hans Mark, C. A. Syvertson, and J. Lloyd Jones.

Thank you

My wife and I would like to express our sincerest appreciation to all of our friends from Ames who made my retirement luncheon such a memorable occasion. It was a most pleasant conclusion to my career at Langley and at Ames. I am very grateful for all the compliments, the congratulations and well wishes from everyone.

The gifts were overwhelming! The large photograph I am framing. The mounted model is especially appreciated. Now I can show everyone what I have been interested in for years. And the two calculators are the greatest ever. I can calculate in any realm now, no matter what the circumstance might be. All I need now is a great deal of practice on both. The Ames pictorial album, as well as the letters from the McDonnell Douglas Corporation, will also be treasured as a reminder of people, tunnels, models, and occasions that made up a part of my career with NACA and NASA.

Louis and Helen Stivers

Bowlers needed

This September starts another season for the "All-Ames Bowling League." Bowling will be on Tuesday evenings at Camino Bowl in Mountain View at about 6:15. There are still some openings for new teams as well as for new individual members. Anyone interested in bowling or forming a team please contact Tom Wills at Ext. 5034.

New Engineering Management program

The University of Santa Clara has announced a new Master of Science program in Engineering Management. The first class in the new curriculum will be offered this fall. Admission requirements include a bachelor's degree in engineering and at least one year of full-time work experience. Individuals who wish to obtain more details on this new program, may attend a meeting on August 4, 1977 at 9:30 a.m., Bldg. 241, Room 147.

Judith Bergland, Ames Bond Coordinator, noted the close of the Center's 1977 U.S. Savings Bond Campaign saw another strong surge in payroll savings bond participation from 69.6% at the start of the campaign to 77.7% at the finish. Since the percentage of bond participation again surpassed 75%, Ames will retain the Minute Man Flag and will be awarded a star for the flag as an indication of a second year of over 75% participation.

The final statistics for the Center are listed below. There were some notable increases: Biomedical Research, Code LR, jumped from 47% to 87% (a spectacular increase of 40%); Financial Management, Code AF, jumped from 67% to 98%. Ten of the 23 divisions had 80% participation or better; four had 75% or better and four were within reach of the goal with 70% or better. Office participation was again very high. Six of the 13 offices had 100% and nine had over 75%.

Some remarkable participation percentages were achieved by several large branches of over 10 members with at least 80% participation:

Code	Complement	Bond Buyers	Percent Participation	Branch
AAS	12	11	92	Supply
AFG	13	12	92	General Accounting
AFP	10	10	100	Pay and Travel
APM	16	15	94	Personnel Management
ASF	12	10	83	Contract Management (Code F)
ASR	11	11	100	Contract Management (Code R)
FAE	13	11	85	Aircraft Aerodynamics
FAO	31	26	84	Mechanical Operations
FAR	14	12	86	Aerodynamics Research
FAX	40	35	88	Experimental Investigations
FSN	29	25	86	Aircraft Guidance & Navigation
FSV	23	20	87	Avionics Systems
FVT	14	13	93	V/STOL Systems Technology
RFE	25	21	84	Research Equipment Engineering
RKP	19	16	84	Computer Systems
RSC	15	13	87	Model Development
RSS	41	34	83	Metals Fabrication
SAE	17	14	82	Experiment Systems
SAS	14	12	86	Spacecraft Systems
SEA	17	14	82	User Applications
SEP	11	9	82	Applications Aircraft & Future Miss.
SPP	11	9	82	Project Development
STE	17	17	100	Experimental Fluid Dynamics
STF	44	36	82	Thermo-Physics Facilities
STP	27	23	85	Entry Technology
STT	23	19	83	Computational Fluid Dynamics

Final statistics — divisions

Code	Leader	Start % 1977	End % 1977	Start % 1976	End % 1976	Complement	Division
AF	Shawlee	67	98	75	92	40	Financial Management
AP	Pike	69	89	58	89	35	Personnel
FA	Petersen	81	87	73	76	103	Aerodynamics
LR	Sandler	47	87			39	Biomedical Research
FV	Deckert	83	86			43	V/STOL Aircraft Tech.
ST	Peterson	76	86	76	80	140	Thermo- & Gas-Dyn.
AA	Reynolds	75	84	62	77	32	Services and Supply
FS	Snyder	80	82	78	84	121	Flight Systems
SA	Hall	71	81	75	79	59	Pioneer
D	Mark	78	80	78	87	46	Director
AT	Bennett	68	78	68	71	32	Technical Information
SE	Knutson	75	78	52	92	60	Airborne Missions & Appl.
RF	Giovannetti	70	77	73	80	177	Research Facil. & Instr.
RK	Dines	67	77	53		61	Computation
LM	Chambers	68	73			22	Man-Vehicle Sys. Res.
RS	Stollar	65	73	57	71	177	Technical Services
SP	Nunamaker	68	71			38	Space Projects
AS	Walsh	54	71	70	80	55	Procurement
FL	Rathert	62	64	77	80	45	Simulation Sciences
SS	Compton	51	62	50	61	79	Space Science
FO	Reese	53	58	45	51	62	Aircraft Operations
LX	Billingham	52	55			44	Extraterrestrial
LB	Johnson	50	53			30	Biosystems

There were 102 bond allotment increases — which is an increase of 32 over last year's number. Those individuals, who increased their bond allotment, indicated by their action their confidence in U.S. Savings Bonds as a method of saving.

All who put in their time and effort on the campaign should be congratulated. Because of their dedication, our goal for this year was reached and surpassed. Ames truly has "THE BOND THAT BINDS."

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-98	Secretary (Typing)	GS-4/5	FSN	Centerwide & Outside	8-5-77
77-99	Voucher Examiner	GS-4/5	AFG	Centerwide & Outside	8-5-77
77-100	Secretary (Typing)	GS-5/6	AT	Centerwide & Outside	8-5-77
77-101	Visual Information Specialists (3 positions)	GS-11/12	ATG	Centerwide	8-5-77

TO APPLY: Call extension 5599 or 5600.

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-59	Computer Aid Technician	FAX	Cancelled
77-86	Secretary (Steno)	AFC	Cancelled
77-87	Procurement Clerk (Typing) or Clerk-Typist	ASF	Bonnie McAfee
77-88	Contract Specialist	ASF	Harry King
77-89	Contract Specialist	AS	Doris Grimes
77-90	Voucher Examiner	AFG	Cancelled
77-92	Secretary (Typing)	SC	Mary Gragg (Outside Candidate)
77-93	Secretary (Typing)	SEA	Doris Chow

Property sale

Defense Property Disposal Service will conduct a sale of 228 line items of disposal property at the Moffett Field facility, bldg. 127, commencing at 0900, 29 July 1977. Property will be available for inspection Monday through Friday, 0800-1500, beginning on 21 July 1977. Property in the following general categories will be included in the sale:

- OFFICE EQUIPMENT
- ELECTRONIC COMPONENTS
- USED CLOTHING
- ATHLETIC EQUIPMENT AND SUPPLIES
- HOUSEHOLD APPLIANCES
- MISCELLANEOUS VEHICLES

Property will be sold to the highest bidder, and must be removed within five days after the sale. Bidders must be at least 18 years of age. Catalogues listing all property will be available at the sale site beginning 21 July 1977.

Moonwalk Festival

North Highlands, California, situated right next to McClellan Air Force Base, was the first community in the country to initiate an annual observance of the first steps taken on the Moon by Astronaut Neil Armstrong on July 20, 1969.

This year, the eighth anniversary of that historic event is still commemorated by North Highlands, California. On July 23, at 6 p.m., North Highlands had its eighth annual Moonwalk Festival with a big parade featuring live elephants, beautiful girls, and floats depicting the Space Shuttle.

Among the dignitaries at the parade was Congressman Robert Legget, McClellan Air Force Base Commandor Col. Frederick C. Freeman, and our own C. J. Fenrick from the Resources Management Office, representing NASA.

Two volumes of the "Apollo" Book was Ames' gift to the North Highlands Community Council.

Want ads Transportation

1972 Pinto, AT, excellent condition, \$1375. 965-4031

FOR SALE: Moped, 120 mpg, 9 mos. old, under 1400 miles, up to 20 mph, excellent condition, \$300. Call 965-4162 eves.

1968 Olds Convertible. Auto, PS, PB, AM/FM radio. Excellent mechanically, needs top. Available 7/29. \$1000 or best offer. 328-8950.

1965 Ford Country Squire Wagon. Heater, luggage rack, radio. Recent tires and battery. Good dependable transportation. \$375 or best offer. Call 948-5412 eves.

1965 Chevy Impala, 327/300 HP, 2-door, good tires, reliable, \$600 or best offer. Call 379-4189 weekends or after 6 p.m. weekdays.

1972 Porsche 911T, red, A/C, 5-speed, alloys, AM/FM stereo, 42,000 mi., excellent condition, \$8700 firm. Call 867-5728 after 6 p.m.

1974 Pinto, excellent condition, white, AT, new tires, new Ancens rims, 24K mi., asking \$2300 or best offer. 926-1555 any time.

1966 Dodge 3/4T 4x4 Power Wagon P.U. 8' - 318/V8 - 4-speed - 3 gas tanks, CB radio and many more extras. Call 867-3613 after 5 p.m.

Housing

FOR RENT: Secluded A-frame at Tahoe Paradise. Week (\$150) or weekend (\$75). 948-9301

North Valley, new 4 bdrm, 2 1/2 ba townhouse. W/W carpets, drapes, refrig., dishwasher, W&D hook-up, fenced yd, garage, pool, club house. \$375/mo. Call 946-2669 evenings & weekends.

FOR RENT: House near Ames Research Center. 4 bdrm, 2 ba, AEK, family room, patio, many extras. Near schools and shopping. Call 736-9114.

FOR RENT-MILPITAS: 2 bdrm, 1 den, 2 ba, family room, partially furnished, washer/dryer, refrigerator, freezer, no pets. \$375 (negotiable). Available August 17 to July 1, 1978. Call Leslie or Tom, 262-3767 after 5 p.m.

Miscellaneous

FOR SALE: Men's Dawes 10-speed bike, alum. frame and parts, racing gears, pump, like new, \$150 or best offer, must see. Call 251-7928 after 6 p.m.

FOR SALE: Singer Touch and Sew Portable - 30 day guarantee, \$95. 257-9041

FOR SALE: Baby items - Swing-a-matic with bassinets, \$20; jumpseat, \$5; electric feeding dish, \$5; car bed, \$10. 257-9041.

FOR SALE: Sears top loading, portable dishwasher, deluxe model, \$50. Call (408) 374-6025 after 5:30 p.m.

Girl's coats, woolen and summer, sizes 12 and 14; junior size 5, top condition, beautiful colors, \$10 each. 964-1725

Steel Trunk, size 31x21x14, in good condition, ideal for overseas shipping, \$30. 964-1725

Totebag, heavy duty black vinyl, like new, \$20. 964-1725

FOR SALE: Woman's 3-speed bike. Used very little, good condition, \$40. Call 736-9114 after 5:30 p.m.

Wooded Lot at Prosser Lake Estates, North Shore Lake Tahoe area, utilities underground, \$7900. Terms. Write M. Mannion, 7492 Borrego, Yucca Valley, CA 92284.

FOR SALE: Tempered plate glass, 3 pcs., 32 1/2 x 35 1/2, a real bargain if you can use this size, 35% of cost; Evaporative cooler, beige vinyl covered with stand, \$20; Reel type mower, completely rebuilt, \$50; 1 to 2" micrometer caliper, excellent condition, \$10. 948-8002

GE Potscrubber Dishwasher, butcher block top portable, nearly new, \$175. 923-6846

LOST EQUIPMENT: Demodulator, 2-channel w/linear D.C. output, Model C-704798204, Serial No. 006. Item removed from delivery point 213-C. Please check your shelves for this item. If found, please notify Chief, Supply Branch, Ext. 5206.

Carpool wanted from Los Trancos Woods, flexible hours. Call Jan Simpson, X5511 or 851-8013.

the astrogram Admin. Mgt. Building
Phone 965-5422

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Space Settlement Study briefing



Ames employees enthusiastically watch the demonstration of the Space Settlement Summer Study's "mass driver" model which was set up for simulation on August 2 here at Ames.

The final briefing on the results of the 1977 Ames Summer Study on Space Settlements and Industrialization Using Non-Terrestrial Materials were given by Dr. Gerard O'Neill and the study teams last week, on Tuesday, August 2nd.

The technical areas addressed by the five teams included the following: the development of long-range plans for the ultimate design of closed or partly closed life support systems; a cost and design sensitivity study on habitats of varying sizes taking into account human physiological requirements; minimum-investment maximum-payback construction plans for space manufacturing; engineering of mass-drivers for the transport of lunar materials into space, of payloads from earth to lunar orbit, and for retrieval of asteroids; detection, orbital characteristics and retrieval scenarios for earth-crossing asteroids; and the processing of lunar or asteroidal material into useful products for the construction of large space structures.

Dr. O'Neill presented an overview to the Space Settlement Study and wrote the following words:

"The 1977 NASA-Ames Summer Study was the largest yet conducted on the subject of space manufacturing and space settlements. More than fifty people took part, from universities, government, and private industry. The study addressed several short-term technical issues vital for the achievement of a low-cost, high return program of manufacturing in space from non-terrestrial materials. The goal in those studies was the production of satellite solar power stations to send clean energy to the earth within the next two decades.

"Details of solar satellite design were not addressed, because these have been covered by other NASA studies. Instead, the summer study looked at ways to use the Space Shuttle system, beginning in

the 1980's to set up a small mining and transport base on the surface of the moon, shipping materials out to a precise point in free space. From there many thousands of tons of lunar materials could be transported to a high orbit above the earth to be processed with solar energy into metals, glass, silicon and oxygen. These pure elements would then be used to construct satellite solar power stations, each weighing as much as an ocean liner.

"Several of the study groups worked on problems of great importance, but not on the "critical path" for the first years of space manufacturing. One group worked out a plan for the necessary research to ensure that crops can be grown and farm animals raised in space, using the results of the latest work done on greenhouse-agriculture on the earth.

"Another group looked at the most efficient designs for space habitats and calculated the costs of providing earth-normal gravity for the workers in space, by habitat rotation. Still another group found ingenious ways to return nearby asteroids to high orbit, using gravity-assist "swingby" methods worked out during previous space missions.

"The study concludes that no "show-stoppers" have been found, and that with the recent hard work many problems now look easier than they did earlier. At the same time, a great program of research and development, comparable to that of the Apollo project, lies ahead if space manufacturing is to be realized."

The "mass-driver" was demonstrated in the parking lot area between Ames' buildings 200 and 201. According to the group "the mass-driver is an electrically-powered machine which accelerates materials to high speed and sends them out in a precise direction. It consists of a long "guideway" (Continued on Page 2)

Satellite aids communications

What began as a dry run wound up with the world's most powerful communications satellite being used this week to transmit disaster-related information from flood-inundated Johnstown, Pa., to the American Red Cross Headquarters in Washington, D.C.

The Communications Technology Satellite (CTS), a cooperative NASA and Canadian satellite, launched in January 1976, was being tested last week by the Red Cross and Comsat Corp. in a simulated disaster situation in Texas.

The Texas tests were part of a research program Comsat is working on with CTS in an experiment demonstrating and evaluating emergency communications by satellite involved with natural disasters.

Results of the Texas tests so impressed Red Cross officials that they asked if the transmission equipment could be brought north for use in Johnstown, where communications had been seriously impaired by floods.

The CTS-Comsat experiment was transported from Houston to Johnstown July 23 and the portable unit was set up at the Vocational Technical High School there, near the University of Pittsburg.

The equipment included a 1.2-meter (4-foot) portable antenna which transmitted and received signals from the CTS which is in synchronous orbit, stationed over the equator at an altitude of about 36,000 kilometers (22,300 miles) at 116 degrees W. longitude, just west of South America.

Solar space conditioning

Dr. Klaus Heineman from Alten Associates (one of the most knowledgeable companies in the area on the subject of solar installations), will be the guest speaker at the Ames-ACES meeting on Thursday, August 18, at 11:30 a.m. in the Space Sciences Auditorium, Bldg. 245.

Klaus will be remembered by many at Ames as he worked here as a Physicist in the Material Sciences Branch. Klaus will present slides and information on home installations of "Space Heating and Air Conditioning" and "Hot Water Heating." Illustrations of new and retrofit units will be shown and the technical details will be discussed.

Also, on August 19-21, "Solaron '77" will be showing the latest developments in alternative energy sources and savings at Brooks Hall in San Francisco. Over 200 manufacturers will be represented. Tickets will cost \$5 at the door, or \$4 at Bass or Ticketron agencies.

Home Life rep.

Norman Check, from the Home Life Insurance office in San Jose, will be at Ames on Thursday, August 18, from 9:00 a.m. to 12:00 noon. He will be the service representative for the NASA life insurance program and will be available to assist Ames employees with any life insurance questions. Appointments can be made by calling the Training and Special Programs Branch, ext. 5622.

Space technology and breast cancer

Every year thousands of women are subjected to screening procedures for breast cancer which use potentially harmful X-rays. Many of these women go through the physical and emotional anguish of radical surgery in the treatment of this disease.

Repeated X-rays have often been considered necessary because developing stages of breast cancer are sometimes undetectable by doctors who examine the earliest breast X-rays, making early diagnosis more difficult and sometimes allowing cancerous tissues to multiply until massive surgery is the only solution.

For two years engineers in the Data Analysis Facility at KSC have been working on the problem. The experimental process involves techniques similar to those originally developed to analyze imagery transmitted from Landsat satellites. By applying these space techniques to the medical field, engineers have developed a method which may enable doctors to detect early stages of breast cancer and to determine the likelihood that a woman will ever develop breast cancer.

This experimental technique for early cancer detection is a product of X-ray enhancement — the ability of computers to enhance or make more visible information from X-rays not ordinarily detectable by the human eye.

Trained radiologists who examine X-rays work with a built-in handicap — the human eye. The eye has difficulty in detecting small density changes or changes in the gray shades of the intensity spectrum's upper density region. Most X-ray data is within this upper density region.

The human eye — even the most highly trained one — can detect about 32 different shades of gray at best. For radiologists this means that much of the information contained on an X-ray is invisible to them.

The need is for a method of putting these undetectable shades of gray in a better perspective — enhancing them so they are easily visible.

This is where the Data Analysis Facility steps in with its General Electric "Image 100" multi-spectral image analyzer. It is a computer-controlled system which extracts and classifies the information about an image much better than can be done by human means.

Shades that were previously invisible to a doctor's eyes are now analyzed in much more detail. This makes significant information visible much earlier, improving prospects for an earlier diagnosis.

The special optical tool that begins this process is called a microdensitometer. Far superior to the human eye, it can detect 256 shades of gray with great accuracy.

The current goal is to try to develop a computerized method of separating those women who are in a low risk group (least possibility of developing breast cancer) from those in a high risk group (high possibility of developing breast cancer). If this method becomes feasible, it should reduce the need for repetitive screening-type mammograms.

The new X-ray analyzing system, if the development effort is successful, may allow separation of women into low, medium and high risk groups, allowing radiologists to concentrate on the mammograms from the high risk group.

Medical persons and engineers hope that some day this method may lead to techniques that would allow detection of very early breast cancer. Depending on the rate of change in X-ray gray shades, the yardstick doctors use to diagnose various stages of breast cancer, the computer may yield information enabling the radiologist to determine if very early indications of breast cancer are present.

Castle honored by fellow Joggnernauts



Members of the Ames Joggnernauts present Bruce Castle (far right) with a certificate for performing as coordinator for this year's Inter-NASA Jogging Competition. The group includes, from left to right, Paul Sebesta, Vito D'Aloia, Donna Hafeman, Jerry Barrack, Beth Farrell, Cynthia Harlow, George Lenehan and Bruce Castle.

Space Settlement Study

(Continued from Page 1)

made of aluminum strips, wound with coils. A small vehicle with no moving parts, called a "bucket," floats along the guideway by magnetic forces, using principles known for the past sixty years. The bucket accelerates to high speed, pushed by magnetic forces, then releases its payload, and returns for re-use.

There are three applications for mass-drivers: as launchers for lunar materials into space; as rocket-engines in space, moving heavy loads from the altitude the Shuttle can reach up to lunar orbit; and as "tugs" to retrieve large asteroidal masses.

This year's study derived standard design formulas for mass-drivers, and further improved their design and efficiency over our best previous efforts. It appears that a mass-driver can be built, assembled in space, and then make round-trips between low orbit and the orbit of the moon, carrying the components of the necessary lunar mining base and the orbital manufacturing station.

On each six-month round trip, the mass-driver would carry about 700 tons of payload, and would obtain its thrust by expelling at high speed small pellets made from the Shuttle external tanks. Those tanks can be carried to Shuttle orbit at almost no penalty in Shuttle payload, but once in orbit are "surplus." Our calculations show that within the limits of existing materials mass-drivers can be built with performance more than twice as high as the best chemical rocket.

ARA ACTIVITIES

RENAISSANCE FAIRE — Special admission rates to the Renaissance Faire are available to Ames employees. Coupons are at the ARA Store on the counter and offer mail order or box office price reductions. Regular admission is \$5.95 adults, \$2.95 children 12 and under. Mail order price with coupon is \$5.25 adult, \$2.25 children 12 and under. Box office price with coupon is \$5.50 adult, \$2.50 children 12 and under.

Safety corner

The use or attempted use of elevators during fires has caused many fatalities. In many of these instances, serious injuries and fatalities resulted from minor fires that otherwise would have been insignificant. Experience has shown that the effects of fire and smoke on the operation of automatic elevators is unpredictable. Elevators have stopped on fire floors without signals being activated by occupants. On occasions, elevator doors would not close, preventing movement from the fire floor. Elevators have also unexpectedly stopped at or between floor levels. When the doors would not open, the passengers were trapped in an atmosphere which would not sustain life.

Warning signs have been placed in elevator cabs and/or elevator lobbies to educate building occupants to use the exit stairways and not the elevators to egress during a fire emergency.

GSA has an ongoing program for the installation of automatic elevator recall systems with emergency service features. High-rise buildings are being given priority in this program. The recall system takes elevators out of service and returns them to a selected floor immediately upon initiation of a fire signal. Elevators can then be operated only by a key from inside the cab.

In some buildings the automatic elevators can be recalled manually with a key control in the elevator lobby and then operated manually with the key control in the elevator cab. In other buildings the only way to retrieve an elevator is when the elevator responds to the call button. These elevators also have the key control for manual operation.

2 U.S. firms chosen for space telescope contracts

Lockheed Missiles and Space Co., Sunnyvale, and Perkin-Elmer Corp., Danbury, Conn., have been selected by NASA for final negotiations leading to the award of contracts for the development of two major elements of the Space Telescope.

The contracts, totalling more than \$131 million, would be awarded in October for a period of performance through 1983.

Lockheed would develop the Support Systems Module of the Space Telescope at a proposed contractor's cost of about \$72.8 million, exclusive of fee. The contract calls for design, development, fabrication, assembly and verification of the module, integration with the Space Telescope's other major elements, verification of the entire Space Telescope, systems engineering and analysis for the overall project, and support to NASA for planning and implementing ground and flight operations.

Perkin-Elmer would develop the Optical Telescope Assembly at a proposed contractor's cost of about \$58.5 million, exclusive of fee. The contract calls for design, development, manufacture, verification, and delivery of the telescope assembly and its ancillary equipment. It also includes the focal plane assembly systems engineering, support of the Space Telescope assembly, verification, launch, orbital verification, and mission operations planning.

Marshall Space Flight Center has management responsibility for the Space Telescope and will directly manage the Support Systems Module and Optical Telescope Assembly contracts. Goddard Space Flight Center has U.S. management responsibility for scientific instrument development. The program is under the direction of NASA's Office of Space Science, Washington, D.C.

The 2.4-meter (8-foot)-diameter Space Telescope, capable of accommodating up to five different instruments at its focal plane, will be placed in orbit in late 1983 by NASA's Space Shuttle.

The module will enclose the Optical Telescope and Scientific Instruments and also provide all interfaces with the Shuttle Orbiter. The module provides electrical power, communications, data processing and storage, attitude sensing and control and environmental control to the telescope assembly and the scientific instruments.

The Space Telescope has as its overall objective the development and operation of a high resolution optical telescope system which will provide mankind with an astronomical capability substantially beyond that which can be achieved from the surface of the Earth or from any of the space telescopes flown to date.

Albacore fishing

Albacore fishermen needed - four people - for Sept. 16th. Contact A. Bogart X5560.

EEO Counseling

As you may have noticed, the faces on the Equal Employment Opportunity poster on your local bulletin board change now and then. This happens when a counselor's term expires, or when a counselor resigns for some other reason and a new counselor is appointed. Since counselors are appointed to limited terms of 2 years, these vacancies will occur periodically and new counselors will be needed.

If you are interested in helping other people and have a personal commitment to equal job opportunity, the Equal Opportunity Programs Office urges you to participate in this program. The principal duties of the EEO Counselor are to counsel employees who believe they have been discriminated against because of race, color, religion, national origin, sex, or age, and to attempt to resolve these problems informally through inquiries and personal interviews. New counselors receive training in their counseling duties through a 3-day Civil Service Commission course on Basic EEO Counseling in San Francisco, as well as training sessions conducted by the Ames EOP Office. In addition to regular counseling duties and related training, counselors are required to attend monthly meetings of the Committee of EEO Counselors. Total counseling-related activities will occupy less than 20% of your official work time.

When a counselor vacancy occurs, all persons who have expressed an interest will be contacted and interviewed by a subcommittee of the Committee of EEO Counselors. Based on the interview, the committee makes its recommendation to the Chief, EOP Office, who in turn recommends a new counselor for appointment by the Director.

If you are interested in being an EEO Counselor, or would like to know more about it, please call the EOP Office, ext. 5778, or one of the EEO Counselors whose names and extensions appear on your local bulletin board.

Bowling

The Thursday Night Ames Mixed 5 Bowling League will start Sept. 8, 1977, Moonlite Lanes, Santa Clara, Calif. at 6:15 p.m. Anyone interested in bowling or substituting please contact Georgene Laub (sec.), ext. 5835, or Mitch Radovich (pres.), ext. 5180.

Photo club

The Ames Photography Club is now offering its members the opportunity to hold a one-man show in the display areas of the Main Library, ILLIAC, ILLIAC Annex, and N229. The first of these shows will be the photographs of Lynn Hunton, which will be exhibited in the Main Library August 8-28. All are invited to admire Lynn's masterful work.

The next Photography Club meeting will be held at 4:45 p.m., August 31, in the Space Sciences Auditorium, N245. All prospective members are invited to attend. Further information may be obtained from Dick Fish, Ext. 5991.

Dru Scott on radio

Dru Scott and KGO Radio 81 News Talk on Saturday mornings from 9 a.m. to 11 a.m., for 5 weeks, starting August 6, will be talking about everything in general and work in specific. How do you know when it is time to leave your job? How do you deal with stress on the job? What do you get out of working? How do you get ahead? Do you want to get ahead? What about workaholics? What is it like to be a work dropout?

Winning With Dru Scott and KGO Radio 81 - call Dru on Saturday mornings: San Francisco, 478-3456; San Jose, 272,1233; East Bay, 832-9707; Marin County, 453-6523.

In addition to co-authoring "Woman as Winners" and "Affirmative Action for Women," Dru Scott has published many articles on management and motivation. As head of Dru Scott Associates Inc., Dru has helped organizations develop what she calls "Productive Partnership" relationships between top executives and their management teams, marketing people and their customers, and women and management groups.

Recording for the Blind

Enjoy reading out loud? The San Francisco Unit of Recording For the Blind is in need of general readers who are able to read clearly and reasonably fast the college level material requested by blind and physically handicapped students and professional people.

Prospective volunteers are asked to demonstrate their ability by taking a voice test to reveal the quality of their voice on recording tape and their competence reading in such various fields as physics, biology, music, electronics, law, medicine, literature, history, economics, foreign languages, and computer programming.

At the Recording For the Blind Studio, located at 488 West Charleston Road, Palo Alto, volunteers work in teams of two: a reader in a sound proof recording booth and a monitor operating the tape recorder directly outside the booth following with a second copy of the text to ensure accuracy.

Recording For the Blind, Inc. is a national non-profit volunteer-based organization, supported by contributions from the public, supplying free recorded text books on loan directly to blind and handicapped students, business and professional people, who are seeking knowledge and an independent relation to the visual world.

For further information, contact the studio director at Recording For the Blind, phone (415)493-3717.

Golf

Co-chairmen Mike Orozco and Dean Jaynes ran a fine individual low-net tournament at Santa Teresa Golf Course on July 23, 1977. They report the following winners:

First Flight: 1 - L. McCulley, 2 - Tie between F. Lazzeroni and G. Lazzeroni, 4 - Tie between L. Hochstein and O. Koontz, G. Lazzeroni won closest to the pin.

Second Flight: 1 - P. Quattrone, 2 - M. Radovich, 3 - V. Oyama, 4 - R. Dick, 5 - Tie between R. Richardson and E. Menefee. P. Quattrone won closest to the pin.

Third Flight: 1 - A. Joly, 2 - J. Weyers, 3 - R. Dowell, D. Davis, and T. Pullian all tied. B. Scott won closest to the pin.

Fourth Flight: 1 - C. Banducci tied with S. Johnson, 3 - B. Quattrone, 4 - C. McCloskey, E. Watson, and N. Barsi all tied. C. Banducci won closest to the pin.

"Thank you"

I wish to thank all those who participated in my retirement party on July 8th. It's gratifying to know you have so many friends who will give of their time and money to make my departure, after 34 years such a memorable occasion.

The gifts were most selective and some were works of art and will long remind me of the association I had with so many wonderful people.

To those close associates who put it all together and made it the party of my life, a very special "Thank you."

William (Bill) Moores

To everyone who remembered me while I was in the hospital and now through this lengthy recuperation. I wish to say thank you in a very big way. I was hoping to get a note to each and everyone of you, but somehow I'm not the speedy one I used to be.

All remembrances have meant an awful lot and sure have brightened my days.

I hope to be back with you very soon. This convalescence I can do without. I'd rather be at work.

Again, many, many thanks.

Darlene Moen

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-102	Secretary (Typing)	GS-5/6	FH	Center & Outside	8/19/77
77-103	Tools and Parts Attendant Trainee	WG-1	RFP	Centerwide	8/26/77
77-104	Supervisor Aerospace Engineer	GS-13/14	FAR	Centerwide	8/22/77
77-105	Purchasing Agent	GS-5/6/7	ASP	Centerwide	8/19/77

TO APPLY: Call Extension 5599 or 5600

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-49	AST Experimental Facilities and Equipment	FSV	M. Bondi
77-55	Supervisory Aerospace Engineer	FH	H. K. Edenborough (outside candidate)
77-95	Secretary (Typing)	RKS	Patricia Dunkin (outside candidate)
77-96	Personnel Management Specialist (Temporary)	APM	Joan McCullough Kathleen Morehouse

Want ads Transportation

For sale: '71 Mercury Marquis wagon, full power, AM/FM stereo, luggage rack, radials, exc. cond. \$2000/offer. 984-6952.

1968 Mercury, 64K mi, new steel radials and battery. PB, PS, radio. \$1000 or best offer. Paul Sebesta, 257-6040.

For sale: 1969 Chevrolet Chevelle, 2-door coupe, automatic transmission, power steering, new radial tires, also new shocks, new brakes, new water pump, new carburetor. Runs good. \$1500. 732-5463 or 243-4882.

For sale: 1965 Corvaire, exc. tires and brakes. New paint job. Has air-conditioning. Engine needs work. 255-4115.

For sale: Porsche, 1966 metallic brown, 4-speed, rebuilt engine, new paint, new shocks, \$5,300. Gary, 287-0676.

1976 Buick Century Wagon - 9-pass., power steering and brakes, air, roof rack. Very good condition, \$4500. 408-335-5075.

For sale: 1972 Vega II, 4-speed, A/C, hatchback, color: red, good condition, \$900. Call eves. 996-0944.

Motorcycle: 1976 Triumph 750. 3300 miles, \$1600/offer. Call Ron at ext. 5283.

1974 Yamaha DT125A Enduro. Excellent condition. Less than 2000 mi. \$425. Call Jan, 965-5420 bet. 1400-2000 or 365-8830.

1965 Mercury wagon, \$200 or best offer. Good tires and engine. Leaky radiator and some dents. W. E. Pearson, (408)354-8915.

For sale: '71 Honda CL450. Clean, 18,000 miles. \$650. Phone 257-3824.

1970 Thunderbird, Landau Brougham Coupe, all power, A/C, Cruise Control, Tilt Wheel, AM/FM, clean, tight, smooth. \$1700 or best offer. Call Kay, 867-7838 after 5 p.m.

For sale: '70 MGB w/wire wheels, rack, and tonneau, \$1950. Nita, 247-8759, eves.

1973 VW Thing, 18K mi, radials, mags, stereo, empis extras, yellow, like new. Paul Sebesta, 257-2207.

1968 MGB. Xlnt cond, good top, roll bar, 67,000 miles. \$1400. Steve, 252-4535.

Housing

House for rent, Sunnyvale. 3 bdrm, 1 ba, double garage, fireplace, large yard with patio and barbecue pit, lots of fruit trees, drapes, stove, refrigerator, 3 miles to NASA. \$360 mo. Call 248-9733 or 734-2103.

4 Plex, San Jose, for rent. Immac., 3 bdrm, 2 ba. \$350. 298-5010.

Appealing 3 bdrm, 2 ba home with garage, frpic, crpts, easy care yard, 2 blks to buslines, near National and Los Gatos-Almaden Road, \$395 mo., f.l. & dep. 356-2230 or call BIJOY, 735-0635.

For rent: 4 bdrm, 2 ba, furnished Eichler home in Sunnyvale. AEK, dishwasher. Recently painted interior. Available for 1 year beginning Sept. 16 - negotiable. \$550 p/m plus utilities. No pets. Call Dr. Tettenbaum, 736-5319, after 4 p.m. on weekdays or weekends.

Miscellaneous

College student wants clean, reliable used car. Please call Frank at 248-4690 after 6 p.m. or weekends.

Car pool: Room for one more. 7:30 to 4:00 p.m. White and Norwood. Phone 238-3390.

Free to good home: Two miniature poodles, females, black and apricot. Very loving, and would like to keep together if possible. Call 985-0849 after 5 p.m.

For sale: Man's bicycle, \$10, 493-9406.

Wanted: Carpool to and/or from corner of Middlefield and Loma Verde in Palo Alto. Am blind, therefore cannot drive. Will share expenses. Call Jim Stevenson at ext. 5720 or 494-3311.

For sale: 21" color TV, 1½ yrs old. Table model. Excellent condition, \$200. Call 267-5116 after 5:30 and on weekend.

For sale: "Sports Grip" steering wheel cover, tan colored. Never been used, \$2. Call Grace at 968-0697 after 5 p.m.

For sale: 12 ft alum. boat plus 7½ hp motor. Includes oars and aux. gas tank, \$350 total. Call E. Menefee, 243-5382.

For sale: Singer Touch-and-Sew with cabinet, accessories. 1967 model with 12 mo. warranty on last servicing. \$200. Phone 257-3824.

For sale: Desk of mahogany wood, "knee-hole" style, seven drawers (three on each side, one in middle for lots of storage); very solid, top could use some refinishing, \$85 or best offer. Call M. Moore, 739-5373.

Waterbed, double size, finished wood, heater, \$60. Piano, upright, for rent \$16/month or \$500. Thomas, 326-6495.

Dinette set, formica walnut-grain top and leaf, 4 flower-print chairs. \$50. Bob Hodge, 251-6403.

For sale: upright piano, antique. Needs some work. \$150. 732-5463 or 243-4882.

Sailboat (15') with sails and trailer, \$1300. Workbench (electronic prof'l) with drwrs, \$75. Call Bob after 5 p.m. (408) 732-3228.

Modern Sofa, blue, 7½ ft long, good condition, \$25; Colonial Loveseat, maple frame, \$15; Lawnmower, sturdy wood shaft, \$10; Dinette Table, wood grain formica, 35" x 62", \$15. 272-0287 after 6.

Portable typewriter and case, Smith-Corona Classic 12 model, excellent condition. \$20. 272-0287 after 6.

Car pool: Opening for one more. White and Quimby area. 7:30 a.m. to 4:00 p.m. Phone 238-3390.

Jetsetters "Hula Day"

NASA Ames Jet-Setters Hawaiian "Hula Day." Sept. 8-15, 1977, only \$399 per person, 8 days and 7 nights on Maui - Golf - Tennis - Swimming - Relaxation. Time is running out, space is limited so don't miss out, sign up now to avoid disappointment. Send reservations or call Linda Atwood - (415) 369-1711 at Bulanti Travel, 2808 El Camino Real, Redwood City, CA 94061.

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The Astrogram

VOLUME XIX NUMBER 24

August 25, 1977

Gillam selected as DFRC Deputy

Isaac Thomas Gillam IV has been named Deputy Director of the Dryden Flight Research Center. He was formerly Director of Shuttle Operations for the Approach and Landing Tests (ALT) of the Space Shuttle currently underway.

Gillam, 45, replaces Gerald D. Griffin, who is now Deputy Director of Kennedy Space Center.

Prior to going to Dryden in 1976, Gillam was Program Manager of Small Launch Vehicles for NASA Headquarters. He first joined NASA in 1963 after a 10 year tour of duty in the U.S. Air Force as a pilot and missile launch crew commander.

After graduating from Howard University, Washington, D.C. with a Distinguished Military Student Award, Gillam attended Tennessee State University while working on graduate studies and serving as Assistant Professor of Air Science. Among other awards, Gillam has received the NASA Distinguished Service Medal for the Launch Vehicle Program.

Amelia Earhart Fellowship Awards

Grants of \$4,000 to women for graduate work in aerospace related sciences and engineering are being offered by Zonta International, a service organization of executive women in business and the professions.

The Amelia Earhart Fellowship Awards, established in 1938 as a memorial to Zonta's famed air pioneer member, are made annually to qualified candidates. A bachelor of science degree preparatory for graduate work in some field of aerospace related science and engineering, plus evidence of exceptional ability and potential and commendable character, are required. Awards are made to women entering or continuing a full-time graduate program who have been accepted at an institution offering accredited courses in the applicant's area of study. The number of Fellowships awarded each year is determined by the number of qualified candidates. Applications must be completed and submitted before January 1, 1978.

The Amelia Earhart Fellowship Awards, supported by business executives and professional women who are members of 700 Zonta clubs in 48 countries, have increased in value and broadened the application as aerospace science and technology have created new fields and invaded others. They encouraged the first women aeronautical engineers and produced space age pioneers. They are now rearing personnel for the NASA Space Shuttle program and all its exigencies and anticipating an extensive probing of the universe. Applications of aerospace research "spin-off" are improving the quality of all life on Earth as well as investigating the possibilities of life on other planets.

Zonta International Amelia Earhart Fellowship Awards application forms may be requested by students, or by instructors wishing to recommend students, from: Zonta International, 59 East Van Buren Street, Chicago, Illinois 60605 U.S.A.

First Shuttle Orbiter free flight test a success

Shuttle Orbiter *Enterprise*, with astronauts Fred W. Haise and C. Gordon Fullerton at the controls, was successfully released from atop a 747 carrier aircraft for the first free flight approach and landing test (ALT) at NASA's Dryden Flight Research Center on Friday, August 12th.

Haise and Fullerton flew the 75-ton Orbiter to an unpowered landing on a dry lake runway after explosive bolts released the Orbiter from its 747 carrier aircraft at an altitude of about 22,100 feet above ground level. The free flight of the Orbiter took five minutes.

This initial solo flight follows a series of unmanned and manned captive test flights conducted at Dryden which began in mid-February. The Orbiter was carried aloft for a series of five "inert" flights (Orbiter systems inoperative) before astronauts Haise and Fullerton and fellow ALT crew members Joe Engle and Richard Truly flew subsequent captive flights.

The captive flights verified the aerodynamic and handling capabilities of the 747/Orbiter combination as well as Orbiter systems and crew procedures.

Takeoff time for the flight was 8 a.m. PDT (11 a.m. EDT) with separation about 45 minutes

later. The combined weight of the two vehicles is 585,000 pounds.

Enterprise's first solo flight followed this pattern:

The flight path of the Orbiter and 747 follows a racetrack pattern with separation occurring when the vehicles are about 13 kilometers (8 miles) to the right and flying parallel to the landing runway. From the separation point, the Orbiter flew a U-shaped ground track to the runway.

Astronauts Engle and Truly will pilot *Enterprise* during the second flight, tentatively scheduled for August 30.

A series of free flights is currently scheduled with the Shuttle Carrier Aircraft (SCA-747) serving as the airborne platform from which the Orbiter will be launched. These flights, with NASA astronauts at the controls of the unpowered Orbiter, are designed to verify the Orbiter's subsonic airworthiness, integrated systems operations and pilot-guided and automatic approach and landing capabilities.

The Orbiter, workhorse of the Space Shuttle program, is designed to be used a minimum of 100 times. It is as big as a commercial jetliner (DC-9); its empty weight is 68,000 kg (150,000 lb); (Continued on Page 3)

Group Special Achievement Award



A Group Special Achievement Award for Large-Scale Aerodynamics Branch and Boeing personnel was recently presented to six individuals who were involved in the development of techniques and apparatus for making noise measurements in closed-test section wind tunnels. Those honored included Ames employees, D. Hickey, W. F. Ahtye, P. Soderman; A. Atencio and Boeing employees, W. Strout and C. Jaek. The above photo pictures Leonard Roberts, Chief of the Ames Aeronautics Directorate (far left, front row) presenting Warren Ahtye (middle), Adolph Atencio (right), Paul Soderman (second from left, back row), and Dave Hickey (second from right) with their awards. Also in attendance at the ceremony were Mark Kelly, Chief of Large-Scale Aerodynamics Branch (middle), Tom Snyder, Chief of Division (far right), and Irv Statler, Director of Ames' Army Air Mobility Office (far left, back row).

Overlong details to higher graded positions

In a recent published decision, the Comptroller General of the United States has determined that employees who have been detailed to established positions at a higher grade beyond 120 days without prior Civil Service Commission approval may qualify for retroactive temporary promotions and backpay. Such temporary promotions would normally be effective for the period encompassing the 121st day of the detail until completion of the detail. To qualify for such retroactive temporary promotions and backpay, employees must also meet the normal statutory and regulatory requirements for promotion, such as time in grade, qualification, and Commission approval requirements. The conditions in the published decision apply to former or retired employees, as well as current employees, but there is a 6 year time limit. By statute, the General Accounting Office only has authority to accept claims received in that office "within 6 years after the date such claim first accrued." If any part of the claim accrued more than 4 years ago, GAO requests that it be submitted to the Claims Division, General Accounting Office, to stop the statute of limitations from running.

As an aid to employees in assessing their employment histories in deciding whether or not they have a valid claim for backpay, the following definitions and conditions apply:

- A detail is the temporary assignment of an employee to a different position within the same agency for a specified period, with the employee returning to regular duties at the end of the detail.
- For purposes of this decision, the position must be an established one, classified under an occupational standard to a grade or pay level.
- The detail to a higher grade position must have lasted more than 120 days, and must have been without the approval of the Civil Service Commission to extend the detail beyond 120 days. (One extension of up to 120 days may be approved by the Commission - which would disqualify a claim for backpay. However, details lasting longer than a Commission approved extension will qualify under the backpay decision providing all other conditions are met.)
- While claims may be based on details to higher graded positions, claims may *not* be based on classification actions upgrading positions.
- The employee must satisfy statutory and regulatory requirements for promotion, such as Whitten Amendment, minimum qualification standards for competitive positions, and prior Commission approval for positions above GS-15. For example, the Whitten Amendment

Women's dinner meeting

The Mountain View Business and Professional Women's Club will hold a dinner meeting for prospective members on Wednesday, September 7, at the Officers' Club at NAS Moffett Field.

No host cocktails will be served at 6 p.m. with dinner at 7. The cost is \$5.75 for prospective members and \$6 for members.

The Mountain View Club is part of the National Federation of Business and Professional Women's Clubs established in 1919.

Its objectives are to elevate the standards, promote the interests, bring about a spirit of cooperation and extend opportunities for business and professional women.

Membership is open to all employed women. Anyone wishing to know more about the benefits of belonging to the federation is urged to attend this meeting.

Reservations can be made by calling Mrs. Bruce S. Deam, Federal Women's Program Coordinator at NASA Moffett Field, on 966-5976. The deadline is September 2 for reservations and payment.

generally requires an employee to serve at least 1 year in the next lower grade before promotion in a General Schedule position.

- Backpay claims are limited to 6 years after the date such claim first accrued.

At Ames, many employees are appointed to serve on ad hoc committees or projects which may have a duration of several months or years. These appointments typically involve duties comparable to their regularly assigned duties, but are directed toward specific goals or objectives which are broader in scope than their primary position assignment, or broader than the function of their assigned branch and division organization. For the most part, these appointments do not meet the definition of a detail, are not officially classified positions and consequently would not qualify under the conditions of the Comptroller General's decision for backpay.

Depending on the conditions present in a particular case, an employee may file a backpay claim with either Ames or the General Accounting Office. Claims should be filed with the GAO when:

- (a) Any part of the claim accrued more than 4 years ago; or
- (b) the detail continued beyond a Commission approved extension; or
- (c) a claim has been denied by the Ames Personnel Officer.

Claims should be filed as follows:

1. *Filed With Ames* - Claims must be submitted in writing, over the signature and address of the employee (or the employee's authorized agent), addressed to the Personnel Officer, and should include:

- a. Citation of Comptroller General Decision B-183086, March 23, 1977, as basis for the backpay request;
- b. starting and ending dates of the detail;
- c. title, series, grade, and organizational location of the position to which detailed; and
- d. supporting information in the employee's possession to show the detail occurred.

2. *Filed with GAO* - The same as above, but addressed to the Claims Division, General Accounting Office, Washington, D.C. 20548. Copies of claims submitted to the GAO should concurrently be submitted to the Ames Personnel Officer to facilitate development of an administration report for GAO, or to effect the payment by Ames.

Questions regarding the interpretation of the Commission's detail or backpay regulations and instructions should be directed to John Arcolino at extension 5601. He will also provide guidance in collecting the required documentation and in filing claims.

Second group of astronaut applicants to be interviewed

The second group of 20 Space Shuttle astronaut applicants to be selected for individual interviews and physical examinations reported to the Johnson Space Center, Monday, Aug. 15.

Approximately 200 of the 8,079 who applied for the astronaut program traveled to Johnson Center for further screening. Women and minorities are among those chosen for screening at Johnson.

This second group, like the first group, were all pilots. They were at Houston for one week. The selection process is expected to be complete by mid-November.

In December, NASA will select as many as 20 astronaut candidates in each of the two categories - pilot and mission specialist. Reporting date for the candidates will be in mid-1978. Satisfactory completion of a two-year training and evaluation period will be a requirement for final selection as an astronaut.

Legal notice

NASA General Council Office has received a number of inquiries regarding the acceptance by NASA employees of spacecraft and aircraft models, and books on NASA programs and related subjects, from persons doing business with NASA. Clearly, in view of the nature and complexity of NASA's programs, models can be useful to NASA officials as aids in disseminating information to the public and the press concerning those programs. Also, books concerning NASA programs serve obvious reference and dissemination needs.

Under NASA Standards of Conduct (Part B of NASA Handbook 1900.1B), NASA employees may not accept things of value from those doing business with NASA. An exception to this general rule permits the acceptance of unsolicited advertising or promotional materials, but only if such materials are of a trivial value, "clearly less than \$5.00." Since most spacecraft and aircraft models and books exceed that value, they may not be accepted by NASA employees as their personal property. If there is an official NASA need to be served by the acceptance of a model or book from a NASA contractor, the model or book may be accepted by a NASA employee only on behalf of NASA, in which case it becomes the property of NASA. Legally, the item would appropriately be regarded as an unconditional gift to NASA.

In the case of a book, it should be forwarded to the installation's library for cataloging (and perhaps for loan back to the original recipient). In the case of a model, it should be entered into the appropriate property account by the installation's Property and Supply Officer and managed in accordance with the NASA Equipment Management Manual, NHB 4200.1A.

MBA information meeting

There will be an MBA information meeting Friday, August 26, at 12 noon in Building 241 Room 145 A. Employees learning about the televised MBA program are invited to attend.

Local child care center

The Whisman School District operates the Whisman Early Childhood Development Center.

Children of parents who are working, seeking employment or who are students are eligible for the Extended Day Care Preschool. Also served are parents who are disabled and social services' referrals. Approximately 100 children are currently enrolled. However, openings occur regularly throughout the year.

Children must be at least 2-1/2 years old but not old enough for kindergarten and must be toilet trained. Registration is taken throughout the year. Applicants are screened for eligibility and placed on the waiting list. Available space is filled according to priorities established in Title XX of the Social Security Act.

A weekly fee may be charged. The fee schedule ranges from zero and graduates upward, based on gross monthly income and number of family members.

This is a full-day program which operates twelve months per year. The hours are from 7:00 a.m. to 6:00 p.m. Children are offered an academic program, as well as lunch, snacks and an afternoon nap. Teachers have daily contact with parents, since it is the parent's responsibility to deliver and pick up their child daily. This is especially helpful in cooperative planning for each child's individual needs.

To register, parents should come to the Whisman Early Childhood Development Center at 1995 San Ramon Avenue, Mountain View, between the hours of 8:00 a.m. and 5:00 p.m., or call for further information at 967-4940.

Dr. Lundin to retire

Dr. Bruce T. Lundin, Director of NASA's Lewis Research Center, Cleveland, Ohio, has announced his plans for retirement effective Aug. 26, 1977, after 34 years of service with NASA and its predecessor organization NACA.

Dr. Bernard Lubarsky, Deputy Director of Lewis, will become Acting Director until a successor to Dr. Lundin is announced.

When he joined the staff at Lewis Center in 1943, Dr. Lundin was engaged in heat transfer investigations and in improving the performance of World War II aircraft engines. In 1946, he became Chief of the Jet Propulsion Research Section which conducted some of this country's early research on turbojet engines.

When NACA became the nucleus of the present National Aeronautics and Space Administration in October 1958, Lundin was appointed an Assistant Director of Lewis Research Center. Here he directed much of the Center's expanded role in space propulsion and power generation.

He was appointed Director of the Lewis Research Center, November 1, 1969, a position he has held with distinction for the past eight years. This period marked the redirection of the Center into research vital to solution of United States energy problems.

Dr. Lundin is a member of Tau Beta Pi and Sigma Xi, a Fellow of the American Institute of Aeronautics and Astronautics, and the Royal Aeronautical Society. He is also a member of several governmental advisory committees, including the Scientific Advisory Board of the U.S. Air Force and is a former member of the NASA Aerospace Safety Advisory Panel. In 1965 he received the NASA Medal for Outstanding Leadership, in March 1971 the NASA Public Service Award and NASA's highest award, the Distinguished Service Medal, in October, 1971.

Training applications due

Training Applications (ARC 301) for the coming academic year should be in the Training Office, 241-3, by September 2, 1977.

Shuttle *(Continued from Page 1)*

it is 37.2 m (122 ft) in length and it has a wingspan of 23.8 m (78 ft). The Orbiter is to be launched into low Earth orbit in 1979 with its three main engines augmented by a pair of solid rocket boosters.

The second Orbiter (102), currently under construction, will be the first vehicle to be used in the Shuttle Orbital Flight Test (OFT) program which is scheduled to begin in 1979. Six OFT flights are planned to demonstrate the Orbiter's capabilities in Earth orbit before the Shuttle becomes operational in 1980.

Golf

Co-chairmen Don Graham and Dave Banducci ran a combined best-ball twosome and low net tournament at Pajaro Golf Course on August 6, 1977. They report the following winners:

Best-Ball Event:

First Flight: F. Lazzeroni/B. Odneal tied with M. Orozco/M. Radovich

Second Flight: R. Flippen/D. Chausse

Third Flight: B. Scott/I. Rathert

Low-Net Event:

First Flight: 1 - F. Lazzeroni, 2 - B. Odneal, 3 - T. Almojuela, 4 - G. Lazzeroni

Second Flight: 1 - V. Oyama, 2 - W. Ross, 3 - R. Richardson, 4 - D. Dust

Third Flight: 1 - W. Page, 2 - B. Quattrone, 3 - F. Wirth, 4 - E. Watson

Closest to the Hole was won by O. Koontz and L. Hochstein.

NASA SPECIAL PUBLICATIONS

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Aeronautics and
Space
Administration

The following NASA Special Publications are now on display in the Ames Main Library and the ARA Store. Following your review of these new releases, if you would like a retention copy for your files, return a completed NASA Special Publication Request Form, ARC 303, for each publication you desire to the Main Library, M/S 202-3, and a copy will be mailed to you. Please allow 2 weeks for processing and distribution of your request. Because the number of copies of NASA Special Publications available to the Center is limited, requests will be processed as they are received until the supply is exhausted and distribution will be limited to Ames Research Center employees.

NASA SP-4402 ORIGINS OF NASA NAMES

Helen T. Wells, Susan H. Whiteley, and Carrie E. Karegeannes

The origins of NASA-associated and NASA-generated names of launch vehicles, spacecraft, manned spaceflight programs, sounding rockets, and NASA field installations are compiled for the period prior to 1974. Appendices list abbreviations, acronyms, terms, international spacecraft identifications, and launch records (1958-1974); NASA naming committees are also discussed. Annotated.

NASA SP-413 SPACE SETTLEMENTS - A Design Study

Edited by Richard D. Johnson, Ames Research Center, and Charles Holbrow, Colgate University

A synthesis of some technologically complete and otherwise sound ideas about how mankind might permanently sustain life in space on a large scale is presented. Space colonization, descriptions of the physical properties of space, man's needs in space, the building of a space colony, and thoughts about the future of space colonization are included in this report that grew out of a 10-week program in engineering systems held at Stanford University, Palo Alto, California, and at Ames Research Center, Moffett Field, California, in 1975. Nineteen professors of engineering, physical science, architecture, and social science participated.

NASA SP-3099 TABLES AND CHARTS OF EQUILIBRIUM THERMODYNAMIC PROPERTIES OF AMMONIA FOR TEMPERATURES FROM 500 TO 50,000 K

Ann L. Simmonds, Charles G. Miller III, and John E. Nealy, Langley Research Center

Equilibrium thermodynamic properties for pure ammonia, generated using the Gibbs free-energy minimization method, are presented in tabular and graphical form for a range of temperatures from 500 to 50,000 K and for a range of pressures from 0.01 to 40 MN/m². Equilibrium and thermodynamic properties such as pressure, temperature, density, enthalpy, speed of sound, entropy, molecular weight ratio, specific heat at constant pressure, specific heat at constant volume, isentropic exponent, and species mole fractions are included.

NASA SP-3098 TABLES AND CHARTS OF EQUILIBRIUM NORMAL SHOCK AND SHOCK-TUBE PROPERTIES FOR PURE ARGON WITH VELOCITIES TO 18 km/sec

Charles G. Miller III and Sue E. Wilder, Langley Research Center

Equilibrium thermodynamic and flow properties for moving, standing, and reflected normal shock waves in pure argon are presented in tabular and graphic form. Such properties as pressure, temperature, density, enthalpy, speed of sound, entropy, molecular-weight ratio, isentropic exponent, velocity, and species mole fractions are included. Incident (moving) shock velocities are varied from 2 to 18 km/sec for a range of initial pressures of 5 N/m² to 5x10⁵ N/m². Working charts illustrating shock-tube performance with argon test gas and heated helium and hydrogen driver gases are also included.

NASA SP-4403 ORDERS OF MAGNITUDE: A History of NACA and NASA, 1915-1976

Frank W. Anderson, Jr.

A brief history of the National Advisory Committee for Aeronautics (NACA) and its successor, the National Aeronautics and Space Administration, covering the years from 1915 through 1976, is presented. This revised account of a chapter originally prepared for a comprehensive history of public works in the United States chronicles the rise of aeronautics; the beginning of the modern space program with the dissolution of NACA and the creation of NASA in 1958; the Mercury, Gemini, and Apollo projects; the Mariner and Viking programs of space exploration; and the Space Shuttle. Illustrated.

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ARC 303 (May 77)

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-104	Supervisory Aero. Engineer (Asst. Branch Chief)	GS 13/14	FAR	Centerwide	Extended to 8/31
77-107	Procurement Clerk (Typing or Clerk Typist)	GS 4/5 or GS 3/4	ASP	Centerwide & Outside	9-22-77

To Apply: Complete ARC 59 and submit to Mail Stop 241-6.

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-52	Aero. Engineer	FD	Jay V. Christensen
77-53	Aero. Engineer	FSD	Robert Chen (outside candidate)
77-73	Aero. Engineer	FHR	William Snyder (outside candidate)
77-91	Engineering Information Assistant	RF	Patricia A. Edwards (outside candidate, Ames temporary employee)
77-94	Supervisory AST Space Science Secretary (Typing)	SST	Audrey L. Summers
77-95		RKS	Cancelled

Want ads Transportation

1966 Pontiac Bonneville wagon, 9 pass., A/C, AT, PS, PB, radio, roof rack. Good condition. Call Lado Muhlstein, 253-4106.

Leaving NRC, must sell 1971 AMC Gremlin, man. tr. R/H, 8 tr. tape, new batt. & steel rad. tires. \$875; and 1970 Chev. Kingswood Est. 350 wagon, AT, PS, PB, A/C, AM/FM stereo, 4 spkrs. New tires, water pump, shocks, radiator. \$925; Domestic Imperial automatic sewing machine, \$15; available Sept. 10. Seginer, 493-9372, eves.

1970 Triumph motorcycle, 250 cc., exc. cond., \$250/offer. Call 322-9188 eves.

1971 Ford Torino Wagon, PB, PS, AT, A/C, Disk Br., luggage rack, new front tires, exc. cond., leaving this country, must sell, \$1,150. Call 964-0297 after 6 p.m.

1974 Yamaha TX500A, 4 stroke, twin, runs great! K81's, oil cooler, electronic ignition, \$800 firm. (408)255-8627.

NRC Res. Assoc. leaves country soon and will sell in early Sept. his turquoise Toyota Corona 70, 4-dr sedan, AM radio, vinyl roof, 53 K miles, \$1000. Call Willi for information 737-8946.

1975 Ford 1/2-ton PU; F-100 Ranger XLT new camper shell, PS, PB, AT, A/C, AM/FM stereo, 23 K miles. \$4800 or best offer. Call 926-9963 after 5 p.m.

Housing

For rent: 3-bdrm home in Los Altos, large yard, fruit trees, \$380/mo. Call Esar Schwartz, X5930 or 5931.

For rent: Beach house at Pajaro Dunes (near Watsonville). Completely furnished, including linens; cleaning included in the rent; beautiful views of Monterey Bay, 100 ft from the beach; tennis courts. Reserve now for Fall. Call John Lundell, 252-7260.

Miscellaneous

For sale: Electric range, 220 V, good condition, \$40. 322-9188.

For sale: crib and mattress, \$22; high chair, \$10; stroller, \$15; car seat, \$10; play pen, \$3. 266-8808.

For sale: Afghan hound, male, 5 yr old, masked cream, neutered, AKC papers, \$25, 493-1617.

Sailboat (15') with sales and trailer, \$1300. Workbench (electronic prof'l) with drws, \$75. Call Bob after 5 p.m. (408) 732-3238.

Purebred Rhodesian Ridgeback (African lion hunting dog). Gentle, affectionate, 85 lb male. Free to right home. 494-6084.

NRC Res. Assoc. leaves country soon. For sale and priced to go now or early Sept.: Living room set, \$120; J.C. Penney Stereo incl. record player, \$30; Sunbeam vacuum, \$20; floor lamp, \$9; metal bookstands, \$6; 2 complete twin beds, \$50; nightstand with lamp, \$7; 4-drawer chest, \$8; card table, \$10; hibachi grill w/stand, \$4; 4-chairs dinette set, \$15. Call Willi, 737-8946.

For sale: Spanish style living room furniture. Couch, 2 chairs, 2 end tables, and a coffee table. Good condition. \$150. Call Dane at 266-5236.

Green vinyl hideabed, makes comfortable double bed, \$70; 8x11 green carpet, fine condition, \$25. 968-7341.

New bikes: 20 in. Motor Cross, \$50; 26 in. 1-speed girls & boys, \$30; 26 in. 3-speed girls & boys, \$35; 26 in 10-speed girls & boys, \$50. 296-8594.

For sale: Electric kitchen range and oven. In very good condition. \$75. Call 248-0427, eves.

For sale: '76 Terry Travel Trailer, 24 ft, Model P, sleeps 9, fully self-contained, showroom condition. Phone 244-1132.

India silk saree, new colorful, capturing. Can use to make a long or an evening dress. \$35. Call 964-1725.

Study lamp, \$10; wall lamp, very good cond., \$15; wall mirror, 20x48, like new, \$7; movable lightweight bed frame, \$7. Call 964-1725.

Girl's white 6 pc bedroom set: dresser w/mirror, desk w/chair, nightstand, 2 twin bed frames, \$200. Phone 252-8245.

Craftsman Air Compressor - 2 cylinder, 1 hp, pressure regulator control & safety valve. NEW. With hose & paint gun. \$325. 246-0739 after 6 p.m.

Couple with infant and small dog moving to area in Sept. need 2-3 bedroom unfurnished apartment or house to rent for one year. Prefer location within 1/2 hr of Moffett Field. Excellent references available. Contact Jr. J.G. Lawless at 5220, or write E. Ebelson, 8E Fenimore Trace Apts., Watervliet, N.Y. 12189.

Wanted: Responsible person to drive air conditioned Maverick to New Haven, Conn. early September. J. Rabbott, 941-6251, eves.

Wanted: Good practice piano. Call A. Laboy, 259-7419.

Wanted: Repair service on Word Processing equipment. If you need repairs on MTST, Mag Card, CPT or Savin machines, call Katie Garcia, Ext. 5671. When purchasing, renting new equipment, or converting rental (or lease) to purchase, please also notify Katie so her maintenance records can be updated. No maintenance agreements on this equipment should be entered into by anyone but Services and Supply Division (Katie Garcia).

the astrogram Admin. Mgt. Building
Phone 965-5422

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Editor Meredith Moore
Reporters NASA Employees

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The Astrogram

VOLUME XIX NUMBER 25

September 8, 1977

New high-speed autopilot

Engineers at Dryden Flight Research Center have developed an autopilot that will permit future high-speed, high-altitude aircraft to fly much closer on flight path. The autopilot was developed during flight tests of the 2000-mph YF-12 aircraft that NASA is flying to aid in the development of technology for the design of future high-speed aircraft.

Experience gained from the YF-12, XB-70, and other aircraft that cruise at high speeds and high altitudes indicates that deviations from planned speeds and altitudes can be quite extreme. Altitude changes of plus or minus 4000 ft and speed differences of over 30 mph have been reported.

With the aircraft cruising at Mach three (three times the speed of sound), the gradual temperature and pressure changes across the country appear as rapid changes. Since Mach number is a function of temperature and pressure, this rapid change can result in Mach change. Using conventional techniques to correct for these changes can result in large altitude deviations and poor passenger ride qualities.

If future aircraft are to operate at these speeds and altitudes, much closer tolerances will be required for air traffic control purposes.

These deviations can also result in loss of aircraft performance or exceeding the operating limits of the aircraft.

Conventional aircraft autopilots use flight control surface movement to maintain speed or altitude. However, this method will not work at the higher altitudes and speeds. Automatic throttle control is generally limited to lower speeds.

The YF-12 system combines both surface motion and throttle motion for control. Up to this time, the two systems have not been used together at the high speeds and altitudes.

On the YF-12, the two systems, along with newly developed data sensors, have functioned in a complimentary fashion which has enabled the YF-12 to maintain a high degree of flight path control precision even at high-speed cruise conditions over extended periods of time.

Tax break for retirees

Retired public employees may not be aware that the Congress revised some of the tax laws in the summer of 1977 well after the April 15, 1977 closing date for 1976 Federal income tax returns.

Among the changes was the restoration of the pre-1976 Retirement Income Credit (RIC) for the taxable year 1976 only. This one year restoration permits a retiree to apply for a tax credit or refund as in 1975 and previous years.

Contact your local IRS office and ask for Form 1040-X, the 1976 Schedule RIC form, and any assistance required.

IRS telephone numbers in San Jose are: tax forms only - 998-1551; information and assistance - 998-2300.

Research aircraft conducts studies from canal zone



Ames Earth Resource Survey Aircraft taking off in Panama to collect samples for important studies of atmospheric pollution.

Two National Aeronautics and Space Administration research aircraft, the U-2 and the Lear Jet, were based in the Panama Canal zone for three weeks this summer, conducting important studies of atmospheric pollution.

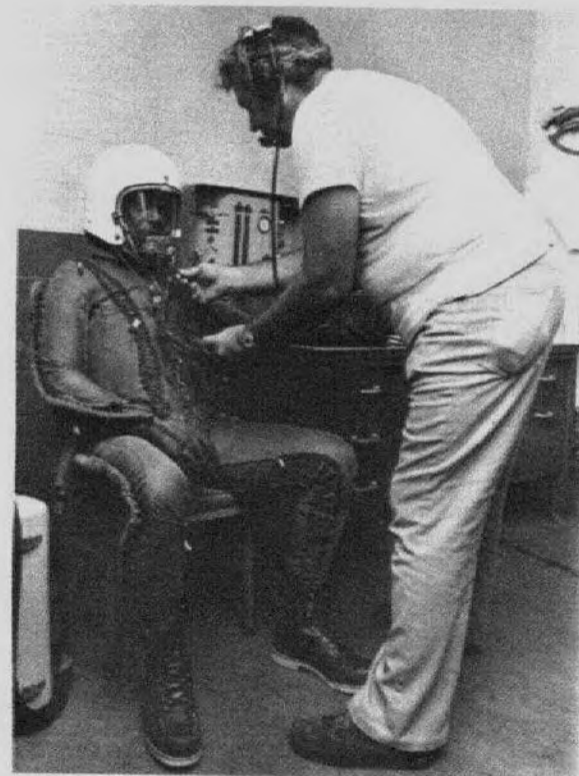
Scientists from several governmental agencies and universities, coordinated by Bill Page of Ames, cooperated in the study, hoping to gain detailed information about the way air motions carry atmospheric pollutants such as halocarbons (freons) from low altitudes into the stratosphere where they may influence the ozone balance. Ozone in the stratosphere (the region approximately 46,000 to 150,000 ft) serves to shield the earth's surface potentially harmful solar radiation.

The study was conducted in the tropics near the earth's equator because it is the location of the intertropical convergence zone, a particularly active region of strong vertical atmospheric motions. Some scientists suspect this is the principle region for movement of low-altitude air and pollutants into the stratosphere.

The study, which was sponsored and planned by ARC, was carried out over a 16-day period with both aircraft making daily flights. The aircraft were heavily instrumented with sensing and sampling equipment and measured atmospheric pollutants along horizontal tracks at multiple altitudes spaced about 1 km (0.6 miles) apart.

The Ames' Lear Jet covered altitudes up to 46,000 ft, the U-2 extended the coverage well into the stratosphere to altitudes of 70,000 ft.

In addition to the aircraft data flights, special meteorological balloons carrying ozone measuring devices (ozonesondes) were flown to about 100,000 ft four times daily to provide a continuous record of meteorological conditions. Precise radar tracking of balloon flights provided detailed data on wind velocity and direction at various altitudes. The radar tracking of the aircraft provides location data



This U-2 pilot is suiting up in a pressure suit in preparation for his daily flight in which air samples are collected at very high altitudes.

for subsequent comparison with meteorological data. Also included in gathering atmospheric data was a series of daily rocketsonde launches to study winds at altitudes of 79,000 to 164,000 ft.

The data collected from the study are in the process of being analyzed, and will be presented on Oct. 12 at a workshop for all people involved in the study. At that time, the material will be discussed and interpreted and the overall success of the study will be assessed.

Hover tests for XV-15 Tilt Rotor Aircraft



XV-15 Tilt Rotor Research Aircraft shown in hover tests at Bell Helicopter Textron's Flight Test Facility, Arlington, Texas.

In the airplane mode, the aircraft is capable of forward speeds in excess of 300 miles per hour. It is expected that the tilt rotor will operate with less noise than conventional helicopters or turboprop aircraft of comparable size.

Ground run testing of Bell Helicopter Textron's XV-15 tilt-rotor research aircraft has resumed following successful initial hover and air taxi tests.

Bell is working under a joint contract with Ames and the U.S. Army Air Mobility Research and Development Laboratory to design, manufacture and test two VTOL tilt rotor research aircraft. The tilt-rotor is expected to combine the best features of helicopters and conventional airplanes for fast point-to-point transportation. Lt. Colonel James H. Brown is manager of the Tilt Rotor Research Aircraft Project Office, Ames Directorate, Army Air Mobility R&D Laboratory.

During three hours of flight testing in the helicopter mode, the aircraft hovered and air taxied at altitudes of up to 100 feet above ground level. It also attained airspeeds up to 40 knots forward, 25 knots sideward and 10 knots rearward.

Other flight test accomplishments included: hovering with the force feel system off; hovering and landing with the stability augmentation system off; hovering and landing with manual rpm control; takeoff, hovering, and landing at 85° pylon angle; short takeoff and landings; and 90° hover turns in 25 knot winds.

Bell test pilots Ron Erhart, Dorman Cannon and Ames' Project test pilot Dan Dugan were so pleased with the aircraft's handling qualities and performance that they made no requests for design changes as a result of the flight tests. Preliminary external noise data obtained during the flights indicate that the 13,000-pound XV-15 is as quiet as a 4,000-pound Bell 206L helicopter.

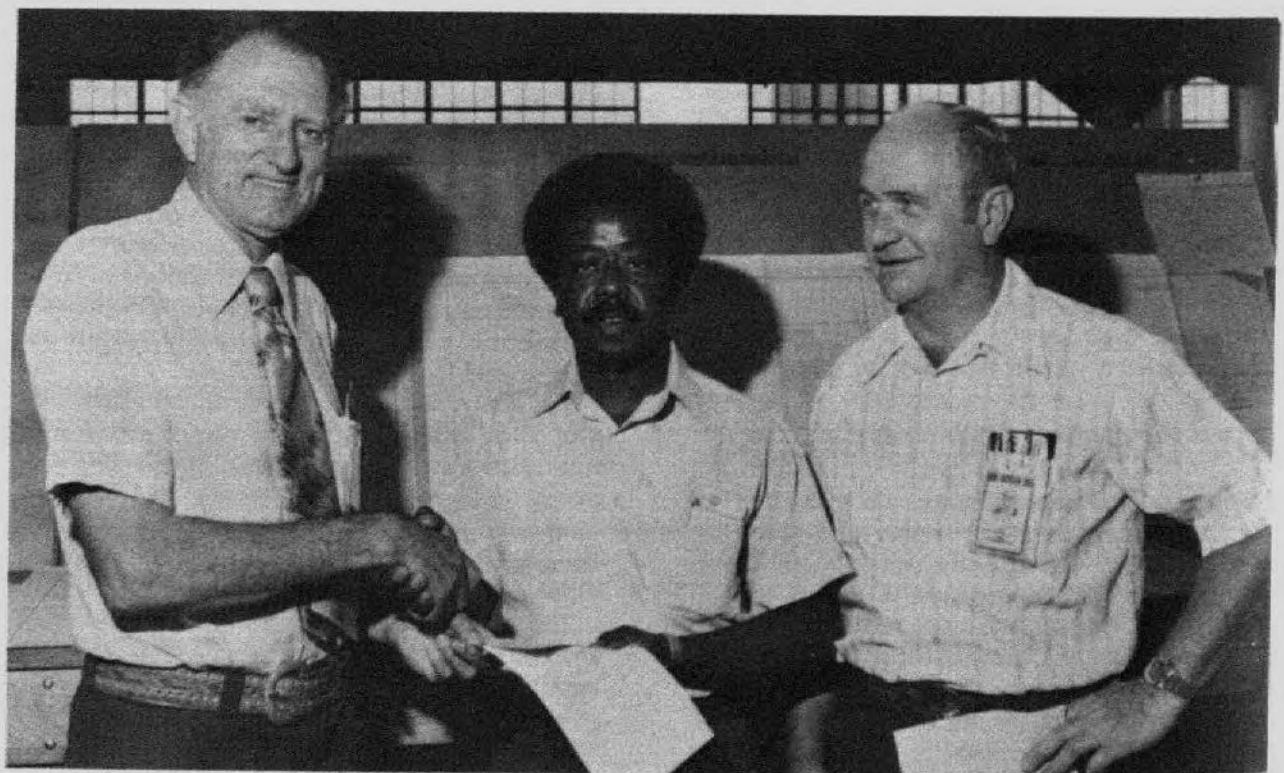
Ken Wernicke, Bell tilt-rotor chief project engineer, reported that after almost 50 hours of ground flight tests had been completed — including several hours at maximum power and one hour of over-speed — running "the transmission gears didn't look as if they had been used."

Final assembly of the Aircraft No. 2 is almost complete in Bell's experimental shop. The aircraft will be delivered to Bell's Flight Test facility in September for completion of research instrumentation installation, systems checkout, and ground run checkout.

Home Life rep.

Norman Check from the Home Life Insurance office in San Jose, will be at Ames on Wed., Sept. 21, from 9:00 a.m. to 12:00 noon. He will be the service representative for the NASA life insurance program and will be available to assist Ames employees with any life insurance questions. Appointments can be made by calling the Training and Special Programs Branch, ext. 5622.

Suggestion award for Lew Turner



Lewis Turner, middle, accepts a check from Branch Chief Mitch Radovich and Supervisor Bob Gordon for a recent suggestion.

Turner designed a protective cover for a scanivalve; Ames has found that the protective cover has eliminated motor repair and that the protection stays with the scanivalve as a permanent fixture.

Turner is a research instrument maker in the Model and Instrument Machining Branch.

NASA selects spinning sail concept for interplanetary missions

A 12-bladed spinning solar sail spacecraft propulsion concept has been selected by NASA as a candidate for Interplanetary Automated Shuttle use within the solar system in the 1980s and beyond. Its first use could be for a Halley's Comet rendezvous in 1986 if NASA selects this mission from among several possible options.

The heliogyro sail — to use its other name — employs a helicopter design concept with extremely long blades or sails. The 12 sails would be made of reflective aluminized plastic film and be deployed in two tiers of six each.

According to NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif., solar sailing development scientists, the 12 blades of the vehicle would be spun out by centrifugal force after being launched from the Space Shuttle.

The scientists say each blade could be 7.4 kilometers (4.5 miles) long and only 8 meters (28 feet) wide. The spacecraft and its scientific payload would be mounted at the center of the heliogyro. The slowly spinning craft would be propelled by the Sun's photon radiation and rotate once every three minutes.

The spinning sail was selected over a square sail concept which would have used an 850-m (half-mile) square configuration. The spinning gyro concept was chosen because it was considered more practical by program engineers and designers.

The spinning solar sail will now compete with a proposed ion drive (solar electric) spacecraft propulsion system for NASA consideration.

Both solar sailing and ion drive programs are being studied by JPL. Several other NASA centers and a dozen industrial and research facilities are involved in the two efforts to develop low-thrust, long-term spacecraft propulsion for the 1980s. California Institute of Technology operates JPL for NASA.

The spinning sail, or heliogyro, idea was first conceived by Richard MacNeal of MacNeal-Schwendler Corp. and John Hedgpeth of Astro Research, Inc., both southern California aerospace engineers.

End of an era

For the past two years, John Belliveau, 18, has worked under the guidance of Dr. Janos Lanyi of the Ames Extraterrestrial Biology Division. Recently, he was invited by the organizers of the *International Symposium on Membrane Bioenergetics* to present the results of his latest research project. The symposium, held on the island of Spetsai, Greece, was an international meeting which drew approximately 200 participants from all over the world, including 20 from the U.S.A. John's poster presentation dealt with the active transport of ions across cellular membranes. Specifically, he presented the first evidence for a calcium transport system in *Halobacterium halobium*. This bacterium is perhaps best known for the special protein it contains — bacteriorhodopsin — which converts light energy into chemical energy by extruding intracellular protons to the external medium after the absorption of light. This is John's second paper dealing with this subject matter and is scheduled to be published in the *Archives of Biochemistry and Biophysics*, as was the first.

Before presenting his paper in Greece, he also participated in the *2nd International Advanced Course of Bioenergetics on "Specialized Membrane Functions"* held in Rome, Italy. This was his first international meeting and culminates his career at Ames.



John's first involvement with the Center began with the Ames Student Space Biology Research Program which is coordinated through the Educational Programs Office. Currently, he is at Ames on the Galileo Fellowship program working with Drs. Roberto Bogomolni and Lanyi, further investigating the biophysics of the bacteriorhodopsin molecule.

This past year, John has received the Westinghouse Science Talent Search Scholarship, the Elks Foundation Family Scholarship, and was awarded memberships in the California Academy of Sciences and the American Institute of Biological Sciences. He was also a finalist in the Hertz Foundation Scholarship Program and the Galileo Memorial Scholarship Program. He has been listed in *Who's Who of America's High School students* for the last two years and is currently a finalist in their scholarship program. John is a 1977 graduate of the Woodside Priory in Portola Valley and will attend the California Institute of Technology to pursue a physics-oriented career.

Conservation notice

Cooling of vacuum line diffusion pumps in the lunar laboratory was consuming 1570 gallons of water daily until the open flow system was replaced by a circulating pump, a water-to-air heat exchanger and a 5-gallon reservoir.

NASA SPECIAL PUBLICATIONS

National
Aeronautics and
Space
Administration

NASA SP-405 VORTEX-LATTICE UTILIZATION

A workshop held at Langley Research Center, Hampton, Virginia, on May 17-18, 1976

Innovative applications of the vortex-lattice method to problems of aerodynamic design and analysis — by industry, government agencies, and universities — are discussed in this compilation of papers presented at a workshop held at Langley Research Center on May 17-18, 1976. Recent research applications of and improvements to the vortex-lattice method are highlighted. Although the method is not new, it is an analytical tool that continues to be used and refined.

NASA SP-402 NASA HISTORICAL DATA BOOK, 1958-1968. Volume I — NASA Resources

Jane Van Nimmen and Leonard C. Bruno with Robert L. Rosholt

Prepared by the NASA Historical Office, this first volume of the Data Book is primarily a presentation of statistical data relevant to NASA's first 10 years. Organization charts and a selection of photographs of NASA Headquarters and of the various research centers are also presented.

NASA SP-407 SPACE SHUTTLE

Prepared by Lyndon B. Johnson Space Center

The Space Shuttle flight system — including the orbiter, the external propellant tank, and the two solid rocket boosters — is described in this generously and effectively illustrated (many illustrations in color) special NASA publication. Included are accounts of the Space Shuttle mission, its hardware and subsystems, its technical capabilities, and its space payload accommodations. Benefits of the space program in general are identified, economic effects of the Space Shuttle are outlined, and principal participants in the program are noted.

NASA SP-3102 SYNOPTIC ANALYSES, 5-, 2-, AND 0.4-MILLIBAR SURFACES FOR JULY 1973 THROUGH JUNE 1974

Prepared for Wallops Flight Center by the Staff, Upper Air Branch, National Weather Service, Camp Springs, Maryland

Satellite radiance measurements and data from meteorological rocketsonder are employed in an analysis of a series of high altitude constant-pressure charts. Northern Hemisphere analyses for 5-mb, 2-mb, and 0.4-mb surfaces are presented for weekly periods from September 1973 through April 1974; and on a monthly basis for July and August 1973, and May and June 1974. Sponsored jointly by NASA and the National Oceanic and Atmospheric Administration.

NASA SP-392 THE SPACE TELESCOPE

Authors' summaries of papers on the space telescope are compiled in this volume. The papers were presented at the 21st annual meeting of the American Astronautical Society, held in Denver, Colorado, August 27-28, 1975.

NASA SP-418 LUNAR SAMPLE STUDIES

Prepared by Lyndon B. Johnson Space Center

Data derived from five studies of several lunar samples collected on various Apollo missions are discussed, analytical procedures described, and relevant data compiled. The studies cover (1) lunar breccia 15015, a coherent, tough breccia with a 95 percent glass-coated surface; (2) lunar basaltic rocks 10069, 10071, and 12008; (3) eight other basalts, seven with similar chemical compositions and one, 75035, with a distinctive chemical and mineralogical composition; (4) troctolitic and basaltic clasts from breccia 14321 (from the Fra Mauro region); and (5) breccias 60018 and 64435, and anorthosite 60025 (determination of uranium, thorium, and lead concentrations, and lead isotopic compositions).

Send order to Library; ARC form 303.

Golf

Chairman Sal Tardio reports a beautiful day and wonderful turnout for the Ames Golf Club Tourney at Seascape (Aptos). Helping him were Roger, Mike, Frank, and Gary.

1st Flight: 1 — T. Almojuela, 2 — F. Lazzeroni, 3 — tie between R. Hedlund and J. Lee.

2nd Flight: 1 — Claudia Eddy, 2 — tie between L. Hochstein, M. Drozco, and R. Dick.

3rd Flight: 1 — tie between D. Davis and B. Kelley, 2 — tie between E. Meneffee and Flipin.

4th Flight: 1 — C. McCloskey, 2 — W. Harry, 3 — tie between I. Rathert, G. Rathert, and K. Bruck.

Child care

If you are in need of Day Care facilities for your child or children, call the Federal Women's Program Coordinator, Annette T. Laboy, on extension 6510 or Janet Carson, Women's Advisory Group member, on extension 5972 or 6053. Annette or Janet have access to a Directory of Local Child Care Programs by alphabetical listing of all child care programs in the county, Head Start Programs, Infant Programs, Programs with Subsidized Tuition, State Pre-schools Program, Family Day Care Programs, and all other child care programs.

Want ads

(Continued from Page 4)

Totebag, heavy duty black vinyl, like new, \$20. 964-1725.

Wanted: 2 tickets to "A Chorus Line" at the Curran Theater in San Francisco. C. Jackson, 248-5546.

For sale: RCA Whirlpool washer and dryer, reconditioned. Like new, \$200. Call Vern, 263-3097 after 5:30.

Modern sofa, blue, 7½ ft long, good condition, \$20; Colonial loveseat, maple frame, \$10; Lawnmower, sturdy wood shaft, \$10; Dinette table, wood grain Formica, 35"x62", \$15. M. Sarjeant, 272-0287.

For sale: Schwinn Lil Tiger two-wheeler w/training wheels (ages 4-6), \$20. Samsonite aqua suitcase (approx. 2'x2½'), \$5. Child's night light/lamp combo, \$3. 241-5503, evenings.

Microwave oven, Litton 420 Memorymatic with variable power and electronic touch control. Like new! \$375. 738-3080.

NRC Res. Assoc. leaves country soon. 19" color TV, 1 yr old, \$200; compact Macy's stereo system AM/FM radio, 8-track tape, turntable and 2 speakers, \$90; hair dryer, \$7; toaster, \$7; end table, \$10. N. Levi, 965-2031.

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-106	Research Aircraft Mechanic Crewchief	WG-14	FDS	NASA & Outside	9-12-77
77-108	Secretary (Typing)	GS-4/5	FAR	Centerwide	9-19-77
77-109	Voucher Examiner (2 positions)	GS-4/5	AFG	Centerwide & Outside	9-16-77
77-110	Contract Specialist	GS-12/13	ASL	Centerwide	9-16-77
77-111	Illustrator	GS-5/7	ATG	Centerwide & Outside	9-16-77
77-112	Secretary (Typing)	GS-4/5	SC	Centerwide & Outside	9-19-77

To Apply: Complete ARC 59 and submit to Mail Stop 241-6.

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-54	Aerospace Engineer	FSN	John Bull
77-74	Aerospace Engineer	FHI	Richard Young (outside candidate)
77-69	Aerospace Engineer	FHI	Ronald DuVal (outside candidate)
77-101	Visual Information Specialist	ATG	Kenneth Atchley Darryll Stroud

Want ads

Transportation

For sale: '69 VW Bug. Excellent condition. Completely rebuilt engine, carburetor. New brakes, C.V.'s, paint, Michelins. \$1250. Call Paul, ext. 6489.

For sale: '68 Rambler American, Silver. New engine, paint, air shocks, and tires. Has 8-track tape deck and speakers. Runs like a dream. Would make perfect car for transportation purposes. Only fault, was in accident 2 weeks ago, has minor body damage. \$400 or offer. Must sell. Call 737-2241 after 4:00 p.m.

1974 Pinto, low miles, AT, new Acen rims, very good condition. \$2300/offer. 926-1555 or 926-1810.

1973 Ford Courier, towbar hitch, shell, recent tune-up, \$2050 or best offer. Call 738-1609.

For sale: 1970 Thunderbird, Landau Brougham Coupe, all power, A/C, cruise control, tilt wheel, AM/FM. Clean, tight, smooth. \$1,700 or best offer. Call 867-7838 after 5.

1974½ Kawasaki 900, Vetter fairing, many extras. Very clean, \$1,695. Call 227-8738.

Leaving NRC, must sell 1973 Chevelle. Impala, 4-door, 64 K miles, AT, PS, PB, A/C, AM stereo, new tires, \$1600. Steinberg, 324-8447.

1968 Datsun 1600 Roadster. Exc. mechanical cond. Less than 20,000 miles on complete engine overhaul. Good body and tires. Top and tonneau cover are both less than a year old. Exc. transportation or great for restoration as a classic. \$895. Call 258-6965 after 4:30.

1965 Dodge Coronet, AT, radio/heater, good tires, in very good condition, presently being used for work transportation. Available after Sept. 25, 1977. Price is \$300 or best offer. Call R. White, 736-5285.

1973 Harley-Davidson, FX1200, good cond. \$2700 or best offer. Call Ron Brackett at 965-2711 after 5 p.m.

College student wants clean, reliable used car. Please call Frank at 248-4690 after 6 p.m. or weekends.

1966 Pontiac Bonneville wagon, 9-pass., A/C, AT, PS, PB, radio, roof rack. Good cond. \$675. Call Lado Muhlstein, 253-4106.

1969 Pontiac Executive wagon, AT, PS, PB, A/C, radial tires, luggage rack, vinyl top, \$800. Available end of Sept. Call 326-9904 eves.

Housing

For sale: 3-bdrm, 1½ bath, 2-story townhouse. Berryessa and Capitol, S.J. New carpet, drapes and dishwasher. \$53,950. 244-7100 days or 926-6758 eves.

New home for rent: \$300 month. All elec. kitchen, family room, fireplace. 3 bdrms. Furnished. Avail. now thru Jan. 15. Call 287-6987, 6 pm. Located in San Jose.

Attractive 3 br, 2 ba, partly furnished house, AEK, washer/dryer. \$475/mo. Avail. Oct. 1, 736-9114.

For sale: Redwood contemporary in Woodside. Spacious living room, free-standing fireplace, gourmet kitchen, large 2 br, 1 ba, on ¼ acre. Air conditioned wine cellar, \$134,500. 851-1932 after 4 p.m.

Young married couple with little one on the way need 2-3 bdrm duplex or house in Mt. View area. Reasonable. 243-4882 evenings, or 732-5463 days. Ask for Dave.

Miscellaneous

Your usable items needed for donations for church rummage sale. Much appreciated. We can pick up. Also, you're invited to buy, Sept. 14 through 17. Redwood Gospel Assembly. Call 737-9519.

For sale: Stereo system in beautiful walnut cabinet, \$150; two track tires and rims, 9.50x16.5, \$95; Student desk, 4 drawer, \$35. Call Daryl Rasmussen, 257-2848.

Interested in low cost sailing on a Columbia 26? Lessons \$7! Rental \$30 for ½ day, \$45 for full day. Call Daryl Rasmussen, 257-2848.

For Sale: Student violins, German-made. Half and three-quarter size. Each used several years. 739-9124.

19" black and white TV. Almost new, \$65; AM/FM G.E. clock radio, \$10; 2 armchairs, \$95; couch, \$95; 2 end tables with lamps, \$30; dining table with 4 chairs, \$30; child's lamp, \$5. Call 324-8447.

For sale: Yamaha skis with bindings, 180 cm, \$20. Call 253-6016 after 6 p.m.

For sale: 45 yds gold sculptured carpet w/pad; exc. cond., \$100 or offer. Call 379-1753, after 6:30 p.m.

Quality day care in my licensed home, ages 3 plus, near Ames, 493-1617.

Jerry Smith's opera tickets. Fri. eve., 5th row orch. Call Bill Wehrend, for avail. dates, 362-7925.

Missing library book: Title - OPTICAL SURFACES, author - Jurek, B. Please return to Don Moody, 213-7, X-5462.

House sitting done: have local references. Call Ken Bilski, ext. 6001.

Stanford vs Illinois, Palo Alto, Sept. 24, two good tickets and special parking pass, Sec. R, row 46: \$15, 493-6846.

The person at Ames who ordered 4 historical photos from Baschet & Cie, Paris, France, please contact Denise in Public Affairs, ext. 5091.

For sale: New Whirlpool Connoisseur electric range with double oven. Never used. White, model RDE 950P, \$450. Call 243-8341.

Bicycle, Ladies, single speed, \$25; 8-mm Kodak movie camera, F1.9 lens, \$25. Telephone 948-5602.

Table cloth, 70x80, Quaker lace, off-white, like new, beautiful, gorgeous, \$30. 964-1725.

Girl's coats, woolen, and summer, sizes 12 and 14, junior size 5, top condition, beautiful colors, \$10 each. 964-1725.

Steel Trunk, size 31x21x14, in good condition, ideal for overseas shipping, \$30, 964-1725.

19" color TV (Wards), 12 months old, outdoor antenna, \$225. Snow chains, fit up to LR70-15 tires, \$10. Night stand with 2 drawers, \$10. Arm chair, \$20. Call 326-9904 eves.

For sale: Frigidaire Flair electric stove, double glass door ovens (chest high), rotisserie, cabinets below, 61" high, 40" wide, 25" deep, \$200, 493-9406.

Bunk bed for sale. Mattresses not included. \$15. 494-6535.

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(Continued on Page 3)

The Astrogram

VOLUME XIX NUMBER 26

September 22, 1977

Space Shuttle fares

"How much does it cost to fly on the Space Shuttle?"

That is a question being asked with increasing frequency and it is a question to which NASA is paying a great deal of attention. NASA plans to begin Shuttle operation flights in 1980.

The answer is anywhere from less than \$10,000 to more than \$21 million, depending on how much the cargo weighs and what volume is involved, whether it's on a reservation or stand-by basis and what optional services are desired.

Passengers?

"No, not yet," NASA's Space Transportation Systems Operations Director, Chester M. Lee says. "Nonastronaut payload specialists may fly on some missions to conduct experiments and operate equipment but we're not ready to book tourists yet."

Lee notes that the Space Shuttle will carry as many as seven people on a flight. Three of these will be crew members, astronauts supplied by NASA — pilot, copilot, and mission specialist. The other four would be payload specialists, assigned by the customer for the mission.

At the low end of the fare structure is the so-called "get-away special" which permits an individual or organization to fly a payload in the Shuttle on a space-available basis for \$10,000 or less. To qualify for this low fee the proposed payload must involve research, weigh less than 200 lb, and have a volume of less than 5ft³ and be self-contained. Any services cost extra.

The \$21 million fare is for using the full capacity of the Space Shuttle on a reservation basis by non-U.S. government customers.

In between the charges made for customers sharing the Shuttle flight with other customers, customers willing to fly on a stand-by basis and customers who have made a substantial investment in the Space Transportation System development. This latter category includes the European Space Agency, its member nations and Canada. ESA is developing the Spacelab to be carried in the Shuttle and Canada is developing the remote manipulator system which will be used in the Shuttle.

Lee says the pricing policies are designed to encourage full use of the Shuttle by making the charges economically attractive while recovering the total operating costs incurred by NASA. Also, for commercial and foreign users there is a use fee that covers depreciation of facilities and equipment and amortization of orbiters.

"After three years of operation we plan to reexamine prices to determine whether operating costs are being recovered and to make adjustments if necessary," Lee said. He added that the policy has an escalator clause to account for increase due to inflation.

There are reduced price incentives for payloads having exceptional merit and added charges for short-term callups, postponements, or cancellations. Lower rates are offered for standby payloads, for floating launch date options and for reserving space on future missions.

U.S. scientists return from U.S.S.R. with biology samples

Two American scientists have returned to the United States from Moscow with biological samples carried aboard the Soviet biological spacecraft Cosmos 936.

The Cosmos mission was the first in which laboratory rats had been subjected to artificially produced gravity during weightless space flight.

The biological specimens plus a radiation measurements package will be distributed for analysis to U.S. laboratories at the University of California, Berkeley; University of Washington, Seattle; University of San Francisco; University of Southern California, Los Angeles; and Ames Research Center.

The satellite, which the Soviets launched Aug. 3 and recovered Aug. 22, carried seven U.S. biological

experiments, as well as experiments from the Soviet Union, France, Czechoslovakia, Bulgaria, Hungary, East Germany, Poland and Rumania.

The U.S. Scientists, Kenneth Souza of Ames and Dr. Eugene Benton of the University of San Francisco arrived in San Francisco from Moscow Sept. 2 with the specimens. The samples, including bone, muscle, and liver tissue from rats and live drosophila (fruit flies) had been processed and packaged in dry ice at a mobile laboratory located at the landing site in Siberia and shipped to Moscow within 36 hours after spacecraft recovery. Souza and Benton were in Moscow to receive the sample, supervise proper packaging and carry them back to the United States.

Local government officials of Hawaii visit Ames



Left to Right: John Arveson, Mayor Herbert Matayoshi, Mary Matayoshi, Megumi Kon, Maude Kon, Kenji Nishioka, and Martin Knutson.

Mayor Herbert Matayoshi and his Deputy Managing Director, Mr. Megumi Kon, along with their wives, Mrs. Mary Matayoshi and Mrs. Maude Kon, were recent (August 29) visitors to Ames. They spend the day touring and being briefed on the research activities at the Center. They also talked with many of the NASA scientists.

The visit resulted from an invitation extended to the Mayor and staff by Mr. Kenji Nishioka, a research scientist at the center and a native of the Big Island, during his visit and meeting with the Mayor in Hilo (in July). The purpose and goal of the meeting and visit were to show and explain to the Mayor and his staff the technologies that have been developed by NASA for the Space and Aeronautics

programs so that they would be aware of these technologies and decide which of them may be adaptable to help solve some Hawaii County problems.

The Mayor and his party were officially welcomed to the Ames Research Center by Dr. Dean R. Chapman, the Director of Aeronautics. After the welcome, the Mayor and his party were briefed on NASA's Applications Programs. In the applications area, the various remote sensing activities ranging from photography to electronic sensing (which includes infrared and also the use of discrete bands within the whole electromagnetic spectrum) were discussed including the use of aircraft such as the

(Continued on Page 2)

Hawaii officials

(Continued from Page 1)

U-2, CV990 (flying laboratory) and C141 (infrared astronomy) and LANDSAT Satellite as platforms for the sensors. This then led to specific task discussions such as the U-2 photography that was taken of Hawaii in 1974, 1975, and 1976, and copies provided to the State of Hawaii's Department of Planning and Economic Development and how the county might possibly use this photography to their benefit. As part of this briefing, the technology status of using teleconferencing via satellite was also covered. The facility at Ames which provides this capability with three other NASA centers in the Eastern U.S. was described. Also, the experiment of using full video communication links for teaching courses between Stanford University in Palo Alto, California and Carleton University in Ottawa, Canada using the CTS (Communications Technology Satellite) was described.

As an example of a cooperative NASA-local governmental agency technology transfer effort, the Mayor was shown the Ames Research Center-Santa Clara Valley Water District Automated Water Quality Monitoring System Project. NASA has developed an experimental mobile Automated Water Quality Monitoring Laboratory using electronics, remote automated operations, instrumentation, computer and systems experiences gained from the space program. Several key instruments in the mobile laboratory for detecting bacteria and trace organics (carcinogenic) are direct adaptations from instruments used on the Mars "Viking" program. This automated Laboratory is being used to monitor the input, in process and final water quality for the new Santa Clara Valley Water District's experimental Water Reclamation Facility located in Palo Alto, California. Santa Clara will use the water from this plant for irrigation and recharge of underground water thus they need almost a continuous measure of water quality; this will be very costly to provide by standard laboratory methods thus they are very interested in seeing whether this automated concept will provide this capability at lower cost.

The Mayor's visit was culminated with a close look at the U-2 aircraft and the cameras and electronic sensors NASA flies in the U-2, for obtaining photographic and other electronic sensor data. The Mayor got a first hand view and feel of what a U-2 pilot sees when he sat in the U-2 cockpit and was briefed by U-2 pilot and Chief of Airborne Missions and Applications Division at Ames, Mr. Martin A. Knutson, on flying this airplane.

Community calendar

Philippe Entremont, Pianist, October 14, 8 p.m., Memorial Auditorium, Stanford. The program includes works by Bach, Beethoven, Chopin, and Ravel. Tickets at \$7.50, \$6.50, \$5.50 are available at Tresidder Ticket Office, Stanford, Bass outlets, all Macy's, Emporium's, and other Bay Area agencies. Call 497-2551 for further information.

Aston Magna performs on Friday, October 21, 8 p.m., Memorial Auditorium, Stanford. Performing on instruments of the Baroque period, the musicians will play works by Jean-Pierre Duport, Veracini, Bach, Mozart, and Handel. Tickets at \$7, \$6, and \$5 are available at Tresidder Ticket Office, Stanford, Bass outlets, all Macy's, Emporium's, and other Bay Area Agencies. Call 497-2551 for further information.

Carlos Barbosa-Lima, Guitarist, performs on Friday, October 28, 8 p.m., Memorial Auditorium, Stanford. Tickets at \$5 each are available at Tresidder Ticket Office, Stanford, Bass outlets, all Macy's, Emporium's, and other Bay Area Agencies. Call 497-2551 for further information.

Australia considers' site for new NASA laser installation

Australia's Minister for Science, Senator J. J. Webster, announced today that consideration is being given to installing a NASA satellite tracking laser in Australia for geodetic research, mapping and use in earthquake prediction.

The Department of Science is studying the technical feasibility of a temporary laser installation for NASA and is seeking a suitable site in western Australia.

Webster said it is proposed that NASA operate the laser in western Australia for about a year, beginning about mid-1978; but no commitments have been made by the Australian or United States governments.

It would be part of a network of tracking lasers to be established for various periods at scattered loca-

tions around the world. The lasers are able to accurately measure the range of a satellite by determining the time it takes pulses of light to travel to the satellite and to be reflected back to Earth.

In conjunction with NASA's Seasat satellite and other lasers in the global network (together with existing tracking lasers such as the one at the Australian Orrol Valley Satellite Tracking Station near Canberra), the proposed laser in western Australia will provide measurements in support of geodetic research — including refinement of the measurement of the shape of the Earth — and mapping of the oceans.

Webster said it would also provide accurate information of great interest to geologists and geophysicists for possible use in earthquake prediction studies.

Publications announcement

The Technical Information Division is about to complete collecting information for the 1976 bibliography, "Ames Research Center Publications." If you, as an Ames' author, suspect that one or more of your published works for calendar year 1976 may have been overlooked, please send a reprint or bibliographical listing of each NASA formal series report, journal article, book, chapter of a book, or conference-presented paper to Ms. Betty Sherwood, Library Branch, Mail Stop 202-3.

The present solicitation includes Ames' civil service employees, contractors, research associates and fellows, grantees and interchange agreement

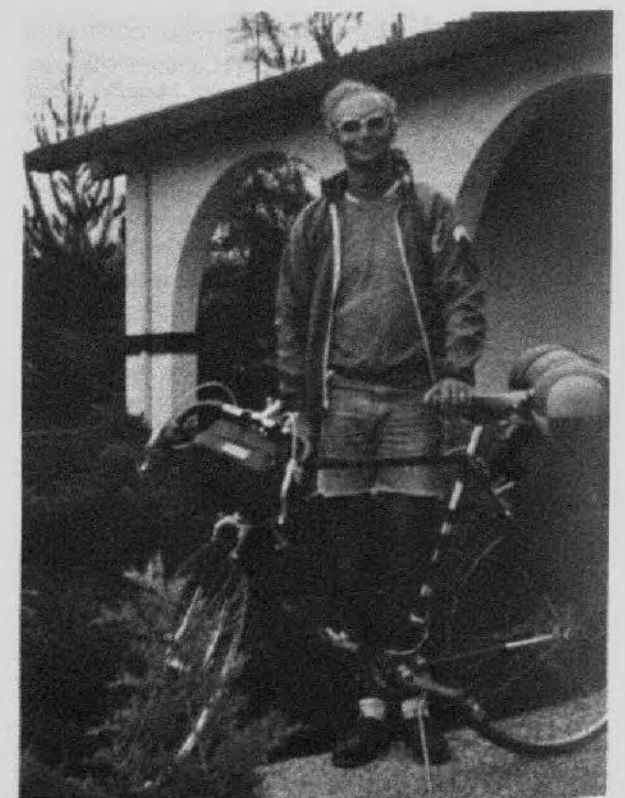
researchers. Do not submit speeches, abstracts, interim or preliminary papers, reviews or comments as these fall beyond the scope of the "Ames Research Center Publications."

So that work can begin on the 1977 edition of "Ames Research Center Publications," it is requested that copies or listings of published works for calendar year 1977 be provided to Ms. Sherwood as they are received by the authors. Any questions about the appropriateness of a published work to be included in the bibliographies should be referred to Ms. Sherwood at extension 5157.

Bike trip to Tahoe a "piece of cake"



On the morning of Aug. 12 Robert Pike, Chief of Personnel, began a 200 mile bike trip from the city of Fremont to Lake Tahoe. The above picture was taken at the onset of his trip and the picture below was one of the milestones of his journey, Carson Pass. Pike averaged 50 miles a day and managed to complete the journey in only 4 days.



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Ben Rich speaks on U-2

Ben R. Rich, Director of the Lockheed "Skunk Works," otherwise known as the Advanced Development Projects, is presenting a lecture before the San Francisco Section of the American Institute of Aeronautics and Astronautics (AIAA) on Wednesday evening, September 28, 1977. The talk is entitled "The Lockheed 'Skunk Works', the U-2, and the SR-71 - Past, Present, and Future." The "Skunk Works" is the advanced aircraft-design group at the Lockheed-California Company in Burbank. Although the designs of many WW-II and later aircraft originated in this group, which was formerly directed by the renowned Clarence L. "Kelly" Johnson, the U-2 aircraft is one of the most noteworthy for Ames' researchers. This airplane plays an important role in the Center's missions. Mr. Rich will comment on the U-2 and SR-71 as well as other aircraft originating within his group. The evening's program also includes a tour of the U-2's based at Ames.

The meeting will be held in the Ames Research Center cafeteria (Bldg. 235). The evening's schedule is: 5:00-6:00 p.m. tour of U-2's; 6:00-7:00 p.m. no host social hour; 7:00-8:00 p.m. dinner; and 8:00-9:00 p.m. lecture. The dinner cost is \$8.50 (incl. tax and tip). For prior reservations, which are required for dinner and/or program, please phone Clara Johnson (965-5258) at ARC or Sandra Morrison (742-7726) at LMSC on or before Monday, September 26. Ames' researchers are also invited to attend.

New copyright law affects Ames

On January 1, 1978 the new copyright law takes effect. The new law makes some specific changes in the current practice that will effect Ames libraries. The most important change deals with photocopying done by Ames users under the current provisions for "fair use." An individual will still be able to make a single copy of a copyrighted article for research use, but only one copy of one article per single journal issue or other copyrighted publication may be legally made after January 1, 1978.

In libraries, such as ours, where copy machines are unattended and thus "unsupervised," responsibility for complying with the copyright law lies with the individual making copies, rather than with the libraries in which materials are located. Users of Ames libraries will be responsible and potentially liable for copies that they make outside the provisions of the new law.

Anyone who is interested in reading the full text of the law and accompanying legislative report will find a copy at the Reference Desk in the Main Library.

More copyright information will appear in future Astrogram issues. Keep watch.

Those at Ames who have the responsibility for developing environmental impact statements will be interested to know of a new reference book available at the Main Library, Building 202. It is: *The Environmental Impact Handbook*, by Robert W. Burchell and David Listokin, published by the Center for Urban Policy Research, Rutgers - The State University, New Brunswick, N. J. You will find it in the Reference Room under call number REF HC110/E5B87.

It covers topics such as EIS content, format, and interpretation; EIS review process, responsibility, and general guidelines and recommended procedures. While not a definitive treatment, it does give guidance in the development and implementation of EIS policy and distills information developed as a result of both federal and state experiences. It gives a listing of the kinds of information required to evaluate the merits of proposals.

NASA SPECIAL PUBLICATIONS

National
Aeronautics and
Space
Administration

The following NASA Special Publications are now on display in the Ames Main Library and the ARA Store. Following your review of these new releases, if you would like a retention copy for your files, return a completed NASA Special Publication Request Form, ARC 303, for each publication you desire to the Main Library, M/S 202-3, and a copy will be mailed to you. Please allow 2 weeks for processing and distribution of your request. Because the number of copies of NASA Special Publications available to the Center is limited, requests will be processed as they are received until the supply is exhausted and distribution will be limited to Ames Research Center employees.

NASA SP-345 ORIGIN AND EVOLUTION OF THE SOLAR SYSTEM
Hannes Alfvén, University of California, San Diego, and Royal Institute of Technology, Stockholm, Sweden; and Gustaf Arrhenius, Scripps Institution of Oceanography, University of California, San Diego

A summary of a comprehensive analysis of the origin and evolution of the solar system is presented. The authors - one a Nobel prize winning physicist and the other a noted chemist - expound their common belief that the compiled events leading to the present structure of the solar system can be understood only through a combined chemical-physical approach. A primary concern is the establishment of general constraints on applicable models. An objective of the authors - to make the physics of their subject understandable to chemists and its chemistry understandable to physicists - is, in the main, achieved. The result is a text useful to researchers and students alike.

NASA SP-410 SATELLITE-DERIVED GLOBAL OCEANIC RAINFALL ATLAS (1973 and 1974)
M. S. V. Rao, W. V. Abbott III, and J. S. Theon, Goddard Space Flight Center

Weekly, monthly, seasonal, and annual rainfall maps for the period December 1972 through February 1975 are presented in this oceanic rainfall atlas. Rainfall data are based on brightness temperatures observed by the Electrically Scanning Microwave Radiometer operating at 19.35 GHz on board the Nimbus-5 satellite. Rainfall patterns in the Pacific, Atlantic, and Indian Oceans are analyzed. A Pacific rainfall pattern associated with the El Niño phenomenon is revealed and an interpretation offered. Contains more than 150 maps and charts; oversize format.

NASA SP-3097 TABLES AND CHARTS OF EQUILIBRIUM THERMODYNAMIC PROPERTIES OF CARBON DIOXIDE FOR TEMPERATURES TO 25,000 K
Charles G. Miller III and Sue E. Wilder, Langley Research Center

Equilibrium thermodynamic properties for pure carbon dioxide are presented in tabular and graphical form for a range of temperature from 100 to 25,000 K and pressures from 40 mN/m² to 1 GN/m². Properties include pressure, temperature, density, enthalpy, speed of sound, entropy, molecular weight ratio, specific heat at constant pressure, specific heat at constant volume, isentropic exponent and species mole fractions.

NASA SP-397 SOLAR-WIND INTERACTION WITH THE PLANETS MERCURY, VENUS, AND MARS
Edited by Norman F. Ness, Goddard Space Flight Center

The proceedings (three volumes) of a bilateral seminar of the US-USSR Joint Working Group on Near-Earth Space, the Moon, and Planets are presented. The seminar was held in Moscow at the Space Research Institute of the Academy of Sciences of the USSR, on November 17-21, 1975.

NASA SP-3096 MOLECULAR PHYSICS OF EQUILIBRIUM GASES: A HANDBOOK FOR ENGINEERS
C. Frederick Hansen, Ames Research Center

An evaluation of equilibrium thermodynamic properties of gases and some applications to engineering problems are described. Although traditionally developed by physical chemists, the basic theory and experimental data are now so complete that engineers should take up the subject and work out the detailed approximations needed for particular applications. The purpose of this book is to provide the engineer with necessary background information.

NASA SP-393 THE STUDY OF COMETS
Edited by: B. Donn and M. Mumma, Goddard Space Flight Center; W. Jackson, Howard University; M. A'Hearn, University of Maryland; R. Harrington, U.S. Naval Observatory

The proceedings of a LAU/COSPAR conference that emphasized the structure and composition of the cometary nucleus and coma are presented. These proceedings complement the 1970 Leningrad meeting at which problems of the motion and orbital evolution of comets as well as the nature of the nucleus were featured. As a result of the discovery of Comet Kohoutek (1973 f) and observations of other recent bright comets - Comet Bennet (1970 II) and Tago-dato-Kosaka (1969 IX) - and a number of either new or improved observational techniques, the conference program was divided into two parts: (1) Observations of Recent Comets and (2) Theory and Interpretation of Cometary Observation. The conference was held at Goddard Space Flight Center, October 27 to November 1, 1974.

Combined Federal Campaign begins next month!

Ames Promotion Plan vacancies

Notice No.	Title	Grade	Org.	Area of Consideration	Closing Date
77-110	Contract Specialist	GS-12/13	ASL	Centerwide	9-30-77 (extended)
77-113	AST Data Systems	GS-12/13	FSV	Centerwide	9-30-77
77-114	Contract Specialist	GS-12/13	ASA	Centerwide	9-30-77
77-115	Printing Specialist	GS-7/9	ATR	Centerwide & Outside	9-30-77
77-116	Secretary (Typing)	GS-4/5	FAE	Centerwide & Outside	9-30-77
77-117	Computer Aid / Technician	GS-4/5	FAX	Centerwide & Outside	9-30-77

TO APPLY: Complete ARC 59 and submit to Mail Stop 241-6.

MERIT PROMOTION PLAN SELECTIONS

Notice No.	Title	Org.	Name
77-80	Aerospace Engineer	FSD	Peter Talbot
77-99	Voucher Examiner	AFG	Cancelled

Jetsetters club

Reno — October 28-30, 1977, cost — \$51.50 double occupancy. Price includes bus trip and 2 nights lodging, plus gambling refund of \$34.00. Bus leaves Ames at 6:00 p.m. on Friday, Oct. 28 and returns at 8:00 p.m., Oct. 30. For reservations contact California Host, 586 N. First St., San Jose, Calif. 95112, telephone (408) 295-7878.

Attn. Stamp collectors

Wanted: Stamp Collectors. With the events that will be commemorated by Ames in the near future, there has been a request by a number of people to establish a Stamp Club at Ames, which would have the backing of the ARA. All interested stamp collectors please submit your name to B. Gibbs, MS200-24 or A. Lopez, MS210-10.

Fastpitch softball

The NASA Ames Fastpitch Softball Team won a championship for the third year in a row. The team placed first in the Sunnyvale League and came in second in San Jose. The team established their best record ever with 20 wins and 6 losses. Pitchers Bob Corbett had a 12-2 record and Jim Myers 8-4. Leading hitters for the team were Larry Gary, 0.408; Mike Green, 0.372, Bruce Ganzler, 0.327; Jim Engard, 0.321; and Jim Myers, 0.313. George Alger led the team with 4 homeruns.

FCC license information

Twelve weekly classes leading to F.C.C. licenses with A.R.R.L. material; PLACE: Foothill College Electronics Museum; DATE: NOVICE-Thursdays, Sept. 22-Dec. 15, GENERAL-Tuesdays, Sept. 20-Dec. 6; TIME: 7-10 p.m.; COST: Study materials only. Call (415) 948-8590, Ext. 381 for information.

Want ads Transportation

1964 Austin Healy 3000 Mk 3. Cherry red, sharp, \$3500/offer. Call (408)356-6849.

1973 VW Thing, 17,000 miles, AM/FM, Mags, like new. Call 257-2207.

1973 Lotus Europa, AM/FM Stereo, 17,000 miles, new paint, \$6950. Call 984-8861.

1971 Datsun for Sale. Good work car, cheap. Call Karla after 5:00 p.m., 296-4577.

FOR SALE: 1968 Plymouth Fury III, 2-dr, vinyl hardtop, AT, PS, air conditioning, very good condition, best offer. Call 967-8240.

1970 Ford Pickup with camper, boat loader, aux. tanks, P/B. P/S. A/C, A/T, new tires and brakes, \$2400. Call 365-0578.

1955 Ford Victoria, 2-dr., HT, AT, V8, good condition. Call 736-3984.

HONDA motorcycles: 1974 CB-550, 5200 actual miles, mint condition; fairing, crash bars, rack, helmet, \$1250. 1970 CL-350, 12,000 miles, excellent condition, rack, helmet, \$450. Call 374-2369.

1970 Firebird Esprit — 350 V8, auto. trans., power steering & brakes, air cond., new radial tires, exc. cond., \$2400/offer. Call 967-7898.

Housing

FOR RENT: Two BR condominium with covered boat slip near Bethel Island. By week, weekend, month, reasonable. Striper fishing, skiing, club facilities with pool. Call (408)356-6849.

Los Altos Duplex — 2 BR, 1 BA, fireplace, private yard, adults. Available about Oct. 15. \$350 per mo. Call 967-3137, 967-1502.

FOR RENT: House in Ponderosa Park area of Sunnyvale, 5 BR, 2½ BA, AEK, \$585. Call 248-4504.

FOR SALE: Beautifully kept 4 BR, 2 BA, 8-yr old, Foothill Estates home in Milpitas. View of hills and valley lights, A-1 condition landscaped yards, covered redwood deck, AEK, sep. dining area, family room with fireplace, 30 min from Ames. \$76,750. Call 263-3321.

For Rent: Beach house at Pajaro Dunes (near Watsonville). Completely furnished, including linens; cleaning included in the rent; beautiful views of Monterey Bay, 100 ft from the beach; tennis courts. Reserve now for Fall. Call John Lundell, 252-7260.

Miscellaneous

For sale: Frigidaire Flair electric stove, double glass door ovens (chest high), rotisserie, cabinets below, 61" high, 40" wide, 25" deep, \$200, 493-9406.

FOR SALE: Air conditioner, 17,000 BTU, Sears, ugly but cool, \$50. Call 257-2207.

E-Z lift trailer hitch — Men's Knapp aerotread shoes 12EE, never worn, \$6.50. — Used inside 32" wide door, \$5. Call 967-8240.

14' Alumacraft with Dilly trailer. 35 hp Evinrude complete rebuilt. Fishing machine, good for duck hunters. Speedy, good for water skiers up to 135 lbs. Center steering, \$850. Call (408)356-6849.

FREE kittens (4), male and female, striped and calico, 8 wks. Call 243-3716.

BEDSPREAD, twin size, quilted, printed with blue and green flowers, little used, \$15. Call 964-1725.

Blankets, twin size, beautiful colors, like new, \$10 each. Call 964-1725.

Boy's ice skate-shoes, size 4, very good condition, \$20. Call 964-1725.

Bikes for Sale: 1-speed 26" mens; 3-speed 26" man; 3-speed 26" ladies; 10-speed 26" Ladies. Call 296-8594.

FOR SALE: NI-CAD Batteries, "AA" size only, new — \$1.00 each. Call 367-1377 eves.

21" Snapper rotary mower with bag, self-propelled, very good condition, 2 years old, \$135. Call 294-5616 eves.

Lumber — 2"x4" to 6"x12", C.I. sewer pipe and fittings 1½" to 4", 2"x6' I Beams, re-bar and mesh. trailer, air compressor, transit and rod, construction tools, Call. 948-5029.

FOR SALE: Student Clarinet, excellent condition. \$95. Call 257-0580.

The Astrogram

Admin. Mgt. Building, Phone 965-5422

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Reporters NASA Employees

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NASA

National Aeronautics and
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Ames Research Center
Moffett Field, California 94035
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